



THE  
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COLUMBIA

# ingenuity

Faculty of Applied Science  
Engineering News

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## Perfecting papermaking

**Dr. Sheldon Green uses fluid mechanics to produce the “perfect” paper**

Hold this newsletter or perhaps a blank sheet of paper up to the light. How does the paper look? Is it pretty uniform in texture, pretty even in brightness? If you answer “yes,” the paper just might meet the high standards of Dr. Sheldon Green, a professor in the Department of Mechanical Engineering.

Dr. Green is an expert when it comes to paper, or more specifically, the fluid mechanics of the paper making process. In his current research, he focuses on the forming sections of paper machines, which play a critical role in determining the quality of any given paper product. To understand why, it’s important to know how paper is made.

“The way one makes paper is to grind up, or by chemical means create, individual wood fibres that are just a few millimetres long. Next we put these wood fibres in a dilute suspension with water and pump the mixture into a device called a ‘headbox,’” explained Dr. Green. “The headbox creates a pulp suspension about seven metres wide and only one centimetre thick.” It’s from this point on that we enter Dr. Green’s area of expertise, known as the papermachine forming section.

The goal in all forming sections is to separate the water from the pulp fibres. Dr. Green specializes in the modern twin wire forming method, where the pulp suspension is placed between two moving fabric belts, which then pass over fixed blades or rotating cylinders that effectively squeeze out the water and leave the fibres behind.

“The trick in the forming section is to spread the fibres as uniformly as possible—that’s what makes for “perfect” paper,” said Dr. Green. Unfortunately, the fibres that come out of the headbox are not all evenly distributed and they tend to form clumps or “flocs.” Flocs are the dark regions you see when you hold a piece of paper up to the light.



The lighter areas represent sections where there are not as many fibres; areas where the paper tends to be weaker and where it may break, either on a printing press or even in the paper machine itself. If you could measure the surface of your sheet of paper, you would see that where there are flocs, the surface is high compared to areas where there are fewer fibres. This uneven surface makes the paper difficult to print on. That’s a big problem if you’re printing a million copies of a magazine or a daily newspaper.

A second crucial issue in the forming section is referred to as ‘retention.’ Paper is composed not only of wood fibres, but also of the small fragments of wood fibres called “fines” and microscopic chemical fillers, which are almost like dust. These fines and fillers can easily pass through the fabric belts. The idea is to retain as many fines and fillers as possible because they fill in the gaps between the fibres, resulting in a better printing surface.

The retention and distribution of fibres and fines is directly related to how water is removed from the pulp suspension. Making any changes to the dewatering process—such as slowing it down or speeding it up—changes the distribution and density of the fibres and fines, the two key determinants of paper quality. [Continued on page 10](#)

# Message

## from the Dean

I am pleased to report that the Faculty of Applied Science has had another successful year and continues to maintain its outstanding reputation in education, research and professional practice. The most recent edition of the *Princeton Review* ranks our engineering programs very highly—each of the individual programs rank either first, second or third in Canada, and are typically within the top ten percent across North America. Of particular note, our Mining and Mineral Process Engineering program ranks first in Canada and second in North America. Likewise, our research activities remain very strong and are benefiting society in a variety of ways. Apart from directly providing advances in engineering knowledge and practice and contributing to major societal issues, our research leads to the training of highly qualified engineers who are in great demand and to technology transfer through start-up companies and the licensing of new products, processes and concepts.

We are particularly proud of our close linkages with our external communities and would like to enhance these further. Following the successful establishment of the Faculty's Engineering Advisory Council, we are now forming External Advisory Committees for all our engineering departments. Also, we view the Faculty's relationship with its alumni as extremely important, and are attempting to strengthen this. As an initial step to doing so, we are expanding the distribution of *Ingenuity* to include all of our alumni.

The Faculty continues to make progress on a number of exciting initiatives. The new Commerce Minor in all our engineering programs was featured in the last issue of *Ingenuity*; and the new Arts/Engineering combined degree program and the Project-Based Learning Program in Electrical and Computer Engineering are featured in this issue. We are also working on a transformation of our first year engineering program to provide incoming students with significant exposure to engineering in their first year through case studies and project-based learning.

The importance of engineering to British Columbia cannot be sufficiently stressed. Engineers work in virtually every major sector of the British Columbia economy, including agriculture, communications, construction, fisheries, forestry, manufacturing, mining, oil and gas, tourism, transportation, the high technology sector, utilities and more. Engineering graduates are needed by the Province across a range of disciplines and industries to assure economic growth and a high quality of life.



The resulting demand for engineering graduates from the University of British Columbia has been very high. At the same time, the demand for entry to UBC's engineering programs has also been very high, with over 2,000 qualified applicants per year for the approximately 600 places currently available.

However, the proportion of engineers making up the labour force in British Columbia, which is a key indicator of productivity growth, and the proportion of university graduates in engineering remain well below the national average, and therefore we need to encourage a greater provincial focus on engineering education and research.

Of course, we continue to face a number of challenges within the Faculty, largely associated with resource constraints. Consequently, we are relying on fundraising to a greater extent, and indeed, this issue of *Ingenuity* has a greater focus on development activities. In this context, we recently received a remarkable pledge of approximately \$2 million from Mr. Leslie Gould (BASc 1937, MASc 1938), for which we are extremely grateful—details of the gift are outlined on page six of this issue. We are working on a number of exciting fundraising projects where we need your help: We are seeking donations for various projects relating to student mentorship and support, as well as larger donations to establish professorships, chairs and new laboratories, each with an associated naming opportunity.

I would like to thank all Applied Science faculty members and staff for their very considerable contributions to the development of the Faculty; and as well our many alumni, friends and partners outside the university for their support. Please contact me—by letter, telephone (604) 822-6412, fax (604) 822-7006, or e-mail dean@apsc.ubc.ca—if you would like further information on the Faculty's activities, if you can assist in the development of the Faculty, or if you have any suggestions to provide.

Michael Isaacson

Michael Isaacson

Dean

# Project-Based Learning

## puts students in control

A unique, new program offers undergraduates challenge & responsibility

Project-Based Learning (PBL) emphasizes integrated understanding of engineering principles, and a student's ability to design practical applications of those principles. It is about group learning and hands-on project work rather than traditional lectures. Even more important, it is the latest and most innovative undergraduate education program currently being integrated into the second year curriculum in the Department of Electrical & Computer Engineering at UBC.

"The concept of problem-based learning originated at McMaster Medical School," explained Electrical & Computer Engineering Professor and PBL Program Coordinator, Dr. Peter Lawrence. "It was very successful because it theorized that when a patient gets sick, a doctor must draw on all of the individual lessons in anatomy, biology, physiology, biochemistry, pharmacology, etc. The idea then became, if doctors work like this, why don't we teach like this? In Electrical and Computer Engineering, our second year courses are interrelated and therefore students should be given an opportunity to explore the interrelationships through projects while learning the fundamental material."

In action, PBL requires professors to integrate their material with that of their colleagues to provide students with the "big picture" rather than just the individual parts. Students come to one central meeting place for discussions with all instructors present. Then, working in teams, students apply their knowledge by designing projects that

The University of Aalborg in Denmark was the first school to widely apply this methodology to engineering studies, and with great success. The UBC program is similar, with a few notable distinctions.

"We are unique because we are running a trial integration program with half of our students taking PBL and half taking the traditional curriculum. That's never been done before," noted Dr. Lawrence. "Second, we're not repeating material from text books in lectures. At Aalborg, they provide lectures first and then have the students follow up with projects. By doing away with traditional lectures and memorization, we are encouraging independent learning and placing more responsibility in the hands of our students." Project-Based Learning is very much in line with the UBC's Trek2000 vision, and as a result, this program has received welcome University support.

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The team and the tools. From left to right, PBL team coordinators Peter Lawrence, David Pulfrey, Andre Ivanov, Matthew Yedlin, and Tim Salcudean.

require skill in all areas of a given field of engineering.

The UBC program began in September, with the task of coordination and implementation falling to Dr. Lawrence and a team of four more Electrical & Computer Engineering professors: Matthew Yedlin, David Pulfrey, Tim Salcudean, and Andre Ivanov. It is their research and collaboration that led to the current "timetable" for this year's PBL students, which includes a mix of project time, small group meeting time (with professors and teaching assistants), and larger group meetings for discussion of case studies and quizzes. In addition, all students take traditional

lectures in math, computer science, and communication.

"Despite the obvious benefits of gaining more hands-on design experience, the program is not without risk," commented Dr. Lawrence. "From a professor's standpoint, it turns upside down all of the things we think we've been doing well, such as conveying textbook material in a lecture format, highlighting on the students' behalf what we think are the most important ideas, handing out materials and expecting students to memorize them for exams. PBL is not like that and it's a little scary—for us as well as the students."

Outside the University, reaction to PBL has been very

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# The best of both worlds

Arts and Engineering team up to launch a combined BA/BASc degree

Arts or Engineering? Up until now, UBC students had to make a choice between the two. For many talented individuals this meant abandoning their interest in one or the other. Fortunately, times have changed thanks to a new combined degree initiative launched by the Faculty of Applied Science and the Faculty of Arts.

Effective this September, UBC students have the option to pursue simultaneously both a Bachelor of Arts and a Bachelor of Applied Science degree through a new combined program.

"Achieving two bachelor degrees is not unusual, but earning them at the same time is" explained Dr. Bruce Dunwoody, Associate Dean of Engineering Student Services.

"The strength of the combined BA/BASc program is that it allows students to earn two degrees concurrently and in less time than would be required if they pursued them consecutively."

Faculty of Applied Science Dean, Dr. Michael Isaacson, was a driving force behind the launch of the BA/BASc program. "For some time, I have believed that our students would benefit immensely if we could find a way to combine the strength of a professional degree in engineering with an arts degree providing wide exposure to the humanities and liberal arts," stated Dr. Isaacson.

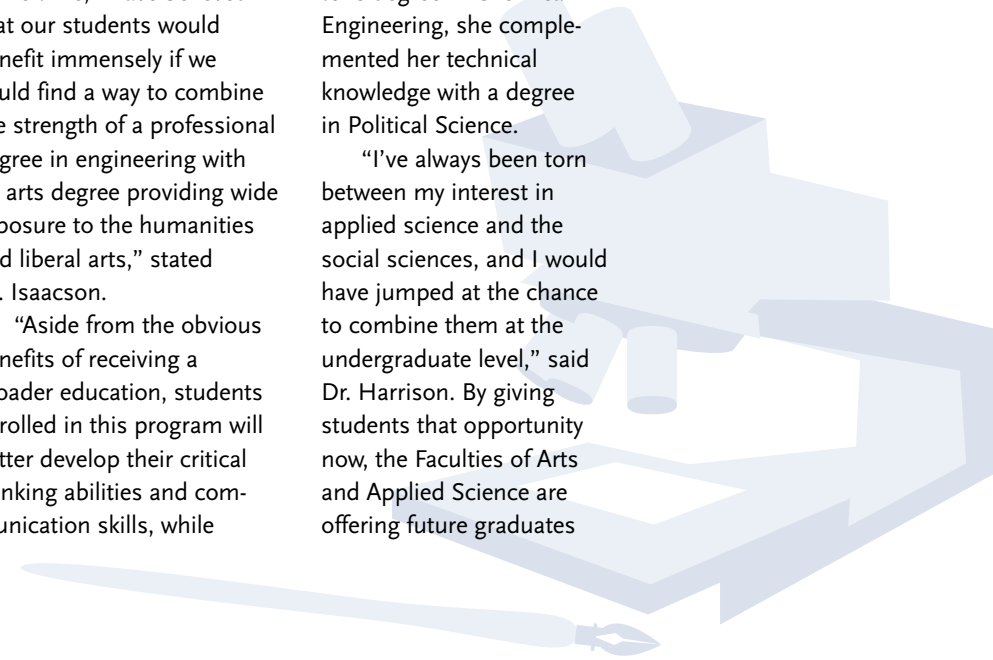
"Aside from the obvious benefits of receiving a broader education, students enrolled in this program will better develop their critical thinking abilities and communication skills, while

developing a broad base of knowledge and a broad outlook that will serve them well in their professional careers and future leadership roles," added Dr. Isaacson.

UBC Associate Professor of Political Science, Dr. Kathryn Harrison, knows first hand the benefits of combining two degrees. After completing her master's degree in Chemical Engineering, she complemented her technical knowledge with a degree in Political Science.

"I've always been torn between my interest in applied science and the social sciences, and I would have jumped at the chance to combine them at the undergraduate level," said Dr. Harrison. By giving students that opportunity now, the Faculties of Arts and Applied Science are offering future graduates

the best of both worlds. Students interested in the combined BA/BASc program may apply for admission to the Dual Degree Board of Studies through either Engineering Student Services (604) 822- 6556 or the Arts Advising Office (604) 822-3247.



## Project-Based Learning

Continued from page 3

positive. "The industry people who we've spoken to have been very supportive. They like the hands-on, project focus and the idea of the students becoming more confident and resourceful," said Dr. Lawrence.

"Employers need students who can think on their feet, formulate original ideas, work well in teams and be able to communicate with each other, their supervisors, marketing people, and customers. They think PBL is a step in the right direction, and some have backed that up with in-kind support. Just before the start of the program, Motorola Canada Ltd. donated

20 new Coldfire microprocessor development boards and software for use in student projects in this program. It's this kind of support that will ensure our students are more than ready to meet industry needs.

"The major goal of this program is to provide students with greater technical skills sooner, thereby impressing employers with their experience as well as their maturity, understanding, and tool familiarity," emphasized Dr. Lawrence. "We'll do that by challenging students and allowing them to take more responsibility for their education."

# Faculty Development

A new perspective on university support

## Planned Giving

Gifts from alumni, friends, corporations and foundations have contributed greatly to the success of UBC and the Faculty of Applied Science. Many people at some time in their life have given a charitable gift to an organization or cause that was close to the heart. While people are very familiar with the process of writing a cheque, putting a gift on a credit card, or giving a gift of cash, the area of planned giving is less understood—and yet it can be one of the most valuable and rewarding means of giving for both the donor and the recipient.

Planned Giving is charitable giving coordinated with the overall financial and estate plans of a donor. Planned gifts include both current and deferred gifts that require elements of estate and tax planning in order to meet a donor's objectives while minimizing the tax payable. There are many vehicles that can help donors achieve their giving and tax goals. Here we outline some of the most common and popular.

### Gifts in Kind

Gifts of property, such as real estate, securities, equipment, art, books and artifacts, can all offer unique opportunities for donors to support their favourite

charity and receive a charitable receipt for tax benefits.

When appreciated capital assets are gifted, the donor realizes a capital gain. However, the charitable receipt offsets the taxable capital gains, leaving a portion of the receipt to be used against other income.

The 1997 Federal Budget introduced a new provision that reduces the taxable capital gain by half when shares listed on a prescribed stock exchange are donated to qualified charities such as UBC. This provision makes gifts of securities a very cost-effective method of supporting a charity. The sidebar example, "Gifts of appreciated securities," illustrates this point.

### Life Insurance

A small investment in premiums can lead to large contributions to a charity such as UBC. The two most common uses of life insurance for charitable gift planning are:

1. **Charitable Life Insurance:** The donor purchases life insurance to provide a bequest to the charity.
2. **Wealth Replacement Life Insurance:** The donor makes an immediate charitable donation and purchases life insurance as a replacement for the donated capital.

### Bequests

Gifts by will are important to UBC and many other charitable organizations. A bequest can be for a specific sum of money or a specific property, such as real estate or securities. As with any other planned gift, donors may direct their gift to an area of choice through the appropriate wording of the will. Donors also may choose to have their gift create a permanent or "endowed" fund from which only the income is used for the donor's purpose. These endowed funds then continue to serve the donor's objectives in perpetuity.

### Other Planned Giving Options

There are several other vehicles for giving planned gifts that can be very beneficial to both the charity and the donor. These include Insured Annuities, Gift Plus Annuities, Charitable Remainder Trusts, and Remainder Interests in Real Property.

If you would like more information on Planned Giving, or any type of gift to UBC and the Faculty, please contact our Faculty Development Officers, Rob Appleton at (604) 822-0603, or David Petis at (604) 822-6197.

## Gifts of appreciated securities: Tax Savings

An alumnus recently made a gift of securities to UBC. He knew that special tax rules introduced in 1997 cut the income inclusion rate on capital gains in half when applied to charitable gifts. The example below demonstrates how this gift worked to the benefit of both the donor and the Faculty.

### In round numbers, the gift broke down as follows:

|  |             |
|--|-------------|
| Present value of shares  | \$100,000   |
| Cost base of shares  | -\$20,000   |
| Capital gain   | = \$80,000  |
| Taxable gain (37.5% x \$80,000)  | = \$30,000  |
| Tax on gain (54% x \$30,000)   | = \$16,200  |
| Donation receipt   | \$100,000   |
| Tax credit (Tax rate based on member having other taxable income of \$60,000+) | \$54,000    |
| Net tax savings (\$54,000-\$16,200)  | = \$37,800* |

By way of comparison, had the alumnus chosen to sell the securities and keep the proceeds as income, the result would have been:

|   |            |
|---|------------|
| Taxable gain (75% x \$80,000)                 | = \$60,000 |
| Tax on gain (54% x \$60,000)                  | = \$32,400 |
| Net after-tax proceeds (\$100,000 - \$32,400) | = \$67,600 |

Therefore, the net cost of the alumnus' \$100,000 gift to UBC was:  
\$67,600 - \$37,800 = \$29,800

\* Remainder of tax credit used against the donor's other income. This provision can often result in the donor paying no tax on their income.

### The Bottom Line

The net cost of a gift of appreciated securities is now much less than that of donating an equivalent amount of cash. If you hold securities that have grown in value and you wish to make a gift to UBC or the Faculty of Applied Science, you can realize significant tax savings by donating the securities instead of cash.

It is important to note that these special tax rules are in effect only until 2001. For more information about the benefits of gifts of appreciated shares, please contact our Faculty Development Officers.

## Details of the Gould gift

When complete, the total value of the Gould “legacy” will be approximately \$2 million, endowed to support the following five initiatives:

### The Elizabeth & Leslie Gould Student Recruitment Fund

This fund will enable the Faculty to promote engineering to prospective young engineers, significantly enhancing the Faculty’s ability to attract the best and brightest students.

### The Elizabeth & Leslie Gould Scholarships

Each year, the Faculty will recognize outstanding students worthy of the Elizabeth & Leslie Gould Scholarships. The scholarships will honour the Gould’s lifetime commitment to the Masonic Order and the Grand Lodge in British Columbia.

### The Elizabeth & Leslie Gould Teaching Professorship in Chemical Engineering

This fund will provide a portion of the salary of a worthy professor in Chemical Engineering, allowing the named faculty member to focus on excellence in teaching in chemical engineering.

### The Chemical Engineering Laboratory Fund

This fund will ensure that the Chemical Engineering program can maintain a strong laboratory component in order to provide students with a better understanding of chemical engineering concepts and hands-on experience with equipment.

### The Student/Engineer Mentorship Fund

This portion of the gift will enable all of the engineering departments to expose students to industrial practitioners through teaching and mentorship.

# Engineering a lasting legacy

## Elizabeth and Leslie Gould help secure the future of Applied Science

Everyone has their own reasons for giving back to the Faculty of Applied Science. For some, it is a way to accomplish a personal goal or make a difference in the world; for others it represents a sound investment in the next generation, a way to support the continuation of high calibre teaching and research, or an opportunity to give others what they received themselves, perhaps from some insightful benefactor or mentor. In the case of Mr. Leslie Gould, Class of Chemical Engineering 1937, it is all of these things and more.

Leslie Gould remembers UBC’s Faculty of Applied Science as the place where he acquired his passion for engineering, his invaluable skills in problem-solving, and the friendship and guidance of mentors like Dr. William Seyer and former Dean, Dr. John Finlayson. With all of these memories in mind, Mr. Gould recently made a thoughtful and very well planned gift to the Faculty of Applied Science and the Department of Chemical & Bio-Resource Engineering.

“Mr. Gould’s gift, which consists of five distinct components, is unique because it will have a significant impact on all areas of Applied Science,” explained Faculty of Applied Science Dean, Dr. Michael Isaacson. “First it begins with funds for student recruitment, then scholarships, teaching and laboratories, and finally mentorship. It is a complete, ‘full-circle’ gift that

acknowledges both his time at UBC and his commitment to another organization, the Masonic Lodge of British Columbia.” (See sidebar for details.)

Mr. Gould turned to the Faculty with this generous “legacy” gift to show his appreciation, to set an example of support for the Faculty, and to help others achieve the kind of remarkable career he has enjoyed in the petroleum and petrochemicals industry. It’s a career that he readily acknowledges began at UBC: “When I graduated from high school, I didn’t know what to take. I came to UBC to talk to Dean Finlayson and he took me on

was with Imperial Oil Ltd. and he remained loyal to the company for most of the years that followed. At one point, he was part of a team that researched, designed, manufactured and commercialized Butyl Rubber, a synthetic product that saved many air crews when their fuel tanks were punctured by enemy fire during WW II.

He also took on a number of special assignments, including a four-year position with the Federal Department of Defense Production during the Korean conflict. There he served as one of the top engineers coordinating US and Canadian Forces ordinance requirements.

**“Mr. Gould’s gift, which consists of five distinct components, is unique because it will have a significant impact on all areas of Applied Science.”**

a tour of the labs. I started taking courses that fall and I was hooked!” remembered Mr. Gould. “Once I got into engineering, there was no taking me out of it. I loved it!”

Fortunately, Mr. Gould’s enthusiasm for engineering was matched by his skill. His career spanned more than 40 years and took him to almost as many countries. He and his wife Elizabeth Margaret (Elma) set up homes on both the East and West coasts of Canada, as well as England, Sweden, Spain, and the United States. Mr. Gould’s very first job

Even after taking on so many groundbreaking assignments, Mr. Gould claims that his days at UBC were the best of his life. His only regret is that he completed his schooling too soon: “I’d like to be here in the Faculty now so I could do it all again with computers!” he smiled. Never one to be left behind, however, Mr. Gould is quick to mention that he has an Internet account and that he makes great use of his home computer for keeping personal records, including tracking the value of his UBC gift. This ability for sound management as well as over-



For Leslie and Elizabeth Gould, a legacy gift represented the best opportunity to express their appreciation and support of Applied Science at UBC.

## Supporting the UBC Annual Fund

### Engineering alumni create opportunities for better education and careers

Engineering alumni provide the Faculty of Applied Science with tremendous financial support. For this, we offer our sincere thanks, and our promise to put your contributions to good use, continually improving the education and career opportunities for the next generation of engineering students. This year, we have asked our alumni to support two fundraising priorities—The Dean’s Engineering Alumni Fund and the Engineering Equipment Fund—and now we’d like to tell you a little more about them and why they are so important.

Within the **Dean’s Engineering Alumni Fund**, we are focusing on three areas of great need: Student Mentorship, Student Projects and Engineering Co-operative Education.

• **Student Mentorship** enhances student interactions with practicing engineers, significantly increasing the Faculty’s ability to prepare graduates for engineering careers. Some of the mentorship opportunities we provide include guest lecturers from industry, field trips to industrial sites, design projects supervised by industrial practitioners, and extended industry visits that allow for one-on-one interaction over a longer period of time. Collectively, these mentorship experiences give our students a better understanding of the responsibilities they will assume as practicing engineers.

• **Student Projects** are all about building hands-on skills. Project-based curricula provide students with opportunities to develop an

whelming generosity will ensure that the names “Elizabeth and Leslie Gould” are forever linked to engineering at UBC. Their gift will see that the quality and reputation of the Faculty of Applied Science and the Department of Chemical & Bio-Resource Engineering continues to improve, helping us hold to the Trek2000 vision in which UBC aspires to be Canada’s best university.

For Leslie and Elma Gould, a legacy gift represented the best opportunity to express their appreciation and support of Applied Science at UBC—but this is just one of thousands of opportunities that we offer. Gifts of any size and nature can make such a big difference to the lives of students, the standards of excellence in teaching and faculty research, and ultimately, the future of the Province

If you’d like more information about current projects, alternative ways of giving, or the tax advantages involved, or you have an idea you’d like to discuss, please contact Faculty Development Officers David Petis or Rob Appleton at (604) 822-6197 or (604) 822-0603.

integrated understanding of engineering principles and their practical applications. This approach to learning, which is increasingly valued by industry, emphasizes skills acquisition and helps students gain confidence in their knowledge and abilities.

• **Engineering Co-operative Education** gives students the opportunity to gain hands-on work experience while completing their academic studies. The program is so successful that we have seen it grow from 238 placements in 1993 to over 800 in 1998. This growth has placed incredible strain on our ability to maintain this outstanding program, but alumni support will help us acquire additional resources and meet the demands of both students and employers for more placements.

Equally important is the **Engineering Equipment Fund**, which, with alumni support, helps us provide a cutting edge learning environment complete with modern computer facilities and teaching laboratories.

If you were able to respond to our alumni appeal earlier this year, we thank you for your support. As you can see, your contributions really are making a difference for this generation of engineering students!

## Upcoming engineering reunions

Some of our ambitious alumni have been working in conjunction with the UBC Alumni Office to coordinate the following special events. The Alumni Office is a terrific resource for all graduates and we encourage you to call on them to organize your own event. All engineering reunions also are listed on the Faculty of Applied Science web site at [www.apsc.ubc.ca](http://www.apsc.ubc.ca) under “alumni.”

**Class:** Applied Science 1939  
**Date:** November 26, 1999  
**Location:** Dinner at Brock House

**Class:** Civil Engineering 1949  
**Date:** September 29, 1999  
**Location:** Tsawwassen Inn

**Class:** Electrical Engineering 1969  
**Date:** October 8, 1999  
**Location:** Dinner at University Golf Club

**Class:** Mechanical and Electrical Engineering 1949  
**Date:** October 2, 1999  
**Location:** Lunch at Green College Coach House

**Class:** Civil Engineering 1969  
**Date:** October 2, 1999  
**Location:** University Centre

**Class:** Geological Engineering 1949  
**Date:** October 2—4, 1999  
**Location:** Contact UBC Alumni Office

Several other classes are considering reunions, but have yet to set dates. These classes include:

Chemical Engineering 1949, Civil Engineering 1979, Electrical Engineering 1956, Geological Engineering 1950 and 1988, and Mechanical Engineering 1969 and 1979.

Remember, the strength of any alumni division is dependent on the enthusiasm of its members—and that includes you!

If you'd like to attend or assist with the planning of any class reunion, or help us revive the engineering alumni division in general, please contact Jane Merling in the UBC Alumni Office at (604) 822-8918 or [merling@alumni.ubc.ca](mailto:merling@alumni.ubc.ca).

## Improving the educational experience

Dr. Michael Davies secures the people and programs necessary for success

Whether he's overseeing the upgrade of classrooms or launching innovative, new programs, Electrical & Computer Engineering Head, Michael Davies, is committed to improving the undergraduate educational experience.

This ambitious undertaking includes a number of different projects such as securing approval to offer separate degrees in electrical as well as computer engineering, (versus having computer engineering as an option), and making plans to offer specialized software engineering curriculum in the coming year.

One of the most exciting initiatives underway is the trial run of the Project-Based Learning Program. “The Faculty is investing quite a lot of resources to give the students a different kind of education through this program,” said Dr. Davies. “We're very excited about it and we think it's going to help students gain a more integrated understanding of the field, allowing them to solve problems right from second year, rather than leaving the integration step to the last year or a final project lab or thesis.” (See page 3, “Project-Based Learning.”)

Because he considers the learning environment as important as the curriculum itself, Dr. Davies is equally enthusiastic about some recent room renovations. “Our big classroom, which is actually the biggest classroom in engineering, was

completely renovated this year. We also renovated two other rooms, including one for Project-Based Learning. Overall, I think these upgrades mean that the experience of being a student in this department is getting better.”

In addition to improving conditions for Electrical & Computer Engineering students, Dr. Davies has been working in collaboration with the Department of Computer Science to increase enrolments in all information technology-related programs and to launch a new the Master of Software Systems program early next year. “All of these are activities we're doing in collaboration with others and I think that says a lot about our commitment in this department—we're committed to improving opportunities for all students,” emphasized Dr. Davies.

This collaborative spirit extends to the external community as well. “We've always had pretty good links to the outside through co-op and our research collaborations,” explained Dr. Davies. In the coming year, we're planning to put in place an advisory council that will formalize those links. It will include a number of senior people who can advise the department on initiatives and strengthen our connections with the outside technical community.”

Within the department, Dr. Davies is proud of the accomplishments and the “collegial attitude” of the faculty and staff members



he leads. “We've had a wonderful year for awards to faculty members, and even our staff members,” noted Dr. Davies. “We were so pleased when Tony Leugner, Supervisory Technician, won the President's Service Award for Excellence. I'm very glad that generally, the members of the department are getting recognition for their excellence, which in turn contributes to the department maintaining strong graduate education and research capabilities.”

Dr. Davies continues to work with others even when it comes to his own research, which concerns control systems for the pulp and paper industry. “Together with (Electrical & Computer Engineering Professor) Dr. Guy Dumont, I've been involved in a string of projects involving paper

machines, data analysis and control.” Many of these projects have been commercialized, which again, is a credit to the success of Dr. Davies' cooperative efforts.

The control systems Dr. Davies designs make manufacturing systems produce materials of high quality with as little variation as possible. “A control system will maintain a level or a temperature or a thickness of a sheet of paper as close to the original design as possible, even though there may be disturbances occurring,” explained Dr. Davies. “These control systems get very complex and designing them all so that they work well together is quite a job.” However, getting things, or people, to work well together is clearly one of Dr. Davies' greatest strengths. His thriving department, a growing list of exciting, new programs, and a talented team of award-winning faculty and staff are all ample evidence of that.

## Terrific turnout in Calgary



Dean Isaacson visits with engineering alumni in Calgary.

An impressive crowd that included more than 60 Faculty of Applied Science alumni turned up at the Petroleum Club in Calgary on June 7, 1999. The evening event, which was hosted by the UBC Alumni Association, featured presentations from University President Martha Piper and several graduate students.

Dean Michael Isaacson was on hand to visit with engineering alumni and update them about Faculty news. The alumni in attendance represented nearly every decade of Faculty existence—from Dwight Purdy (BASC 1935), Tom Scott (BASC 1946), John Middelveen (BASC 1954) and Dale Johnson (BASC 1968), to Christine Blundell (BASC 1976), Randy Green (BASC 1984), and Lorne Caley (BASC 1996).

Our Faculty Development Officers, Rob Appleton and David Petis, also attended the reception. Later, the Dean and Mr. Petis visited a number of Alberta business leaders to get industry insight into upcoming Faculty initiatives and to provide updates about the latest Faculty development projects and subsequent opportunities for industry involvement.

# Engineering Advisory Council

## Industry and government leaders keep faculty at the cutting edge

*In the last issue of Ingenuity, we introduced several members of our Engineering Advisory Council, a group of senior government and industry leaders who, by providing valuable advice and feedback, are keeping the Faculty at the forefront of engineering education and research. In this issue we invite you to meet the remaining members of the council, to whom we are grateful for their support!*

**Bob Affleck** is a Pulp and Paper Consultant associated with Noram Engineering & Constructors Ltd. Over his career of more than 40 years in the BC pulp and paper industry, Mr. Affleck has held a variety of positions in operations, management, planning, environmental management and engineering.

**Ronald Britton** is Vice President of North America and Global Technology for Methanex Corporation, the world's largest producer and marketer of methanol. Prior to joining Methanex, he was the Global Business Manager for Bayer AG, and the Senior Vice President for Bayer's American subsidiary, Bayer Corporation.

**Gordon Forward** is Vice Chairman of the Board of TXI, a leading supplier of cement, structural steel and other building materials. Previously he served as President and CEO of TXI's Cement/Concrete Division, as well as President and CEO of Chaparral Steel. Dr. Forward is a Director of the Steel Manufacturing Association and a Director of Noranda Forest Inc. of Canada. In 1996, he was elected a member of the National Academy of Engineering.

**John Haythorne** is a partner with the law firm of Bull, Housser & Tupper. Prior to being called to the bar in 1981, Mr. Haythorne practiced as a Registered Professional Engineer. He is the current Past President of APEGBC. His law practice focuses on engineering and construction law with a special emphasis on negotiating and drafting contracts.

**Douglas Horswill** is Vice President of Environment and Corporate Affairs at Cominco. Prior positions include Deputy Minister of Finance and Corporate Relations, and Deputy Minister for Energy, Mines and Petroleum Resources in the Government of British Columbia. Before entering government, he was a Mining Engineer at Utah International (BHP) in Port Hardy, BC, and at Inco Ltd. in Sudbury, Ontario.

**John MacDonald**, is one of the founders of MacDonald, Dettwiler and Associates Ltd., and served as President and CEO until September 1982, and Chairman from 1982 until his recent retirement in 1998. He has served as a member of the Science Council of Canada, the National Research Council of Canada, the National Advisory Board on Science and Technology, and he was a founding member of the Science Council of British Columbia.

**Blair Redlin** is the President and Chief Financial Officer of the BC Transportation Financing Authority (BCTFA), a crown corporation established in 1993 with the mandate to facilitate the planning, construction and improvement of transportation infrastructure in BC. He also is Chair of the Board of Highway Constructors Ltd., and Deputy Minister of Transportation and Highways.

**Thomas Simons** is a Director of AGRA Inc. (formerly Simons International), a multi-disciplined engineering and construction company. He served as Director the Vancouver Board of Trade from 1988 to 1993, as Director of the BC Trade Development Corporation from 1994 to 1996, and currently, is a member of the Premier's Advisory Council on Science and Technology.

**Andrei Sulzenko** is Assistant Deputy Minister of Industry and Science Policy for the Federal Government. He is responsible for the development of microeconomic policy as it relates to industry, science and technology, as well investment, international business and internal trade.

ics, and biomechanics. He also has applied his knowledge in fluid mechanics to co-create a novel and very robust anemometer, which accurately measures wind speed and direction without the aid of moving parts.

In everything he does—be it research or teaching—Dr. Green is enthusiastic. He believes this is particularly important in the classroom, “Students know when you’re interested and when you’re there to fill space. I love what I do and I’m enthusiastic about what I teach, and I hope my students recognize and benefit from that.”

# Faculty launches new web site

In July, the Faculty of Applied Science Dean's Office launched a new Faculty web site, making it easier than ever before to share information with students, faculty members, alumni, industry partners and employers, and other individuals with an interest in Engineering (as well as Nursing and Architecture) at UBC.

The site contains new sections for alumni, development, career opportunities, publications and research statistics. Alumni and development are very timely sections which list, respectively, upcoming alumni events and a detailed list of our priority fundraising projects and the steps required to get involved.

Another important feature of our web site is that it gives more space to the Schools of Nursing and Architecture, and better explains their relationship to Engineering within the Faculty of Applied Science.

Throughout the site, the emphasis is on content, consistency and professionalism. So far, feedback has been very positive, with most people commenting on the wealth of information and the ease of navigating the site. If you haven't visited us online recently, we encourage you to check us out at [www.apsc.ubc.ca](http://www.apsc.ubc.ca). Like any site, ours will be in a continual state of improvement, and we welcome your comments!

# Achievements

The Faculty of Applied Science is home to a talented team of award-winning, internationally-recognized faculty members engaged in research and professional service of the highest calibre. We are pleased to recognize their awards and honours achieved since the last issue of our newsletter in March 1999. You can find a complete listing of Faculty achievements for the 1998/99-year on our web site at [www.apsc.ubc.ca](http://www.apsc.ubc.ca).

- **Chemical & Bio-Resource Engineering Professor John Grace**, received a Canada Council Killam Research Fellowship for his investigations into the fundamentals and applications of fluidized beds.
- **Civil Engineering Emeritus Professor Liam Finn**, was appointed as professor and holder of the Anabuki Chair of Foundation Dynamics in the Department of Safety Systems Construction Engineering at Kagawa University in Takamatsu, Shirkoku, Japan.
- **Electrical & Computer Engineering Professor Guy Dumont**, in collaboration with the Department of Electrical & Computer Engineering, the UBC Pulp & Paper Centre, and Universal Dynamics Limited, was recognized with an NSERC Synergy '99 Award for the development and commercialization of “BrainWave,” an adaptive controller for the process industries. Dr. Dumont also was elected Fellow of the Institute of Electrical and Electronics Engineers (IEEE) for his “contributions to the theory and practice of adaptive control and its applications to process industries.”
- **Electrical & Computer Engineering Professors Babak Hamidzadeh and Steve Wilton**, were named as recipients of the 1999 Advanced Systems Institute Research Fellowships, which are intended to encourage researcher interaction with BC information technology industries.
- **Electrical & Computer Engineering Professor Mabo Ito**, was recognized for his “outstanding contribution to software engineering” by the Association of Professional Engineers and Geoscientists of BC (APEGBC).
- **Electrical & Computer Engineering Supervisory Technician Tony Leugner**, was honoured with the President's Service Award for Excellence in recognition of his role as “a leader in the planning and development of the rapidly-changing technical infrastructure that supports the department's teaching and research.”
- **Electrical & Computer Engineering Professor and CICS Director Rabab Ward**, was elected as Fellow of the Royal Society of Canada in recognition of her worldwide reputation as an expert in signal and image processing.
- **Mechanical Engineering Professor Stan Hutton**, received a Gleddon Senior Fellowship from the University of Western Australia, allowing him to conduct joint research in the area of machinery vibration diagnostics.
- **Metals & Materials Engineering Professor Indira Samarasekera**, was selected as the recipient of a Canadian Institute of Mining, Metallurgy and Petroleum Fellowship. Dr. Samarasekera also was honored with the Dofasco Award at a recent Conference of Metallurgists in recognition of her significant contributions to the field of materials engineering. And more recently, she received the Meritorious Achievement Award from APEGBC.
- **Mining and Mineral Process Engineering Professor John Meech and Saiedeh Forouzi**, won the best paper/presentation award from the IEEE Industry Applications Society at the Advanced Process Control Applications for Industry Workshop in Vancouver earlier this year.

## Perfecting Papermaking

Continued from page 1

The central question in Dr. Green's research, therefore, is how to best design the forming section to optimize fibre and fines distribution and density, and ultimately, paper quality. He is assisted in this work by a number of graduate students and two industry partners: the Beloit Corporation and the JWI Group. These partners are eager to keep up to date on the latest techniques for producing paper of consistent, high quality.

Even though Dr. Green's primary research interest is currently papermaking fluid mechanics, he has subsidiary interests in marine propellers, aerodynam-

# Appointments

## Chemical & Bio-Resource Engineering

- **Dr. Axel Meisen**, Chemical Engineering Professor and former Faculty of Applied Science Dean, was appointed as the new President and Vice-Chancellor of Memorial University September 1, 1999. His many academic honours include the medal of Distinction from the Government of Peru, Fellow of the Canadian Institute of Chemistry and Fellow of the Institution of Engineers of Ireland. Dr. Meisen contributed greatly to the Faculty and UBC with his 30 years of dedicated service. We wish him well in this challenging new venture!

- **Dr. Mark Martinez** was appointed Assistant Professor September 1, 1999. This is a joint appointment between the department and the Advanced Papermaking Initiative, a collaborative effort between UBC and BCIT designed to promote teaching, research and outreach for the benefit of the pulp and paper industries and communities in BC.

## Civil Engineering

- **Dr. Perry Adebar**, Professor, was appointed Associate Dean of Administration July 1, 1999. Some of Dr. Adebar's new responsibilities include engineering curriculum changes and program accreditation, budget and resource strategies, space requirements, infrastructure additions and renovations, and school, department and program reviews.
- **Dr. Noboru Yonemitsu** was appointed Assistant Professor in a term position July 1, 1999. Dr. Yonemitsu's specialty is environmental fluid mechanics.

## Mechanical Engineering

- **Dr. Dale Cherchas**, Professor, was appointed Acting Head of Mechanical Engineering July 1, 1999. Dr. Cherchas assumes administration of the department and replaces former Head Dr. Robert Evans.

- **Dr. Kendal Bushe** was appointed Assistant Professor July 1, 1999. Dr. Bushe's interests include thermodynamics and fluid mechanics, with a specialization in combustion.

- **Dr. James Olson** was appointed Assistant Professor July 1, 1999. This is a joint appointment between Mechanical Engineering and the Advanced Papermaking Initiative. Dr. Olson specializes in fibre processing and recently acted as leader of Paprican's fibre fractionation research.

## Metals & Materials Engineering

- **Dr. Goran Fernlund** was appointed Assistant Professor July 1, 1999. Dr. Fernlund's interests include process modeling and fracture and damage of composite materials.



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

### Departments

- Chemical and Bio-Resource Engineering
- Civil Engineering
- Electrical and Computer Engineering
- Mechanical Engineering
- Metals and Materials Engineering
- Mining and Mineral Process Engineering

### Office of the Dean

- Engineering Student Services
- Engineering Co-op Office
- Office of Continuing Education
- Undergraduate Programs (with the Faculty of Science)
  - Engineering Physics
  - Geological Engineering

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

- The Centre for Integrated Computer Systems Research (CICSR)
- The Advanced Materials and Process Engineering Laboratory (AMPEL)
- The Biotechnology Laboratory
- The Pulp and Paper Centre

