



THE  
UNIVERSITY OF  
BRITISH  
COLUMBIA

# ingenuity

Faculty of Applied Science  
Engineering News

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## Improving medical diagnostics

### Research steers the way with advanced technology

Imagine being in the hospital, worried that you have cancer. Your doctor needs to take a biopsy with a 15cm needle. Frightened by the prospect of cancer, as well as the intimidatingly long needle, you anticipate the prick. Now, imagine your continued distress as he tells you he's missed the suspicious region, and he'll need to reinsert the needle.

Professors Robert Rohling and Tim Salcudean, together with graduate students Richelle Ebrahimi and Stephen Okazawa, are developing a better needle, a "steerable" one that will not miss its target and will save patients the stress and pain of multiple insertions.

In medicine, needles are generally used for two purposes: removing tissue for biopsy or injecting drugs. Many such procedures require precision in both the needle and the operator to ensure hitting the target, and avoiding non-targets, such as large blood vessels and bony structures. UBC has been at the forefront of discovery in this area with Professor Salcudean studying the modeling, simulation and planning of needle motion in soft tissues for several years. Steering the tip of the needle, rather than the base, or steering both, has clear advantages.

The prototype steerable needle looks like a stainless-steel barbecue lighter, with a 15cm hypodermic needle. Unique to this needle, embedded in its barrel is a second, flexible rod with a curved tip. This rod can be extended and steered by the thumb-operated joystick on the handle, allowing doctors greater accuracy.

The inventors envision that with an ultrasound device in one hand and the steerable needle in the other, a doctor will see an image of the target and the desired path on a computer screen. With the steerable needle, straight-line paths and intentionally curved paths are both possible. Once inserted, the needle can be steered accurately toward the target.

What's next in this high-tech world of biomedical engineering?

"We look at these types of applications and think ahead to even more advanced systems where we have computer-aided control," said Rohling. "This first iteration has a joystick and the control is in the operator's hand. The second may have the computer handle the joystick, monitor the needle's progress and provide corrections. Eventually, a robotics system may push the needle and steer the tip."

Since beginning his faculty appointment in 2001, Rohling has been working to improve medical diagnostics—especially in the area of ultrasound imaging. Ultrasound is a procedure in which high-frequency sound waves—vibrations that can pass through soft tissue—are used to create a visual image.



Professors Robert Rohling (left) and Tim Salcudean with ultrasound device and steerable needle.

Continued on page 5

# Message

## from the Dean



Welcome to the Spring 2004 issue of *Ingenuity*. Since last I wrote, there have been a number of exciting activities taking place in the Faculty, all designed ultimately to enhance the quality of the education that we provide to our students. From new facilities to collaborative programs to student-driven projects, I'm sure you will find the news compelling.

A modern physical infrastructure, ranging from new buildings to laboratory upgrades to outstanding teaching facilities, is essential to ensuring that we provide the very best education possible. Indeed, our Undergraduate Student Advisory Council (see p.15) has identified this need as a high priority. In this context, in February we were delighted to host the groundbreaking ceremony celebrating the start of construction on the new Chemical and Biological Engineering Building and the Clean Energy Research Centre. The building has been a long time in coming, and we've overcome many obstacles. At the event, former Department Head Paul Watkinson expressed his delight at the start of construction, and recalled the various attempts to proceed with the building—going back to the early 1980's! It was only through the tremendous energy, creative work and a truly collaborative effort involving many stakeholders that we have been able to reach this point (see p. 5). In the meantime, construction of the Fred Kaiser Building, which will accommodate an expansion of the Department of Electrical and Computer Engineering, along with a number of other Faculty functions, is continuing rapidly, and we anticipate occupancy in January 2005.

We are continuing to enhance the quality of the educational experience of our BAsC students in many other ways. Current initiatives include a major expansion of our broad-based admissions program, collaborations with other post-secondary institutions, enhanced instructional support, and an emphasis on student-driven projects and activities.

We are refining our broad-based admissions program to expand this pool of candidates to up to 15% of the total. This program is designed to include well-rounded applicants whose GPA average may be slightly lower than those of others, but whose candidacy takes account of additional factors such as work experience and hobbies related to engineering, extra-curricular competitions, volunteer efforts and demonstrated leadership. We believe that modifying our student intake in this way will ultimately bring great benefits to all.

Our collaborations with other post-secondary institutions continue. The new Environmental Engineering program—run jointly with the University of Northern British Columbia—now has students in both first and second years at UNBC, and the first class is expected to arrive at UBC in September 2004. We were pleased to host these students in February and introduce them to our programs and activities. As well, we are collaborating with the University College of the Cariboo (UCC) in the development of a second-year program at UCC to enable students to transfer directly into our third-year Electrical and Computer Engineering programs. The first students will enter this program in Kamloops in September 2004, and will transfer to the third-year program at UBC in September 2005 (see p. 12).

We are also expanding the Centre for Instructional Support (CIS) that provides our faculty members with training, consultation and support in all aspects of instructional design, learning technology and multimedia development. The CIS is playing an increasingly important role assisting with curriculum re-development and the integration of technology to enhance the student experience.

Finally, we instituted the Professional Activities Fee for our students about two years ago and are now seeing its many benefits. The fund supports student membership in our professional engineering association (see p.13), as well as many student-driven projects and initiatives, such as field-trips, conference participation, inter-university engineering competitions, student space enhancements—including the Civil Engineering Design Studio (see p.3) and clubs such as Engineers without Borders.

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

A handwritten signature in black ink that reads "Michael Isaacson". The signature is written in a cursive style and is positioned above a thin horizontal line.

**Michael Isaacson**  
Dean

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

# Patient leader to guide Civil Engineering

## Eric Hall brings fortitude to the helm

If patience is a virtue, then Professor Eric Hall has the makings of a virtuous man. He considers patience his greatest strength in facing the challenges he foresees in stewarding the Department of Civil Engineering (CIVL) through his five-year appointment as head.

“I’m a patient person,” he said. “I’m not frustrated if things don’t happen quickly. I’m focused and persistent. And as long as I can see small steps in achieving the department’s goals, I will remain persistent.”

That’s fortunate, because CIVL is pursuing several long-term initiatives in curriculum and facility improvements that will require his patience.

First on Hall’s plate is the grand opening of the Earthquake Engineering Research Facility slated for 2004. It has been a 20-year dream in the making for the earthquake engineering team. The building is complete, but before opening, researchers must finish installing the earthquake simulator, or “shake-table.” The massive table, which can rock a 100-ton structure, will allow researchers to develop advanced methods and technologies to reduce seismic risk, making UBC the pre-eminent earthquake research group in Canada.

Student initiatives are also a priority for Civil

Engineering. The department is revamping its curriculum to include more team-based learning, which requires students to construct models in groups. Unfortunately, CIVL is lacking adequate design studios for collaborations. The plan is to refurbish the old earthquake facility to create space for team projects.

Balancing these long-term initiatives may seem daunting to some, but Hall credits his success thus far to those around him—namely Professors Robert Sexsmith and Alan Russell, CIVL’s two most recent department heads. They have worked closely with Dean Isaacson to provide a collegial work environment and excellent facilities. He also praises the department’s administrative staff for helping him balance the challenges of teaching, research and administration.

In addition to overseeing new initiatives and facilities for the department, Hall is challenged with maintaining CIVL’s outstanding reputation. “The department is very well respected across Canada and internationally, and we’ve established that reputation through multiple generations of outstanding faculty,” said Hall.

When asked how he feels about his new role as department head, Hall replied, “At first I didn’t think it was a career move



Civil Engineering Department Head Eric Hall, appointed July 1, 2003.

I was interested in; I thought I wanted to further my passions for teaching and research.”

“I’m lucky that I haven’t had to entirely forego my original passions and now I have the opportunity to delve into administration. I’m quite happy to be in this job for five years, and then I’ll be happy to go back

to being a professor like the rest of my colleagues, focusing on teaching and research.”

Combine patience with a willingness to share credit and a passion for one’s work, and you have the elements of a successful leader; you also have a description of Civil Engineering’s new Department Head Eric Hall.

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“The department is very well respected across Canada and internationally, and we’ve established that reputation through multiple generations of outstanding faculty,” said Hall.

# Research pioneers

## Two new faculty receive CRC awards

Advancing the frontiers of knowledge is all in a day's work for Professors Jimmy Feng and David Wilkinson. Each newly appointed member of the Department of Chemical and Biological Engineering has been awarded a prestigious Canadian Research Chair (CRC).

CRC's are part of Canada's strategy to make it one of the world's top five countries in research and development. In 2000, the government allocated \$900 million to establish 2,000 such chairs in universities across Canada. The Faculty of Applied Science is proud to add Professors Feng and Wilkinson to its growing list of CRC recipients that also includes: Professors Grace, Haynes, Krishnamurthy, G. Lawrence, Oxland, Reed, Rogak, T. Salcudean, Schober and Wang.

### For better safety equipment...

What comes to mind when you think of fluid behaviour—water running through a pipe? Certainly, but consider a fluid more complex than water, such as whipped cream or hair gel. These complex fluids display a wide array of properties and erratic behaviour, which are affected by their molecular structure, as well as the material through which they flow.

This complicated interaction of chemical and mechanical properties fascinates Professor Jimmy Feng, whose joint appointment with the Department of Mathematics began in January 2004. His research focuses on the study of complex fluids and understanding their flow behaviour. His knowledge of their unique properties allows him to design and produce materials with exceptional properties.

"Complex fluids behave in funny ways that are often counter-intuitive," said Professor Feng. "Yet by understanding their quirks and harnessing the underlying science, we can make wonderful things."

One such material is the KEVLAR® fibre. With strength comparable to steel, yet one-fifth its weight, KEVLAR® is ideal for use in safety equipment and high-performance sporting goods such as bulletproof vests and skis. In consumer products, KEVLAR® may not seem to be a fluid, but the molecular orientation of the fibre is produced while it is a liquid-crystalline polymer—a complex fluid.

Professor Jimmy Feng studies complex fluid behaviour by computer modeling.



### Clearing the air...

Carbon dioxide has long been known to deplete the earth's ozone layer, adversely affect air quality and contribute to global warming. It is primarily generated by the direct combustion of fossil fuels. In order to ensure that we have clean air to breathe, and that Canada meets its commitment to the Kyoto Protocol, developing and commercializing clean energy systems, specifically a viable alternative to the combustion of fossil fuels, is imperative.

Professor David Wilkinson studies ways of improving clean energy systems—making them simpler, less expensive, more efficient and more accessible. Specifically, he focuses on electrochemical power sources and processes to create sustainable energy.

The fuel cell is the primary energy conversion device in most clean energy pathways, producing electricity and water as its only byproducts. His research focuses on closing fuel cell technology gaps that exist today, providing a basis for future generations of fuel cell technology and simplifying energy pathways. Fuel cells are being considered for many applications, including the electronics and transportation sectors.

"There is a lot of good science and engineering to be done in fuel cell research," said Professor Wilkinson. "These findings will lead to other exciting discoveries and innovations in clean energy research as well."

Professor David Wilkinson (left) is congratulated by Associate Dean Savvas Hatzikiriakos.



# Construction starts after 20-year wait

## Faculty gets new building

After planning in the works since the early 1980's, groundbreaking ceremonies were held in February to celebrate the start of construction on the new Chemical and Biological Engineering (CHBE) Building, which will also house the Clean Energy Research Centre (CERC).

"This building has been a long time coming," said Dean Michael Isaacson. "We've overcome many obstacles en route and persevered through many iterations."

Located on the south side of the Health Sciences Parkade, between East Mall and Health Sciences Mall, the 123,000 square foot building will include two contiguous components—a replacement facility for the Department of Chemical and Biological Engineering, whose activities are currently dispersed across several

locations on campus, and a new facility for CERC, an interdisciplinary research group with representatives from the Departments of CHBE, Mechanical Engineering and Materials Engineering.

Dean Isaacson highlighted the critical need for the new building. "Engineering is at the core of enhancing B.C.'s economic well-being and quality of life, whereas the province's degree production rate in engineering has been very low."

"Through education, training, research and technology transfer, the Department of Chemical and Biological Engineering is making sustained and significant contributions to key sectors of the economy, and these need to be fostered," said Dean Isaacson. "Also, the Clean Energy Research Centre is leading UBC in the important area



From left: CERC Director Bob Evans; CHBE Professor Paul Watkinson; Dean Michael Isaacson; UBC Vice President Academic and Provost Barry McBride; CHBE Professor and Department Head Kevin Smith; and UBC alumnus and donor Stewart Blusson lift the first ceremonial shovels.

of clean energy research."

Dean Isaacson identified the many sources of financial support for the project—from governments, the private sector, and the university—and expressed gratitude to the supporters and participants in the project to date.

"A project of this magnitude can only come to fruition through the collaboration and dedication of a large and complex team," said Isaacson. "We're

very grateful to all our donors, contributors and stakeholders."

Other speakers at the groundbreaking ceremony included UBC Vice President Academic and Provost Barry McBride; CHBE Professor and former Head Paul Watkinson; CHBE Professor and Department Head Kevin Smith; and CERC Director Bob Evans.

The proposed completion date for the new building is October 2005.

## Improving medical diagnostics... [Continued from page 1](#)

Using a state-of-the-art ultrasound machine, Rohling has developed technology to produce three-dimensional (3D) images. Superior to the standard two-dimensional images, 3D images show depth and provide great detail—even a developing fetus' toenails.

Although it produces superior images, 3D ultrasound is often limited because its subject must be perfectly still in order to

make a clear image—sometimes this requires a patient to hold her breath for up to 20 seconds. With this limitation in mind, Rohling, together with Professor Peter Lawrence and graduate student Giselle Flaccavento, is currently developing a system with a special camera that will allow for slight movement and still produce an accurate image.

"Ultrasound is the fastest growing medical

imaging technique, mainly because of new applications such as these," said Rohling. "These advancements can have a great impact on patient care."

Holding a joint appointment with the Departments of Mechanical Engineering and Electrical and Computer Engineering, Rohling synthesizes the principles from each to improve medical diagnostics and delivery. He credits the ability to under-

take ambitious projects by forming collaborations with the medical industry and fellow researchers, especially Professors Lawrence and Salcudean. The end result is a multi-disciplinary, collaborative research program improving techniques for medical diagnosis with the potential to save lives.

# Reflections & projections

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

Name:

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Address for tax receipt:

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- I would like to make a tax-deductible donation of \$ \_\_\_\_\_, which will be directed to the *Faculty of Applied Science Endowment Fund for Student Support*. (Please make cheque payable to "The University of British Columbia.")
- I would like my gift to be directed to a specific department or program. (please specify)

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- I would like my gift to remain anonymous.

Please return to:

### 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](mailto:development@apsc.ubc.ca)

Web: [www.apsc.ubc.ca/development](http://www.apsc.ubc.ca/development)

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As the academic year draws to a close, I am pleased to report that Dean Isaacson's leadership has guided us through another successful year of fundraising. One of the biggest events the Faculty celebrated was the \$240 million in-kind contribution from the PACE Partners in November. We are also pleased to announce a multi-million dollar, in-kind contribution from Nortel Networks (more details to follow in the fall issue of *Ingenuity*). As well, greatly appreciated are the Eric P. Newell Leadership Award for third- or fourth-year undergraduate engineers, donated by alumnus Eric Newell (BASc 1967), and the NorskeCanada Grants Program for the Pulp and Paper Centre, fostering

advanced research and development in pulp and paper engineering (see p.7).

We have had a number of other important donations from such partners as the Canadian Society for Chemical Engineering, Honeywell, Methanex Corporation and Weyerhaeuser Company. I would like to express our sincere appreciation for the vital support of all our donors, corporate and individual. Each and every gift promotes engineering education and research, and creates an environment for engineering excellence.

Our biggest priority remains funding the new, much-needed Chemical and Biological Engineering Building, which will also house the Clean Energy Research Centre. Should



you want to find out more about this or other development projects, please contact me by phone at 604-822-1329 or email at [hillary.gosselin@ubc.ca](mailto:hillary.gosselin@ubc.ca). I hope you will join us in making this year of fundraising as successful as the last.

**Hillary Gosselin**  
Acting Manager of Development

## Alumnus supports leadership

Eric Newell celebrates retirement by fostering students

Eric Newell (BASc'67), former Chair and CEO of Syncrude Canada and an Officer of the Order of Canada, has recently endowed a generous award for third- or fourth-year undergraduate engineering students. The \$100,000 endowed Eric P. Newell Leadership Award will provide \$5,000 annually in awards to students who excel both academically and in community leadership—two endeavors highly valued by Newell.

Recently retired, Newell has been active throughout his life in community leadership. His activism began back in 1967 when he served as president of the Engineering Undergraduate Society at UBC. He has been awarded numerous honorary degrees for his leadership and business acumen, including Doctor of Laws from UBC. He is also a member of the UBC Sigma Tau Chi honorary fraternity.

"This new award will not only help students with the

cost of their education, but will also encourage them to be active in student leadership and in the community," said Dean Isaacson. "Gaining skills beyond engineering will help make them successful in their careers and as leaders in their communities."

On behalf of the students of the Faculty of Applied Science, we extend our deepest gratitude to Eric Newell for establishing this award.

# NorskeCanada announces grants program

## Pulp and Paper Centre to benefit

NorskeCanada, British Columbia's largest producer of paper products, recently established an innovative grants program with the Pulp and Paper Centre to foster advanced research and development in pulp and paper engineering. Each year the director of the centre will chair a committee to review and select research projects to receive the \$60,000 grant. It will fund a multi-year project advancing papermaking and engineering technologies specific to processing B.C. coastal fibre into high-value paper products. Additionally, NorskeCanada has agreed

to provide matching in-kind gifts of equipment to the centre to support the research.

"All faculty associated with the Pulp and Paper Centre will be eligible for grants, no matter what field they are researching," said Centre Director, Professor Richard Kerekes, adding that he hopes the program will not only provide excellent research support for students and faculty, but will also assist the centre in leveraging funding from other sources such as the Natural Sciences and Engineering Research Council.

"We recognize that new knowledge and technology advancements in papermaking help us, and the B.C. industry, hold our advantage in a very competitive global marketplace," said NorskeCanada President and CEO Russell J. Horner. "In addition, our relationship with UBC is longstanding with many graduates among our employees, and we're proud to contribute in a way that will undoubtedly attract excellent students and researchers to this university and its research partners."

The recipient of the 2003



Russell Horner (left) examines the cross section of a pulp screen basket used in PhD candidate Satya Mokamati's study of best quality paper production.

grant was Professor Peter Englezos, whose research focuses on papermaking chemistry and technology. He intends to use the funds to support a research initiative involving the optimization of additives for high-value paper products.

## Construction begins despite shortfall

### We still need your help

You've read the exciting news on p.5 about the long-awaited start of construction on the Chemical and Biological Engineering Building. The new facility will allow for consolidation of the Department of Chemical and Biological Engineering and will also house the Clean Energy Research Centre, adding exceptional, state-of-the-art laboratory and classroom facilities to the Faculty's resources.

Unfortunately, there is another side to the story. Although construction has begun, the project still has

a notable budget shortfall. If you are at all able to contribute to the success of Chemical and Biological Engineering or the Clean Energy Research Centre through a donation, please contact our development office by phone at 604-822-8335 or email at [development@apsc.ubc.ca](mailto:development@apsc.ubc.ca). Many visible, tax-deductible naming opportunities currently exist including the atrium, classrooms, project rooms and laboratories, as well as opportunities to support teaching and research.

Both the department and the centre are dedicated

to benefiting society and future engineers by their research and teaching activities. Each helps to make sustained and significant contributions to key sectors of the economy and the environment.

The 123,000 square foot building will be located on the south side of the Health Sciences Parkade, between East Mall and Health Sciences Mall. The building is scheduled for completion in the fall of 2005.

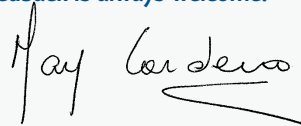
Sketch of the new Chemical and Biological Engineering Building.



# Alumni update

2003 was yet another exciting and rewarding year organizing and attending alumni reunions. Thank you to all the class volunteers for your time and support in helping make these gatherings memorable events for your classmates. If you would like to be involved in organizing your class reunion or would like to participate in other alumni activities, please contact me by phone at 604-822-9454 or by email at [mcordeiro@apsc.ubc.ca](mailto:mcordeiro@apsc.ubc.ca).

The OLC Network™ (on-line community) was developed by the alumni affairs office of the University of Victoria in 1998, and customized in 2000 for use by UBC students and alumni. To register, please visit <http://www.olcnetwork.net/ubc/>. We hope you are pleasantly surprised by the great resources available here. Feedback is always welcome!



May Cordeiro  
Alumni Relations Officer

## 2003 Reunion Highlights



### MECH'68 — 35th Reunion— September 11-13, 2003

Left: Mechanical Engineering Class of 1968 alumni celebrate their 35th reunion with a pub night and dinner at Green College on campus.

### BASc'83 — 20th Reunion — September 11-13, 2003

The Class of 1983 celebrated its 20th reunion with a variety of activities, including a grads-only get together at Cecil Green, a movie night (old department movies from Film fEUSt competition) at the McLeod building and a family picnic at Spanish Banks. Thanks to Jack Gin, John Lee and Bill Richardson for all their help. And thanks to John Lee, MECH'83, for supplying these three photos and captions.



Never far from the beer, Civilllllll, CIVL'83.



Older, not necessarily wiser, MECH'83.



Once a cone, always a cone, EECE '83.

## EECE'53—50th Reunion— September 19 and 20, 2003

The Electrical Engineering Class of 1953 celebrated its milestone 50th reunion at a lunch at Cecil Green Park on Friday, September 19 and a dinner at Seasons in the Park on Saturday, September 20.



Some of the vibrant alumni from EECE'53. From left: Clark Shearer, Murray Fraser, Ted Berger, Bill Mausser, Dick Haywood, Rich Milne and John Drinnan.

## CIVL'49—Luncheon—October 23, 2003

Classmates from the Civil Engineering Class of 1949 and their wives enjoyed the annual reunion at a lunch at the Uplands Golf Club in Victoria on Thursday, October 23. Thanks to Ray Cunliffe and Hub Baker for their efforts to make this a memorable reunion for their classmates.



Back, from left: Hub Baker, Les Edgeworth, Bob Smith, Knute Soros, Bob Bagnall, Jim Rowledge, Stan Oakes, Stu Hamilton, Frank Mehling. Front, from left: Sandy Robertson, Mary Oakes, Elsie Hamilton, Maisie Mehling and Ray Cunliffe.

## MECH'94— 10th Reunion— September 27, 2003

MECH'94 celebrated its 10th anniversary on Saturday, September 27 with a family picnic at Spanish Banks followed by a barbecue outside the Cheez Factory. Thanks to Dean Olund for his help in making the reunion a fun event.



MECH'94 grads and their guests enjoy a BBQ outside the Cheez Factory.



Future engineers! MECH'94 offspring at the family picnic.

# Upcoming events for 2004

Below is a list of upcoming 2004 reunions. All class events will be held in Vancouver. Detailed information will be mailed in the coming months. If you would like to get involved or have any questions, please contact me by phone at 604-822-9454 or by email at [mcordeiro@apsc.ubc.ca](mailto:mcordeiro@apsc.ubc.ca). Please check our website for details on these and other events. We update the site daily as new information comes to light: <http://www.apsc.ubc.ca/alumni/reunions>.

CLASS	DATE	EVENTS
<b>BASC'54</b>	Oct 1-2	Luncheon, breakfast, reception & tour
<b>BASC'64</b>	Oct 3	Reception
<b>BASC'74</b>	Oct 7	Reception
<b>CHML'64</b>	Jun 26	Luncheon, tour
<b>CHML'69</b>	TBA	TBA
<b>CIVL'64</b>	TBA	TBA
<b>CIVL'84</b>	TBA	TBA

CLASS	DATE	EVENTS
<b>EECE'54</b>	TBA	TBA
<b>EECE'60-90</b>	Aug 19	BBQ
<b>EECE'69</b>	Oct 1-2	Tour & dinner
<b>GEOE'54</b>	TBA	TBA
<b>MECH'54</b>	TBA	TBA
<b>MECH'64</b>	July 24	Luncheon, tour & dinner
<b>MECH'74</b>	TBA	TBA
<b>MECH'84</b>	Apr 24-25	Pub night, tour & dinner

### Regional alumni events:

Washington breakfast—May 6; Calgary reception—June 3; California reception—Oct 14; Toronto reception—Nov 18

# Educational velocity comes to UBC!

## Record-breaking contribution from PACE gives students top hardware and software

In November 2003, the Faculty of Applied Science had the privilege of hosting the Partners for the Advancement of Collaborative Engineering Education (PACE) to celebrate the largest ever in-kind contribution to UBC. PACE—made up of a corporate alliance between General Motors, EDS, Sun Microsystems and UGS PLM Solutions—contributed hardware, software and training commercially valued at \$240 million to the Faculty.

UBC held a day-long celebration for this important contribution beginning with a public announcement, which included statements by Michael Grimaldi, President of GM Canada, Stéphane Boisvert, President

of Sun Microsystems Canada, John Dowd, President of EDS Canada, Phil Taylor, President of UGS PLM Solutions Canada and Hulas King, Director of Global Strategic Partnerships, UGS PLM Solutions. B.C. Minister of Advanced Education Shirley Bond, UBC President Martha Piper and Dean of Applied Science Michael Isaacson also spoke.

Anand Dayal, a fourth-year Mechanical Engineering student and captain of the Formula UBC team, represented the students in expressing gratitude. "Not only does the software enable us to ensure the quality of our projects and designs, it allows us to better understand mechanical design, all of which will lead to our becoming better engineers," said Dayal, adding that the software was invaluable to his team's work on the formula car.

After a luncheon at Norman MacKenzie House, President Piper's residence on campus, the executives were taken on a tour of the PACE laboratories and other Department of Mechanical Engineering facilities. The visit included Professor Martin Davy's undergraduate class in progress in the PACE laboratory, and continued on to presentations at the laboratories of Professors Yusuf Altintas and Mohamed Gadala.

The day concluded with a student reception where the PACE executives had a chance to talk with students and visit displays assembled by student teams.

"I am extremely proud, as Dean, to be able to bring this to the Faculty," said Dean Isaacson. "The PACE educational contribution, combined with our innovative curriculum, will ensure successful graduates who are in demand by engineering companies across North America."

UBC is one of 26 institutions PACE has contributed to world-wide. To date, PACE has contributed over two billion dollars in in-kind donations to post-secondary education.

The contribution to UBC is comprised of computer hardware—55 new workstations to form a student laboratory—and software licenses and training for Unigraphics and MSC.ADAMS engineering design software. These programs are used by engineering companies all over the world.

**"The PACE educational contribution, combined with our innovative curriculum, will ensure successful graduates who are in demand by engineering companies across North America," said Dean Michael Isaacson.**



From left: Corporate Presidents John Dowd, EDS Canada; Michael Grimaldi, GM Canada; Stéphane Boisvert, Sun Microsystems Canada and Phil Taylor, UGS PLM Solutions Canada listen to the PACE public announcement.



“Not only does the software enable us to ensure the quality of our projects and designs, it allows us to better understand mechanical design, all of which will lead to our becoming better engineers,” said Anand Dayal, fourth-year Mechanical Engineering student.

Mechanical Engineering student, Anand Dayal, speaks at the PACE announcement. From left: Honourable Shirley Bond, Minister of Advanced Education, B.C., President Piper and Dean Isaacson listen attentively to Dayal.

The hardware portion of the PACE contribution is presently housed in four laboratories at UBC, and will be used primarily for undergraduate teaching and graduate research. Students will now be able to draw, design, animate and analyze mechanical designs of everything from cars to buildings to airplanes. Training and experience with Unigraphics and MSC.ADAMS will give graduates the design skills that are in demand in industry no matter where they want to work, and a competitive edge when they begin to search for positions in industry.

The PACE contribution represents much more than computer equipment—through this new hardware and software, UBC has joined an elite group of institutions who are able to offer students both an excellent theoretical education as well as practical experience and skills needed in industry. PACE has made a contribution not only to our facilities, but to the careers and success of our students and to industry in Canada, which will greatly benefit from the skills and talents of UBC graduates.



The PACE core team received thank you gifts from UBC's Dean Isaacson and President Piper (centre). The PACE team includes from left: Michael Grimaldi, President, GM Canada; Stéphane Boisvert, President, Sun Microsystems Canada; Hal Ryckman, Executive Vice-President, Western Region, EDS Canada; and Hulas King, Director of Global Strategic Partnerships, UGS PLM Solutions.



PACE core team member Hulas King (right) visits with students in the PACE computer laboratory located in the Rusty Hut.



From left: Phil Taylor discusses design for car rear suspension with graduate students Sebastian Griffin and David Kline in Professor Gadala's Finite Element and Design Optimization laboratory.

# Faculty to welcome third-year EECE students

## New partnership with UCC helps Double the Opportunity

For the first time, third-year transfer students will be accepted into the Faculty's Electrical and Computer Engineering (EECE) programs beginning fall 2005. Thanks to a new collaboration with University College of the Cariboo (UCC), incoming students will be able to complete their first two years in Kamloops and then transfer to UBC to finish their undergraduate degrees in electrical or computer engineering. This new program helps UBC meet the provincial government's Doubling the Opportunity (DTO) initiative.

DTO began in 2001, when the B.C. government promised to double the number of electrical and computer engineers and computer scientists educated in the province, thereby increasing skilled labour in the high-technology sector. As a result, UBC was given the mandate and funding to double the capacity of these particular engineering programs.

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**“We view this as a unique opportunity to provide access to students from the Interior,” said EECE Head Vijay Bhargava. “It is also an opportunity for faculty at each school to collaborate and share knowledge.”**

The Faculty has long recognized the value of transfer programs with regional post-secondary institutions. Since 1981, students have been taking advantage of the first-year engineering program offered by eight colleges and university colleges, including UCC, for university transfer.

“Transfer programs benefit both schools and students,” said Bruce Dunwoody, Associate Dean of Engineering Programs at UBC. “We are able to increase our diversity by attracting students from the Interior, and we’re also able to accept additional students—those who may not have had the grades or maturity to matriculate a year earlier.”

As a result of current collaborations, this fall UCC will launch a second-year Electrical and Computer Engineering Program equivalent to UBC's.

“We have been promoting our ECE year-two initiative in high schools, colleges and university colleges,” said Ben Giudici,



From left: Chair Henry Reiser, UCC Electronics; Assoc. Dean Bruce Dunwoody, APSC; P.Eng. Jeff Holm, RD Lewis & Associates Engineering; Dean Don Noakes, UCC Advanced Technology and Mathematics; Assoc. VP Academic Colin James, UCC; P.Eng. Trevor Watson, Watson Engineering; VP Academic and Student Services Neil Russell, UCC; Engineering Transfer Program Coordinator Ben Giudici, UCC; Dean Michael Isaacson, APSC; Head Vijay Bhargava, EECE.

Engineering Transfer Program Coordinator at UCC. “Our goal is to attract not only some of our own first-year engineering students, but also those who may have completed first-year engineering elsewhere.”

“Many of our faculty members are working in consultation with faculty in UBC's Departments of Mathematics, Electrical and Computer Engineering, and Computer Science as well as Applied Science's writing centre (Technical Communication Centre) to ensure timely development and articulation of UCC course materials,” said Giudici. “In addition we are

renovating and equipping our facilities for the laboratory and design components of the program.”

“We view this as a unique opportunity to provide access to students from the Interior of B.C. and to integrate them into the Electrical and Computer Engineering Department at UBC,” said Vijay Bhargava, EECE Department Head. “It is also an opportunity for faculty at each school to collaborate and share knowledge.”

UCC is the only B.C. post-secondary institution outside the lower mainland and Vancouver Island to offer a second-year engineering program.

# Partnership for professionalism

## APEGBC and Faculty team for common goals

**professional** n. a highly skilled and experienced person (*The Canadian Oxford Dictionary*, 2001)

The term “professional” is an honour—an honour of distinction reserved for those working at the highest levels in their fields. It implies an advanced level of workmanship, dedication, integrity and ethical responsibility.

The Association of Professional Engineers and Geoscientists of British Columbia (APEGBC) provincially regulates and governs the work of professional engineers or P.Engs. APEGBC sets and maintains high academic, experience and professional practice standards.

To be registered as a P.Eng., one must meet a number of rigorous requirements: provide acceptable university academic qualifications; demonstrate a minimum of four years engineering experience; complete a law and ethics seminar; and pass the professional practice examination.

The Faculty of Applied Science is deeply woven into APEGBC’s network—83% of the engineering faculty are P.Eng. certified. Faculty serve in a variety of roles on APEGBC committees, including sitting on their examination

board and advising on academic requirements.

Additionally, Dean Michael Isaacson plays an important role in liaising with the organization. He meets with APEGBC Council once a year to provide an update of UBC Engineering and he (or his designate) attends their annual general meeting. Likewise, the Faculty’s Engineering Advisory Council includes the Executive Director of APEGBC on its board, helping to keep our curriculum relevant to industry’s and society’s changing needs.

In turn, APEGBC is involved with the Faculty at many levels. Guest lectures by P.Engs. benefit both students and faculty by providing their perspectives on current practice. The partnership of APEGBC and the Faculty ensures that undergraduates are introduced to the concept of professionalism at an early stage in their studies.

The two organizations have been focusing on increasing the interactions between students and practicing professionals through the Member Advantage Program for Students, or APEG-MAPS. Students actively support this partnership through a portion of their Professional Activities Fee—arrangements have been made to

ensure that all 2,600 engineering students have APEG-MAPS memberships.

In collaboration with the Engineering Undergraduate Society (EUS), APEGBC hosted a series of industry nights during the fall of 2003. Over the course of four evenings, the event brought together over 400 engineering students and 60 industry professionals, giving them the opportunity to network and informally discuss the future of the profession.

“It was interesting and helpful to learn from professional engineers,”

said Angela Ho, EUS Professional Relations Officer. “In talking with them I became aware of the skills currently needed in industry and the career opportunities available to me.”

“We are proud of our strong and mutually beneficial partnership with APEGBC and the professional engineering community,” said Dean Michael Isaacson, P.Eng. “UBC Engineering, the province and society benefit enormously from APEGBC’s valuable contributions to the profession.”



Ralph Sultan, P.Eng., speaks with EUS Treasurer Melissa Wong and EUS 2nd Vice President Ryan Rowe, both Mechanical Engineering students, at Engineering Week’s Old Red New Red event 2003.

# Recruiting the best and the brightest

## Faculty creates new position

Attracting the best and the brightest undergraduates helps ensure that students will thrive with like-minded cohorts and the Faculty will graduate successful engineers. To attract the best applicants and better serve its international students, the Faculty has created the new position of Recruitment Officer/International Student Coordinator.

Until last fall, Engineering Student Services (ESS) consisted of three staff members responsible for all undergraduate academic matters, including advising and coordinating course scheduling for over 2,600 engineering students. Ruth Kwok, a member of the ESS team since 1994, applied for the new recruit-

ing position and was the successful candidate. Under the leadership of Associate Dean of Engineering Programs Bruce Dunwoody, the office now consists of Director Mary Murphy, Recruitment Officer Ruth Kwok, and Student Advisors Susanne Milner and Rob Bacon.

Ruth's role is especially demanding at this time. While she is overseeing Rob's training in her former position, she is also responsible for Faculty recruiting at the high-school level and represents UBC in international recruiting. Both recruiting efforts require extensive work in event planning, marketing and travel.

As International Student Coordinator, Ruth balances

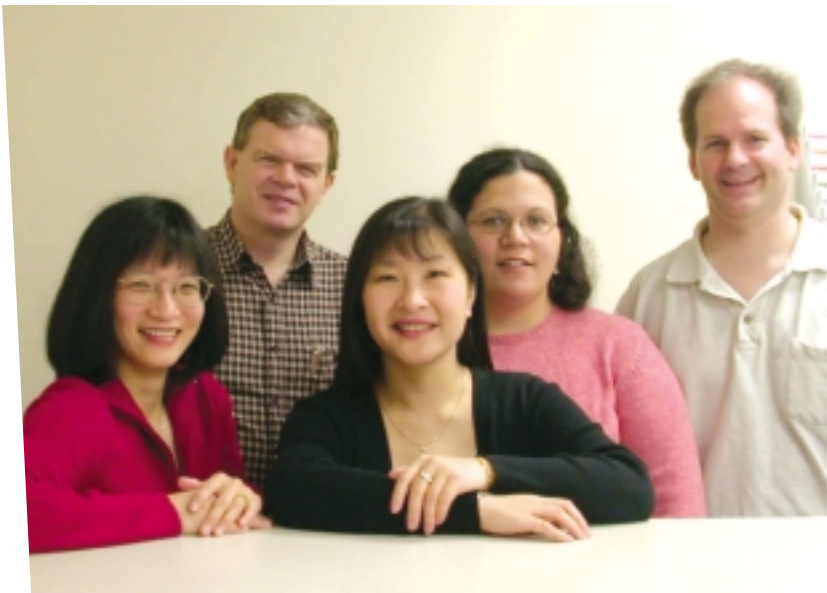
her time recruiting students with providing support for them once enrolled. "The biggest challenge for me is balancing it all," said Ruth. "This is a newly created position without established parameters. I'm finding that my enthusiasm to take on new projects extends beyond the hours in a day."

At the high-school level, Ruth is working to pique student interest in engineering career opportunities by focusing on an awareness campaign, including outreach and a proposal to faculty to open their laboratories for scheduled visits.

The foremost item on the campaign's agenda is conferences at UBC. The first will include Grade 10 and 11 female students this

spring, and the second will include Grade 9 and 10 students in the fall. A third will be added to the roster next year to include Grade 11 and 12 students. All the conferences will be interactive, allowing students to participate in workshops hosted by faculty members, professional engineers and engineering students.

"It's my job to be creative in working with guidance counselors and students to promote engineering," said Ruth. "Prospective students need to have individual interactions to ignite their interest."



The ESS team from left: Director Mary Murphy, Assoc. Dean Bruce Dunwoody, Recruitment Officer/Int'l Student Advisor Ruth Kwok, and Student Advisors Susanne Milner and Robert Bacon.

Ruth Kwok explains the variety of engineering options available to international student Sun Yi at a recent recruiting event.



# Integrating the student perspective

## Faculty receptive to input

Established in 2002, the Faculty's Undergraduate Student Advisory Council (USAC) includes 16 engineering undergraduate representatives, the Dean and Associate Deans of Applied Science, Engineering Department Heads and Program Directors. The council meets to provide input on issues, challenges and opportunities facing the Faculty.

Every March, each of the undergraduate student clubs appoints a council member for a twelve-month term. The remaining student members are selected by the Engineering Undergraduate Society (EUS). Starting with the 2004/05 academic year, there will be an additional representative from the Environmental Engineering Program when the first cohort is enrolled.

The meetings provide an interactive forum for general issues affecting students such as teaching evaluations, study space and differential tuition fees. They present an opportunity for students to make their preferences known, and for the administration to gauge student receptivity to Faculty proposals.

"The USAC has provided engineering student leaders with unprecedented access to administration," said Trevor Olson, EUS president. "Issues such as student space, teaching quality and curriculum can be addressed directly to those with the ability to effect change."

The January 2004 meeting demonstrated how influential the council can be. With scheduling conflicts discussed first, first-year President Chris McCann mentioned the prob-



The 2003-04 Undergraduate Student Advisory Council.

lem of the mandatory APSC 121 course inhibiting students from participating in simultaneously scheduled EUS meetings. A discussion ensued about the value of the course, with a consensus reached that it should be replaced. Although a group of students may come to this conclusion, it is the key interaction of students with administrators that drives change. Due to the presence of Dean Isaacson and Associate Deans Adebar and Dunwoody, the decision to secure approval of this change in curriculum was made without delay.

"The Undergraduate Student Advisory Council is a great example of students working together with the Faculty to strengthen their program," said Associate Dean Dunwoody. "Applied Science is showing leadership in involving students to improve the program; this initiative is likely to be emulated by other faculties across campus."

## Appointments

### Chemical and Biological Engineering

**Jimmy Feng** was appointed Associate Professor on January 1. This appointment is joint with the Department of Mathematics (40%). His research expertise is in the field of fluid mechanics, specifically modeling and numerical simulation of complex fluids.

**David Wilkinson**, whose appointment as Professor is pending approval at time of publication, specializes in electrochemical power sources and processes to create clean and sustainable energy.

### Electrical and Computer Engineering

**Rafeef Abugharbieh** was appointed Assistant Professor on January 1. Her research focus is in the area of computerized processing, analysis and understanding of digital images.

**Philippe Kruchten** was appointed Professor on January 1. He is an expert in the field of software engineering, including telecommunications, defense, transportation, aerospace and software development sectors.

### Engineering Physics

**Bill McCutcheon**, Professor of Physics and Astronomy, was appointed Acting Director of the Engineering Physics Program on January 1.

### Mechanical Engineering

**Peter Ostafichuk** was appointed Instructor on April 1. The position is associated with the new project-based curriculum program for second-year, MECH 2. His academic interests include fluid mechanics and controls.

## New Name

At a recent meeting of the Faculty of Applied Science (Engineering), a motion was passed to change the name of the Department of Metals and Materials Engineering. The new name, effective April 1, 2004, is the Department of Materials Engineering (MTRL).

# Achievements

Chemical and Biological Engineering Associate Professor **Jimmy Feng** has been awarded a Tier 2 Canada Research Chair in complex fluids and interfaces.

Chemical and Biological Engineering Professor **John Grace** has earned two distinctive honours: He was awarded an honorary degree from the University of Western Ontario; and he was elected a Fellow of the Engineering Institute of Canada.

Chemical and Biological Engineering Professors **Jamie Piret** and **Kevin Smith** were both elected Fellows of the Chemical Institute of Canada.

Chemical and Biological Engineering Professor **David Wilkinson** has been awarded a Tier 1 Canada Research Chair in clean energy fuel cells.

Civil Engineering Associate Professor **Helmut Prion**, along with Altus Engineering, have received a 2003 Environmental Award in the Design, Construction and Monitoring category from the Association of Professional Engineers and Geoscientists of B.C. for the first worldwide application of continuous wooden dome construction.

Electrical and Computer Engineering Professor Emeritus **Robert Donaldson** was elected a Fellow of the Engineering Institute of Canada.

Electrical and Computer Engineering Professor **Guy Dumont** has been named a UBC Distinguished University Scholar in recognition of his exceptional scholarship in the field of advanced process control systems.

Electrical and Computer Engineering Professor **André Ivanov** was elected Chair of the Computer Society Test Technology Council of the Institute of Electrical and Electronics Engineers (IEEE) effective January 1.

Electrical and Computer Engineering Assistant Professor **Lutz Lampe** has received a 2003 ITG Foerderpreis (award) for his PhD thesis on non-coherent coded modulation. ITG of the VDE is the German sister society of the IEEE.

Electrical and Computer Engineering Professor **Tim Salcudean** has been awarded a UBC Izaak Walton Killam Research Prize for his outstanding accomplishments in research.

Electrical and Computer Engineering Associate Professor **Steve Wilton** and graduate student **Andy Yan** have received a best paper award at the 2003 IEEE International Conference on Field-Programmable Technology held in Tokyo, Japan, for their paper "Product Term Embedded Synthesizable Logic Cores."

Mechanical Engineering Professor **Clarence de Silva** and graduate student **Yang Cao** have received a best student paper award at the 2003 IEEE International Conference on Mechatronics and Machine Vision in Practice held in Perth, Australia, for their paper "Adaptive Control of a Manipulator with Flexible Joints Using Neural Networks."

Mechanical Engineering Assistant Professor **Derek Yip-Hoi** has been awarded a Fellowship from the Advanced Systems Institute of B.C. to research computer-aided design methods and their application to virtual high performance machining.

Materials Engineering Professor **David Dreisinger** has been awarded a UBC Izaak Walton Killam Research Prize for his outstanding accomplishments in research.



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#### Editor and Writer:

ErinRose Handy  
Communications Officer  
Faculty of Applied Science  
Tel: 604-822-1524  
Fax: 604-822-7006  
[erinrose.handy@apsc.ubc.ca](mailto:erinrose.handy@apsc.ubc.ca)

#### Contributing Writers:

May Cordeiro  
Hillary Gosselin  
Sherry Green  
Jeannie Scarfe

#### Design and Production:

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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
- Materials Engineering
- Mechanical Engineering
- Mining Engineering

#### Office of the Dean

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

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

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

#### Mailing address:

Ingenuity  
UBC Faculty of Applied Science  
2006—2324 Main Mall  
Vancouver, B.C. V6T 1Z4

PUBLICATIONS MAIL AGREEMENT  
NO. 40602510  
RETURN UNDELIVERABLE CANADIAN  
ADDRESSES TO  
UBC FACULTY OF APPLIED SCIENCE  
2006-2324 MAIN MALL  
VANCOUVER, B.C. V6T 1Z4  
[INFO@APSC.UBC.CA](mailto:INFO@APSC.UBC.CA)