Activities related to innovation and entrepreneurship are increasing exponentially in our Faculty, and much of the success is due to professors, students and alumni working more closely to bring innovative ideas to market.

To maintain the momentum, a major education initiative is underway that is helping budding entrepreneurs to access additional resources to meet their goals.

The multi-faceted program is anchored in an alumni-based Innovation Fund that supports a myriad of activities: a mentorship program; entrepreneurship and leadership training workshops and seminars; an inspirational speakers series; a student travel program; summer undergraduate entrepreneurship awards and student entrepreneurial start-up internships. The latter provides an opportunity for students to embed themselves in an entrepreneurial setting in the business world.

The new Innovation Fund provides support to students and professors spearheading start-ups and other creative ventures.

One set of grants (TechAccel I) is for early stage customer discovery resulting in the generation of a business model. These are valued at $500 to $2,000 each.

The other set of grants (TechAccel II) is to build prototypes and develop marketing initiatives that ensure customer validation. These are valued at $2,000 to $10,000 each.

Professor Jim Nicoll, Dean of Engineering, says “the Innovation Fun lies at the heart of our Faculty’s mission of encouraging entrepreneurial thinking, at all levels, throughout our six Departments and two Schools. It supports team-based, innovative projects that spur inventiveness, promote technological innovation and help to train students to think entrepreneurially.”

(See New mindset page 2)
Dean’s Message

This issue of the Dean’s Report highlights the importance our Faculty places on innovation and entrepreneurship. Equally important, it shows how partnering with alumni results in a better education for students. Alumni and industrial partners provide expertise, serve as role models, and generously support programs to spurs our engineers, architects and urban planners to become even more adept at commercializing their ideas. We need their partnership and involvement.

Let me be clear. The Faculty of Engineering’s priority is not the creation of new companies per se. Rather, new businesses will be an important by-product of what we do, but as a university, our role in the entrepreneurial ecosystem is the education we provide that will help to create entrepreneurs. Our focus, therefore, is creating the next generation of innovators.

Alumni like you play a key role in this process. This past year alumni donations funded two William and Rhea Seath Awards in Engineering Innovation, three Faculty of Engineering Innovation Awards, and the Ian MacAlpin Prize for Entrepreneurship in Engineering.

Several of the students and professors who benefited from these awards are featured in this newsletter, but they are just a small sample of the industrious people working here to transform their knowledge into products and services that benefit society.

The questions I ask you to consider are these: “How many other valuable projects could have moved forward if more alumni support had been available?” “How many missed opportunities could have become true success stories?”

You’ll be hearing much more about these themes in the months ahead. When you do, I ask you to do everything you can to help our Faculty’s innovators.

New Mindset (cont’d from front page)

Larger-term plans for the Faculty’s entrepreneurial initiative include one- or two-year post-doctoral support that would enable graduating PhD students to continue working with their supervisors, and a proposal for a new centre tentatively called the McGill Engineering Innovation and Entrepreneurship Centre (McGill EngInE for short). The multi-purpose centre would provide expertise, coaching, financial support and a dedicated space for students and professors who are spearheading start-ups and other creative ventures.

“Recent innovations at our Faculty—such as the less invasive mitral valve repair system described in this issue—have involved multi-disciplinary collaboration,” Nicoll says, “and one of the main purposes of the McGill EngInE would be to provide physical and virtual space to encourage the next generation of innovators.

Alumni who are spearheading start-ups and other creative ventures.

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Adapting to Address Industry Needs

Cold-Chain Revolution

Commercializing engineering is about bringing innovative ideas to market. And those ideas are even better when they also protect the environment.

This is the case with TemperPack—a company commercializing innovative, cold-chain packaging materials and processes that was developed by two Faculty of Engineering undergraduates: James McGoff, BEng ’15, and Charles A. Vincent, BEng’13. The duo was helped along the way by our Faculty’s William and Rhea Seath Awards and an award from McGill’s Dobson Centre for Entrepreneurship.

TemperPack Inc., founded in 2013, produces light-weight, highly insulating and environmentally friendly shipping containers to transport temperature sensitive materials such as perishable foods and medical supplies.

Compared with traditional shipping packaging, such as styrofoam containers, TemperPack substantially reduces the burden on the environment by using earth-friendly, compostable materials without compromising thermal performance.

During their Mining and Materials Engineering studies at McGill, McGoff and Vincent examined the unique properties of natural fibres as an alternative to aerogel as a costant material. They developed

The University’s role in creating the next generation of innovators.

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Entrepreneurship:
Innovation and The Faculty of Engineering Goes to Market

graduates. To do this, they need to become the creation of new career opportunities for increased impact of their work and through change in our Faculty,” Nicell says. “We want having scientific and technical expertise with program would form part of the strategy, too—business ventures. An Entrepreneur-in-Residence would help innovators to build prototypes and develop novel ideas and business plans. An Entrepreneur-in-Residence program would form part of the strategy, too—to facilitate coordination between individuals having scientific and technical expertise with those having business credentials and training.

“We see the McIll EngInE as playing a major role in bringing about a transformative culture change in our Faculty,” Nicell says. “We want our students and professors to fully explore the potential of their imaginative and ground-breaking ideas by pursuing their commercial potential. In this way, they can directly benefit from increased impact of their work and through the creation of new career opportunities for graduates. To do this, they need to become more familiar with the basic requirements and resources needed to launch start-ups.”

“And by consolidating the many entrepreneurial endeavours now underway, we would simultaneously enhance education and foster a true entrepreneurial environment with close ties to the Montreal entrepreneurial ecosystem.”

Professor Benoit Boulet MP’92, Associate Dean Research and Innovation, describes the proposed McIll EngInE as the nerve centre for all our Faculty’s entrepreneurial activities.

McGill EngInE, the Engineering Innovation and Entrepreneurship Centre, would be the centrepiece of a concerted program at the Faculty of Engineering to enhance education, nurture innovative ideas and coordinate entrepreneurial efforts. Its education mission would include extensive, co-curricular and extracurricular activities that complement what students learn in classrooms and labs. “The overall objective,” says Engineering Dean Jim Nicell, “would be to show students how to create new opportunities, to be problem-solvers and to meet challenges head on.”

By offering physical space and seed money, McIll EngInE would help innovators to build prototypes and develop novel ideas and business ventures. An Entrepreneur-in-Residence program would form part of the strategy, too—to facilitate coordination between individuals having scientific and technical expertise with those having business credentials and training.

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“I would also link academic strengths across McGill with the growing commercialization expertise and business know-how offered through specialized units such as McGill’s Dobson Centre for Entrepreneurship and the IDEA Team (Invention Development and Entrepreneurship Assistance) at the Office of Innovation and Partnerships. “It would signal in a very strong, very public way, the Faculty of Engineering’s commitment to entrepreneurship,” Boulet adds, “while stimulating student involvement in innovation and entrepreneurship very early in their education.”

Alumni: Come Partner With Us

We are seeking alumni for:
Donations to the Innovation Fund
- An annual contribution (suggested amount is $1,000)
- A funded award
Membership opportunities
Evaluation of student projects (TechAccel I & TechAccel II)
For more information contact our Faculty’s University Advancement Office at: engineering.alumni@mcgill.ca or 514-398-1371.

Invitation to the 2016 Innovation & Entrepreneurship Awards Evening

Please note that our Faculty’s annual Innovation and Entrepreneurship Awards Evening will be held this year on Wednesday April 27, 2016, from 5:00 pm to 7:00 pm, in the lobby of the Macdonald Engineering Building.

Mechanical Engineering PhD student Toufic Azar is a prime example of the robust entrepreneurial spirit at work in our Faculty. A medical device that Azar developed will enable cardiac surgeons to use a more effective and less invasive technique when operating on patients suffering from mitral valve regurgitation disease.

The minimally invasive approach reduces the risk and trauma associated with conventional open-heart surgery.

Azar won a 2012-2013 William and Rhea Seath Award in Engineering Innovation for his initial design, developed under the guidance of four McGill professors: Jorge Angeles, Jozef Kowces and Rosaire Mongran, from the Department of Mechanical Engineering, and Dr. Renzo Cecere, a cardiac surgeon at the McGill University Health Centre.

A year later, Azar and Cecere took first place honours at McGill’s annual Dobson Cup Competition for the modified valve repair device they submitted under the entrepreneurial competition’s Innovation Track.

The duo continues to refine their design, expanding its application to other surgical procedures where conventional sutures are used. The photo at left shows four Mechanical Engineering undergraduates with the award for Azar and Cecere as part of their final-year capstone project—a prerequisite for graduating.

Space Earmarked for McGill EngInE

Tentatively named McGill EngInE, the Engineering Innovation and Entrepreneurship Centre, located in the proposed entrepreneurial hub that would focus on technology based innovation in the Faculty of Engineering and serve as a resource centre for other technology-driven entrepreneurial ventures across McGill. The multifaceted facility would serve society and the entrepreneurial community for generations to come. The dedicated space it would provide would make it easier for students, professors, alumni and others to collaborate and learn from each other, and show the importance placed on transforming innovative ideas into new products and services.

Space has been earmarked for McGill EngInE on the ground floor of the Frank Dawson Adams Building. The location is considered prime real estate because it lies at the crossroads of all pedestrian traffic between the McGill Engineering Student Centre (MESC), our Faculty’s cross-cutting institutes, other student service points and the McConnell Engineering and Macdonald-Harrington Buildings.

The space would be particularly helpful in encouraging innovative ideas or projects that are not linked to a particular researcher or department. It would provide access to tools that support entrepreneurship (e.g., specialized software, 3D printing and machine tool shop) and space for meetings, workshops, small lectures and company visits related to entrepreneurship, hiring and general outreach.

The locale would also provide a venue for displays that highlight entrepreneurial successes, showcasing the many stories the Faculty would challenge others to share creatively.

Among its uses, the space would:
• Become a hub for professors and students who are seeking mentors and guidance related to innovation and entrepreneurship. Support would include meetings, workshops, small lectures, company visits and outreach, etc.;
• Become a destination for companies to connect with the Faculty of Engineering, both for entrepreneurship activities and other linkages;
• Provide offices to house the Director of EngInE, the Manager of ICE (Innovations Catalyst in Engineering) and an Entrepreneur-in-Residence;
• Showcase—through displays, etc.—successes in entrepreneurship. By publicizing the work of William and Rhea Seath Award winners, TechAccel grant recipients and successful alumni and benefit companies, the Faculty of Engineering would provide role models and would challenge others to shine creatively and make an impact in the world.

Fully Porous Hip Replacement Implant Eliminates Bone Resorption

Existing hip replacement procedures often require follow-up surgery that can increase the risk of complications. The challenge for the medical community is that current hip implants are incapable of preventing long-term stress-related bone loss, which creates the difficulties with follow-up surgery. The stress is the result of a difference in stiffness between fully solid metallic hip stems and the natural host bone in which they are implanted.

A novel implant developed at our Faculty uses a fully porous structural biomaterial that avoids bone resorption by seamlessly matching the properties of the local host bone tissue. The novel design can be adopted with no modifications to existing surgical technique and hospital infrastructure.

The research is led by Professor Damiano Pasini, of the Department of Mechanical Engineering whose team won a 2014-2015 William and Rhea Seath Innovation Award for their implant design. The Seath prize is being used to cover some of the costs of animal studies on the implant—the last step in the product’s commercialization.

Affordable High-Quality Headphones

Demand for high-quality, over-ear headphones is increasing exponentially. Sales figures indicate that the multi-billion-dollar over-ear consumer market accounts for 44% of the headphone sold worldwide. There is a problem, though. The polymer used to produce most headphone diaphragms doesn’t deliver the sound quality that can be achieved with more expensive materials.

The solution to this dilemma may lie in graphene oxide, a reasonably-priced chemical derivative of graphite. Professor Thomas Szkopek of the Department of Electrical and Computer Engineering and his team are replacing carbon-based diaphragms in commercial headphones with graphene oxide diaphragms prepared right here at the Faculty.

The modified headphones are being tested at a state-of-the-art Music Multimedia Room at McGill’s Schulich School of Music, and the results are promising. The researchers say the prototypes being developed provide the performance of high-end materials at a cost suitable for the consumer headphone market.

Both the prototypes and the test results are being used to attract an industrial partner who can handle the volume production required to commercialize the invention.

Szkopek’s headphones breakthrough was one of three projects singled out last year for a Faculty of Engineering Innovation Award. At year’s end he and his research team were named winner of our Faculty’s Ian McLachlin Prize for Engineering Innovation & Entrepreneurship Awards Evening.

Microwave Based Screening

Improving the Health of Women Potentially at Risk of Breast Cancer

Detection of early stage breast tumors is critically important. Each of the current modalities, such as mammography, ultrasound and MRI, has downsides, often resulting in late tumor detection and, consequently, a lower success rate in post-surgical treatment.

Low power microwave based screening is an emerging field that promises inexpensive, comfortable and safe monitoring of breast tissue, to enable early detection of malignant lesions.

The William and Rhea Seath Award that Professor Milica Popovic of the Department of Electrical and Computer Engineering explains her monitoring process at last year’s Innovation & Entrepreneurship Awards Evening.

Haptics and Smartphones – Haply

Department of Mechanical Engineering

Master’s student Colin Gallacher is a 2014-2015 winner of our Faculty’s Ian McLachlin Prize for Entrepreneurship in Engineering. The founder of Haply Robotics, Gallacher is building a low-cost, entry level haptic device that can be attached to tablet and laptop screens to enable users to interact with the digital worlds by way of touch. Multiple applications will benefit from this platform technology.