



McGill | Engine

5TH 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.

2018-2019 WILLIAM & RHEA SEATH AWARDS REVIEW COMMITTEE

Dr Ronald Chwang (B.Eng.'72 with honors) in Electrical Engineering, FAB member, chairman and president of ID Ventures America, a venture investment and management consulting service group. He was the chief executive officer of Acer America from 1992 until 1997, growing it to over \$1 Billion in revenues, and then became chairman and president of Acer Technology Ventures until 2004, managing high-tech venture investment activities in North America. Previously, he was president of two Acer business groups in Taiwan, from 1986 to 1991.

Doug Farnell (BEng'76 in Mechanical Engineering McGill, MBA 88 Concordia), currently retired, is the co-founder and past president of Farnell-Thompson Applied Technologies Inc – a design and supply company that has been involved in most of the world's largest Mining projects. The company specializes in large gear and gearless driven grinding mills. Doug and his business partner Steve Thompson were recently awarded the Canadian Mineral Processors Art MacPherson Award for their contributions to the industry in the field of comminution.

Dr Pedro Alvarez is the George R. Brown Professor of Civil and Environmental Engineering at Rice University, where he also serves as founding Director of the NSF Engineering Research Center on Nanotechnology-Enabled Water Treatment (NEWT). His research interests include environmental implications and applications of nanotechnology, bioremediation, fate and transport of toxic chemicals, water footprint of biofuels, water treatment and reuse, and antibiotic resistance control. He is an Associate Editor of Environmental Science and Technology and previously served on the scientific advisory board of the EPA and of the advisory committee of the NSF Engineering Directorate. Prof. Alvarez was elected to the National Academy of Engineering in 2018.

Professor Gordon W. Roberts received a B.A.Sc. degree from the University of Waterloo, and M.A.Sc. and Ph.D. degrees from the University of Toronto, all in electrical engineering. At McGill University, he holds the James McGill Chair in Electrical and Computer Engineering. He has co-written seven textbooks on analog IC design and mixed-signal test. Dr. Roberts is named on 14 patents, and has received numerous awards for teaching and for his work on mixed-signal testing. In 2003, he started DFT Microsystems, a company specializing in high-speed timing measurement. He is a Fellow of the IEEE.



2018-2019 WILLIAM & RHEA SEATH WINNERS IN ENGINEERING INNOVATION

Professor Thomas Szkopek
(Electrical and Computer Engineering)
Professor Vivian Yargeau
(Chemical Engineering)
Ibrahim Fakih, PhD candidate
(Electrical and Computer Engineering)

Project Title
Next-Generation Hydrological Sensor
Technology for Water Quality Monitoring

Summary
Water is a natural resource essential to the global biosphere, and no less important to the well-being of a nation's citizens. Despite its importance, water quality is insufficiently measured in space and time due to cost, practicality and overall feasibility. Deficiencies in water quality monitoring can be overcome by increasing the accessibility of ion sensing tools. We have developed inexpensive graphene ion sensing field effect transistors (ISFETs) with very low detection limits that can measure water quality in real-time. Our invention can potentially fill an important void in water quality monitoring technology. With this award we will validate graphene ISFETs by testing them in the field and integrating them with the Internet of Things (IoT).

Hamed Rafezi, PhD candidate
(Mining and Materials Engineering)
Professor Ferri Hassani
(Mining and Materials Engineering)

Project Title
Tricone Bit Wear Monitoring and Failure Prediction

Summary
The mining industry is moving toward automation and autonomous machinery for increasing the efficiency and precision in production. A successful automated blasthole drilling condition monitoring is a necessary component of this journey. Drilling and blasting are two preliminary tasks in large surface mining operations and constitute more than 15% of the total operational costs. Bit wear and subsequent bit failure create remarkable delays and costs. The detached bit parts after the failure must be removed from the hole to avoid damage to the rock crusher equipment. In addition, fully autonomous drilling would not be achievable without a machine sensing system for recognizing when the drill bit is worn and requires replacing. Our patent-pending system offers a solution to monitor the bit wear level in real-time and to predict the catastrophic failure. The system relies on signals analysis and an artificial intelligence model trained by full-scale drilling data gathered in mining operations in the past phases. The proposed application aims to cover the costs to build a stand-alone prototype of our system.



2019 ISSUED PATENTS

TITLE	US PATENT	INVENTORS
Flexible polar encoders and decoders	10,193,578	Professor Warren Gross, Gabi Sarkis, Pascal Giard, and Camille Leroux
Combined magnetometer accelerometer mems devices and methods	10,197,590	Professor Mourad El-Gamal, Mohannad Elsayed, Paul-Vahe Cicek, Frederic Nabki
Synergistic combination of a phenolic-rich maple syrup extract and an antibiotic	10,206,906	Professor Nathalie Tufenkji, Vimal Maisuria
Multi-mode unrolled polar decoders	10,305,514	Pascal Giard, Gabi Sarkis, Professor Warren Gross, Claude Thibeault
Methods and devices relating to high gain amplifiers	10,312,869	Professor Gordon Roberts and Ming Yang
Oxygen functionalized graphene nanoflake, a stable and surfactant-free graphene nanoflake nanofluid and method from making same	10,329,156	Professor Jean-Luc Meunier, Professor Dimitrios Berk, Ulrich Legrand, Norma-Yadira Mendoza Gonzalez, Pierre -Alexandre Pascone
Methods and systems relating to enhancing material toughness	10,329,194	Professor Francois Barthelat, Seyed Mohammad Mirkhalaf Valashani, Ahmad Khayer Dastjerdi
Multilayered bone graft and method of making same	10,376,611	Professor Francois Barthelat, Michael Tanzer, and Sacha Cavalier
Method of forming an acoustic transducer	10,390,162	Peter Gaskell, Robert-Eric Gaskell, Professor Thomas Szkopek and Jung Wook Hong
Finite element methods and systems	10,394,978	Professor Dennis Giannacopoulos, Yousef El Kurdi, and Professor Warren Gross
Methods and systems for network address lookup engines	10,469,235	Professor Warren Gross and Naoya Onizawa
TITLE	EU PATENT	INVENTORS
Biomaterial, Method for Making the Biomaterial and uses of the same	2681280	Professor Showan Nazhat, Benedetto Marelli, Jake Barralet, Giuliano Freddi, and Antonio Alessandrino
Bone replacement implants with mechanically biocompatible cellular material	2793756	Sajad Arabnejad Khanoki, Professor Damiano Pasini, and Michael Tanzer
TITLE	AU PATENT	INVENTORS
Production of high strength hydrochloric acid from calcium chloride feed streams by crystallization	2016202157	Professor George Demopoulos and Thomas Feldmann



NATURAL SCIENCES & ENGINEERING RESEARCH COUNCIL OF CANADA (NSERC) GRANTS

IDEA TO INNOVATION GRANTS

The objective of the NSERC Idea to Innovation (I2I) Grants is to accelerate the pre-competitive development of promising technology originating from the university and promote its transfer to a new or established Canadian company. These highly competitive I2I Grants provide funding to college and university faculty members to support R&D projects with recognized technology transfer potential and are co-written with the technology transfer managers.

Professor Odile Liboiron-Ladouceur, PhD student Bahaa Radi and Postdoc Reza Nezami
Integrated Photonic Receiver Enabling Parallel Electronic Processing for Cost Effective High-Speed Data Communications

Professors Thomas Szkopek and Viviane Yargeau, and Dr. Ibrahim Fakh
Market assessment of Next-Generation Hydrological Sensor Technology



TECHACCEL GRANTEES

TECHACCEL

The TechAccel Grants help students jump-start their technologically-based ideas that have business potential and social impact. 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 reach up to \$10,000 per team. Applications are reviewed every two to four weeks by members of the Innovation Committee.

Axon

Wilfred Mason
(Mechanical Engineering),
Raffi Hotter
(Mathematics and Computer Science),
Thomas Ribeiro
(Bioengineering)

BaseDash

Max Musing
(Software Engineering)

Cookiestruct

Jiayuan Wang,
Alexander Gupta
(Mechanical Engineering)

DawaSwift

Odero Otieno
(Computer Engineering)

Lunavoy

David Lin (Electrical Engineering)

Ozzie

Louis-Jacques Bourdages
(Mechanical Engineering),
Raffi Hotter
(Mathematics and Computer Science),
Simon Tartakovsky
(Mathematics
and Physics),
Harsh Patel
(Computer Science and Biology),
Etienne Denis
(Computer Science),
Daoud Piracha
(Computer Science),
Anna Brandenberger
(Physics and Computer Science),
Jad Hamdan
(Mathematics and Computer Science)

The Sweater Guys

Dexter Storey
(Architecture)
Michael Cantacuzene
(Electrical Engineering)
Dom DeFelice (Economics)

Rokulo

Anthony Laye
(Software Engineering)
Guy Stysis
(Chemical Engineering)

ZimDigester

Tino Makuvire
(Electrical Engineering)
Nicholas Toronga
(Management)



2019 IAN McLACHLIN PRIZES FOR ENTREPRENEURSHIP IN ENGINEERING

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. 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.

Neath Nguon

(Chemical Engineering, Undergraduate Student)

and

Aissam Souidi

(Chemical Engineering, Undergraduate Student)

Project Title:

Artizanko

Summary

Artizanko is a zero waste packaging solutions company for local enterprises.

Currently, we are collaborating with local producers to innovate compostable packaging for their products. Our goal is to have packages that are inexpensive, compostable, heat and water resistant.



2019 CANSBRIDGE-ENGINE 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.

Katherine Sirois

(Computer Engineering, minor in Technological Entrepreneurship)

and

Nayem Alam

(Electrical Engineering, minor in Software Engineering)

THE INNOVATION FUND NEEDS YOUR SUPPORT.

The Innovation Fund lies at the heart of our Faculty's mission of encouraging entrepreneurial thinking—at all levels—through our six departments and two schools. The fund supports team-based, innovative projects through the TechAccel Grants that help students jump-start and accelerate technologically-based ideas that have business or social impact potential.

For more information contact:

Katya Marc, M.Eng, MBA, McGill Engine Associate Director
Tel: 514-398-3355 or katya.marc@mcgill.ca

The Innovation Fund is being supported by alumni:

Jim & Barbara Brodeur (BEng '56)
Ian Mclachlin (BEng'60)
Pasquale Di Piero (BEng'76)
Fonex Data Systems Inc.
The Anna & Louis Viglione (BEng'78) Foundation
Michael Barski (BEng'68)
Mark Levine (BEng'91)
Arthur Levine (BEng'61)
Howard Stotland (BEng'66)
Robert Walsh (BEng'65)

The Innovation Fund needs your support through:

1. An annual contribution (Suggested amount is \$1K)
2. A named endowment within the Innovation Fund

For more information contact:

Mr. Krish Dasgupta
Director
University Advancement Office
Faculty of Engineering
514-398-2016
krishanu.dasgupta@mcgill.ca

The McGill Engine, the Faculty of Engineering Innovation and Entrepreneurship Centre, focuses on stimulating technologically- based innovation and entrepreneurship at McGill in collaboration with the McGill Dobson Centre for Entrepreneurship and the Office of Innovation and Partnerships. The McGill Engine aims to help develop the next-generation of McGill technological innovators and entrepreneurs, to promote and accelerate the commercialization of inventions and software out of the Faculty, and to increase engagement and R&D collaborations between innovation-driven companies and the Faculty of Engineering.