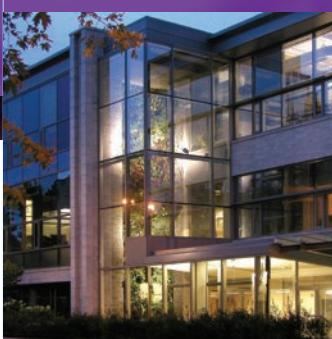


# Applied Science Engineering at Queen's

Spring '07

Newsletter



Tom Harris, Dean

## A Message from the Dean

This will be my final Dean's Message since my term ends in June, 2007. I plan to take a two-year research leave, after which I will resume my teaching and research responsibilities in the Department of Chemical Engineering.

The Dean Designate, Dr. Kimberly Woodhouse, was recently appointed by the Principal. Dr. Woodhouse is a Professional Engineer and a professor in the Department of Chemical Engineering and Applied Chemistry at the University of Toronto. She is also the Associate Director of the Advanced Regenerative Tissue Engineering Centre at Sunnybrook Health Sciences Centre. After receiving her undergraduate degree in chemical engineering from McGill, Dr. Woodhouse spent nearly eight years as a production supervisor, staff engineer and department and production manager with two multi-national companies located in Canada. She returned to school, completing her doctoral studies in chemical engineering at McMaster University – the same department where I received my doctorate. Dr. Woodhouse has established an internationally-recognized research program in tissue engineering at the University of Toronto (see a profile of her research on page 2). She serves on a number of provincial, national and international committees overseeing basic and applied research and commercialization of research. She is very committed to engineering education.

I have known Dr. Woodhouse for many years and I am delighted that she will become the new Dean of the Faculty of Applied Science. Since her appointment was announced we have been working together on a transition strategy. I know that she is looking forward to her interactions with faculty, staff, students and alumni. She will bring considerable energy and enthusiasm to the position of Dean.

There have been enormous changes in higher education since my appointment as Dean in July 1996. Universities, while still well supported by provincial and federal governments, have come to rely increasingly on tuition fees to finance their operations. When I became Dean, the tuition for undergraduate engineering students was \$3,187; it will be \$7,311 this September. As one might expect, student expectations have also risen! As well, governments are requiring increased accountability from universities for the public funds that they receive. Universities compete nationally, and in some cases internationally, for undergraduate and graduate students. There is a global demand for faculty members. Proposals for research are evaluated against international standards. Today, universities can no longer afford to be ivory towers. Innovation, imagination, strategic planning and implementation are essential requirements for success in today's post-secondary environment. I believe that Applied Science has responded well to the challenges of this competitive environment.

There has been considerable evolution in our undergraduate programs of education at both department and Faculty levels. Our integrated learning initiative has received national and international recognition. We put considerable time and energy into recruiting students to Applied Science at Queen's. We continue to be successful in attracting a diverse group of very bright and well-rounded students who are willing to work very hard for their degrees.

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# New Dean brings a passion for research

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Our students are also involved in many leadership activities outside of the classroom. Engineering students are an incredibly positive force for change on this campus. They have an extraordinary influence on University and Faculty governance. They don't readily accept 'no' for an answer unless there is a very compelling reason. If our students had a motto, it would probably be "work hard – play hard!"

Our research programs have also expanded with the growth in research funding. Many research initiatives are now conducted in centres and institutes that bring together researchers from several disciplines, including those outside engineering. Nearly half of the current faculty members in Applied Science have been hired since 1999. I continue to be amazed by the high level of commitment of faculty members to both teaching and research. As well, I have very much appreciated the dedication and hard work of our administrative and technical staff.

When I was appointed Dean, the Faculty had very little interaction with alumni and companies. Over the past six years, nearly a third of my time has been devoted to this important constituency; I have visited close to six hundred alumni. Our Faculty has benefited enormously from your observations on program development and the changing environment in which our graduates work. There has been an abundance of hospitality, goodwill and generosity in your interactions with me for which I will be ever grateful.

It has been a privilege to have served as the Dean of the Faculty of Applied Science at Queen's University.

When Kimberly Woodhouse arrives on campus in July to assume her position as Dean of Applied Science and Professor of Chemical Engineering she will also be taking her research in a new direction.

An expert in the design of novel materials used in regenerative medicine (repairing or replacing damaged or diseased tissue and organs), Dr. Woodhouse says that coming to Queen's will allow her to shift the focus of her studies – and it's a change that she eagerly anticipates.

"I see this as an opportunity to concentrate on an area of research that has been my passion for a long time, but which I haven't been able to pursue until now," she says. "I'm very excited about that."

With eight years experience in private sector manufacturing and cross-appointments to the Institute of Biomaterials and Biomedical Engineering, Dr. Woodhouse, currently a Professor in Chemical Engineering at the University of Toronto, has built an international reputation in the engineering of soft tissue. Currently, she is developing a cardiac patch that would act as a guide to support the growth of heart cells. This work is being done in collaboration with Dr. John Rabolt at the University of Delaware, and other investigators from the U.S. and Australia.

Dr. Woodhouse is also Associate Director of the Advanced Regenerative Tissue Engineering Centre (ARTEC) at Sunnybrook Health Sciences Centre in Toronto – a position that both Queen's and Sunnybrook have encouraged her to retain. A recent offshoot of her work in the Centre has been the development of tissues that support fat, in studies that she conducted with Queen's new Chemical Engineering appointment, Lauren Flynn.

The new research that Dr. Woodhouse hopes to pursue at Queen's will focus on a tissue-engineered blood vessel. This



Dr. Kimberly Woodhouse

will address some of the debilitating consequences resulting from diabetes, such as the peripheral vascular disease that causes problems with circulation and blood flow below the knee.

"Currently we don't have a synthetic material that works below the knee in those small vessels," explains the incoming Dean. "It's a continuing challenge" she says, noting that this research builds on her original Ph.D., and is a natural extension of her work on cardiac patches.

At Queen's, Dr. Woodhouse and her students will use both synthetic and naturally-based elastomeric (stretchy) materials to develop scaffolds: three-dimensional structures to which cells can adhere and grow into tissue. She intends to focus on materials made from biodegradable polyurethane (on which she holds patents) and from polymers that are found in nature.

Studying how the human body heals and reacts to artificial material is an exciting aspect of her research, says Dr. Woodhouse. "Through working on the tissue, scientists learn a tremendous amount about how the body engineers itself."

# ADMI adds value to an engineering degree



The Advanced Design and Manufacturing Institute (ADMI) is a unique graduate program helping engineers in the field enhance and renew their professional skills.

Created in 2001 through the partnership of Queen's and four other leading Ontario universities, ADMI combines expertise in manufacturing and design with best business practices and management skills. The Master of Engineering in Design and Manufacturing degree program provides practicing engineers with enhanced knowledge, tools and technology, as well as business and management skills.

"The ADMI program dovetails nicely with our focus at Queen's on integrated learning," says Professor David Strong, NSERC Chair in Design Engineering. "It provides an opportunity for engineers in the field to enhance their undergraduate degrees on both the technical and the management side, without sacrificing either." The ADMI degree's split is about 70 per cent technical and 30 per cent business.

Endorsed and supported by Ontario industry, ADMI is the central organization through which the partner universities and industry design and develop the program and pool key academic and industrial resources. Other university partners are McMaster University, the University of Toronto, the University of Waterloo and the University of Western Ontario.

Queen's engineering graduates now working in the field are strong advocates of the ADMI program. According to Martin Walker (Sci '01, Mechanical), Product Development Engineer at Datec Coating Corporation in Milton, Ontario, "The ADMI program allows me to tailor my program to develop a unique set of relevant skills. I appreciate being able to select business as well as technical

courses, giving me exposure to business issues without having to complete an MBA. The modular-format courses give me the freedom to pursue my Masters' degree at my own pace, in balance with work and personal responsibilities."

Graeme Paul (Sci '97, Mechanical) is an Equipment Manufacturing Engineer with Vari-Form in Strathroy, Ontario. "I have found the courses to be challenging and rewarding, and the professors from the partner universities are terrific," he

says. "Projects that accompany each course have allowed me to apply classroom teachings immediately to address specific workplace issues."

For more information on the ADMI M.Eng. visit [www.admicanada.com](http://www.admicanada.com). Contact: Prof. David Strong, P.Eng., Professor and NSERC Chair in Design Engineering, Queen's: 613-533-2606, [strongd@apsci.queensu.ca](mailto:strongd@apsci.queensu.ca); or David Heaslip, ADMI Executive Director: 905-855-9787, [dheaslip@admicanada.com](mailto:dheaslip@admicanada.com).

## Growing tissue in the lab

Stephen Waldman's cross appointment to two departments in the Faculty of Applied Science – both Mechanical and Materials Engineering, and Chemical Engineering – underscores the collaborative nature of his research. Professor Waldman joined Queen's in September 2003.

A mechanical engineer by training, he is intrigued by the chemical environment in which cells grow. His work on tissue engineering focuses on load-bearing connective tissues, particularly those that are soft, such as cartilage, ligaments and the spongy tissues that separate the vertebrae.

"Whenever damage is inflicted, through a traumatic event or disease, these tissues tend to degenerate," says Dr. Waldman, who is the Canada Research Chair in Tissue Engineering of Synovial Joints. "Typically, the damage inflicted is allowed to progress to the point at which the entire tissue can be replaced by synthetic materials."

But synthetic materials have disadvantages, and recent efforts have been focused on developing biological replacement tissue as a more desirable alternative. Dr. Waldman's research group applies physical and chemical stimuli to cells during tissue growth, encouraging the cells to produce structures with appropriate properties for

restoring joint function and for survival after implantation. "We monitor the cultures as they're growing and look both chemically and mechanically at what the cells are making: the proteins and their organization needed to create functional tissue," he explains.

One key application of this work will be to develop cartilage that can be used to treat osteoarthritis and delay the need for total joint replacement. "If we can repair the damage to cartilage early, the patient may be able to avoid or at least delay a total joint replacement," says Dr. Waldman, noting that there is nothing commercially available to do this yet. Dr. Waldman's research is funded by the Natural Sciences and Engineering Research Council of Canada (NSERC), the Canadian Institutes of Health Research (CIHR), Materials and Manufacturing Ontario (MMO) and the United States Army.

"While we're progressing in this and other areas now, our products won't be available for use in the immediate future," he continues. "There are some very positive developments that we're excited about, however, and we do think we have the potential here to further the field substantially."

For more information on Dr. Waldman's research, please visit: <http://www.chemeng.queensu.ca/people/waldman/>.

# Shell Canada Limited backs Queen's TEAM



Thanks to generous support from Shell Canada Limited, Queen's engineering students are gaining valuable insights into potential careers in the energy sector, and tackling real-life industrial problems on multi-disciplinary teams.

Through its new Campus Ambassador program, the company links students with senior-level Shell executives, provides guest lecturers and arranges field trips to Shell plants. According to Chief Financial Officer Cathy Williams (MBA '77), who is Shell's Campus Ambassador to Queen's, "The students gain practical experience in their field of study and Shell gets to meet top-notch prospective recruits."

As part of the program this year, 25 fourth-year mining engineering students visited the oil sands in Fort McMurray and 110 students in Chemical Engineering and Engineering Chemistry went on a field trip to Shell's refinery in Montreal. Organizers suggest that exposing students to the reality of working in an industrial environment will help them make informed decisions about their future.

Shell has also donated \$400,000 to TEAM (Technology, Engineering and Management), a Queen's multi-disciplinary program that enables upper-year students to work on projects for industrial clients. Over the past decade, Shell Canada Limited has invested a total of \$12 million in Canadian academic institutions.

"TEAM provides students with an opportunity to practice innovative thinking, problem solving, and business analysis in real-world situations," explains Barrie Jackson, an associate professor in Chemical Engineering. Barrie devised the TEAM program and in 1998 was awarded the Canadian Council of Professional Engineers Medal for Distinction in Engineering Education. One of the TEAM projects this year has students from Chemical and Mechanical Engineering, Commerce, Law and Biology evaluating the integration of energy from biomass into the production of fuels from the Alberta oil sands. For more information on the TEAM program and how you can get involved please visit <http://team.appsci.queensu.ca>.



James Snyder (Mining 07) is ready to go get his first load of oil sand in his 400 ton CAT truck at Albian Sands.

## You're Invited

Save the date for Homecoming 2007: October 12-14! Join the new Dean, Dr. Kimberly Woodhouse, at the Applied Science Alumni Reception on Friday October 12th, 3:30-5:30pm in Beamish-Munro Hall.

# Harnessing wind for renewable energy

When he was an engineering student at Queen's, Ian Baines (Sci '74, M.Sc '76) was impressed by the intense winds that had helped bring the 1976 Olympic sailing competitions to Kingston. Years later, that memory struck a chord with this Canadian Hydro Developers consultant, who has a passion for renewable energy.

With fellow Queen's grad Samit Sharma (MBA '02) and a team of like-minded enthusiasts, the wind project by Canadian Hydro Developers convinced the Ontario Power Authority last fall to accept their bid to build a \$410 million wind farm on Wolfe Island. The project will

feature 86 high-tech turbines producing almost 200 megawatts of electricity: enough to supply 75,000 households.

Although he has now moved on from the project, Baines is following it closely and calls on the University to "Get aggressive and find ways to embrace renewable energy."

Sharma hopes it will have a positive impact on enrolment in the Faculty of Applied Science. "It will attract a whole new group of students who want to take courses in renewable energy and environmental solutions to help in Canada's quest to tackle global warming," he says.



# Hatch is home for Applied Science grads



When Bancroft, Ontario farm boy Bert Wasmund (Sci '61) attended Queen's in the late 1950s, he was struck by the bright minds and infectious spirit of his fellow students, who came from all across Ontario and other parts of Canada. "It was a great people school," he recalls, noting that the total enrolment then was only 2,700.

Today, he is the Executive Director of the international engineering company Hatch Ltd., which also has three managing directors and a second executive director who graduated from Queen's. Hatch also employs a number of Queen's graduates and is actively working with the Faculty of Applied Science to make sure that relationship continues.

Industries served by Hatch world-

wide range from iron and steel, non-ferrous metals, industrial minerals, light metals, power generation, oil and gas, industrial and transportation infrastructure through to new technologies and advanced computer systems.

Headquartered in Mississauga, Ontario, the company has 80 offices throughout Australia, North America, South Africa, South America, China, Russia and India.

Hatch is the key sponsor of the Queen's Solar Vehicle Team, and has partnered with the Faculty to provide multi-disciplinary classroom opportunities for engineering students. As an industrial sponsor for a fourth-year design stream project, the company is working with a student team to design and prototype an electric utility tractor with state-of-the-art electronics, control systems, drive mechanisms and battery technology.

Hatch also offers professional experience to Queen's students through summer positions and internships. A unique arrangement is also being finalized between the company and the University of Western Australia, which will allow Queen's students to gain international work and study experience.

According to Dr. Wasmund, the relationship has paid off. "Hatch has been most fortunate in acquiring steadily over the years a strong contingent of Queen's graduates, mostly from engineering but from other faculties as well," he says.

The advantages are equally clear to Dean of Applied Science Tom Harris. "The Faculty appreciates the support from Hatch," says the Dean. "They are providing our students with leadership and technical opportunities not easily replicated in a traditional classroom environment."

# A quest for inquiring young minds

The dream of two women Applied Science students almost 20 years ago has blossomed into an initiative that today touches the lives of thousands of young people annually.

Science Quest – a summer day camp and outreach program – provides exposure to engineering and science for children in grades four to eight. During May and June, the service runs workshops at schools across eastern Ontario. Then, when elementary school classes finish at the end of June, the program becomes a day camp on Queens campus. Science Quest is overseen by the Engineering Society; camp instructors are predominantly engineering students.

Week-long, project-based experience in areas such as earth and materials sciences,

engineering design and information technology are offered, mostly based in Beamish-Munro Hall. And, during a special Girls Week at Science Quest, young girls are given an opportunity to experiment with science and engineering projects in a predominantly female environment.

An exciting new focus introduced this past year has seen the program taken to Aboriginal communities in northeastern Ontario. With four other students, the program's Business Director, Penny Lam (Sci '08, Electrical) conducted 16 workshops for more than 200 Aboriginal students in the isolated communities of Matheson, Calstock, Chappleau and Wikwemikong.

The first step in a five-year Aboriginal

Outreach initiative, the idea is to focus the organization's strategies in approaching and initiating satellite programs in First Nations communities, says Ms. Lam. The secret of Science Quest's success, she adds, is "its young instructors with their utter love for science and engineering."

Dean Tom Harris has been an enthusiastic supporter. "Outreach programs such as Science Quest are very important as they provide young students with an interesting and engaged perspective on science. The Science Quest initiative started at Queens has since been adopted at many universities across Canada."

# Students helping students save money

Until the recent expansion of mega-bookstores, Queens was able to claim to have the largest bookstore between Toronto and Montreal. Although still an important campus service, today's Campus Bookstore can no longer claim that title.

A non-profit corporation overseen by Queens University Engineering Society Services Inc. (QUESSI), it is the only student-owned and student-operated campus bookstore in Canada with a history of successful operation.

Known for years as Technical Supplies (or "Tech Supplies" in the college vernacular), the Bookstore not only stocks required textbooks for all courses offered by the University – at a discount below listing price – it also carries a wide range of general interest and reference books, other academic supplies, crested clothing, and gift items.

The Bookstore's origins date back almost a century to 1909, when two enterprising Applied Science students wanted to offer their peers more reasonably priced textbooks than could be found in downtown Kingston. Initially housed in Fleming Hall, Tech Supplies moved to its present Clark Hall location in 1951. Today, this student initiative has grown into a \$10-million



Clark Hall, home of the Campus Bookstore

corporation recognized nationally as a model of the way a campus bookstore should be run. mated \$500,000 per year. QUESSI Chair Duncan Findlay (Sci '07) says, "Our prices are usually much cheaper than online retailers who often don't even have the book in stock." The discount is passed on to students in subsequent years through a huge market in used texts, which can save them another 25 per cent or more.

Another money-saving initiative is the Bookstore's Custom Courseware. Manager Chris Tabor says it's like a "best of" collection geared to a specific course: "Each term the bookstore produces more than 100 titles of Custom Courseware, which contains selections of materials from numerous textbooks together with instructors' notes," he explains. "These are usually produced at much lower prices than full or complete textbooks."

Duncan Findlay says planning is now under way for the time when digital course materials replace paper textbooks. "It's an issue we're definitely looking at and taking quite seriously. We believe it will happen – quite possibly within the next five to ten years."

Fast approaching its first century of successful operation, Queens Campus Bookstore is already making plans for the next one.

# Reincarnation of a campus landmark

In the 1950s and 1960s, it was *the* place to meet on campus. The venerable Queen's Tea Room, located on the northeast corner of Union and Division streets, is fondly remembered by alumni from that era as a prime dating destination, where more than one marriage proposal occurred.

Now, more than 30 years after its destruction to make room for the construction of Goodwin and Dupuis Halls, the Queen's Tea Room is back. Java, Cokes and burgers have been replaced by Fair Trade coffee, tea infusions, smoothies and sandwiches.

Housed in the Integrated Learning Centre (ILC) in Beamish-Munro Hall, which extends over the site of the original Queen's Tea Room, the reborn café held its grand opening last fall. In keeping with the spirit of the ILC, today's Tea Room is designed to be a living lab exemplifying innovation, creativity and collaboration.

Run by the Engineering Society as an environmentally sustainable and socially responsible business, the café operates on the principles of eliminating waste,



The original Tea Room

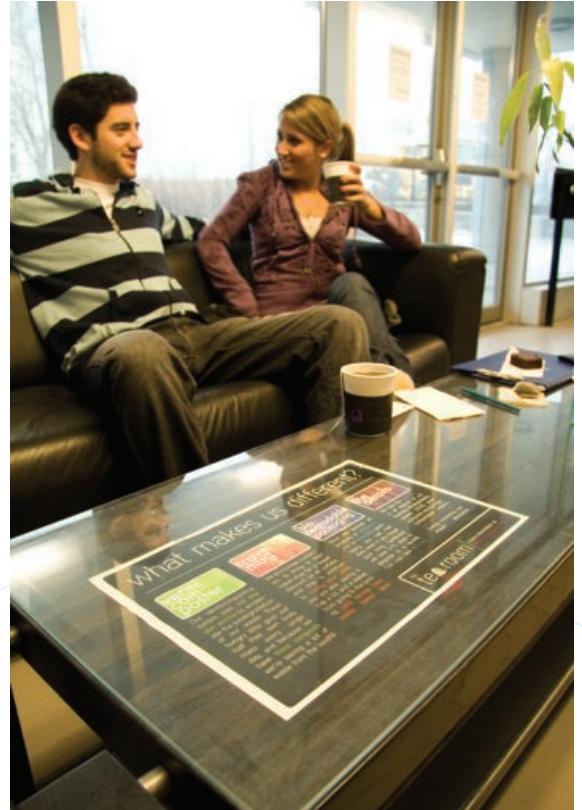
avoiding the use of non-renewable energy sources, and using all resources responsibly.

"The consumer interest in our many environmental initiatives has been extremely motivating," says Marketing Manager Josh Workman (Sci '08). "We're frequently asked for tours to see our vermi-composting system in action," he adds.

The new system makes use of Red Wiggler worms to accelerate the process of composting food and biodegradable waste from the café, Josh explains. Combined with standard recycling procedures, it eliminates the need for garbage disposal and allows customers to purchase products without contributing waste to a landfill.

Other unique features of the new Tea Room include: a special discount on tea and coffee products consumed in any reusable travel mug; a computer screen on which customers can monitor the café's energy consumption in real time; and biodegradable or recyclable products for all consumer packaging. The structure itself has been constructed with sustainable building materials.

Thanks to a generous donation from the class of Science '48 – some of whom enjoyed the ambiance of the original Tea Room – contemporary patrons will have



The newly opened Tea Room in Beamish-Munro

a wide selection of reading material to consume with their refreshments. The Science '48 Educational Bookshelf offers a range of current periodicals and subscriptions, as well as local and campus publications.

The most requested menu items at the revamped Tea Room? Manager Josh Workman reports that the 32 flavours of tea and the fresh cupcakes are the biggest hits with students, faculty, staff and Kingston residents who pack the popular café every day for lunch.

# Queen's University Alumni Association Awards

Each year Alumni Association branches across the country recognize members for distinguished service to their community, the branch and the University. This past year, Applied Science alumni were recipients of many of these awards.

In Calgary, Kathy Sendall (Sci '77) received the Johnson Award, named after Ernie (M.D. '38) and Edna Johnson for their generosity and dedication to their alma mater and their community. As Senior Vice President, North American Natural Gas for Petro-Canada, Kathy currently chairs the Canadian Association of Petroleum Producers (CAPP) and is a Director and Past President of the Canadian Academy of Engineering. She was named a Mentor of the Millennium by the Alberta Women's Science Network and an Engineering Role Model by the United States Academy of Engineering. For the past four years, Kathy has been listed among the "Top 100 Most Powerful Women in Canada" by the country's leading organization for the advancement of executive women – one of seven Queen's alumnae and the only engineer to be included in 2006. She was also selected last year as one of the Financial Post's "Next 25 CEOs".

One of the 2006 Grunnan Onarach Award (Gaelic for "honour group") recipients from the Ottawa Branch was John Oliver (Sci '56). John joined the executive of the Ottawa Branch in 1960. He co-founded and was President of the consulting firm, Oliver Mangione McCalla and Associates Limited, which in 1995 amalgamated with Trow Associates Inc. John was also an

architect and had the pleasure of working with many young engineers on a variety of projects, including industrial and manufacturing facilities, hospitals, research facilities and recreational complexes. In 1986 he became a Fellow of the Engineering Institute of Canada and in 1988 John received the prestigious Beaubien Medal from the Association of Consulting Engineers of Canada. For twelve years John served as Chief Warden for Camp 12 for The Ritual of the Calling of the Engineer. Two of his children, David (Sci '82) and Christy (Sci '83) continue the family tradition.

David Whiting (Sci '65) is the 2006 recipient of the Toronto Branch's John Orr Award. David is a member of the Board of Trustees, the University Council, the Board of PARTEQ (the University's technology transfer agent) and past President of the Alumni Association. His commitment to the Alumni Association has been recognized with the Herbert J. Hamilton Award, and his contribution to the University with a Distinguished Service Award. He is also a member of the Grant Hall Society, and has been the driving force behind the Science '65 Bursary. David's commitment to Queen's is not a recent phenomenon; as a student David received the Tricolour Award in his graduating year. David is currently President of Merlan Scientific Ltd.

Also this past year, the Kingston Branch presented Bob Pritchard (Sci '64) with the Padre Laverty Award, named in honour of former Queen's Chaplain, "The Padre," Dr. A. Marshall Laverty. A leader in both the Alumni Association and University Council, Bob has chaired the Student Life Committee and participated actively in the mentorship of Queen's students. Further evidence of his commitment to students is evident in his establishment of a scholarship in the Faculty of Applied Science. He has also contributed generously to the Kingston community through his promotion of entrepreneurship among city youth, his involvement in the First Capital Challenge program, and by assuming an advisory role with the Entrepreneurship/Small Business sector of KEDCO (Kingston Economic Development Corporation).



2006 Grunnan Onarach Award Recipient John Oliver

## Change in Tax Laws

In 2006, the Federal Government announced new tax incentives that make donating to Queen's an even more attractive proposition. Now publicly-traded securities such as stocks, bonds, and mutual funds that are transferred to Queen's will not be subject to capital gains tax. Similar incentives exist for individuals who have invested in flow-through share programs or who hold employee stock options.

Not only can you reduce the amount of tax owed on the appreciation of your investment, you will receive a charitable tax receipt for the full fair market value of your shares.

The cost to you is reduced to the amount initially invested, but the benefit to Queen's can be many times greater. For instance, your gift of shares valued at \$10,000 today will create a tax credit of \$4,600, depending on which province you reside in, and no capital gains tax will be owed. If the original cost of the securities was \$5,000, you will have almost completely recovered the value of the gift.

It is important to remember that the securities must be transferred directly to Queen's and not cashed out first. The Office of Planned Giving at Queen's would be happy to discuss tax-smart ways to support the Faculty of Applied Science.

Please contact Planned Giving at 1 800 267 7837 or [christina.attard@queensu.ca](mailto:christina.attard@queensu.ca).



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