



THE
UNIVERSITY OF
BRITISH
COLUMBIA

ingenuity

Faculty of Applied Science
Engineering News

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On the road to a smoother, safer drive

Saving lives with technology

The research of Dr. Tarek Sayed, Associate Professor in the Department of Civil Engineering, offers some exciting solutions to help reduce traffic congestion, keep drivers safe and even encourage more people to try public transit. So if you are tired of feeling all clogged up with traffic congestion, Dr. Sayed is working on a cure.

"Traffic congestion contributes to the number of accidents, lost lives and lost productivity. It also has negative effects on the environment," says Dr. Sayed. "About 4,000 fatalities and 50,000 injuries occur on our highways each year. There is also the underlying economic effect. The direct cost of lost productivity alone is estimated at \$12 billion a year," he continues. "The Insurance Corporation of British Columbia pays out \$2.2 billion annually in collision claims alone. Something must be done."

Dr. Sayed says that since 1970 the number of vehicles on our roads from coast-to-coast has doubled, yet the number of roads to accommodate growing traffic volumes has remained essentially unchanged. He says there is now growing recognition that we need to rethink the future of road transportation, and building more highway lanes to remedy traffic congestion is no longer automatically viewed as the solution.

"Future highway and transit systems, will utilize advanced information and communication technologies and Intelligent Transportation Systems (ITS) to monitor the performance and impact of traffic flow, transit schedule adherence and even air quality," says Dr. Sayed.



Dr. Tarek Sayed standing in front of a 99 B-Line bus

Together with several consulting firms, Dr. Sayed established an ITS vision and strategic plan for the province of British Columbia. The project, funded by Translink's ITS division, emphasizes the use of advanced technologies, and the implementation of several ITS to help solve provincial, regional and local transportation issues.

Dr. Sayed is working with Translink to optimize the operation of rapid bus service—buses that operate during peak hours and make fewer stops. Using an advanced technology micro-simulation system that mimics traffic flow and bus operation on a computer screen, Dr. Sayed is currently monitoring the Number 99 B-Line that runs between Richmond and Vancouver.

Message

from the Dean

Welcome to the fall 2002 issue of *Ingenuity*. The key components of the Faculty's mission relate to education and research. Many factors contribute to the education component: for example, the quality of our instructors, maintaining up-to-date curricula, developing innovative programs, improving learning approaches, and providing relevant co-op experiences. These all depend upon an adequate level of high-quality classrooms and buildings, and modern equipment for our students.

Likewise, fulfilling the research component of our mission depends on recruiting and retaining world-class faculty members, attracting excellent graduate students, and providing buildings and equipment appropriate for leading-edge research. Thus, sufficient high-quality space is essential to both components of our mission. In this context, I would like to use this message to update you on the Faculty's capital projects. I am delighted to report major progress. The Faculty is currently involved in five projects which have a combined value of close to \$70 million. Here is a brief summary:

Chemical and Biological Engineering Building. A new building for the Department of Chemical and Biological Engineering has been the Faculty's most pressing building requirement for some time — in part because of the need to assure continuing accreditation of the Department's programs. We have assembled a funding package that includes \$7 million from the Province, contributions from the University and the Faculty, and donations. The building's schematic design has been completed, and construction is expected to commence in fall 2003. This is a six-storey, 9,000 square metre building to be located immediately south of the Health Sciences Parkade.

Clean Energy Research Centre. We established this Centre through \$9.5 million from the Canada Foundation for Innovation (CFI), the British Columbia Knowledge Development Fund (BCKDF), and matching donations. The Centre will provide support for more than 20 faculty members, and will be built in conjunction with the new Chemical and Biological Engineering Building.

Electrical and Computer Engineering Building. This is needed to remedy the Department's current space shortfall, and to accommodate significantly increased student enrollments through the Province's *Doubling the Opportunity* initiative. Two recent announcements highlight our progress: On October 18, Premier Gordon Campbell announced major capital funding for UBC in support of *Doubling the Opportunity*, with some \$22 million directed to the new Electrical and Computer Building and to major upgrades to the MacLeod Building. And, on October 23, UBC

announced a remarkable \$4 million gift from the Kaiser Foundation for Higher Education in support of Electrical and Computer Engineering. Details of this gift, which celebrates the achievements of Fred Kaiser, are highlighted on pg. 10-11. The new 7,000 sq. m. building will adjoin the north face of the MacLeod Building. Project development has been fast-tracked, with construction expected to commence in April 2003.



Institute for Computing, Information and Cognitive Systems (ICICS). The Institute has secured \$22 million through CFI, BCKDF, and donations, to build and equip a 5,000 sq. m. research facility. Construction will commence next April. The Departments of Electrical and Computer Engineering and Mechanical Engineering are major participants in ICICS.

Earthquake Engineering Research Facility. This \$2.5 million project, involving CFI, BCKDF and donations, is intended for a new high-head earthquake testing laboratory, complete with telecommunications and conferencing systems for remote monitoring of tests. Construction is now underway, and the facility is expected to be completed by Summer 2003.

The development of new capital projects is a complex process. Steps leading to construction include: project concept and location; assembling the principal elements of a funding package; the facilities program, in which the different types of spaces and their areas are identified; the architect selection process; the schematic design, in which the configuration of the building is developed; the detailed design (right down to the plumbing); and, finally, tendering and confirmation of contracts.

I would like to pay particular tribute to Ron Loewen, our Capital Projects Manager, whose involvement has led to major cost savings for the Faculty and who has enabled us to proceed with these projects at a rapid pace.

But there is one catch! Although we are making excellent progress, we still have a shortfall of some \$2 million overall in the donations component of the funding. To bridge this gap, we need the support and active involvement of our alumni and friends. I would be pleased to present you with naming opportunities for classrooms, laboratories, and other facilities (for donations of \$100,000 or more, which can be pledged over a five-year period). Facilities may be named in memory of a loved one, or as a tribute to one of our distinguished alumni, friends or corporate partners.

Please contact Mona Miller-Tait (see pg. 6 for contact details), or contact me at 604-822-6412, or by e-mail (dean@apsc.ubc.ca) if you would like to discuss any of these projects, or if you can otherwise assist in the Faculty's development, or have other suggestions to offer.

Michael Isaacson

Michael Isaacson

Dean

Dr. Young directs challenging and rewarding program

Engineering Physics bridges science and engineering

Dr. Jeff Young first came to UBC to begin his undergraduate studies in the early 1970s. For the past four years he has been the Director of the Engineering Physics Program where he plays an integral role in developing and overseeing what he proudly says has a reputation for being one of the most challenging, competitive and rewarding programs offered at UBC.

Dr. Young describes the discipline of Engineering Physics as the bridge between science and engineering. It's where scientific discoveries are converted into tools that engineers can use. "This is the essence of contemporary engineering physics. The fundamentals of math and physics don't change. It's all about new and exciting applications," he says.

Students in the program specialize in one of three options: Electrical Engineering, Mechanical Engineering, or Computer Science. The Program comprises nine academic terms, plus one year of technical work experience, where students take time away from school to work for a company.

Students can be placed in small to large high-tech companies, or even research laboratories, in the Lower Mainland, across Canada, and sometimes in

other parts of the world. Companies have included Ballard Power Systems, Microsoft and PMC Sierra.

The Engineering Physics Program encourages team-based-project-learning from the very start, and balances theory with application. An example is the Program's second year Instrument Design Course (Physics 253), developed and run by Dr. Andre Marziali. Students spend the first half of this course learning the basics of instrumentation, and the rest of the time applying this knowledge to the design and construction of autonomous robots. This course is a good example of providing students with practical design experience before having taken all the relevant theoretical material the Program offers.

"In second year, students are also immersed in the study of photonics," Dr. Young adds, "where they learn how light is generated, transported and detected. This builds awareness of contemporary applications of basic physical principles."

By their final year, students are experienced in preparing proposals for open-ended design projects, such as the development of components for wireless or fibre-optic communications systems. Dr. Young says that UBC often receives project ideas from technology-based companies

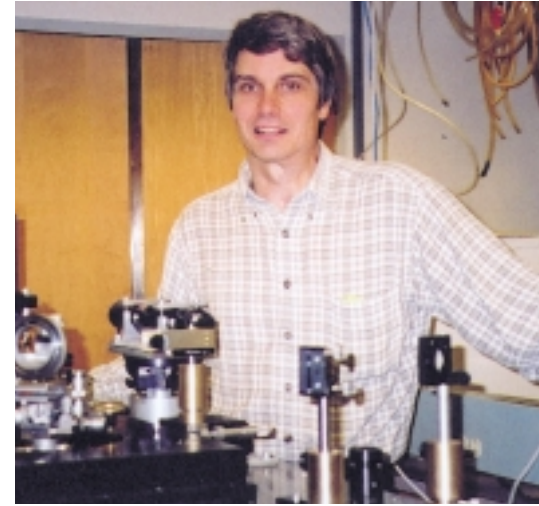
interested in exploratory research support.

"Whether they choose one of these projects or decide to work on a concept of their own, all students are required to carry out the design, fabrication and testing aspects of their project," says Dr. Young. "A key focus for me as Program Director is to ensure our graduates hit the job market prepared. When students leave here, they're job ready."

UBC's Engineering Physics program is well-recognized, and many graduates work for companies located throughout North America. Enrollment has been steadily increasing, which is due in no small part to Dr. Young's efforts to encourage and recruit high school and college students. Both he and an Engineering Physics co-op coordinator visit schools and give presentations on what the Program offers.

And Dr. Young's recruiting efforts are working. "When I entered this UBC program as a student in the early 1970s there were five people in my graduating class. This year we accepted 57 students into the Program."

"Engineering Physics typically attracts students who would like broader work options once they graduate. This breadth derives from the expertise they acquire



Dr. Young standing behind an Optical Cryostat, used to study the properties of devices being developed for fibre optic communications

both through learning advanced concepts in mathematics *and* physics, and applying them in the world of mechanical, electrical, and computer engineering," Dr. Young adds.

When asked how the time commitments of being Program Director have effected him, he says, "I have less time to experiment in my lab." When *Ingenuity* jokingly asked if it was a bit like having less time to play in the sandbox, the glint in his eyes suggested that perhaps it was time spent in the sandbox years ago that first inspired Dr. Young's interest in design and application.

Software tool makes better paper

UBC engineers and industry produce a
theoretically sound solution to a practical problem

At one time or another while trying to print an important document we've all experienced the annoying "paper jam," and have been quick to blame it on the often-innocent printer. Well, Electrical and Computer Engineering Professor Guy Dumont and PhD graduate Greg Stewart say it's often not the printer's fault, but the uneven caliper (thickness) of the paper that causes the jam. As a result of a collaborative project between UBC's Pulp and Paper Centre and Honeywell Industry Solutions (formerly Honeywell-Measurex), the new IntelliMap version 3 software tool enables industrial paper machines to produce higher quality paper.



Brian D. McMillan

From left: Electrical and Computer Engineering Professor Guy Dumont and Dr. Greg Stewart received NSERC Synergy Award for Innovation

An industrial paper machine is a huge complex system. It's about one city block long and 11 metres wide. Pulp goes in one end and paper comes out the other, with many steps in between. The sheet weight, moisture content and caliper are constantly monitored and controlled. The physics of these processes are quite varied and include heat transfer, thermal expansion, drying dynamics, fluid flow and beam bending.

"There was a problem to be solved with the stability of the control system, resulting in paper waste," Dr. Stewart says. "In 1997 I took this on as my PhD thesis project. Resolving the problem required a significant amount of effort on the theoretical side prior to jumping into the design. The first stage was to decipher why the Cross Directional controller (CD) loses stability and what factors influence its performance. The CD controller adjusts the paper thickness to ensure that it's smooth and even in texture. Better quality paper means fewer, or no, printer paper jams."

IntelliMap version 3 is a software tool that contains CD controller tuning functionality. When the finished dried paper emerges at the end of the machine, a scanner sensor sends a signal about every 30 seconds to the front of the machine so it can adjust up to 300 Cross Directional actuators that span across the width of the paper machine, and tunes the computer controller to produce quality paper without the risk of waste.

In accordance with the terms of an NSERC Industrial Postgraduate Scholarship, Dr. Stewart worked on a research project that included academic and industrial components, and spent 20 per cent of his time at Honeywell Industry Solutions, the collaborating company. "My academic supervisor was Dr. Guy Dumont, from UBC's Electrical and Computer Engineering Department and Pulp and Paper Centre. My industrial supervisor was Dr. Dimitry Gorinesky at Honeywell Industry Solutions," Dr. Stewart advised.

"We have had successful collaboration with Honeywell-Measurex for nearly 15 years," Dr. Dumont said. This latest success is a perfect example of how advanced theory developed in academia can be used to solve an industrial problem of high relevance to industry. Dr. Stewart's PhD thesis provides a definitive explanation of actuator picketing as well as an elegant and industrially relevant solution to a costly problem. It's extremely gratifying to see the results of a PhD thesis being used commercially to give a competitive edge to a local company with a global reach."

The project recently won an NSERC Synergy Award for

NSERC's role is to make investments in people, discovery and innovation for the benefit of all Canadians by supporting more than 9,000 students in advanced studies. It funds more than 8,700 researchers every year, and encourages Canadian companies to invest in university research. In 2002-2003, NSERC will invest \$678 million in university-based research and training in all the natural sciences and engineering.

Innovation research prize for UBC. "This is the second NSERC Synergy bestowed upon my research group in the last three years," says Dr. Dumont. "Indeed, in 1999, my collaboration with Richmond-based Universal Dynamics, the development of the adaptive controller Brain Wave received such recognition. To me, these two awards indicate that our success is not serendipitous."

As a result of his PhD thesis project, Dr. Stewart was given a full-time research and development position at Honeywell Industry Solutions, and has been appointed Adjunct Professor of UBC's Electrical and Computer Engineering Department.

Three graduate students are currently working on

their thesis projects in collaboration with UBC and Honeywell. Academic supervision is provided by Dr. Dumont and Dr. Michael Davies, and industrial supervision is now in the capable hands of Dr. Stewart.

IntelliMap version 3 has been marketed by Honeywell Industry Solutions and is installed in mills throughout Asia, Canada, Europe, South America and the USA. It's been selling at a rate of about 10 orders a month, worldwide.

"To work on an industrial problem as a student was not always easy," says Dr. Stewart, "but to now be at the stage where our design is being used by papermakers is an immensely rewarding experience."

On the road...

Continued from page 1

To enhance the travel time and reliability of rapid bus service, most lighted intersections will soon be equipped with a location-based transit signal priority system. Sensors near the intersections, along the rapid-bus corridor will detect a B-Line bus approaching. If the bus is behind schedule, it will automatically extend the green phase or truncate the red phase of the intersection light to ensure the bus stays on time.

Dr. Sayed's research also extends to traffic safety. He says human error is cited as contributing to 90 per cent of traffic accidents but

that this should not mislead one to think that there is no road engineering solution to the traffic safety problem.

Engineers now know that effectively-designed roads, and vehicles, can significantly reduce the potential for human error.

"We are moving into new concepts of highway design. Our plan is to influence the behavior of all road users, not just drivers, but pedestrians, cyclists, and, transit operators and users," Sayed says. "I'm in favor of designing 'forgiving and caring' highways," says Sayed. He calls this new highway design concept "context sensitive design" and many research components of this new

concept are underway at UBC. The safety analysis models and methods developed have been widely recognized and have been used by agencies such as the U.S. Federal Highway Administration, U.S. State Farm Insurance, and the American Automobile Association—Michigan, among others.

Dr. Sayed says we have the potential to reduce traffic congestion and average commute times by up to 50 per cent. "We have the technical tools to improve traffic flow without adding additional lanes, or building new highways," says Dr. Sayed. "The application of these technologies

is expected to completely change the way transportation systems are designed, built, operated and maintained."

With the potential of the 2010 winter Olympics on the horizon, Dr. Sayed's research is already on the road to helping save lives.

The British Columbia Ministry of Transportation is using his research to evaluate potential improvements to the Sea to Sky Highway.

What is in a name?

Because of the Faculty’s various capital projects that are now underway (see the Dean’s Message on pg. 2), we are in a unique position to present naming opportunities for classrooms, laboratories, atriums, and lounges. What does this mean to UBC and its alumni and friends?

The opportunity to acknowledge and celebrate the success of distinguished graduates and close friends of the Faculty, and at the same time, benefit from the associated funding, advances the Faculty in many ways. We want to encourage engineering students to become leaders in their communities. Providing visible examples of those who have achieved success in their careers in engineering, and are continuing to enhance the profession through the support of UBC engineering, is one means of doing so. Once students understand the relationship between the donor and UBC engineering, they may be inspired to consider the possibilities of their own careers. The names contribute to the culture of the institution.

The “cost of naming” is significantly less than the cost of the associated construction, yet when an individual or corporation commits to funding such an initiative, the Faculty

is furthered in its ability to properly fund large projects. Other naming opportunities are associated with endowed Chairs and Professorships, and Funds in support of student initiatives.

Please send any feedback you might have with respect to “Naming at UBC Faculty of Applied Science” to Mona Miller-Tait, Manager of Development. Email: mona.miller-tait@ubc.ca; mail: 2006-2324 Main Mall, Vancouver, V6T 1Z4.



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"/> Geological Engineering	<input type="radio"/> Mining Engineering	<input type="radio"/> Minor in Commerce
<input type="radio"/> Computer Engineering	<input type="radio"/> Integrated Engineering	<input type="radio"/> Co-operative Education Program	<input type="radio"/> Minor in Information Technology
<input type="radio"/> Electrical 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

Applied Science receives more than \$1 million for new Chair

Metal extraction industry supports growing area of research

The Faculty of Applied Science is pleased to announce the establishment of an endowed **Chair in Hydrometallurgy Research**, made possible by more than \$1 million in funding from the metal extraction industry and equivalent matching funds from The University of British Columbia.

The Faculty of Applied Science acknowledges the following sponsors of the Chair in Hydrometallurgy Research: AMEC Simons, Barrick Gold, BHP Billiton,

Cognis, Cytec, Falconbridge Limited, Fluor Daniel, Hatch Associates, Hudson Bay Mining & Smelting, INCO Ltd., Natural Resources Canada, Placer Dome, Praxair, Rio Tinto and Teck Cominco.

Hydrometallurgy, which involves the use of various water-based processing techniques, is emerging as the dominant technology for the extraction of metals from ores. This industry is tremendously important to the economy of B.C. and

to Canada. New developments in hydrometallurgy promise to improve the efficiency by which low-grade ores are treated, and to allow treatment of complex ores and raw materials for metal recovery. They should also produce significantly less pollution compared to conventional processing methods.

The appointed Chair holder, Dr. David Dreisinger has considerable expertise in hydrometallurgy research and teaching. He has been at UBC since 1984 and joined the Faculty in 1988. Dr. Dreisinger's interests span the fields of mineral leaching, solution purification involving technologies such as solvent extraction and ion exchange,

and metal recovery using methods such as electrowinning and electrorefining. He has received a number of significant awards for work at UBC, including the Sherritt Hydrometallurgy Award, offered by the Canadian Institute of Mining and Metallurgy.

He will contribute to furthering the Department's reputation as a world centre of excellence and activity in hydrometallurgy. Dr. Dreisinger is actively assisted in the Chair program by Dr. David Dixon (currently Junior Chair in Hydrometallurgy) and Dr. Akram Alfantazi (active in hydrometallurgical research).



Above: Metals and Materials Engineering Professor David Dreisinger

Below: Hydrometallurgy staff and graduate students working with the international sponsorship of the Hydrometallurgy Research Chair at UBC



Alumni update

Engineering reunions continue as year comes to a close

2002—Another year has almost passed, but not without wonderful opportunities to meet UBC engineering graduates at the many reunions and receptions hosted throughout the year. These events have not only allowed us to meet and update you on current activities at UBC, and within the Faculty of Applied Science, but also to receive your feedback and advice for the future of engineering at your alma mater. We are happy to share highlights of some of these events.

Once again, we offer our assistance to help plan and organize your reunion. We would love to hear from you.

ECE alumni with Faculty
Development Officer Danae
Slater (standing)



Kathryn Myles



Kathryn Myles

Calgary Alumni and Friends Reception— Thursday, May 23

On May 23, Dean Isaacson hosted our annual reception for Calgary engineering alumni and friends at the Calgary Petroleum Club. Mr. Norm Webster (CIVL'72, MENG'75), President of Read Jones Christoffersen Ltd., delivered an informative slide presentation and talked about the importance of, and approaches to, industry connections to the University.



Dean Michael Isaacson thanks Mr. Norm Webster, and presents him with a UBC sweatshirt.

ECE salmon barbeque—Thursday, August 29

ECE alumni who graduated between 1960 and 1990 enjoyed their third annual salmon barbeque at the University Centre (formerly The Faculty Club). The sunny afternoon provided an ideal setting to socialize on the patio, before sitting down to a delicious barbecued salmon dinner while speeches were delivered by Dean Isaacson; Dr. Mabo Ito, Acting Department Head; Ms. Winnie Lai-Fong (BASC'88, MASC'91) and Mr. Dan Bowditch (ECE'71).

In his speech, Mr. Bowditch highlighted how ECE engineering had an impact on his life and career and he listed some of the memorable events during his time on campus. He thanked faculty who were responsible for seeing him through those formative years.

In closing Mr. Bowditch read, "I know that UBC has a world-class ECE Department and I encourage you to give something back, whether it be a donation, making research opportunities possible, volunteering your time on advisory councils, or mentoring students and offering them summer jobs or co-op placements. The ECE graduates of the future are our future and the ECE research and innovation are our hope—for a strong economy and for relief of a stressed planet with its increasing population and diminishing natural resources."

ECE alumni and faculty
with Development Manager
Mona Miller-Tait



Ron Sly

BASC Class of 1952—50th Reunion Highlights

October 4 to 5 was UBC Alumni Reunion weekend. This year is special for our **BASC Class of 1952**, and guests were treated to a special weekend. The events kicked off with a lunch, hosted by Dean Isaacson at Cecil Green Park on October 4. The lunch was attended by about 80 alumni and guests. Some alumni had not been back to our campus since graduation and were thrilled to see old friends, and to share some memorable moments from their university days. Alumni also had the opportunity to meet current faculty and staff, and to receive an update on our activities.

Saturday, October 5 started off with a pancake breakfast at Cecil Green Park hosted by the UBC Alumni Association. The morning included live music and a warm welcome by UBC President Martha Piper.

Engineers enjoy a pancake breakfast



Chris Petty



Class of 1952 at luncheon hosted by Dean Isaacson on Friday, October 4

Alumni return to the Civil and Mechanical Engineering Building for a reception. Dr. Dale Cherchas, Associate Dean, Research and External welcomes guests. Following the reception, APSC faculty and staff took guests to see some engineering exhibits and on a tour of some of UBC's engineering buildings.



Chris Petty

List of more 2002 reunions

Class	Date of Function	Details
BASC 32-38	Wednesday, June 5	Lunch at UBC's Cecil Green Park, hosted by Dean Isaacson
BASC'62	Monday, October 7	Reception at UBC's Cecil Green Park, hosted by Dean Isaacson
BASC'72	Wednesday, October 9	Reception at UBC's Cecil Green Park, hosted by Dean Isaacson
CIVL'52	Friday and Saturday, October 4-5	Happy hour at classmate Doug Lambert's residence and dinner at UBC's Cecil Green Park
ELEC'72	Friday and Saturday, June 7-8	Reception at a classmate's residence and dinner at the Delta Vancouver Airport Hotel, Richmond, B.C.
MECH'52	Friday, October 4 and Sunday, October 6	Brunch, and dinner at the Best Western Abercorn Inn, Richmond, B.C.
MECH'57	Saturday, September 7	Eastern reunion with cocktails and dinner at Bob Blackburn's residence in Ottawa
MECH'57	Friday, September 27	Tour of the UBC Engineering facilities and dinner at the Best Western Abercorn Inn, Richmond B.C.

Highlights and other event details will be posted on our faculty website at www.apsc.ubc.ca/alumni. In the meantime, if you have comments, suggestions, or if you would like to get involved, please contact our Alumni Relations Officer May Cordeiro by phone (604) 822-9454, fax (604) 822-7006 or by e-mail at mcordeiro@apsc.ubc.ca

“Powering” the Future of Engineering at UBC

The Kaiser Foundation for Higher Education
Funds a Tribute in Honour of Fred Kaiser

To celebrate the accomplishments of Fred Kaiser, founder of Alpha Technologies and Chairman of Alpha Technologies Inc., who has built one of the largest power engineering and manufacturing companies worldwide, the Kaiser Foundation for Higher Education has donated \$4 million to the Faculty of Applied Science, towards the construction of a new building for Electrical and Computer Engineering, with the interest of naming it in Mr. Kaiser’s honour.



UBC President Martha Piper thanks Mr. Fred Kaiser at a lunch in appreciation of the Foundation’s commitment to the University

Speaking with Dr. Martha Piper, President of UBC, about his philanthropic goals, which inspired him to establish the Foundation just five years ago, Mr. Kaiser emphasized the importance of closing the technology gap, and of the education of youth, who represent the leaders of tomorrow.

Dr. Piper responded that the Kaiser Foundation is “powering” the future of engineering at UBC through this gift and lauded the Trustees for their commitment. “I particularly want to thank Lynda Hogarth, Trustee of the Foundation, for having the vision, the courage and the ambition to make this contribution, and generating the support of all Trustees and decision makers.”

“Fred Kaiser created the Foundation to support higher education. Since this gift will have a significant and lasting impact on engineering education at UBC, we see it as a personal way to help the University and honour Fred at the same time,” said Lynda Hogarth. “As many of the members of Alpha Technologies’ senior management are

UBC alumni, we have close relations with the professors, and as we also need to continue to hire more great students from UBC, the decision to donate to UBC was an easy one.”

John C. Lee (BASc ‘83), Vice President, General Manager and Board Member of Alpha Technologies Ltd., commented on the importance of honouring Mr. Kaiser. “Fred is an entrepreneurial visionary. With his experience in engineering and business, his financial support, guidance and entrepreneurial insight, he has not only built Alpha, but also helped many people launch their own successful businesses. As a result, his contributions to B.C. industry have been substantial.”

The gift from the Kaiser Foundation and funding from the Provincial Government of B.C. will enable the Faculty of Applied Science to construct a state-of-the-art building for Electrical and Computer Engineering. The building will be equipped with modern laboratories and equipment that are required for this rapidly changing field of study,

and will also provide for the growing enrollment in this area. Commenting on the impact of this gift, Dr. Michael Isaacson, Dean, Faculty of Applied Science, said, "As a result of this remarkable gift, the quality of our student's education will be significantly enhanced; and our researchers will also benefit from an improved research environment."

As an active participant on the Faculty's Advisory Council, Mr. Kaiser provides

guidance to the Faculty on its directions in engineering education and research. "We are truly inspired to do great things because of Fred's expressed confidence in us," reflected Dean Isaacson. The Faculty of Applied Science is honoured to further its association with Mr. Kaiser and Alpha Technologies through this tribute.

From left: Mr. Fred Kaiser, Dr. Silvia Dragomir-Ene, Ms. Lynda Hogarth, Dr. Martha Piper and Dr. Michael Isaacson



Biography: Fred Kaiser

Founder & Chairman/CEO,
Alpha Technologies Inc.

Fred Kaiser graduated in 1965 with a Degree in Electrical Engineering from the Ohm Technical University in Nuremberg, Germany. He later completed numerous technical and management courses at BCIT, and also received a Diploma in Marketing Management from the University of British Columbia in 1977.

As founder and current Chairman/CEO of Alpha Technologies, the industry's leading power technology company, Mr. Kaiser has built a global enterprise focused on providing the most advanced, most cost-effective power solutions available. These power systems provide critical power protection and emergency backup power to networks providing advanced voice, video and data services. The company has multiple initiatives, which diversify it from its main focus in telecommunications into areas of alternate energy, and co-generation for home and industrial applications. These growth areas will fill a critical role in society and business at large.

Today, Alpha Technologies employs more than 2,000 people, holds dozens of power technology patents and operates from nearly 700,000 square feet of manufacturing space spanning five continents. The company recently celebrated its 25th year in business, which was marked by the shipment of its millionth broadband power system.

Mr. Kaiser is a member of the World Economic Forum, an international organization committed to improving the state of the world, and is a former member of the Vancouver Board of Trade.

In addition to his professional success and accomplishments, Mr. Kaiser is a passionate aviation enthusiast, fully certified as an Airline Transport Pilot in airplanes, and holds advanced ratings for gliders and helicopters. He is also an avid skier, golfer, tennis player and distance runner.

Latest Canada Research Chair additions to the Faculty

Nature to help improve human implants,
while signal processing improves wireless communications

The Canada Research Chair Program is designed to build Canada's research capacity through federally-funded research positions that help to retain and recruit top researchers. The Program's goal is to attract and retain some of the world's most accomplished and promising researchers, in all fields.

The government has invested \$900 million to support the establishment of 2,000 Canadian Research Chair positions at universities across Canada by 2005.

Of the 2,000, 156 UBC Chairs will be named. The title of Chair is granted to scientists and scholars who are at the forefront of their disciplines. At this time, UBC has about 60 faculty members designated — 10 are within the Faculty of Applied Science.

Below: Electrical and Computer Engineering
Professor Vikram Krishnamurthy



Martin Dee

Above: Metals and Materials Engineering
Assistant Professor Rizhi Wang

Dr. Vikram Krishnamurthy

All the way from the University of Melbourne in Australia, Professor Vikram Krishnamurthy is a new UBC faculty member in the Electrical and Computer Engineering Department. He has also been awarded a Canada Research Chair in Statistical Signal Processing.

Dr. Krishnamurthy's research in statistical signal processing will lead to improved wireless telecommunication systems— everything from better reception in cellular phones to the development of high quality mobile hand-held devices for web-browsing and e-commerce.

But this is just the surface of Dr. Krishnamurthy's research. Research in statistical signal processing has new and exciting applications in the design and analysis of defense networks, neuro-biology and robot navigation systems.

Dr. Rizhi Wang

Currently, most implants made for the body are produced out of titanium, with a polymer cement or ceramic coating that may disintegrate, causing the implant to loosen in the body.

Dr. Wang's research focus is to strengthen the

interface between an implant and the bone surrounding it, with a goal to encourage tissues to regenerate. In his search to find more bone-friendly materials, Dr. Wang has studied the shells of pearl oysters, the teeth of horses, cows and even alligators to examine their surface.

He calls his field of research "bio-inspired materials design and processing" because he isn't trying to duplicate materials found in nature, he is looking for good examples of natural design interfaces that he can incorporate into the design of materials processed in the lab—like plastic, polymer and titanium.

Dr. Roger Reed

Professor of Metals and Materials Engineering Dr. Roger Reed has been appointed a Canada Research Chair in High Temperature Materials. Dr. Reed came to UBC in January from the University of Cambridge. His area of expertise is in the physical metallurgy of metals and alloys, including their structure and constitution, mechanical behaviour and processing, and the relationship between these. He has applied his expertise principally to nickel-based superalloys, but has also done work on steels.

Engineers steal the show with royal gesture

Queen Elizabeth made honorary engineer

UBC engineering students have a reputation for making news, but this time they made news in royal fashion.

Queen Elizabeth visited UBC on October 7 as part of her Golden Jubilee tour through Canada and amongst the thousands of people lined up, in some places 10-people-deep, there was a streak of red that obviously caught her eye.

The Queen stopped to chat with a couple of UBC engineering students, who presented her with an honorary engineering cardigan custom-scribed on the sleeve.

For news media, this became one of the focal-points of The Queen's visit to our campus, and the next morning fourth-year

Mechanical Engineering student Charlotte Dunford and third-year student Joel Atwater appeared on the front page of *The Province*, *The Vancouver Sun* and *The National Post*. The two students were also interviewed by Global News.

Our engineering students are a traditional bunch, and what would a visit to the University by a dignitary be without an engineering souvenir to take home? In the past, cardigans have been presented to Boris Yeltsin during his visit to the University in 1993, and Prince Charles in 1980.

Engineering students waiting for the royal moment to present The Queen with special cardigan



Michelle Cook



Gerry Kahrnmann/Vancouver Sun

Discovery by Design

New book chronicles Mechanical Engineering history

The notion to produce a history book on the Faculty of Applied Science's Department of Mechanical Engineering started with a technician, Doug Yuen, who inadvertently came across a stack of archival material in the Department.

"We ended up with an idea to publish a book on the origins and history of the Department of Mechanical Engineering," says Associate Dean, Dale Cherchas, who initiated the project while

he was Acting Head of the Department. "I'm very pleased because we have a book that's a historical record of the Department that also celebrates the Faculty, and it's all quite timely, as it was produced at the beginning of the new century and millennium."

Discovery by Design spans 94 years (1907–2001), and begins with an account of how the Department developed. It highlights the Department's challenges

and many accomplishments throughout the years. "The book is a keepsake for faculty and staff, and particularly engineering graduates, as it even includes a list of graduates, in order of graduation year – to 2001," adds Dr. Cherchas.

UBC faculty, staff and alumni celebrated the official book launch on April 24, at a reception hosted by the Dean of Applied Science, Dr. Michael Isaacson, and Ronsdale Press.



The author of the book, Dr. Eric Damer, completed his masters and doctoral degrees in educational studies at UBC.

Books are available at the UBC Bookstore, or through the Publisher's website — Ronsdale Press at www.ronsdalepress.com.

Students engineer a grateful smile from a special young man

New basketball game overcomes handicap



Elliott Brito immersed in a game of basketball

Earlier this year, a list of potential projects was distributed to UBC engineering students and while there was no mention of “looking for angels or elves,” a couple of fully-qualified candidates responded, by deciding to design and build a special toy for a special boy.

Ten-year-old Elliott Brito, is unable to stand on his own, or sit for any length of time. But, physical limitations aside, he’s a child like any other who wants to play with toys and games.

Recent Mechanical Engineering grads, Sandy

Mak and Danny Kuan designed a basketball-type game with three Velcro-placed moveable hoops. The concept of the game was to pull a lever and try to get the ball into one of the hoops. Once Elliott mastered the game, the hoops could be moved around to make it more challenging.

“It was a great concept, but once the students had Elliott try the game, I had two discouraged students come to my office. Elliott’s muscles weren’t strong enough to enable him to pull the lever,” said Dr. Don McAdam, Senior

Instructor of Mechanical Engineering. “We fixed the problem by turning the pull lever into one you push, and Elliott was then able to play the game.”

“Not only is it a game that he can play and enjoy; but it’s a game he can play on an equal footing with his friends, who also find the game entertaining,” said Elliott’s mother, who originally approached UBC with this special challenge.

Dr. McAdam says that other engineering students are busy designing and building two more games for Elliott to play.

First IT Minor graduates

Three students receive their degrees

“Computer literacy is not optional for applied science professionals anymore,” says Dr. Luis Linares, Information Technology Minor Coordinator.

In Spring 2002, the first three students to complete the Information Technology Minor received their degrees. The IT Minor was conceived and promoted by Dean Michael Isaacson as a way to provide engineering graduates of non-IT disciplines with a solid understanding of computer systems technology that would allow them to cooperate actively with computer professionals in the solution of real engineering problems.

“An IT Minor provides engineers with a professional advantage,” says Dr. Linares. “They will be able to ask the appropriate questions, to follow and understand the process of solution, and to ensure that the desired end results are achieved.”



From left: Chun Yee Pang; Sunny Ngai Chan; Dr. Michael Isaacson, Faculty of Applied Science Dean; Afshin Mehin; and Dr. Luis Linares, IT Minor Coordinator

Appointments

Applied Science

- **Ms Annette Berndt** was appointed Instructor in the Technical Communication Centre on September 1. She brings a strong background in English language and rhetoric to the position. In addition to teaching APSC 201, she gives workshops and assists students in engineering courses with their writing and oral presentation skills.

Chemical & Biological Engineering

- **Dr. Elod Gyenge** was appointed Assistant Professor on April 15. His research expertise is in the field of electrochemical engineering, electrocatalysis and interfacial phenomena with emphasis on electrochemical power sources, inorganic and organic electrosynthesis.

Civil Engineering

- **Dr. Pierre Berubé** was appointed Assistant Professor on September 1. His position is associated with the Integrated Engineering program. He specializes in membrane and advanced oxidation technologies for water and wastewater treatment.
- **Dr. Bernard Laval** was appointed Assistant Professor on June 1. Dr. Laval's expertise is in environmental fluid mechanics, physical limnology, coastal oceanography, transport processes, hydrodynamic stability, and mixing.
- **Dr. Susan Nesbit** was appointed Instructor on March 1. She brings with her a strong background in adult education methods and technologies, and expertise in the application of sustainability principles within engineering practice and colloid behaviour and surface science within the pulp and paper recycling process.
- **Dr. Robert Sexsmith**, Professor, was appointed Acting Department Head on July 1, for a one-year term, while the Faculty conducts a search to fill the position vacated by Dr. Alan Russell.

- **Dr. Sheryl Staub-French** was appointed Assistant Professor on March 1. She is Coordinator of the Engineering Management specialization of the Master of Engineering Program, and teaches and performs research in construction engineering and management. Her research focus is on feature-based cost estimating, design for constructability, and product and process modeling.

Electrical & Computer Engineering

- **Dr. Mabo Ito**, Professor, was appointed Acting Department Head on July 1, for a one-year term, while the Faculty conducts a search to fill the position vacated by Dr. Michael Davies.
- **Dr. Juri Jatskevich** was appointed Assistant Professor on August 1. Dr. Jatskevich's research interests include numerical efficiency of simulation and algorithms for automated modeling and analysis of switched electrical systems using multi-computer networks.
- **Dr. Vikram Krishnamurthy** was appointed Professor on July 1, with a Canada Research Chair in Signal Processing. His research aims to develop new algorithms for improved performance of mobile wireless telecommunication systems and defense sensor systems.
- **Dr. John Madden** was appointed Assistant Professor on September 1. His research interests include nanostructured materials (conducting polymers and carbon nanotubes) and their application in electronic components, artificial muscle, sensors and medical devices.
- **Dr. Shahriar Mirabbasi** was appointed Assistant Professor on August 1. His research interests include analog and mixed-signal integrated circuits and systems design, with an emphasis on high-speed data communication and signal processing applications.
- **Dr. Panos Nasiopoulos** was appointed Associate Professor on July 1, and the first holder of the Endowed Midnet Professorship, established by Midnet. The Professorship

is intended to further develop a network environment to provide a secure platform for universal media accessibility. Dr. Nasiopoulos has been an Adjunct Professor with the Department since 1995 and Director of the Master of Software Systems program since 1999.

- **Dr. Robert Schober** was appointed Assistant Professor on May 1. His research interests are in the area of wireless communication. Current research topics include space-time processing, space-time coding, multiuser detection, noncoherent receivers, equalization, interference suppression, coded modulation, iterative processing, and adaptive algorithms.
- **Dr. Vincent Wong** was appointed Assistant Professor on July 1. His research interests include resource allocation and mobility management in wireless cellular networks, wireless personal area networks, and wireless mobile ad hoc networks.
- **Dr. Joseph Yan** was appointed Assistant Professor on September 1. Dr. Yan's research focus is in the field of micromechatronics and he is particularly interested in biomedical applications and biomimetic robotics.

Geological Engineering

- **Dr. Roger Beckie**, Associate Professor of Earth and Ocean Sciences in the Faculty of Science, was appointed Director of the interdisciplinary Geological Engineering program on July 1, assuming administration of the program and replacing former Program Director Dr. Oldrich Hungr.

Mechanical Engineering

- **Dr. Dale Cherchas** replaced Dr. Guy Dumont as Associate Dean Research and External on August 9. In his new role, Dr. Cherchas has many responsibilities, including liaising with government and industry visitors, overseeing graduate programs and international

activities, and assisting all departments and schools with research initiatives.

- **Dr. Olivera Kesler** was appointed Assistant Professor on July 1. Her expertise is in fuel cells and fuel cell systems, residual stresses, engineering design, mechanics of solid materials, graded and multi-layered materials, and metallic foams and catalyst substrates.
 - **Dr. Walter Mérida** was appointed Assistant Professor on July 1. His current research interests include sustainable energy systems, fuel cell and hydrogen technologies, and fuel generation from biomass.
- ## Metals & Materials Engineering
- **Dr. Matthias Miltzer** was appointed Acting Director of the Advanced Materials and Process Engineering Laboratory on January 1, following the retirement of former Centre Director Dr. Alec Mitchell.
 - **Dr. Chad Sinclair** was appointed Assistant Professor on July 1. His research is focused on the structure/property relationships in novel engineering materials. In particular he is interested in the mechanical properties and microstructural stability of fine-scale multiphase metals (e.g. multilayers) and the mechanical anisotropy of metals, particularly stainless steel.

Mining Engineering

- **Dr. Marek Pawlik** was appointed Assistant Professor on July 1. His expertise is in the surface/colloid chemistry of mineral processing, suspension rheology, environmental chemistry, polymer and surfactant chemistry.
- **Dr. Mario Morin** was appointed Assistant Professor on July 1. He specializes in the area of systems analysis and design for the development of integrated, intelligent computer applications for the simulation, optimization, design, planning and scheduling of underground hardrock mines.

Achievements

- Civil Engineering Professor **Alan Russell** was honoured with the 2002 Walter Shanly Award by the Canadian Society for Civil Engineering in recognition of his outstanding contributions to the development and practice of construction engineering in Canada.
- Civil Engineering Associate Professor **Helmut Prion** earned two distinctive honours: he was named Associate Chairholder of the NSERC Chair in Design Engineering; and he was awarded a Killam Teaching Prize in recognition of his teaching innovation and performance.
- Civil Engineering Professor and Acting Department Head **Robert Sexsmith** was honoured with the Association of Professional Engineers and Geoscientists of British Columbia's 2002 Meritorious Achievement Award in recognition of distinctive and outstanding achievements in his field and his dedication to the profession and the community.
- Electrical and Computer Engineering Professor **Guy Dumont** has been awarded his second NSERC Synergy Award, this time for his collaboration with Honeywell Industry Solutions.
- Electrical and Computer Engineering Professor **Vikram Krishnamurthy** was awarded a Tier I Canada Research Chair, as well as a Fellowship from the B.C. Advanced Systems Institute. The Fellowships are presented annually to selected new faculty members to encourage knowledge transfer from B.C. universities to the B.C. technology industry.
- Electrical and Computer Engineering Professor **Peter Lawrence** earned two distinctive honours: he was named Chairholder of the NSERC Chair in Design Engineering, and when he was chosen as the inaugural recipient of the Association of Professional Engineers and Geoscientists of British Columbia's 2002 Teaching Award in Engineering and Geoscience.
- Engineering Physics Professor and Program Director **Jeff Young** received the Science Council of British Columbia's 2002 New Frontiers in Research Award in recognition of his outstanding research contributions to the field of optics, microelectronics and the study of planar photonic crystals.
- Mechanical Engineering Professor **Yusef Altintas** has earned three distinctive honours. He was awarded the Association of Professional Engineers and Geoscientists of British Columbia's 2002 Meritorious Achievement Award in recognition of distinctive and outstanding achievements in his field; he was appointed Chairholder of the NSERC/Pratt & Whitney Chair in Manufacturing; and the Electro-Mechanical Engineering Program which he created, and has won the Alfred Scow Award in recognition of the positive impact it has had on student life and development at UBC.
- Mechanical Engineering Professor **Clarence de Silva** was honoured with the Lifetime Achievement Award from the World Automation Congress in recognition of his outstanding contributions to the field of intelligent automation.
- Mechanical Engineering Professor and Clean Energy Research Centre Director **Robert Evans** earned two distinct honours: he was named Fellow of the Canadian Academy of Engineering, and also Fellow of the Society of Automotive Engineers International.
- Mechanical Engineering Emeritus Professor **Philip Hill**, also of Westport Inc., has received the Science Council of British Columbia's 2002 Industrial Innovator Award in recognition of his innovative, practical and commercially successful research on the application of natural gas in heavy-duty diesel engines.
- Mechanical Engineering Professor and Department Head **Nimal Rajapakse** was elected Fellow of the Canadian Academy of Engineering in recognition of his outstanding engineering achievements and leadership.
- Metals and Materials Engineering Professor **Roger Reed** was awarded a Tier I Canada Research Chair in High Temperature Materials.
- Metals and Materials Engineering Professor and UBC Vice President Research **Indira Samaraskera** has been inducted as an Officer of the Order of Canada in recognition of her profound impact on academia and industry in Canada and worldwide.
- Metals and Materials Engineering Assistant Professor **Rizhi Wang** was awarded a Tier II Canada Research Chair in Biomaterials.



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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

