



Dean's REPORT



Long-time Engineering Faculty supporter Lorne Trottier, BEng'70, MEng'73, DSc'06, jokes with student award-winners about the punch cards that programmers used at the dawn of the computer era. Trottier is the founder and CEO of Matrox Electronic Systems Ltd. and an internationally respected technology innovator.

Dear Graduates and Friends,

Global economic forces, rapid scientific advances, cross-border migrations and new approaches to problem-solving are moving societies in directions that were unheard of a decade ago. By the year 2020 our graduates will have to master new technical information to tackle increasingly complex social, economic and environmental problems. Coming generations of engineers, in particular, will need a great understanding of the global marketplace; they will need to collaborate with multidisciplinary teams of experts and they will have to be attuned to the social and environmental ramifications of their work.

Leading-edge universities like McGill must also give graduates the tools to prepare for varied work experiences throughout their lives, because a significant percentage of engineering school alumni eventually pursue careers in other fields. Producing this new breed of multi-talented professional will require exceptional professors, outstanding students and a stronger focus on interdisciplinary co-operation.

The Faculty of Engineering is up to this new challenge. Our professors, students and alumni have made major contributions to our profession and to society.

Building on this base, McGill Engineering is poised to become a true leader among engineering schools worldwide to ensure that graduates leave university with the full range of knowledge and skill sets needed for success.

Planning has been underway for several years to set this process in motion and a number of basic elements are already in place. The next major step is to secure the financial resources that our Faculty's five departments and two schools will need to bring the plan to fruition.

The principal tool available to us is the \$750-million fundraising effort that McGill launched last fall. Campaign McGill: History in the Making is the most ambitious fund drive ever launched at a Canadian university. Our Faculty's objective is \$70.5-million.

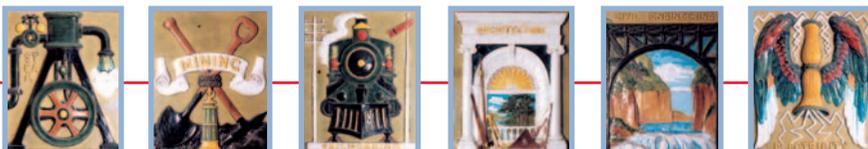
The campaign's purpose is not growth for growth's sake, but to serve as a mechanism to better prepare engineering, architecture and urban planning students for the realities they will face in the years to come.

Major individual and corporate donors such as Dr. Lorne M. Trottier, Hydro-Québec, Dr. Gerald G. Hatch, Ian and Helgi Soutar, Gerald Sheff, Marika Roy, Petro-Canada, Dr. Leslie Vadasz, Dr. Andrew Benedek and Dr. Diana Mourato-Benedek,

Dr. Michael D. Sopko, the late Lars J. Firing, David W. Kerr and Sheryl L. Kerr, William Lassner, Howard Stotland, Dr. David J. Azrieli, Shell Canada Limited and A. Scott Taylor have already provided generous gifts to help McGill Engineering give its students the finest education possible.

Their donations are helping us recruit and retain world-calibre professors, undergraduate and graduate students, modernize our programs and provide state-of-the-art teaching and research laboratories. A new Faculty Advisory Board, composed of alumni, benefactors and industry leaders, is also hard at work helping us to develop our vision for the future. Support from our graduates and friends is critical if the Faculty of Engineering is to continue making strides. Our students, teachers and researchers are relying on your help, and I ask each of you to add your support.

Christophe Pierre
Dean, Faculty of Engineering



ENGINEERING
ALUMNI PRIDE

One-stop shop for Engineering students

BY PATRICK LAVERY

The McGill Engineering Student Centre (MESC) is building a one-stop shop for all undergraduate students in the Faculty of Engineering, rolling student affairs, career counseling and peer tutoring into one comprehensive office.

Recent gifts from companies like Shell Canada, and from alumni like Ian and Helgi Soutar, have brought the Centre to “a new level of service,” and it now provides students with career and academic advice, helps secure internships across the country and around the world, and supports McGill Engineering in its efforts to build its sterling reputation as a leading resource for top talent.

“We are emphasizing a relationship management model with our customers – both employers and students,” says Nelly Vassileva, the Industry Liaison Manager, Careers. While students benefit from increased internship opportunities and broad exposure to the job market, Vassileva says “employers value the opportunities we provide them to go beyond recruitment and get involved in student projects, speaker events and the like.”

But the MESC does much more than arrange internships, provide academic advising, award scholarships and prepare students for international study terms abroad. It also offers an extensive outreach program of workshops, demonstrations and presentations throughout the school year that relate directly to student life and student learning within the Faculty. This

year the Centre organized ACT Now - Advising Matters!, a week-long series of events highlighting Centre services such as tutoring, help with courses, interview preparation, degree assessment, business etiquette and opportunities for women, as well as the Engineers-in-Action Speaker Series, where leading engineers share real-world experiences with students.

As well, in partnership with the McGill University Career & Placement Service and the Project Management Office, the MESC recently launched MyFuture, an online career management system that features job postings for internships and full-time positions, employer profiles, job search resources, and an events calendar. Students can apply for jobs, sign up for interviews, manage their documents, register for workshops and complete their internship reports online.

Judy Pharo, Associate Director of the MESC, says bringing in state-of-the-art technology has helped streamline operations and free up time for the Centre's employees to offer students more counseling and workshops and build more relationships with employers.

“It allows us to focus more on the things that matter,” she says.

Architecture director and bridge-builder-in-chief

BY PATRICK McDONAGH

Michael Jemtrud



PHOTOS: OWEN EGAN

Michael Jemtrud, MArch'00, is a man with a mission. In addition to redesigning curriculum and introducing cutting-edge technologies, the new Director of the Faculty's School of Architecture is charged with building bridges across his Faculty, his University and beyond.

Jemtrud returned to McGill in August 2007 after teaching at Carleton University and establishing its Immersive Media Studio. He hit the ground running, and has already implemented a brand new digital architecture research program and curriculum. But even for an architect, building bridges isn't always easy.

“The School does not have an entrenched tradition of blending digital media and architec-

ture,” Jemtrud says, “but what it does have is plenty of research and scholarship in related areas, from theories of representation to fabrication research. I'm really looking forward to integrating this whole package.”

The integration he talks about is much more than just talk – already, he has built partnerships with IBM, Autodesk and other industry giants to develop network-enabled platforms for three-dimensional remote applications. The idea is to create “collaborative software” that would allow an architect in Montreal to work with engineers in New York on a project in Singapore. So far the tools to ease this long-distance dialogue are primitive, but Jemtrud is changing that.

“Collaborative software exists out there,” he says, “but it doesn't allow collaborators to manipulate data directly in real time, or to work within certain realistic, high-fidelity immersive contexts.”

In addition, Jemtrud is working with UbiSoft and the National Research Council on an urban heritage project to digitally map the lower section of Montreal's historic St-Laurent Boulevard.

These projects push the boundaries of technology, and often involve multiple massive datasets; while most university broadband networks operate at 100 megabits per second, Jemtrud's work can gobble up to four gigabits – 40 times as much. “Integrating all these datasets across a network on the fly is a massive task,” he says. “It's truly cutting-edge stuff.”

Jemtrud is involved in yet another project with Architecture professor Alberto Perez-Gomez, and plans to build further collaborations within Architecture, at the Centre for Intelligent Machines and across the Faculty of Engineering. There is also a potential for shared interdisciplinary work in Medicine and at the Centre for Interdisciplinary Research in Music Media and Technology, among others.

“We have an extraordinary pool of resources in our Faculty and across the University,” he says. “I'm excited about what we can do.”



PHOTOS: OWEN EGAN

Renowned architect Moshe Safdie, BArch'61, LLD'82, delivered the David J. Azrieli Lecture last October. The event marked the 40th anniversary of Safdie's “Habitat 67” housing complex, conceived during his studies at McGill.

Gerald Hatch

KNOWLEDGE AND PROCESSES

BY PATRICK McDONAGH

In a career spanning 50 years, Gerald Hatch, BEng'44, DSc'90, has managed complex projects from research and development through to design and production. As president of Hatch Investments and founder of Hatch Ltd, a comprehensive engineering firm that employs more than 7,400 people, he honed a broad range of skills demanded by the challenging and stimulating world of process engineering.

Hatch has always appreciated the importance of sharing his knowledge and passion. This March, Hatch once again opted to share his resources as well, donating \$3-million to the Faculty of Engineering. Half will provide an endowment for three Hatch Faculty Fellows in Engineering – three-year renewable \$25,000 awards for professors researching process materials engineering – while the other half will create the Hatch Graduate Fellowships in Engineering, awarded annually to students researching in this field. Hatch has a long history of generosity to the University, both as an individual and through his company, his latest gifts bringing the total to nearly \$5-million.

Hatch's latest gifts will support a wide range of process materials research across the Faculty.

"Industrial processes are very multi-disciplinary," he says, "not just materials, but civil, mechanical, chemical and electrical engineering are all involved. A lot of innovation takes place beyond the initial research phase. And it is interdependent. No one works alone in this field."

Stephen Yue, Chair of Mining and Materials Engineering, agrees. "Researchers in our department are involved with producing known materials as well as creating new ones. But creating material in a lab is not the same as manufacturing millions of tons," he says.

No one knows that better than Hatch, who based a successful career on turning knowledge into practice. In the mid-1950s, Quebec Iron and

Titanium – now QIT-Fer et Titane – was struggling to improve its ductile titanium operation in Sorel. As the company's works manager, Hatch implemented a comprehensive approach to process design that reversed its fortunes and made it the success it remains today. That experience, combined with his academic knowledge, laid the foundation for his own company's evolution into an outstanding player in process engineering.

When he started the company with five partners in 1958, he identified two important assets. "I had terrific training, not just in metallurgy but in chemical engineering, the physics of metals and process engineering from McGill and then MIT,

where I received my doctorate," he says. "And at Quebec Iron and Titanium, I had a close look at how not to do things."

"Gerry built his company through sound engineering, innovative processing and hard work," says Yue. "He had a lot of ideas and drive, but he also realizes the value of people, and wants his gift to McGill to help as many people as possible." The Hatch Faculty Fellows (also known as Faculty Scholars) will support those who have been working in the field, and will retain promising young faculty members – as well as attracting new ones. "And Gerry is not only supporting the expertise of Mining and Materials Engineering, but also making it attractive for other departments to develop research in this area as well," Yue says. "There is real momentum to come together to develop a research centre in process engineering."

In recognition of his support, passion and contributions to the field of engineering, McGill awarded him an honorary Doctor of Science degree in 1990. Hatch's late wife, Sheila Baillie Hatch, BArch'46, was a passionate McGill supporter as well, and was among the first women graduates from our School of Architecture. A scholarship exists there in her name.



Following the announcement of his \$3-million gift, alumnus Department Chair Stephen Yue provides the guided tour.



PHOTO: OWEN EGAN

Graduate student Rebecca Payant, BSc'06, shares her research with Gerald Hatch in the Sulphide Self-Heating Lab.



PHOTO: OWEN EGAN

Gerald Hatch (left) visits McGill's Mining and Materials laboratories.

Cold Spray, Hot Technology

BY PATRICK McDONAGH

Forget mousetraps. Stephen Yue believes that if you build a better blisk, the world will beat a path to your door. Creating a blisk – a bladed disk such as those found in turbines – demands a high-precision forging of the initial hunk of material. But then, fully three quarters of the material must be cut away to reveal the blades.

“The process is expensive, wasteful and time-consuming,” says Yue, who succeeded Robin Drew as Chair of the Department of Mining and Materials Engineering in August 2007. And the problems don’t end in production – once in use, the blisk spins in its casing at high speeds and temperatures, and even the tiniest bit of wear can cause enormous damage. Since it’s far too expensive to discard, it must somehow be repaired.

“Blisk production and repair are good examples of what cold spray technology could do in the future,” says Yue. Cold spraying involves blasting a powder onto a substrate at 600 metres per second, or 2,150 kilometres per hour – about the speed of a bullet fired from a .22 calibre rifle. The powder builds up and is shaped with fine-tuned robotic controls capable of creating even tiny components with incredible precision. The technology is still far from having the capacity to build blisks from scratch, but there’s a good chance it will be repairing them in the very near future.

In addition to his new responsibilities as chair, Yue heads the McGill Aerospace Materials and Alloys Design Centre (MAMADC), which opened its doors in February at the National Research Council (NRC) Industrial Materials Institute near Montreal. “We’re the only cold spray lab anywhere in the world with three distinct cold spray systems,” he says, “ranging in size from a large cold gas technology system, which can spray anything that can be plastically deformed, to a small portable unit. Other labs tend to have allegiances to one type or another, so we are well-positioned to do versatile, objective research.”

Yue, whose expertise lies in microstructures and thermomechanical processing, will be spending his lab time studying the properties of materials being sprayed, while the NRC’s skilled technicians will help make sure the technology runs smoothly. Post-doctoral fellow Ahmad Rezaeian is McGill’s on-site representative, and he’ll eventually be joined by teams of graduate and post-doctoral students, as well as professors. MAMADC is also expected to provide opportunities for undergraduates in the Faculty’s co-op program.

The project is funded by the Canada Foundation for Innovation to the tune of \$4.8-million, and will further entrench McGill’s profile as a major R&D player in Quebec’s vibrant aerospace milieu. “We’re really looking forward to working with this community,” Yue says, and the sentiment is reciprocal – already Yue and industry giants Pratt & Whitney have won a \$750,000 NSERC grant to explore the use of cold spray on titanium alloys.



PHOTO: OWEN EGAN

Mining and Materials Engineering Chair Stephen Yue explains cold spray technology at an alumni cocktail.

8 Engineering profs awarded CFI grants

Eight Engineering professors were awarded Canada Foundation for Innovation (CFI) grants in 2007-2008.

- Dominic Frigon, Civil Engineering and Applied Mechanics
- Susan Gaskin, Civil Engineering and Applied Mechanics
- Raynald Gauvin, Mining and Materials Engineering
- Michael Jemtrud, School of Architecture
- In-Ho Jung, Mining and Materials Engineering
- Zetian Mi, Electrical and Computer Engineering
- Michael Rabbat, Electrical and Computer Engineering
- Viviane Yargeau, Chemical Engineering

Engineering wins 2 of McGill's 12 Canada Research Chairs

McGill won 12 of 62 Canada Research Chair (CRC) appointments across the country, bringing \$10.5-million in research funds to the University. Awarded during the 2007 academic year by Diane Ablonczy, Canada's Secretary of State (Small Business and Tourism), the CRC appointments include:

- Tho Le-Ngoc, of the Department of Electrical and Computer Engineering, whose Tier 1 CRC in Broadband Access Communications comes with \$1.4-million in research funds
- Sylvain Coulombe, a professor in the Department of Chemical Engineering and the holder of a Tier 2 CRC in Non-thermal Plasma Processing worth \$500,000

OTHER NOTES:

A warm welcome

The Faculty is delighted to welcome Luc Mongeau, a Professor of Mechanical Engineering and the Canada Research Chair in Flow-Induced Sound and Vibrations, as Engineering's Associate Dean, Academic Affairs.

A century of excellence

2008 marks the 100th year of Chemical Engineering at McGill.

Name Change Note:

In January, the Department of Mining, Metals and Materials Engineering became the **Department of Mining and Materials Engineering**, reflecting the fact that materials is an umbrella category that encompasses metals.

Development Update

BY PATRICK McDONAGH

Alma Mater Fund Ambitions

The Faculty of Engineering raised \$780,000 through McGill's Alma Mater Fund this past year, with gifts from about 13 per cent of the 19,300 alumni from Engineering, Architecture and Urban Planning. Approximately one per cent gave \$750 or more, joining the ranks of our Leadership Donors.

Dean Christophe Pierre aims to double that amount to \$1.6-million a year between now and 2011, and significantly increase the percentage of alumni who give. "Every dollar helps to improve the overall quality of education that we provide our students," he says, "and because of that, alumni support is critically important." Among other things, annual alumni gifts are used to fund undergraduate scholarships, graduate fellowships, research projects and pressing infrastructure needs.

Honours and hors d'oeuvres

The Faculty's Development Office organizes events and fundraising programs throughout the year to strengthen ties with graduates and keep them abreast of developments in our two schools and five departments. Here's a sampling of recent activities:



PHOTO: OWEN EGAN

Dean Christophe Pierre (left) with U. J. "Lloyd" Lortie, BEng'57, at the Engineering Dean's Breakfast during Homecoming 2007.



PHOTO: OWEN EGAN

Mechanical Engineering students (left to right) Pierre-Yves Lacroix, Maxime Romano, Philippe Picchiottino, Amrit Richardson and Mardig Taslakian show off the latest in student design teamwork at Homecoming 2007, and Chemical Engineering alumnus David Suliteanu, BEng'84 (in car) is eager to go for a spin.

• Back Home Again

Trekking to McGill from across Canada, the U.S., the Caribbean and elsewhere, more than 200 guests attended the Engineering Dean's Breakfast, hosted by Christophe Pierre during Homecoming 2007. There, they reconnected with old classmates and made new friends before embarking on tours of the Faculty's departments and schools, rubbing shoulders with students and professors, and – for the lucky ones – testing the ergonomics of prototype race cars designed by students for Formula One, Mini-Baja and hybrid vehicle competitions. Vrrrooom!

• Breakthroughs and Cocktails

Shaking up expectations and stirring interest – that's what a good cocktail event should do, and the three Dean's Cocktail receptions this year delivered, with nearly 100 alumni, faculty members and friends learning about some of the most exciting research happening anywhere.

FACULTY of ENGINEERING DEAN'S REPORT Summer 2008

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Chemical Engineering professor Nathalie Tufenkji and Electrical Engineering professor Geza Joos spoke about protecting our environment and alternative energy; School of Architecture Director Michael Jemtrud addressed architecture, design and environments; and Mining and Materials Engineering Department Chair Stephen Yue and Electrical Engineering professor Sam Musallam discussed cold spray technology and brain-machine interfaces.

PowerPoint versions of these presentations are available on the new Development and Alumni Relations section of the Faculty of Engineering website, at www.mcgill.ca/engineering/dar/. The site contains information about other researchers, too, as well as news about students, donors, McGill's *History in the Making* Campaign and copies of recent McGill Engineering publications.

• Acknowledging excellence and generosity

Over 100 students and faculty joined with donors and industry partners at a Student Award Reception on March 27 in the Lorne M. Trottier Building. The invitation-only event recognized award-winning undergraduate and graduate students and celebrated donors for their involvement and support of education. Students met with their benefactors to swap stories and share their gratitude.



PHOTO: OWEN EGAN

Professor Nathalie Tufenkji, BEng'00, (centre) and researchers Irwin Adam Ejdeman, BEng'07, (left) and Robert Delatolla, MEng'03, demonstrate how cranberries can help prevent the attachment of bacteria to biomaterials at the Applause research recognition event in February.

Joining one of McGill's Giving Circles

Dean Pierre and his Development Office Team encourage alumni to consider joining the ranks of McGill's particularly generous donors in one of the University's four Giving Circles. Existing Giving Circle members who have the means are also being encouraged to move to a higher circle. The breakdown by level of donation is as follows:

Deans' Circle: \$750 - \$1,499

Principal's Circle: \$1,500 - \$2,499

Chancellor's Circle: \$2,500 - \$4,999

Governors' Circle: \$5,000 - \$25,000

Founders' Circle: \$25,000 and more



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Discovery Channel Lauds McGill's "Mean Green Machine" BY JULIA VYSE

On March 24, McGill ingenuity took centre stage on the Discovery Channel's Mean Green Machines television show, in an episode featuring a zero-emission electric snowmobile designed and built by a dedicated team of Engineering students.

The builders – led by the Faculty's own Simon Ouellette – also took first-place honours at the 2007 SAE Clean Snowmobile Challenge, hosted by Michigan Technical University. Five years in the making, the winning snowmobile was selected by the U.S. National Science Foundation to provide clean transportation for climate researchers in some of Greenland's remotest reaches. Ouellette, a Master's student and the team leader, was sent along for the ride.

Things didn't go as planned – although Ouellette arrived on time at Greenland's Summit Station, the U.S. Air Force plane charged with its transport was delayed at a New York air base. Ouellette took the set-back in stride, and worked with the station's mechanic to help him understand, operate and potentially repair a machine the likes of which few have ever seen.

"I ended up at the top of a glacier in the middle of nowhere without a snowmobile," he laughs. "It was almost like being on Mars."



PHOTO: SIMON OUELLETTE

McGill's student-built zero-emission snowmobile rips into action.

McGill's electric snowmobile did eventually arrive and posted an admirable tour of duty, shuttling supplies back and forth all summer between the outpost's main camp and its satellite station a few kilometres away. Regular snowmobiles aren't suitable because the scientists need precise measurements of the carbon dioxide and other greenhouse gases in the air. With a regular diesel rig, Ouellette says, "95 per cent of what they're reading is fumes from their snowmobile."

NOTEBOOK

Engineers Without Borders McGill

Youth Without Borders Day: Becoming a Global Engineer at McGill
On March 27, Engineers Without Borders (EWB) McGill and the Faculty of Engineering hosted 48 local high school students as part of an outreach program aimed at highlighting the use of engineering to fight extreme poverty. The youngsters visited labs, learned about the role of engineers in international development, and heard presentations by EWB's overseas volunteers.

Junior Fellows in International Development

In 2007, EWB selected three of our undergraduate chapter members for 18-month Junior Fellowship internships, which included four-month volunteer placements in Ghana and Burkina Faso. Sarah Johnson (Civil

Engineering), Claire-Elise Orléach (Civil Engineering) and Mel Lefebvre (Environmental Science) learned first-hand the realities of poverty and the development sector, and applied their skills to help build technical capacity in rural developing communities.

Upon returning to Canada in September, all three took on leadership roles in the chapter. Among many other activities, Mel planned a city-wide fair trade outreach day, Sarah coordinated presentations in Engineering's compulsory Ethics class, and Claire-Elise organized development-oriented lectures for students.

This May, EWB will send two more McGill undergrads to Africa, with Courtney Miller (Civil Engineering) heading to Ghana and Jenna Senecal-Smith (Bioresource Engineering) setting off for Malawi.

Giving Is Important

Your gift can support Engineering Faculty students directly. When you receive a pledge card to make a donation, be sure to mark Engineering or the name of your Department or School in the space provided. And now you can also make your donation online at www.alumni.mcgill.ca/online-giving/. Don't forget to select the Faculty of Engineering as your preferred area of support.

Matching Gifts

If you're an employee of a company with a matching gift program, your gift can do twice as much for McGill students. Simply ask your employer for a matching gift application form. These programs bring thousands of dollars in corporate matches to McGill and allow you to give more – for free.



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