PHILANTHROPY CHANGES LIVES
Impact of Giving: 2017-18
Thank you for your generosity.
Welcome to this year’s report on how your generosity is making a difference to McGill University’s Faculty of Agricultural and Environmental Sciences. As you know, the Macdonald Campus is home to a teaching and research hub with superbly talented scientists and lecturers. Most inspiring of all are the brilliant and creative students. I am immensely proud, and gratified, that we can add to these strengths another: you, our truly committed alumni and friends. As I know from meeting many of you since becoming Dean of the Faculty, we could not be where we are without your support.

In the following pages, you will learn more about how you are making a difference to the educational and entrepreneurial opportunities benefiting our students, the knowledge generated by our research teams, and the impact this knowledge can have on communities locally, nationally and globally.

You are helping our students expand their horizons, acquire real-world experiences that they cannot gain within the classroom, and discover new ways in which they can make a difference in the world. Visionary projects such as the Lister Family Engaged Science Initiative bring students enriching opportunities to ensure their work resonates beyond the University – and the donor-supported Student Experience Enhancement Fund brings the students themselves outside the classroom to benefit from experiential learning activities. Our students had two top winning teams, Protera Farms and Myco-Rise, in the 2017 Dobson Cup, the start-up competition hosted by McGill’s Dobson Centre for Entrepreneurship, and these successes attest to the impact of our Innovation and Entrepreneurship Program, which would not be possible without your support.

In addition, your support enables our professors and graduate students to pursue the kind of research that is going to make a difference well beyond the University. Dr. Elsa Vasseur’s work on animal health and welfare is not only adding to a body of knowledge, but also engaging directly with the Quebec and Canadian dairy industries and, ultimately, reaching their consumers. Dr. Marie-Josée Dumont and her team are investigating ways of using agricultural waste to synthesize bio-based polymers that could be of value in many applications, including those currently based on fossil fuels.

These wide-ranging initiatives would not be possible without the support we receive from individuals, families, foundations and organizations. Your generosity enables us to fulfill our mandate of teaching, research, and community engagement. Thank you once again for your commitment to the Faculty, to Macdonald Campus and to McGill University.

Thank you,

Anja Geitmann
Dean, Faculty of Agricultural and Environmental Sciences
Support for Students

Adding the Entrepreneurial Touch to Bright Ideas

Start-ups supported by the Faculty of Agricultural and Environmental Science’s (FAES) Innovation and Entrepreneurship Program (IEP), launched in 2014 thanks to donor support, have established an impressive track record at McGill’s annual Dobson Cup competition. In the past three years, eight FAES start-ups have finished among the top entries in the highly competitive event. One reason for this success: a concerted effort by the IEP to prepare students for the competition through advisory meetings, workshops, and mentoring.

Before the competition starts, “we run a series of events for students to highlight that innovation is part of the McGill ecosystem,” explains Eduardo Ganem-Cuenca, the IEP’s Director. As well, the events help build momentum among the would-be entrepreneurs. The IEP also hosts an information session to outline what is involved in doing well at the Dobson Cup, bringing in previous Dobson success stories like Yumibox (yumibox.com), which won the 2016 Small/Medium-Sized enterprise category, and Groundit, which came fourth in 2015 in that category.

For the competition’s first stage, the presentation of business plans, Ganem-Cuenca offers one-on-one mentoring to help students refine their market research. As the competition progresses to the semi-finals, he organizes practice pitching sessions.

Those start-ups that made it to the April 2017 finals were paired with alumni or other contacts from the IEP’s network to receive further mentoring and professional guidance. The efforts paid off, with two Macdonald entries taking first in their respective categories: Protera Farms as top Social Enterprise, and Myco-Rise as top Small/Medium-Sized Enterprise. Both had also received Faculty Innovation and Entrepreneurship Start-Up prizes in March, awards which provide initial $2,500 seed funding to develop ideas.

All of the IEP’s activities, including start-up awards and prizes, are made possible through the generosity of donors.
Ademola Adekunte accepting the award for Protera Farms.
Here’s a recipe for success: breed black soldier flies, which are plentiful, clean, and without negative environmental impact, then collect their eggs, feed their larvae on organic agricultural waste collected from local sources, and harvest the fattened larvae for their protein. The process yields high-protein, low-cost and sustainable food for animal feed, especially in poultry and fish farming.

Former student Sidiki Sow, CEO of Protera Farms, and his partner Ademola Adekunle, MSc’15, a doctoral candidate in Bioresource Engineering, rode their black soldier fly recipe to first place in the Dobson Cup’s Social Enterprise stream. The victory built on Sow’s first attempt in the Dobson Cup. In 2016, he proposed a start-up marketing cookies containing protein provided by ground-up insect larvae, but the idea didn’t carry him into the finals. The experience, however, was instructive. He later travelled to his native Mali, where he met with an engineer who had been working on using fly larvae as a nutritional substitute in agriculture. Sow also credits mentorship support from his first Dobson Cup experience with boosting his success in his second effort.

The second idea landed Protera a big accolade: being named a “global top-five” in the UN Development Program’s Accelerate 2030 competition for initiatives targeting UN sustainability goals. Accelerate 2030 brought Sow to Geneva in October 2016 to pitch Protera and begin developing a network of investors; he also receives pro bono consultation as part of the program. “So I had a bankable business plan going into the 2017 Dobson Cup, with a solid assessment of my project’s environmental impact,” he says.

Sow and Adekunle planned to start with a small operation in Mali, but their investors encouraged them to go big. Now, they are working to obtain funds to establish a larger enterprise in Abidjan, Côte d’Ivoire. “Our goal and our timeline has changed, but we hope to raise at least half the money we need soon so we can start construction of the plant,” he says. “In 2018 we aim to be producing larvae-based poultry and fish feed at scale.”

For more information about this exciting project, visit proterafarms.com.
Current student Louis-Philippe Dessureault, and Marc Brettschneider, an employee at the Macdonald Campus’s Horticulture Research Centre, became friends while working at the Centre, when they discovered an unusual shared passion. “We were both super enthusiastic about growing mushrooms,” says Brettschneider. “So we decided to combine our efforts, and from that point in spring 2016, everything came together quickly – that was the founding of Myco-Rise.”

The operation not only grows tasty oyster mushrooms using organic agricultural waste, but also generates a secondary product in compost, making it an eminently sustainable enterprise. “We collect industrial and post-consumer waste to grow mushrooms,” Dessureault explained to the Dobson Chronicles. “Once that process is finished, we process our waste through a vermicomposting system, which allows us to reduce our carbon footprint and provides us with nutrient-rich fertilizer that we can sell.”

While Myco-Rise was already in existence before the Dobson Cup, the competition gave Dessureault and Brettschneider the opportunity to bring it to a higher level. “We were thrilled to showcase the culmination of our mushroom R & D,” says Brettschneider. “The help we’ve received from many people, but especially from Eduardo Ganem-Cuenca, made everything possible. And winning the Dobson Cup really facilitated our expansion. The $11,000 first prize money meant we could afford equipment and increase our production system when we moved to our current space.” The Dobson Cup success was quickly followed by another: In October 2017, Myco-Rise finished in the top three of Forces-Avenir’s environment category contenders.

The team is also offering learning opportunities to students while easing its expansion costs. Recently, Myco-Rise enlisted three Bioresource Engineering students to design a new sterilizer as part of their required third-year design project. The sterilizer was built for a fraction of the cost of purchasing one.

“Our model involves transforming waste into food, and there are areas of the world where waste is abundant but food is scarce,” says Brettschneider. “So we hope to find ways to help with technologies that use waste to cultivate or create food, and even provide added value through additional vitamins or minerals that people need.”
HEADING OUT INTO THE FIELD…

Sometimes Literally!

The Student Experience Enhancement Fund (SEEF) supports learning activities that offer knowledge, skills and values by taking students beyond the traditional classroom. The SEEF supported several initiatives last year, including the Macdonald Farm Educational Program (MFEP) and the participation of undergraduate students in the Canadian Nutrition Society Annual Conference.
Maximizing the Takeaways at CNS

Thanks to SEEF support, 13 undergraduates from the School of Human Nutrition attended the 2017 Canadian Nutrition Society (CNS) Annual Conference in Montreal from May 25-27. In addition, three graduate students were funded to host a pre-conference symposium to prepare the undergrads for the conference, helping them to understand the breadth of nutrition research on campus and the different career paths offered by graduate school and nutrition research. Neil Brett, a Human Nutrition PhD candidate who serves as the CNS representative for McGill, provided a detailed presentation on preparing for the conference.

Properly prepped, the students immersed themselves in the event, which gathered 450 of Canada’s top nutrition researchers. The scientists showcased investigations across the spectrum of basic, clinical, epidemiological and community nutrition in a series of presentations, poster sessions and workshops. Students attended sessions on translating research into health policy, took advantage of opportunities to network with other students and professors, and met with representatives from Health Canada and the food industry. In the end, they gained a greater understanding of the diverse career opportunities offered in the field of nutrition.

Macdonald Farm Educational Program

The MFEP gives McGill students the chance to engage with the community through existing venues, the Farm-to-School and Ag-Connect programs. Farm-to-School reaches out to youth from Montreal and the West Island, introducing them to existing projects in agriculture and environmental sciences through hands-on activities developed by McGill students.

“This year, we wanted to develop learning modules so that when kids come to the Macdonald Campus for farm visits, they have activities to help them learn about agriculture,” says current student Ingrid Laplante, MFEP president. “So we connected Macdonald students with students from the Faculty of Education, who provided input and assistance on the visuals we were creating.” Another group of kids also benefited through the spin-off Farm-to-School summer program, which employs McGill students to introduce youth aged 6-13 to the world of agriculture in a series of week-long day camps. McGill students gained valuable experience as well, using their creativity to produce educational modules, communicating their knowledge to a larger public, developing teamwork and leadership skills, and connecting with the local community.

Laplante also led the creation of Ag-Connect, a new program giving youth with intellectual disabilities the chance to learn about agriculture and acquire employable skills. Partnered with McGill students, the program’s participants learned how to work with farm animals and in gardens of the Macdonald Farm, and also visited and volunteered on other local farms. At the end of the program, each participant received a certificate and could request a letter of recommendation.

I first got involved with the MFEP in the 2015–16 academic year because I love agriculture and I feel there is a lack of education about it. And I believe it’s very important that kids have an idea where their food comes from.

– Ingrid Laplante, MFEP president
2,151 students enrolled

- 1,425 undergraduate (including Farm Management and Technology)
- 688 graduate
- 38 post-doctoral

58% Quebec
16% rest of Canada
26% international

25% of students are francophone

107 countries represented in the student body

more than 100 undergraduate scholarships (entrance or in-course)

480 number of graduates (all programs)

296 1996-1997
322 2006-2007

1996-1997
2006-2007
315 faculty & staff members

100 professors (34 new hires 2007-2017)
141 other academic staff
74 support staff

8 named Chairs, Fellows and Faculty Scholars

- Lawrence Goodridge
  Ian and Jayne Munro Chair in Food Safety
- Jim Fyles
  Tomlinson Chair in Forest Ecology
- Hugo Melgar-Quinonez
  Margaret Gilliam Faculty Scholar in Food Security
- Murray Humphries
  McGill Northern Research Chair
- Elsa Vasseur
  NSERC/Novolait/Dairy Farmers of Canada/Valacta Industrial Research Chair in Sustainable Life of Dairy Cattle
- Jan Adamowski
  Liliane and David M. Stewart Scholar in Water Resources
- Elena Bennett
  E.W.R. Steacie Fellow
- Elias Georges
  CP Chair in Biotechnology

3 professors who are members of the Royal Society of Canada

- Colin Chapman (joint appointment MSE/Anthropology)
- Vijaya Raghavan
- Hosahalli Ramaswamy

5 faculty centres & institutes

- Brace Centre for Water Resources Management
- Centre for Indigenous People’s Nutrition and Environment
- Institute of Parasitology
- Mary Emily Clinical Nutrition Research Unit
- McGill Institute for Global Food Security
Legionella, the bacteria responsible for Legionnaires’ disease, is nourished by a range of man-made water environments – from water towers and damp ventilation shafts to shower stalls and jacuzzis. We know relatively little about this pathogen, but that may soon change, thanks to Mariam Saad, a graduate student working with Professor Sébastien Faucher in the Department of Natural Resource Sciences. Saad is developing strategies to better characterize and detect this pathogen, which is becoming an increasing problem: in North America, incidents of diseases associated with Legionella have quadrupled in the past 15 years.

“My research involves trying to find ways to better characterize Legionella and how it works so we can identify it more effectively,” Saad explains. Current strategies for identifying Legionella are “woefully inadequate,” being too expensive, time-consuming, and labour-intensive, while also being insufficiently precise.

This January, Saad’s summary of her investigations won the inaugural Macdonald Three Minute Thesis (3MT) competition, which featured graduate students presenting their research in three minutes or less to a non-specialist audience. “The Three Minute Thesis competition helped me a lot,” she says. “With research, you can really get lost in the details, to the point where you no longer remember why you’re doing it. But when people understand what you’re doing because you communicate it effectively on a platform like this, you feel validated. Your research is not just some obscure thing in an academic lab with no real-world impact or application.”

The competition was created with support from the Lister Family Engaged Science Initiative. Established by E. Edward Lister BSc(Agr)”55, MSc’57, and his wife Teresa, the Initiative supports activities that will help students and faculty bring the fruits of their efforts into public discourse – thus advancing research, influencing science policy, enhancing science literacy, informing citizens, and fostering innovation. In addition to the 3MT competition, the Engaged Science Initiative has supported a series of “Talking it up Without Dumbing it Down” workshops for undergraduate students, designed to help them explain their research to non-experts.

Saad expects to benefit from her 3MT experience over the long term, too. “It’s one thing to talk to your supervisor or lab-mates about your research, but to explain it to someone who is not a specialist is difficult,” says Saad. “I work in an interdisciplinary department and collaborate with a lot of people who don’t share my background, and I have had industry people interested in my research. The 3MT has helped me to explain the nuances of my research in language these others can understand.” She effusively says of 3MT: “I think all students should do it.”

You can sample Saad’s presentation style on YouTube: youtube.com/watch?v=O-FQXizfktk
Dairy producers want cows that are happy, healthy and productive for as long as possible, and that means a commitment to animal welfare. But just what conditions make for this contented cow? That’s the question being addressed by Dr. Elsa Vasseur, Assistant Professor in Animal Science, who in January 2016 joined McGill from the University of Guelph (bringing some of her graduate student team with her). Vasseur is now the Associate Chairholder of the NSERC/Novalait/Dairy Farmers of Canada/Valacta Industrial Research Chair (IRC) in Sustainable Life of Dairy Cattle.

With five years of funding, the IRC supports an initiative relevant to all of Canada’s dairy farmers: a multicomponent certification program that will include criteria for animal welfare along with such other parameters as food quality, biosecurity, and environmental sustainability.

“It isn’t enough to tell producers that they have a problem,” says Vasseur, who served as a member of the team that developed protocols for assessing animal welfare. “You need the research to tell them how to solve the problem.” With that in mind, she has collaborated with an advisory committee of the IRC’s industry partners to design a research program focusing on three themes: cow comfort and management, cow longevity, and environmental and social issues connected to dairy farming.

― Dr. Elsa Vasseur, Assistant Professor, Animal Science
“Commercial farms all differ in terms of their environment and management, and to make specific recommendations you need a controlled design environment,” she says. “That is why the dairy research facility here is so important.” With 88 dairy cattle, Macdonald’s facility is the last dairy farm on the island of Montreal; it is also similar in size to Quebec commercial farms, which average 60 lactating cows. And with 15 students – graduate and post-doctoral, as well as trainees – her research team is on the level of a mid-sized enterprise.

That’s a good thing, as her research agenda is wide-ranging and data-intensive. Many of the studies performed by her team use automated data loggers that monitor physical activity, ruminating, feeding, resting and sleeping, and if no appropriate automated device exists, the team tracks the animal with cameras. “But I don’t want my students to watch too much video, so we’re finding innovative ways to automate as much as possible,” she says. “We have adapted a lot of devices for this research from other applications. For example, we are testing different approaches to reducing restriction for the cows, such as giving extra stall width, and we need to know how the cows are using this space.” The study to determine how cows use different sized stalls involves, among other things, pressure pads normally designed to track bicycles passing over them: the pads are strapped to the sides of the stall, and signal whenever a cow bumps them.

Another aspect of this larger study examines constraints in tie stalls, where cows are chained to a rail within their stall; 96 per cent of the farms in Quebec, and about half the farms in the rest of Canada, use this system. Vasseur’s team has attached data loggers to cows with different lengths of chains to track how they are using their allotted space. “We have seen problems in both tie-stall and free-stall systems,” says Vasseur. “Our research aims to help farmers to implement best practices.”

Vasseur’s research will be directly applied; indeed, every six months she meets with her advisory committee to discuss the research agenda and present deliverables. “Bridging a gap between science, industry, and consumers is a very important part of the work we’re doing with the IRC,” she says. “And our facilities here make McGill one the best possible places to do this research.”
Hydroxymethylfurfural (HMF), an organic compound derived from certain sugars, is a “sleeping giant molecule” — or more prosaically, a platform molecule. “Platform molecules are important because they can be transformed into a plethora of other molecules,” says Bioresource Engineering Professor Marie-Josée Dumont. “We are using HMF and levulinic acid (LA), another platform molecule derived from biomass (e.g., starch, cellulose), because they can serve in the synthesis of polymers, biofuels, bio-pesticides, among others.”

But while Dumont and her research group can synthesize HMF and LA, these molecules are notoriously difficult to handle and purify. “For our research we use these molecules in large quantities and quickly,” says Dumont. Thanks to support from the Dr. Louis G. Johnson Foundation, her lab has been able to bring in a CombiFlash Rf+ Automated Flash Chromatography System. “This system allows us to synthesize much bigger samples in a fraction of the time, and these samples are much purer,” she says. The machine is also used by Dumont’s colleagues working with pharmaceutical compounds, so it is ramping up research in several labs.

Dumont is researching how to convert non-edible agricultural feedstocks and residues into bio-based materials and chemicals, which will be able to replace many conventional fossil-fuel-based products. Indeed, in 2015 the Canadian government estimated a US $3.6-billion global market potential for bio-based polymers and a US $62.3-billion global market potential for bio-based chemicals.

Another area of focus for Dumont and her team is the use of proteins from agricultural waste to synthesize hydrogels and aerogels that can absorb diesel and heavy metals at a capacity higher than the current industry standard, and thus could be used...
This system allows us to synthesize much bigger samples in a fraction of the time, and these samples are much purer.

– Professor Marie-Josée Dumont, Bioresource Engineering

for environmental remediation. In addition, Dumont’s team has found that food-grade hydrogels can be used as capsules for probiotics. Because they keep their shape in simulated gastric fluid and dissolve slowly in simulated intestinal fluid, probiotics could survive in the acidic environment of the stomach and be released at the intestine level – a feature that is very interesting to food and pharmaceutical industries.

The Dr. Louis G. Johnson Foundation has supported the Faculty of Agricultural and Environmental Sciences for many years, enabling such initiatives as the purchase of critical equipment for the Food Safety Program (2013), the upgrading of teaching labs for animal physiology (2012), and the purchase of an industrial crop dryer in the Emile A. Lods Agronomy Research Centre (2016), among many others.

The Stewart Brown & Anne Myles Brown Granting Committee of The Martlet Foundation, a long-time supporter of the Faculty of Agricultural and Environmental Sciences, enabled several important infrastructure acquisitions this past year, most notably: 40 phase contrast microscopes with projection and Bluetooth capability, which will help students in Plant Sciences, Microbiology and Farm Management Technology programs; equipment for the plant science greenhouse, which will benefit over 300 students, primarily in the Department of Plant Science; and 30 dissecting microscopes for student use, which annually serve over 450 students in Plant Sciences, Molecular Biology and Biotechnology.

The Committee also supported a crucial equipment upgrade for the Fluid Mechanics Lab in Bioresource Engineering. In addition, it has provided funding to the Innovation and Entrepreneurship Program and its students since the Program’s launch, and recently created two endowed undergraduate internships in support of the Macdonald Farm Community Engagement Centre.
Nairobi is a long way from the Macdonald Campus, but that’s where Alex Pritz, BSc(AgEnvSc)’13 – MSE, is usually found these days. “It’s been a winding path,” says Pritz of his career trajectory since graduating from the McGill School of Environment, where he focused on ecological determinants of health. But in at least one way, the path was direct: Pritz arrived in Kenya a week after finishing his McGill exams, missing convocation ceremonies to begin a media job for a local start-up. Within a year he threw himself into the world of full-time independent documentary filmmaking. “Nairobi is a true hub for media across east Africa, and it was intimidating to begin freelancing in a completely foreign country,” he recalls. “That first year was a struggle, but things have picked up steadily in the last two years.”

Indeed, Documist, the media company Pritz co-founded in 2014 with two colleagues – Will Miller, BA/BSc’13, and Jack Weisman – has established itself as a significant player in documentary video-journalism, primarily shooting short web videos for non-profit organizations but currently expanding into multimedia. Documist has developed an impressive client list that ranges from smaller NGOs like Uganda-based Mama Rescue to international organizations such as the Gates Foundation, UNESCO and the World Health Organization; its documentaries have also appeared on the websites of CNN, The Guardian, The Independent, The New York Times, Vice News, IRIN News, and Columbia University.
Pritz had a well-honed interest in film production when he arrived at McGill from his native Ithaca, New York. In 2009, he and Miller visited Kenya and filmed short documentaries—an experience that led to their co-founding Developing Pictures, a McGill-based, student-run enterprise. “When the earthquake devastated Haiti in 2010, we wanted to help, so we started by fundraising on campus,” says Pritz. “Then we sent student volunteers to Haiti to shoot video, giving media exposure to the important work being done by organizations and individuals working outside the traditional media spotlight.” The result was tens of thousands of dollars raised from McGill sources, positive feedback from their partners in Haiti, and a long life for Developing Pictures, which won a 2010 Forces Avenir award, recognizing exceptional student involvement in social causes.

Between Developing Pictures and Documist, Pritz’s path took another tangent. In 2011, he collaborated with McGill student Christian Elliot, BA/BSc’13 – MSE, and Arcie Mallari, at the time a Jeanne Sauvé scholar from the Philippines. “Arcie comes from a community on the edge of one of the huge trash dumps that services Manila,” says Pritz. They wrote a proposal for a Dalai Lama Fellowship with the goal of helping people in such communities, and it was accepted. “The focus was on waste and environmental issues because a lot of schoolchildren’s families worked as trash pickers, looking for recyclable goods in massive waste hills.” With the $10,000 fellowship, the team created a multimedia-based curriculum for students in extra-curricular schools Mallari was running in Montalban in the Philippines and Montreal to teach digital storytelling and video journalism skills, which the students then used to investigate issues of waste and overconsumption in their communities.

The project, Iwastology, added an educational component to Pritz’s activities. “I hadn’t really thought about teaching before Iwastology, but now I’m going in that direction quite a bit,” he says. This past spring he taught a workshop for a legal aid group of Somali lawyers and activists about how to use video as evidence admissible in courts. In addition, Documist runs workshops to instruct individuals and groups at all levels of expertise how to shoot film and rents equipment to aspiring filmmakers.

Like Developing Pictures and Iwastology, Documist is characterized by a deep commitment to causes and communities that face profound challenges while receiving little media attention.

Pritz, who received the Gretta Chambers Leadership Award while at McGill, credits his education with providing many of the tools needed on his professional journey. “The McGill School of Environment put me on both Macdonald and downtown campuses and gave me a huge range of courses,” he says. “I have always wanted to carve my own thing out of whatever I was given, and the options presented by the MSE were incredibly valuable to me.”

Check out Pritz’s work at Documist at documist.com, and Iwastology at iwastology.wordpress.com.
Since 1821, McGill has been offering outstanding educational opportunities to students from across the globe, pioneering new areas of research and discovery, and changing how we understand the world. As we approach our University’s 200th anniversary, McGill’s professors, researchers and students continue to tackle the biggest questions in science, culture and human endeavour.

Looking towards McGill’s third century, we hope you will join with us in celebrating and supporting this important work as we embark on The Road To 200 and beyond, and as, together, we create an even better world and a brighter future.

THE ROAD TO
200

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