



McGill | Engine

7TH ANNUAL  
CELEBRATION  
OF INNOVATION &  
ENTREPRENEURSHIP

McGill Engine Centre,  
McGill University  
3450 University St. Room 5  
Montreal, QC H3A 0E5



McGill | Faculty of  
Engineering

THE WILLIAM AND RHEA SEATH AWARDS SUPPORT INNOVATIVE RESEARCH AT THE FACULTY OF ENGINEERING. THEY WERE MADE POSSIBLE THROUGH THE GENEROSITY OF ALUMNUS, THE LATE WILLIAM SEATH, (BENG'52). THE AWARDS RECOGNIZE OUTSTANDING WORK BY ENGINEERING, ARCHITECTURE AND URBAN PLANNING STUDENTS AND PROFESSORS WHO CONDUCT INNOVATIVE RESEARCH WITH POTENTIAL FOR COMMERCIALIZATION.

## 2020-2021 WILLIAM & RHEA SEATH AWARDS REVIEW COMMITTEE

**Neal Gordon**, (BEng'83 in Chemical Engineering McGill, PhD MIT), is currently managing director at BDO. Previously he was chief development officer at Cobalt Biomedicine a life-science start-up founded by Flagship Venture Labs. Neal is a serial entrepreneur in the life sciences with product development and operating roles across research tools, therapeutics and diagnostics. He is a hands-on leader with a strong record of technology innovation and translation of platform technology into products.

**Praveen Prasanna**, (BEng'96 and MEng'98 in Chemical Engineering McGill, PhD Tufts), is a global leader with a track record of successfully leading cross functional (multi-site) teams in business-critical initiatives. He has extensive experience in managing and effectively working with development (CDMO), manufacturing (CMO), distribution, and testing partners worldwide to ensure an uninterrupted supply chain. He draws from a deep knowledge of current approaches to process development and process validation, including application of QbD, DOE, FMEA, and risk analysis to ensure robust manufacturing processes.

**Michael Mee**, (BEng'09 in Bioresource Engineering McGill, PhD Boston University), is a principal at Amplitude Ventures, a capital catalyst for highly innovative healthcare companies at the point of value acceleration. He is a firm believer that the biggest impacts of the age of biotechnology are yet to be discovered. He is passionate about providing the necessary capital and entrepreneurial insights to pull visions of the future into reality. Previously, he conceived, founded and built novel platform companies at Flagship Pioneering.

**Nathan Stubina**, (BEng'80, Meng'82 in Metallurgical Engineering McGill, PhD University of Toronto), joined Sherritt International as vice president of technologies in November 2018. Prior to that, he was managing director of innovation for McEwen Mining. With 30 years of international industrial experience, he also worked at various major mining companies including Barrick Gold Corp., Noranda Inc.

### **Professor Benoit Boulet.**

Professor Benoit Boulet, P.Eng., Ph.D., SMIEEE is Professor in the Department of Electrical and Computer Engineering at McGill University which he joined in 1998, Director of the McGill Engine, and Associate Vice-Principal, Innovation & Partnerships. He was Associate Dean (Research & Innovation) of McGill's Faculty of Engineering from 2014 to 2020. Professor Boulet obtained a Bachelor's degree in applied sciences from Université Laval in 1990, a Master of Engineering degree from McGill University in 1992, and a Ph.D. degree from the University of Toronto in 1996, all in electrical engineering. He is a former Director and current member of the McGill Centre for Intelligent Machines where he heads the Intelligent Automation Laboratory. His research areas include the design and data-driven control of electric vehicles and renewable energy systems, machine learning applied to biomedical systems, and robust industrial control.



William and Rhea Seath

## 2020-2021 WILLIAM & RHEA SEATH AWARDS INNOVATION WINNERS

**Professor Nathalie Tufenkji and  
Dr. Mathieu Lapointe**  
(Chemical Engineering)

### Project Title

A Paradigm Shift in Water Treatment:  
Reengineering with Low-cost, Sustainable  
and Recovered Wastes

### Summary

With an annual global market of \$18 billion, coagulants and flocculants are critical to water treatment but carry an economic and environmental burden. For wastewater alone, these chemicals generate ~8 million tons of metal-containing sludge waste annually. To simultaneously deal with the issues of process sustainability, cost, and efficiency, our team have developed new materials notably reengineered using recovered waste from treatment plants; namely, cellulose, polyester, cotton, and keratin fibers.

**Pavel Sinha, Professors Ioannis  
Psaromiligkos and Zeljko Zilic**  
(Electrical and Computer Engineering)

### Project Title

Power-efficient AI-Processor with Direct  
Raw Camera-Sensor Data Processing

### Summary

Currently, Artificial Intelligence (AI) is mostly in the cloud computing space, but in the future, AI will be present in every electronic device. Companies trying to build such computing devices are presently concentrating on the hardware component, which has been the traditional approach. Our team believe that the optimal approach is to simultaneously optimize the algorithm, hardware platform, and the overall system, resulting in a scalable and highly cost-optimized solution. Our team have a patent-pending AI-Processor hardware architecture that is best in its class for power consumption. The technology enables running on battery power for over a year without needing a battery replacement. Further, we differentiate ourselves with our technology that enables the application of optimized AI algorithms directly on raw camera sensor data, reducing the need for expensive image signal processing hardware, thus lowering cost and power consumption. Finally, our integrated software development platform enables developers to effortlessly integrate AI algorithms from any of the popular Python/Matlab environments to our AI-Processor. We have demonstrated several attractive applications such as real-time object detection and classification and automatic lip-to-audio synthesis.



## 2021 ISSUED PATENTS

TITLE	PATENT	INVENTORS
Structural Porous Biomaterial and Implant Formed of Same	US 10,842,634	Damiano Pasini, Burnett Johnston, Michael Tanzer, Sajad Arabnejad Khanoki
Methods and Systems for Foam Mine Fill	CA 2,982,194	Faramarz (Ferri) P Hassani, Mohammed A Hefni, Mehrdad Fadaei Kermani
High Efficiency Visible and Ultraviolet Nanowire Emitters	US 10,892,379	Zetian Mi, Songrui Zhao, Renjie Wang
Dense Hydrogels	CA 2,881,599	Showan N Nazhat, Chiara E Ghezzi, Benedetto Marelli, Neysan Nejat Oliver Kamranpour
Method and Apparatus for Wirelessly Communicating over a Noisy Channel with a Variable Codeword Length Polar Code to Improve Transmission Capacity	US11057053-B2	Warren Gross, Adam Christian Cavatassi, Thibaud Tonnellier, Yiqun Ge
Bioresorbable Medical Devices and Method of Manufacturing the Same	EP 2844311	Rosaire Mongrain, Stephen Yue, Olivier Bertrand
Sulfidated Nanoscale Zerovalent Iron and Method of Use Thereof	US 11,111,164	Subhasis Ghoshal, Sourjya Bhattacharjee



# TECHACCEL GRANTEES

## TECHACCEL

TechAccelR Grants are intended to help professors in the Faculty of Engineering accelerate their research-based ideas that are reported as inventions but need further validation prior to commercialization. These grants come out of the Faculty of Engineering Innovation Fund, which is funded by charitable gifts from alumni and other community donors. They are available throughout the year and can go up to \$7,500 per project.

**Professor Milan Maric, Professor Richard Leask (Chemical Engineering) and Professor Jim Nicell (Civil Engineering)**

### **Project Title**

Additive that Prevents Surface Defects in PVC Films

### **Summary**

Gas checks are visible fleck-shaped defects that occur on the surface of poly(vinyl chloride) (PVC) films during industrial calendering. Films containing these surface defects often do not meet minimum product specifications and therefore must be disposed of or recycled, resulting in increased cost and material waste. Currently, gas checks are controlled by keeping film gauge low and through trial-and-error modifications of processing parameters by calender operators. We found that a series of poly(caprolactone) (PCL)-based compounds with diester linkers and alkyl chain cappers were all effective at preventing the formation of gas checks during calendering, with low additive concentrations, thus producing films with no gas checks.

**Professor Mathieu Brochu and Dr. Sunyong Kwon (Materials Engineering)**

### **Project Title**

High Temperature Te-Based Solder Alloys

### **Summary**

High-temperature solders require solidus temperature at least 270 °C and the liquidus temperature at most 350 °C. The conventional high-temperature (HT) solders mainly comprise of Pb, which include Pb-5Sn, Pb-10Sn, Pb-5Ag, Pb-2Ag-8Sn, etc. Sn-based solder alloys are currently used for lead-free solders; but they suffer from high temperature properties due to their low solidus temperature (<260 °C). The present invention provides four lead-free alloy compositions, whose eutectic temperatures ranging from 300 to 350 °C depending upon compositions. The technological limitation to be addressed is to develop lead-free, high solidus temperature, high service temperature alloys.

**Professor Mihriban O. Pekguleryuz and Dr. Luis Angel Villegas-Armenta (Materials Engineering)**

### **Project Title**

High Temperature Te-Based Solder Alloys

### **Summary**

Designing new materials is crucial to face the ever-increasing engineering challenges of the future. Particularly for metals, the light-alloy design is a process that involves great time and expenses to perfect a proposed material. This is traditionally done by incrementally adding elements to an alloy and testing various heat treatments until the desired properties are obtained, which involves substantial work at each iteration. The KASSANDRA method is a novel solution to design light alloys that relies on artificial intelligence to dramatically accelerate the design process. It is a flexible approach that can be applied to a wide range of challenges: mechanical resistance, corrosion resistance, ductility improvement, cost reduction and more. It has the potential to reduce the development process from years to weeks, reducing costs and giving companies a competitive edge over other traditional approaches.



# INVENTION TO IMPACT TRAINING PROGRAM

## INAUGURAL COHORT

The new Invention to Impact (I-to-I) Training Program uses experiential learning to help McGill graduate students and their faculty supervisors gain insight into:

- technology commercialization
- entrepreneurship
- industry requirements and challenges

I-to-I provides tools and training to support researchers to translate their fundamental research to the marketplace and have their solutions benefit society. The program imparts an evidence-based methodology that students and professors can use for the rest of their careers, and it also enables the transformation of inventions to impact.

The inaugural teams are:

**Professor Daniel Varro and Sebastian Pilarski (Ph.D student)  
(both in Electrical & Computer Engineering)**

Project Title

Bandits, "Solutions to decision-making problems via multi-armed bandits"

**Professor Corinne Hoesli and Hugo Level (Ph.D student)  
(both in Chemical Engineering)**

Project Title

C2BioSurfaces, "Versatile surface treatment platform to create cell-specific biocompatible implants or cell culture systems."

**Alexandre Marceau-Gozsy (MBA student) and Jonathan De Belle**

Project Title

Go Green Hydrogen, "Long-haul hydrogen transportation solution to accelerate heavy vehicles transition towards net-zero emissions"

**Professor Jiayu Li, Zhenwei Ma (Ph.D student), Ran Huo (Ph.D student), Christopher Chung-Tze-Cheong and Alex Nottegar  
(all in Mechanical Engineering)**

Project Title

Mimetik Solutions, "Injectible, tough, adhesive hydrogel for sutureless wound management and meniscus repair"

**Professor J. Matt Kinsella, Jacqueline Kort-Mascort (Ph.D student) and Salvador Flores-Torres (Ph.D student)  
(all in Bioengineering)**

Project Title

Time Biosystem, "Novel tissue-based biomaterial to replace preclinical small animal models for improved drug screening and development"

**Lulan Shen (Ph.D student), Ruofeng Li (Ph.D student), Yitian Zhang and Shilei Lin  
(all in Electrical & Computer Engineering)**

Project Title

TrustCare, "AI-based solution to facilitate communication between residents' family members and elderly care facilities"

## TECHACCEL

The TechAccel Grants help students jump-start their technologically based ideas that have business potential and social impact. Teams develop their entrepreneurial skills through an online training platform, one-on-one business mentorship and project funding for product, process, or service development. These grants come out of the Faculty of Engineering Innovation Fund, which is funded by charitable gifts from alumni and other community donors.

### **Brighten**

Kieyan Mamiche Afara  
(Electrical & Computer  
Engineering)  
Neel Faucher (Electrical &  
Computer Engineering)  
Nathan Leuranguer  
(Mechanical Engineering)

### **Cloud Nine**

Tanbin Chowdhury  
(Electrical & Computer  
Engineering)  
Marie-Lynn Mansour  
(Electrical & Computer  
Engineering)  
Ammar Rudani (Software  
Engineering)  
Lawrence Zhang (Electrical  
& Computer Engineering)  
Tanjim Chowdhury (Mining  
& Materials Engineering)  
Ajrin Jamil

### CourseLnk

Abdullah Arafat (Electrical  
& Computer Engineering)  
Sebastian Danson  
(Computer Science)  
Victorien Garrigues  
(Computer Science)  
Aritra Banik (Computer  
Science)

### **DIASkin Technologies**

Mohul Sharma  
(Bioengineering)  
Xavier Santerre  
(Bioengineering)  
Serine Ben Abdesslem  
(Bioengineering)

### **Freely**

Nina-Marie Martinez  
(Mechanical Engineering)  
Pierre-Luc Leboeuf  
(Mechanical Engineering)  
Alex Moreau (Computer  
Engineering)  
Benjamin Lusterio-Adler  
(Mechanical Engineering)

### **HOUND**

Ari Kaufman (Mechanical  
Engineering)  
Diego Dorantes-Ferreira  
(Computer Science)  
Anthony Pultrone

### **Libro**

Chun Kit Calvin Li  
(Mechanical Engineering)  
Chun Bon Charles Li  
Chun Ho Brian Li  
Yue Du  
Erica Li

### **Mimetik Solutions**

Zhenwei Ma (Mechanical  
Engineering)  
Huo Ran (Mechanical  
Engineering)

### Parklue

Joey Koay (Electrical &  
Computer Engineering)  
Maggie Xiong (Faculty of  
Science)  
Signe Hoel (Faculty of  
Science)  
Aidan Eglin  
Vibhor Gautam  
Elena Pan  
Evian Yang  
Rita Jin

### Pètiencie

Guanbingxue Huang  
(Mechanical Engineering)  
Yangshixing Li (Chemical  
Engineering)  
Tianxing Zhong (Tianxing  
Zhong)  
Chen He (Software  
Engineering)  
Yuzhou Yan (Computer  
Science)

### **Recycling Pioneers**

Kirkklann Lau (Mining &  
Materials Engineering)  
Misghana Kassa  
(Department of Surgery)  
Arneet Karla (Computer  
Science)  
Simina Alungulesa



# TECHACCEL GRANTEES (CONTINUED)

## Rheto

Albert Kragl (Electrical & Computer Engineering)  
Bernard Boisclair  
Arvin Khodayari (Faculty of Law)  
George Kandalaft (Electrical & Computer Engineering)  
Pouyan Zabihian (Faculty of Law)  
Melissa Li (Cognitive Science)  
Binyuan Sun (Electrical & Computer Engineering)

## Sheltered

Mfoniso Ikpe (Mechanical Engineering)  
Paul Hinta (Mechanical Engineering)  
Jane Lee (Mechanical Engineering)

## SMS NanoTech

Mahsa Jalali (Bioengineering)  
Tamer Abdelwahab (Bioengineering)

## SWAM

## Reviv

Adam Rajguru (Mining & Materials Engineering)  
Michel Abdelnour (Software Engineering)

David Brenken (Mechanical Engineering)  
Johan Boscher (Computer Science)  
Matthew Wittmann (Computer Science)

## TrustCare

Lulan Shen (Electrical & Computer Engineering)  
Ruofeng Li (Electrical & Computer Engineering)  
Abdulrahman Takiddeen (Electrical & Computer Engineering)

## Tulsi.farm

Juliano Cobuzzi (Chemical Engineering)  
Justin Dragan  
Mehdi Ibn Brahim





# STARTUP INTERNSHIP PROGRAM

## STARTUP INTERNSHIP PROGRAM

Thanks to our generous alumnus donor John D. Thompson and to the Government of Canada's Student Work Placement Program (SWPP)/TECHNATION Canada Career Ready Program, the McGill Engine continued to offer the Startup Internship Program to our students as an experiential learning opportunity within our startups over the summer. Seven McGill Faculty of Engineering affiliated startups were selected to train and supervise an intern for 12 weeks.

The selected interns were from the faculties of Engineering and Science and each of them had the opportunity to collaborate remotely with both the startup and a mentor at the Engine Centre to ensure a well rounded learning experience during the internship.

The interns are listed below each startup.

### CourseLnk

Abris Gilvesy (B.A. Computer Science),  
Android Developer

### Pètiencie

Cyril Saidane (B.Eng Software Engineering),  
Front-end Developer for Native Application

### Acrylic

Rakshitha Ravi (B. Eng Computer Engineering),  
Software Developer

### LFAnt Medical

Andy Li (B.Eng Electrical Engineering), Bioelectrical Engineer

### TrustCare

George Kontorousis (B.Eng Software Engineering),  
Mobile App Development Intern

### SWAM

Salim Benchekroun (B. Eng Computer Engineering),  
Signal Processing Intern

### Alpha Iota Alloys

Chaimae Fahmi (B.Eng Software Engineering),  
Web developer Intern



## 2021 IAN MCLACHLIN PRIZES FOR ENTREPRENEURSHIP IN ENGINEERING

The prizes were established in 1998 by Ian McLachlin, B.Eng. 1960, to encourage students in the Faculty of Engineering to undertake new ventures with business or social impact potential. They are awarded to students enrolled in the Faculty of Engineering with high academic standing who have begun, have made progress towards, or have completed an entrepreneurial project with business or social impact potential.

**Natasha Jacobson and Trevor Cotter**  
(both Mechanical Engineering, PhD students)

**Venture Name**  
BioOptic

**Summary**

BioOptic is a necessary staple in physiotherapy and rehabilitative offices, globally, for its ability to characterize the abdominal compartment, non-invasively, for improved and targeted treatment plans. We directly measure and relate intra-abdominal pressure and abdominal wall elasticity to clinicians and patients, alike.

and

**Yannick D'Mello**  
(Electrical and Computer Engineering, PhD student)

**Venture Name**  
Stocate

**Summary**

Stocate is an online platform that supports the Buy Local movement by connecting local sellers with potential buyers. They represent small businesses, artists, grassroots organizations, producers, and independent teachers in our mission to empower individuals to find, create, and add their own value to the world.



## 2021 CANSBRIDGE-ENGINE-EMPOWER FELLOWS

The scholarships offer two entrepreneurially-minded undergraduate students enrolled in McGill's Faculty of Engineering entry into The Cansbridge Fellowship and provide the necessary resources to live and work in Asia over the summer as well as a weeklong bootcamp and conference in San Francisco.

The Cansbridge Fellowship has partnerships with top-tier Canadian universities in order to offer a unique experience to their most ambitious, high-impact students. It aims to create a community of young Canadian professionals who share a love for adventure and entrepreneurship and will become the leaders of tomorrow.

**Shlesha Van**

(B.Eng. Electrical Engineering)

**Tinetendo Makata**

(B.Eng. Chemical Engineering with a minor in Software)

## ABOUT MCGILL ENGINE

The McGill Engine Centre, out of the Faculty of Engineering, focuses on stimulating and supporting technologically based innovation and entrepreneurship at McGill University in collaboration with the McGill Dobson Centre for Entrepreneurship and the Office of Innovation and Partnerships.

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## THE ENGINE CENTRE NEEDS YOUR SUPPORT!

### CALL FOR VOLUNTEERS

Volunteers are an essential part of the university community; your participation and financial support are key elements in ensuring that coming generations of students achieve their goals.

#### WE ARE LOOKING FOR

- 01 TechAccel Mentors
- 02 Guest Speakers & Judges
- 03 WRSAs Proposal Reviewers

[LEARN MORE HERE!](#)

## FINANCIAL SUPPORT

The Faculty of Engineering Innovation Fund lies at the heart of Engine's mission of encouraging entrepreneurial and innovative thinking. The fund supports team-based innovative projects through the TechAccel grants that help students to jump start and accelerate technologically based ideas that have business or social impact potential.

The Innovation Fund is being supported by alumni:

Jim & Barbara Brodeur (B.Eng. 1956)  
Ian Mclachlin (B.Eng. 1960)  
Pasquale Di Pierro (B.Eng. 1976)  
Fonex Data Systems Inc.  
The Anna & Louis Viglione  
Foundation (B.Eng. 1978)

Michael Barski (B.Eng. 1968)  
Mark Levine (B.Eng. 1991)  
Arthur Levine (B.Eng. 1961)  
Howard Stotland (B.Eng. 1966)  
Robert Walsh (B.Eng. 1965)  
Leon Fattal (B.Eng. 1962)

The Innovation Fund needs your support through:

1. An annual contribution
2. A named endowment within the Innovation fund
3. Online donation to the Faculty of Engineering Innovation Fund

For more information please contact:

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