ANNUAL REPORT

July 1, 2014 to June 30, 2015

Department of Mechanical and Materials Engineering

Western Engineering

Western University

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MESSAGE FROM THE DEPARTMENT CHAIR

Welcome to Western's Department of Mechanical and Materials Engineering! As you browse this report, you'll discover a vibrant Department which offers strong academic, research and professional engineering programs. Our students are provided with an education that is solidly based in the fundamentals, infused with creativity and innovation, and geared to instill a strong ethical responsibility commensurate with the engineering profession. They are well prepared to take on leadership roles in industry and government when they leave our programs.

The department had 234 full time and 34 part-time undergraduate students (years 2, 3 and 4) and 115 graduate students. The Mechatronics Program offered jointly with the Department of Electrical and Computer Engineering exceeded planned enrolment by 100% and has reached enrolment of 48 We awarded 74 BESc degrees, 34 MEng degrees, 9 MESc degrees and 10 PhD degrees this year. We think that we are the right size, where we are small enough to offer personal attention to our students and large enough to have broad, state-of-the-art technical expertise. Our numerous, high quality graduates are sought after by industrial employers from across the country, whilst many others continue on to graduate, medical, dental, business and law schools, all taking with them core skills in engineering design. Indeed, every year, our senior undergraduates work on “real world” design projects sponsored by a variety of companies.

In the past year, we have reviewed several aspects of our undergraduate curriculum and have continued to strengthen the experiential part of the program. Our courses expose students to the use of sensors, actuators and controls, which are essential elements of modern intelligent mechanical systems. Our new Controls Laboratory serves 3rd and 4th year students. The new 3D Printing Laboratory is used by the design courses in the 2nd and 3rd years for rapid prototyping as well as by the 4th year manufacturing courses. The new Gas Dynamics Laboratory started to serve 3rd year students. Our laboratories are among the best in the country according to external reviewers. We have expanded the scope of our graduate professional programs in order to address society's needs. Enrolment in these programs has reached the planned capacity. Our program in Heating, Ventilation and Air Conditioning (HVAC) addresses the current preoccupation with energy and its efficient use. The program in Engineering and Medicine addresses the needs of our aging society and the opportunities associated with maintaining healthy life styles, while the program in Composite Materials focuses on the automotive as well as biomedical industries both of which require improved and lighter materials.

Our students have the opportunity to participate in a variety of international experiences. We have an ongoing exchange program with the National University of Singapore and the University of Hong Kong. We have an exchange program with the University of British Columbia for students who want to experience other parts of Canada. This year we hosted 9 students from other countries, whilst 20 of our own students went into various Internships.

Our department has several active student societies including the American Society of Mechanical Engineers (ASME), the Society of Automotive Engineering (SAE), the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) and the Canadian Society for Mechanical Engineering (CSME). These student societies have regular meetings, field trips to companies who hire our students and they participate in regional competitions and meetings. We encourage them to participate in collegiate design competitions including the Formula SAE race car, the SAE Baja car, the solar car, the concrete toboggan, the SAE Aero remote-controlled aircraft and others.

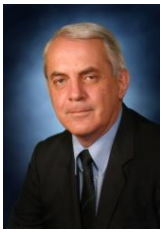
Many of our faculty members are highly recognized in their fields and have earned numerous honors and awards from different engineering societies. Last year we have hosted 25th Canadian Congress of Applied Mechanics which brought almost 300 researchers from all over the country to our campus. With annual externally funded research expenditures exceeding $2.5 million, research support is derived from major Federal research funding agencies, such as the Natural Sciences and Engineering Research Council, the Province of Ontario and industry. The Department has several large research laboratories in the areas of thermos-fluids, materials, biomechanics, dynamics, computational mechanics and mechatronics, among others. The major research areas include: (i) Heat transfer, (ii) Fluid mechanics, (iii) Composite materials, (iv) Biomechanics, (v) Micro-electro-mechanical systems (MEMS), (vi) Mechatronics, (vii) Computational mechanics and (viii) Design. Our research activities place us the third position in the country according to the ratings prepared by the University of Toronto.

We look forward to our continued success in the years to come and we warmly welcome your involvement in ensuring a strong future for Mechanical and Materials Engineering at Western.

J.M.Floryan
Professor and Chair

ADMINISTRATION

Chair



J.M. Floryan, Ph.D., P.Eng.
Professor

519-661-2111, Ext: 88330
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Associate Chair, Graduate Research Programs

K. Siddiqui, Ph.D., P.Eng
Associate Professor

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Office: SEB 3078
ksiddiqui@eng.uwo.ca

Graduate Research Programs Committee 2014-2015

G. Knopf
M.D. Naish
E. Savory
R. Klassen, Associate Chair, Professional Programs (July 1-December 31, 2014) (on sabbatical leave until June 30, 2015)
R.O. Buchal, Associate Chair, Professional Programs (January 1, 2015–June 30, 2015)
K. Siddiqui, Associate Chair, Research Programs

Associate Chair, Graduate Professional Programs

R. Klassen, Ph.D., P.Eng.
Associate Professor
(sabbatical leave January 1, 2015 to June 30, 2015)

519-661-2111, Ext. 88323
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R.O. Buchal, Ph.D, P.Eng.
Associate Professor
(January 1, 2015 to June 30, 2015)

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Office: SEB 2069C
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Graduate Professional Programs Committee 2014-2015

R.O. Buchal
T. Kuboki
P. Kurowski
A.G. Straatman
K. Siddiqui, Associate Chair, Research Programs
R.O. Buchal, Associate Chair, Professional Programs (January 1, 2015-June 30, 2015
R. Klassen, Associate Chair, Professional Programs (July 1-December 31, 2014)(on sabbatical leave until June 30, 2015)

Associate Chair, Undergraduate Affairs

J.T. Wood, Ph.D., P.Eng.
Associate Professor

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Office: SEB 3061
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Undergraduate Curriculum Committee 2014-2015

T. Jenkyn
L. Jiang
P. Kurowski
O.R. Tutunea-Fatan
J. Wood, Associate Chair, Undergraduate

AWARDS AND RECOGNITION

J.M. Floryan

Received the McCurdy Award from the Canadian Aeronautics and Space Institute.
Elected to the membership of the Ambassadors Club of Montreal

K. Siddiqui

Elected as a Fellow of the American Society of Mechanical Engineering (ASME)

A.G. Straatman

Terry Base Award for Outstanding Teaching in Mechanical and Materials Engineering. Nominated by the MME UG Students.

FACULTY MEMBERS AND ADMINISTRATIVE STAFF

1. FULL-TIME FACULTY MEMBERS

Asokanthan, S.F., Professor, Ph.D. Office: SEB 2057A
519-661-2111, x 88907 sasokanthan@eng.uwo.ca

Research Interests: Dynamics and Control; Inertial Sensing and Applications; Nonlinear and Stochastic Mechanics; Rotating Flexible Multi-body Systems

Buchal, R.O., Associate Prof, Ph.D., P.Eng. Office: SEB 2069C
519-661-2111, x 88454 rbuchal@eng.uwo.ca

Research Interests: Design Methods and Tools; Design Education; Instructional Technology; Manufacturing Inspection Planning

Ferreira, L., Assistant Prof, Ph.D., P.Eng. Office: SEB 3024
519-661-2111, x 86124 lferreira@uwo.ca

Research Interests: Medical Mechatronics; Implantable Transducer Design; Biomechanics of Major Joints Computer-Aided Systems for Orthopaedic Surgery

Floryan, J.M., Professor, Ph.D., P.Eng. Office: SEB 3057
519-661-2111, x 88330 mfloryan@eng.uwo.ca

Research Interests: Fluid Mechanics; Hydrodynamic Stability; Flow Control; Numerical Algorithms; Moving Boundary Problems; Immersed Boundary Conditions Method

Jenkyn, T.R., Associate Prof, Ph.D., P.Eng. Office: SEB 2075
519-661-2111, x 88339 tjenkyn@eng.uwo.ca

Research Interests: Orthopaedic Biomechanics; Advanced Medical Imaging; Musculoskeletal Computational Modeling; Injury Causation Biomechanics; Sport Science

Jiang, L.Y., Associate Prof., Ph.D., P.Eng. Office: SEB 3076
519-661-2111, x 80422 lyjiang@eng.uwo.ca

Research Interests: Nanostructured Materials; Nanomechanics; Piezoelectric Materials; Thin Film Materials; Fracture and Failure Analysis

Johnson, J., Professor, Ph.D., P.Eng. Office: SEB 2076
519-661-2111, x 88255 jajohnso@eng.uwo.ca

Research Interests - Orthopaedic Biomechanics; Implant Design and Analysis; Joint Motion and Load Transfer

Khayat, R.E., Professor, Ph.D., P.Eng. Office: SEB 3086
519-661-2111, x 88253 rkhayat@eng.uwo.ca

Research Interests: Theoretical Fluid Dynamics; Free Surface and Interfacial Flows; Hydrodynamic Stability; Micro-Convective Heat Transfer; Newtonian and Complex Fluids

Klassen, R., Associate Prof, Ph.D., P.Eng. Office: SEB 3075
519-661-2111, x 88323 rklassen@eng.uwo.ca

Research Interests - Micro-Mechanical Properties of Materials; Time-Dependent Deformation of Materials; Microstructure /Mechanical Property Relationships

Knopf, G. K., Professor, Ph.D., P.Eng. Office: SEB 3087
519- 661-2111, x 88452 gknopf@eng.uwo.ca

Research Interests: Engineering Design; Geometric Modeling; Laser Micro-Fabrication; Optical Devices and Systems; Bioelectronics Biosensors

Kuboki, T., Assistant Prof, Ph.D. Office: CMLP 1306
519- 661-2111, x 88519 tkuboki@uwo.ca

Research Interests: Polymer Composites; Biocomposites, Nanocomposites; Polymer Blends; Bioplastics; Natural Fiber; Processing of Polymers and Composites; Plastic Foaming; Mechanical Properties of Polymers and Composites

Kurowski, P., Assistant Prof, Ph.D., P.Eng. Office: SEB 3077
519- 661-2111, x 80125 pkurowski@eng.uwo.ca

Teaching: Product Design, Finite Element Analysis, Mechanical Vibrations, Kinematics and Dynamics

Research Interests**: Teaching Methods in Design and Design Analysis, Engineering Curriculum Development**

Naish, M.D., Associate Prof, Ph.D., P.Eng. Office: SEB 2055
519-661-2111, x 88294 naish@eng.uwo.ca

Research Interests: Mechatronic Systems; Computer-Assisted Surgery and Therapy; Surgical Robotics; Sensing Systems; Surgical Training; Medical Devices; Robotics

Price, A., Assistant Prof, Ph.D. Office: SEB 3026A
519-661-2111, x 86420 aaron.price@uwo.ca

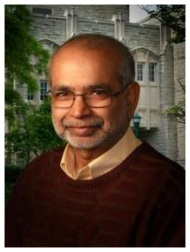
Research Interests: Smart Material Actuators and Sensors; Mechatronic Systems for Industrial Automation and Biomedical Applications; Additive Manufacturing of Advanced Materials; Conductive Electroactive Polymers and Composites; Magnetic and Thermal Shape Memory Materials

Savory, E., Associate Prof, Ph.D., P.Eng, C.Eng Office: SEB 3085
519-661-2111, x 88256 esavory@eng.uwo.ca

Research Interests: Experimental Fluid Dynamics; Wind Engineering; Environmental Flows; Biological Fluid Mechanics

Siddiqui, K.**,** Associate Prof, Ph.D., P.Eng. Office: SEB 3078
519-661-2111, x 88234 ksiddiqui@eng.uwo.ca

Research Interests: Experimental Fluid Mechanics; Turbulence; Interfacial Fluid Dynamics and Heat Transfer; Alternative Energy Systems; Energy Conversion



Singh, A.V., Professor, Ph.D., P.Eng. Office: SEB 2059A
519-661-2111, x 88321 avsingh@eng.uwo.ca

Research Interests: – Computational Methods; Vibrations of Plates and Shells; Mechanics of Composite Materials; MEM and Nano Structures

Straatman, A.G., Professor, Ph.D. P.Eng. Office: SEB 2069B
519-661-2111, x 88249 astraatman@eng.uwo.ca

Research Interests: Computational Fluid Dynamics; Porous Materials; Convective Heat Transfer; Turbulence

Sun, X.A. (Andy), Professor, Ph.D. Office: SEB 3059
519-661-2111, x 87759 xsun@eng.uwo.ca

Research Interests: Nanotechnology; Nanomaterials; Clean Energy Fuel Cells; Lithium Ion Batteries; Energetic Materials

Tutunea-Fatan, O.R., Associate Prof, Ph.D Office: SEB 2063A
519-661-2111, x 88289 rtutunea@eng.uwo.ca

Research Interests: Multi-Axis CNC Machining; Computer-Aided Design and Manufacturing; Intelligent Machining Systems; Numerical Methods

Wood, J.T., Associate Prof, Ph.D., P.Eng. Office: SEB 3061
519-661-3482 jwood@eng.uwo.ca

Research Interests: Structure – Property Relationships; Lightweight Structural Materials for Automotive Applications; Magnesium Die-Casting; Composite Materials

Yang, J., Associate Prof, Ph.D., P.Eng. Office: SEB 3089
519-661-2111, x 80158 jyang@eng.uwo.ca

Research Interests: Nanofabrication; Atomic Force Microscopy (AFM); MEMS/NEMS; BioMEMS; Lab-on-a-chip; Microfluidics; Nanomaterials; Polymers; Biomedical Devices; Biophysics

Zhang, C., Professor, Ph.D., P.Eng. Office: SEB 2065
519-661-2111, x 88345 czhang@eng.uwo.ca

Research Interests - Computational Fluid Dynamics; Gas-Solid Two-Phase Flows; Vapor-Liquid Two-Phase Flows; Combustions and Emission Controls

2. PROFESSOR EMERITI

J.R. Dryden, Professor, Ph.D.
J.D. Tarasuk, Professor; P. Eng.; Ph.D.

3. ADJUNCT ACADEMIC PROFESSORS

W. Altenhof, Ph.D.
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Experimental and numerical modeling of structures subjected to impact/dynamic and quasi-static loading; large deformation of materials; metallic and polymeric foams; crashworthiness evaluation; child safety in vehicles; durability of mining vehicle wheels

G. Avigad, Ph.D.
Mechanical Engineering
Braude College of Engineering
Karmiel, Israel
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Multi-objective and multi modal optimization, evolutionary algorithms, robotics, conceptual design, design for adaptability.

A Barari, Ph.D
Faculty of Engineering and Applied Science
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Automotive Body and Structural Design and Analyses, Geometric Inspection and Coordinate Metrology, Tolerance Analyses, Computer-Aided Design, DFM

E. Bordatchev, Ph.D., Dr.Sc.(Eng)
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High-precision microfabrication; dynamics, monitoring, diagnostics, control and optimization of micromachining processes; micro molds/dies; micromechatronics; MEMS/MOEMS; micromechanisms; microsensors; micromanipulations.

R. Canas, Ph.D.
Email: rcanas@uwo.ca

Mathematics and physics modeling. Finites element, Computational Fluid Dynamics, Particle modeling, High performance computing and high performance graphic. Haptics and Virtual Environment. Non Destructive Testing. Application for Manufacturing, Automotive, Aerospace and Nuclear Energy.

C.E. Dunning, Ph.D., P.Eng.
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Human Orthopaedic Biomechanics; Joint Replacement (Implant) Design; Joint Kinematics; Impact Loading and Analysis.

R. Gurka, Ph.D.
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Turbulent and complex flows; Transport phenomena in biological flows; Experimental fluid dynamics.

F. Henning, Ph.D.
Fraunhofer Institute for
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Composite materials, in-line compounding of long-fibre reinforced polymers, injection moulding,design and construction of composite parts.

J. Johrendt, Ph.D.
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Materials and component characterization, neural networks, novel structural methods, vehicle durability, road test simulation, and driver modeling.

B. Minaker, Ph.D.
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Modelling, simulation, and control of vehicle dynamics, multibody dynamics, finite element analysis, design of vehicle suspension systems.

S. Nikumb, Ph.D.
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Laser micro-processing of materials, high power laser development, photonic band gap materials, porous semiconductors, machine & process dynamics, micro-devices & sensor fabrication, micro-electro-mechanical-systems (MEMS), diode laser joining of materials and multi-kilowatt carbon di-oxide lasers.

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Department of Mechanical and Industrial Engineering
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Toronto, Ontario M5S 3G8
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Foaming of Thermoplastics and Composites

M. Sadayappan, Ph.D.
CANMET - Materials Technology Laboratory
Natural Resources Canada, McMaster Innovation Park
289-922-8567
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Permanent mold casting of non-ferrous metals, development of lead-free copper alloys for plumbing applications, alloy development and solidification processing of light metals including aluminum and magnesium.

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905-525-9140, Ext. 23213
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Polymer processing, extrusion machinery, composite materials, compounding technology, particle mechanics, foams.

4. VISITING PROFESSORS

Dr. Gideon Avigad, Ort Baude College of Engineering, Israel
Dr. Da Chen, Shandong University of Technology, China
Dr. Libo Fan, Xuchang University, China
Dr Hanspeter Frei, Dept. of Mechanical and Aerospace Engineering. Carleton
Dr. Stanislaw Gepner, Warsaw University of Technology, Poland
Dr. Roderich Gross, The University of Sheffield, UK
Dr. Jian Gu, Hubei Institute of Aerospace Chemotechnology, China
Marcel Holzner, Fraunhofer ICT, Karlsruhe, Germany
Dr. Gui-Chuan Hu, Chongqing University of Science & Technology, China
Dr. Yuhuai Hu, Springpower International Limited, London, Ontario
Dr. Jian Liu, Lawrence Berkeley National Laboratory, California
Dr. Erella Matalon-Eisenstadt, Ort Braude College of Engineering, Israel (GK)
Dr. Weirong Nie, Nanjing University of Science and Technology, China
Dr. Junqing Pan, Beijing University of Technology, China
Dr. Wenqing Qu, Beihang University, China
Dr. Yanzhi Sun, Beijing University of Technology, China
Dr. Jianshe Wang, Zhengzhou University, China
Dr. Rong Xie, Dalian University of Technology, China
Dr. Fang Yuan, Henan University of Technology, China
Dr. Kun Zhang, Southwest Jiaotong University, China
Prof. Quanchao Zhang, China University of Mining and Technology, China
Dr. Wei Zhang, Beihang University, China

5. ADMINISTRATIVE SUPPORT STAFF

Chris Seres
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Joanna Blom
Graduate Coordinator
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Claire Naudi
Coordinator, Undergraduate and MEng Programs
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6. TECHNICAL SUPPORT STAFF

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Adam Woodhouse
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UNDERGRADUATE EDUCATION

The Department of Mechanical and Materials Engineering offers an accredited program in Mechanical Engineering. In preparation for a career in Mechanical Engineering, the program at Western endeavours to balance the theory and applications necessary for the spectrum of work situations. The first year courses are common with all other disciplines in Engineering. The second and third year courses focus on the fundamental areas of Mechanical Engineering. In the fourth year, students are given an opportunity to select electives in areas of interest or specialization. The program focuses on a broadly based Mechanical & Materials Engineering education that stresses: fundamental engineering concepts, contemporary design practices, development of interpersonal skills, and interaction with engineering practitioners.

1. MECHANICAL ENGINEERING PROGRAM

Second Year Program
Applied Mathematics 2413, ECE 2274A/B, ES 2211F/G, MME 2200Q/R/S/T, MME 2202A/B, MME 2204A/B, MME 2213A/B, MME 2259A/B, MME 2260A/B, MME 2273A/B, MME 2285A/B, Statistical Sciences 2143A/B,

Third Year Program
Applied Mathematics 3413A/B, ECE 3374A/B MME 3303A/B, MME 3307A/B, MME 3334A/B, MME 3350A/B, MME 3360A/B, MME 3379A/B, MME 3380A/B, MME 3381A/B.

Fourth Year Program
There are four options: Mechanical Engineering Option; Mechanical Engineering and Law Option; Mechanical and Medicine Option; Mechanical Engineering and Business Option

Mechanical Engineering Option

Business Administration 2299E, ES 4498F/G, MME 4499. Five of the following technical electives: MME 4401Y, MME 4414A/B, MME 4422A/B, MME 4423A/B, MME 4424A/B, MME 4425A/B, MME 4427A/B, MME 4428A/B, MME 4429A/B, MME 4443A/B, MME 4445A/B, MME 4446A/B, MME 4450A/B, MME 4452A/B, MME 4453A/B, MME 4459A/B, MME 4460A/B, MME 4464A/B, MME 4469A/B, MME 4473A/B, MME 4474A/B, MME 4475A/B, MME 4479A/B, MME 4480A/B, MME 4481A/B, MME 4482A/B, MME 4483A/B, MME 4485A/B, MME 4486A/B, MME 4487A/B, MME 4491A/B, MME 4492A/B. Students may elect to substitute technical electives from other engineering disciplines or from the Faculty of Science, provided they have the required prerequisites, and provided at least half of their technical electives are chosen from the above list. A maximum of two 0.5 courses may be taken from the Faculty of Science and used towards the BESc degree. All courses outside of the MME list must be approved by the Department of Mechanical and Materials

Mechanical Engineering and Law Option

Admission
Before entering the combined BESc/JD degree program, students must have completed the first three years of the Mechanical Engineering program at Western (or equivalent). In addition to applying for the combined degree program through the Office of the Associate Dean - Academic of the Faculty of Engineering, students must also make a separate application to the Faculty of Law for admission into the JD program by the published deadline, May 1. In the application to the Law School, the applicant must indicate that he or she is applying to the combined BESc/JD program.

Admission Criteria
To be eligible for the combined degree program, students must have completed all the requirements of the first year curriculum in the Faculty of Engineering, and the second and third year program, Option B, in the Department of Mechanical Engineering with either a minimum cumulative weighted average (CWA) of 80% or stand in the top 10% of the class. In addition, the applicant must meet the minimum LSAT requirement established by the Law School Admission Committee for all combined degree programs. Entrance into the combined degree program is competitive and limited.

Progression Standards
Once admitted to the combined program, students are required to maintain a minimum year weighted average of 75% in their Engineering curriculum courses and a B average in their Law courses.

Failure to Meet Progression Standards
A student who fails to meet the combined program progression standards in any year will be required to withdraw from the combined program. However, a student who has met the progression standards of either the Engineering or LLB program, will be allowed to proceed to the next year of that program. If the progression standards of both individual programs have been satisfied, the student may continue in either program and may petition the Faculty whose program was not selected for permission to complete that program at a later date. A student who is required to withdraw from the combined program and wishes to pursue either or both of the individual programs, must complete all the degree requirements of the individual program or programs in order to graduate from that program or those programs.

First Year Program
Common first year of Engineering.

Second Year Program
Applied Mathematics 2413, ECE 2274A/B, ES 2211F/G, MME 2200Q/R/S/T, MME 2202A/B, MME 2204A/B, MME 2213A/B, MME 2259A/B, MME 2260A/B, MME 2273A/B, MME 2285A/B, Statistical Sciences 2143A/B,

Third Year Program
Applied Mathematics 3413A/B, ECE 3373A/B, ECE 3374A/B MME 3303A/B, MME 3307A/B, MME 3334A/B, MME 3350A/B, MME 3360A/B, MME 3379A/B, MME 3380A/B, MME 3381A/B

Fourth Year Program
First year Law curriculum. No courses outside Law may be taken during this year.

Fifth and Sixth Year Programs
Two 0.5 Technical electives
MME 4499
In years five and six students must complete the following requirements for the JD:
1. The two compulsory upper-year Law courses
2. At least three Law core-group courses
3. Additional Law courses totalling at least 25 credit hours. One Law course must have an essay requirement of at least two credit hours.
Requirements 2 and 3 must include one of the courses listed below under "Economics" and one listed under "Impact of Technology on Society."
Notes: Fulfillment of the Faculty of Engineering requirement of courses that expose students to the impact of technology on society, ethical issues, and economics must be taken as follows:
• Economics: One of Law 5220 Income Taxation, Law 5555 Corporate Finance, or an approved Law Selected Topics course.
• Ethical Issues: Law 5150 "Legal Ethics & Professionalism" – [part of the first year curriculum].
• Impact of Technology on Society: One of: Law 5615 "Biotechnology Law", Law 5605 "Advanced Issues in Technology Law", Law 5350 "Media Law", Law 5600 "Advanced Intellectual Property", Law 5620 "Information Law", Law 5625 "Intellectual Property", Law 5630 "International Protection of Intellectual Property", Law 5610"Advanced Patent Law", or an approved Law Selected Topics Course.
•Thought Processes of the Humanities and Social Sciences: Law 5110 Constitutional Law, Law 5115 Contracts, Law 5120 Crimnal Law, Law 5140 Property, Law 5145 Torts [part of the first year curriculum]

Exchange Programs
Students enrolled in the combined program are not eligible for an exchange program with the Faculty of Engineering; however, they may be eligible for an exchange through the Faculty of Law in Year Five or Six. This will require advanced planning with both faculties.

Mechanical Engineering and Medicine Option

Admission
Before entering the concurrent BESc/MD degree program, students must have completed the first three years of the Mechanical Engineering program at Western, Option C (Mechanical Engineering and Medicine). In addition to applying for the concurrent degree program through the Office of the Associate Dean - Academic of the Faculty of Engineering, students must also make a separate application for admission into the MD program. As a part of the application process, students must write a letter to the Schulich School of Medicine & Dentistry (Admission Office) indicating their intent to proceed into the concurrent BESc/MD program.

Admission Criteria
To be eligible for the concurrent degree program, students must have completed all the requirements of the first year curriculum in the Faculty of Engineering with a minimum year weighted average (YWA) of 80%, and the second and third year program of Option C (Mechanical Engineering and Medicine), in the Department of Mechanical and Materials Engineering, with a minimum year weighted average (YWA) of 80% in each year. In addition, the applicant must meet the minimum performance standards in the MCAT and GPA, determined by the Schulich School of Medicine & Dentistry, and must be invited and attend a personal interview with the Schulich School of Medicine & Dentistry. A confidential assessment form, proficiency in English and Basic Life Support Training is also required. Entrance into the concurrent degree program is competitive and limited.

Admission Procedures
A student interested in the concurrent BESc/MD program will apply during the February registration period of the first common year of the Engineering program for admission to the Mechanical Engineering program, Option C (Mechanical Engineering and Medicine). The student must write the MCAT before the third year of the Mechanical Engineering and Medicine program, for the following year's admission into the MD program. Students must apply to the MD program by the deadline established (usually October) by the Ontario Medical School Application Service (OMSAS) during the third year of the Mechanical Engineering and Medicine program.
Admission to the BESc program does not guarantee admission to the MD program. Note: This program is only open to Canadian citizens or permanent residents.

Progression Requirements
A student enrolled in the concurrent BESc/MD degree program must satisfy the following progression requirements:
Year 2: a minimum YWA of 80% in courses taken as a part of Option C (Mechanical Engineering and Medicine)
Year 3: a minimum YWA of 80% in courses taken as a part of Option C (Mechanical Engineering and Medicine)
Year 4: progression requirements of the MD program and successful completion of Engineering courses.
Year 5: progression requirements of the MD program
Year 6: progression requirements of the MD program
Year 7: progression requirements of the MD program and successful completion of Engineering courses.
If the student fails to satisfy the conditions above, he or she will be required to withdraw from the concurrent program and will be required to transfer out of Option C into Option A of the Mechanical Engineering program.

Concurrent Degree Program

First Year Program
Common first year of Engineering.

Second Year Program
Applied Mathematics 2413, ECE 2274A/B**,** MME 2200Q/R/S/T**,** MME 2202A/B, MME 2204A/B, MME 2213A/B, MME 2259A/B, MME 2260A/B, MME 2273A/B, MME 2285A/B, Statistical Sciences 2143A/B, Business Administration 2299E.

Third Year Program
Applied Mathematics 3413A/B, ECE 3374A/B, ES 4498F/G, MME 3303A/B, MME 3307A/B, MME 3334A/B, MME 3350A/B, MME 3360A/B, MME 3379A/B, MME 3380A/B, MME 3381A/B

Fourth Year Program
Regular Year 1 of the MD program.
MME 4499

Fifth Year Program
Regular Year 2 of the MD program.

Sixth Year Program
Regular Year 3 of the MD program.

Seventh Year Program
Regular Year 4 of the MD program less the Advanced Communication Skills course.
MME 499 (will count as an "elective" credit in the fourth year of the MD program).

Mechanical Engineering and Business Option

Admission Requirements
Normally, students apply to the HBA program during their second year in Engineering by the published deadline. Application for the combined program is made during the first year in the HBA program. Students applying to the Ivey Business School's Academic Excellence Opportunity (AEO) are also eligible to be considered for the combined program. Admission to the program is competitive and limited. Upon completion of the program students will receive both an HBA and a BESc degree.

To be eligible for the combined program, all students, including those admitted via the AEO route, must have completed all the requirements of the first year curriculum in the Faculty of Engineering and the second year program in the Department of Mechanical and Materials Engineering. Students must obtain a weighted average (YWA) of 78% in each year. During the second year of the program students are required to complete Business Administration 2257 with a minimum grade of 70%. Demonstrated participation in extra curricular and/or community activities, leadership and work experience are also admission criteria.

Progression Standards

Students in this combined program must meet the following progression standards: Students enrolled in first year HBA (Year Three) must attain at least 78%.

In Years Four and Five, students must attain a minimum weighted average of 75% in their 4000 level HBA courses and a 75% average in their Engineering courses.

Failure to Meet Progression Standards
A student who fails to meet the progression standards in any year must withdraw from the combined program. However, a student who has met the progression standards of either the HBA or BESc program will be allowed to proceed to the next year of that program. If the progression standards of both individual programs have been satisfied, the student may continue in either program and may petition the School or Faculty whose program was not selected for permission to complete that program at a later date. A student who is required to withdraw from the combined program and wishes to pursue either or both of the individual programs, must complete all the degree requirements of the individual program or programs in order to graduate from that/those program(s).

First Year Program
Regular first year curriculum in the Engineering program.

Second Year Program
Applied Mathematics 2413, ECE 227A/B, MME 2200Q/R/S/T, MME 2202A/B, MME 2204A/B, MME 2213A/B, MME 2259A/B, MME 2260A/B, MME 2273A/B, Statistical Sciences 2143A/B, Business Administration 2257.

Third Year Program
Business Administration 3300K, 3301K, 3302K, 3303K, 3304K, 3307K, 3311K, 3316K, 3321K, 3322K, 3323K.

Fourth Year Program
Applied Mathematics 3413A/B, MME 2285A/B, MME 3303A/B, MME 3307A/B, MME 3334A/B, MME 3360A/B, MME 3379A/B, MME 3380A/B, MME 3381A/B, ECE 3374A/B Applied Project Requirement: Business Administration 4569

Fifth Year Program
ES 4498F/G, MME 3350A/B, MME 4499, MME 4492A/B
One 0.5 technical electives
3.0 Business Administration courses: 0.5 course: International Perspective Requirement: Business Administration 4505A/B, 0.5 course: Corporations and Society Perspective Requirement: at least one 0.5 course from Business Administration 4521A/B, 4522A/B, 4523A/B or other business elective as determined and approved by the HBA Program Director to satisfy this requirement. 2.0 elective courses chosen from 4000 level Business courses.

Exchange Programs
Students enrolled in the combined program are not eligible for an exchange program with the Faculty of Engineering; however, they may be eligible for an exchange through the Richard Ivey School of Business in Year Five. This will require advanced planning and approval of both faculties.

Engineering Externship Program (EEP) for Mechanical Engineering

The optional Engineering Externship Program (EEP) allows Mechanical and Materials Engineering students the opportunity to pursue up to an eight-month certificate program after second or third year at an educational institution which will offer courses related to a practical Certificate Program. The EEP program is currently linked to the "Practical Elements in Mechanical Engineering (PEME)" program offered at Fanshawe College of Applied Arts and Technology. Mechanical Engineering students who wish to exercise this option must apply for the EEP Course ES 2275-Mechanical and Materials Engineering Externship Program following their second or third year of Mechanical Engineering. Western Engineering controls entry into the program. Prerequisites are: 60% YWA with no failed courses. If accepted into the program, students will take the courses specified by the PEMS certificate Program linked to ES 2275.

2. UNDERGRADUATE ENROLLMENT

Full Time

	Year 1	Year 2	Year 3	Year 4	TOTAL
Mechanical	n/a	75	88	71	234

Part Time

	Year 1	Year 2	Year 3	Year 4	TOTAL
Mechanical	n/a	1	24	9	34

3. DEGREES GRANTED

Fall 2014	Spring 2015
3	71

4. UNDERGRADUATE AWARDS

Recipients (Fall 2014) – Students registered in the Department of Mechanical and Materials

Andrea Bailey Memorial Award
4th Year MME Awarded to a female student entering fourth year of Mechanical and Materials Engineering who demonstrates financial need, a minimum 75% academic average and involvement in extracurricular activities at the University and in the community. Preference will be given to a student meeting the stated criteria who is in a concurrent degree program. The recipient must not be in receipt of any other award in the Department of Mechanical and Materials Engineering. This award was established by friends and family in memory of Andrea Bailey.

Awarded to: **Kristen Bujnowski**

Ian Duerden Memorial Award
3rd Year MME Awarded to a full-time undergraduate student in his or her third year of the Mechanical and Materials Engineering program who demonstrates financial need and achieves a minimum 75% academic average. This award was established through Foundation Western in memory of Ian Duerden, a former Associate Dean of the Faculty of Engineering.

Awarded to: **Matthew Kyle**

Lynda Diane Shaw Memorial Award
4th Year MME Awarded to a student entering the fourth year of the Mechanical Engineering program in good standing. This student must have been active in community service activities, student clubs and extra-curricular activities and possess good interpersonal skills. Established by friends, colleagues and family in memory of Lynda Diane Shaw.

Awarded to: **Allison Waters**

Andrade Family Award in Engineering
Awarded annually to a full-time undergraduate student in 2nd or 3rd year of the Mechanical and Materials Engineering program, based on a minimum 75% average, and demonstrated volunteer and leadership skills through participation in university life.

Awarded to: **Nathaniel Holmes, Asli Nur Ozyoruk**

Donald P. Morris Engineering Award
Awarded to a full-time undergraduate student in year 2 or higher of any Engineering program based on academic achievement and involvement in extra-curricular activities that demonstrate leadership skills.

Awarded to: **Victoria Kerr**

Fourth Year Continuing Admission Scholarship

Awarded to: **David Timothy Axford, James Alexander Crocker, Mitchell James Dooreleyes, Nathaniel Graham Holmes, Joshua Salvatore LeClair, Jordan Rose, Gerrit Jonathan Satosek**

Entrepreneurial Spirit Award

Awarded to: **Jason Ng**

Ontario Professional Engineers Scholarships for Education Scholarships
Awarded to: **Nathan Curiale, Nathaniel Holmes, Victor Lee**

London and District Construction Association Award
Awarded to: **Victor Lee**

Dr. L. Stuart Lauchland Scholarship
Awarded to: **James Crocker**

Recipients (Spring 2015) Awards of the Graduating Class June 2015 – Students registered in the Department of Mechanical and Materials

The John E.K. Foreman Gold Medal in Mechanical and Materials Engineering

This medal is named in honour of the late Dr. J.E.K. Foreman, the first Professor and Group Chair of Mechanical Engineering in the Faculty of Engineering. It is awarded to the fourth year engineering student in the Mechanical Engineering program with the highest aggregate final marks for the third and fourth years.

Awarded to: **Mitchell Dooreleyers**

The ASHRAE Award (1-$500.00 & One Year Membership/Fundamentals Handbook)

Awarded to the fourth-year engineering student in the Department of Mechanical and Materials Engineering, based on the candidate's marks in HVAC I and HVAC II. The student must have a minimum Year Weighted Average of 70

Awarded to: **Matthew Moore**

The Dr. James A. Vance Prize

Named in honour of a distinguished engineer from Southwestern Ontario, this prize is awarded annually to an undergraduate student who in the opinion of the Faculty of Engineering has shown excellence in engineering design.

Awarded to: **Allison Waters**

The Donald D.C. McGeachy Award for Materials Engineering

Awarded to the fourth-year engineering student in the Department of Mechanical and Materials Engineering, who in the opinion of the Faculty has the highest academic standing in Materials Engineering

Awarded to: **Malcolm Chorel**

The Canadian Society for Mechanical Engineering Award

Sponsored by the Canadian Society for Mechanical Engineering, this award is given to a fourth-year engineering student in the Department of Mechanical and Materials Engineering, who demonstrated outstanding achievement.

Awarded to: **Allison Waters**

5. DESIGN PROJECTS

Projects at a Glance

Project Title	Student(s)	Faculty Advisor(s)	Contact/Sponsor
Vehicle shaker	Ryan Clements, Troy Saunders, Cody Dirse, Nolan Butler	P. Kurowski	P. Kurowski
Lower body exercise machine	Colin Marley, Julien LoTufo, Thomas Whitfield, Spencer Kardash	P. Kurowski	Pure Energy Fitness
Human jaw motion simulator	Mitchell Dooreleyers, Jayanth Prakhya, Brendan Beallor, Malcolm Chorel	L. Ferreira	L. Ferreira, Y. Hosein
Quadgrips: augmented quadriplegic hand grips for hand cycling	Steven Gregus, Scott Gregus, Frederick Holness, Corey Smith	L. Ferreira	L. Ferreira
Wheelchair cleaning device/system	David Michelin, Zachary Carver, Derek Brown, Ryan Hartman	M.D. Naish	J.T. Wood
Aerodynamic optimization of Western Formula Racing vehicle	Graham Griffin, Geoffrey Hockin, Arun Ravi Shankar, Matthew Crossan	M.D. Naish	Western Formula Racing
Apparatus for oil flow measurement of air-oil two phase flows in a bearing test rig	Darren Brix, Julia Tsaltas, Spencer Hoernke, Matthew Mahaffy	M.D. Naish	FAG Aerospace
Drive system for an utility scale single axis tracking photovoltaic ground mounted structure	Ryley Bolton, Jordan Cook, Marc Sinclair, Patrick McJannett	M.D. Naish	Presstran Industries
Articular joint implant removal tool	Joshua Eagen, Jason Gharibo, Emily West, Dylan Murray	L. Ferreira	L. Ferriera
Western Formula Racing Engine package optimization	Adam Wiggers, Patrick Tobias Mecan, Allison Waters	P. Kurowski	Western Formula Racing
2014 Student Design Project Competition (ASHRAE)	Bassam Khammash, Awad Khan, Husam Al-Kiswani, Mohammad Hassouneh, Mohammad Shariq	O.R. Tutunea-Fatan	W. Altahan
Roller coaster restraint system for amputees	Roman Astrachan, Fraser Bain, Dayna Schols, Brent Parsons Fawad Khan	O.R. Tutunea-Fatan	O.R. Tutunea-Fatan
Automation system for manufacturing and assembly of 5 Vial	Pibulchai Kasemphaibulsuk, Kateyln O'Gorman, Sean O'Sullivan, Cameron Rodger, Edward Bell	M.D. Naish	McCormick Canada
Free Cooling system for brewery cellars	Kristen Bujnowski, Kevin Johnson, Christopher Foster, Wesley Ducharme, Cristina Osorio	O.R. Tutunea-Fatan	Labatt Canada
Device for rapid and accurate assessment of multiple postural parameters	Matthew Moore, Michael Sanajko, Jeffrey Armstrong, Dustin Willett	O.R. Tutunea-Fatan	Moore Chiropractic
Design of knee joint motion simulator	Nathanael Curiale, Alison Findlay, Alexandra Blokker, Justin Laing, Peter Byers	J. Johnson	T. Burkhart

MME 4401y Presentation

Project Title	Student	Faculty Advisor
Biomechanical investigation of medial opening wedge high tibial osteotomy (HTO): The effectiveness of a pre-drilled hole surgical procedure.	Kristen Bujnowski	T. Burkhart
Tendon excursion and adhesion simulation in cadaver hand specimens: comparative force and kinematics analysis	Mohammad Haddar	L. Ferreira
Comparsion of young's modulus and fibre fraction in direct long fibre thermoplastics	Thomas Whitfield	T. Kuboki
Developing a booklet for personal injury lawyers, entitled: "Understanding & undermining engineering expert reports: The mechanical engineering that all personal injury lawyers should know."	Anna Berger	J.T. Wood
Computational tools for studying of magnetic seizure therapy and its efficiency	Jayanth Prakhva	S. Asokanthan
A biomechanical assessment of bone models used for upper limb prostheses testing	Matthew Mahafy	J. Johnson

5. EXCHANGE PROGRAMS

Incoming Exchange

First Name	Last Name	Home University	Home Country
Shubha	Havaldar	Vishwakarma Institute of Technology Pune; Ontario/Maharashtra-Goa Exchange Program	India
William	Russell	University of New South Wales	Australia
Asawari	Tuppack	The University of Queensland	Australia
Marine	Taton	INSA Toulouse	France
Chong Yu	Ng	Nanyang Technological University	Singapore
Li Khee	Lim	Nanyang Technological University	Singapore
Anais	Delpech	Insa Lyon, Ontario/Rhone-Alpes Exchange Program	France
Rory	Clifford	University of New South Wales	Australia
Khudabux	Irani	Vishwakarma Institute of Technology Pune; Ontario/Maharashtra-Goa Exchange Program	India

7. INTERNSHIP PROGRAM

The Faculty of Engineering offers an Internship Program for those students interested in gaining practical engineering employment experience in industry. In this program, students spend 12 to 16 consecutive months working in industry between their third and fourth years of the Bachelor of Engineering Science program. Time spent in internship may count as one-year of pre-graduation experience toward the four years experience required for licensing as a Professional Engineer in the Province of Ontario. Any engineering student who is completing third year, has at least a 65% average, is permitted to work in the country in which the job is located and who is in good academic standing may enroll in the program.

The following students from the MME Department completed an Internship in 2014-15

First Name	Last Name	Employer
Neil	Chudleigh	Yunite Inc.
Juan (Sebastian) Vallejo	Delgado	Trudell Medical International
Cory	Early	Formet Industries - Magna International
Elizabeth	Fox	Labatt Breweries of Canada
Ryan	Goralczyk	Toronto Hydro
Joel	Keck	Union Gas Ltd.
Grace	Kusuma	Shell Canada Ltd.
Patrick	Lafontaine	Ontario Power Generation
Victor	Lee	Schaeffler Canada Inc.
Nathan	Leifer	Honda of Canada Manufacturing
Alicia	Lenny	Union Gas Ltd.
Seth	Marriott	Meridian Lightweight Technologies Inc.
Sotirios	Petrou	Callidus Engineering
Arman	Rasekh	ThyssenKrupp Elevator (Canada) Ltd.
Claire-Helene	Sauve	SNC-Lavalin Inc.
Julian	Shanahan	Formet Industries - Magna International
Dankha	Soro	Schaeffler Canada Inc.
Brandon	Tartaglia	Armatec Survivability
Grant	Warr	Multimatic Technical Centre
Byeong (Bill)	Yoo	Presstran Industries - Magna International

8. SUMMER ENGINEERING CO-OP PROGRAM

First Name	Last Name	Employer
Jeffrey	Armstrong	Sle-Co Plastics Inc.
Edward (Ted)	Bell	Sle-Co Plastics Inc.
Luke	Berkmortel	Wolfe Heavy Equipment Inc.
Derek	Brown	Smith + Andersen
Malcolm	Chorel	3M Canada Company
James	Crocker	General Dynamics Land System Canada
Mitchell	Dooreleyers	Imperial Oil Limited/ExxonMobil Companies in Canada
Scott	Gregus	Hendrickson Canada ULC
Akeem	Hinds	Hendrickson Canada ULC
Matthew	Kyle	OES, Inc.
Mark	Major	Terepac Corp.
David	Michelin	HTS Engineering
Braden	Scott	INVISTA
Joseph	Simic	Tecsar Engineering Inc.
Steven	Voorberg	HTS Engineering
Dustin	Willett	Qualtech Seating Systems

9. PEME PROGRAM

Practical Elements in Mechanical Engineering is a certificate program developed by the MME Department at UWO in collaboration with Fanshawe College of Applied Arts and Technology. The PEME program is comprised of practical courses in machining, welding, metrology, etc. and was designed specifically to give university engineering students exposure to the practical side of their profession.

The PEME program was developed mainly in response to the changing backgrounds of students entering university engineering programs. PEME provides an opportunity for interested students to get exposure to some practical courses outside the traditional Mechanical engineering curriculum. The PEME program is thus a formal avenue whereby students have an opportunity to enrich their practical knowledge of their profession by taking specialized courses offered by experts.

Students in the Mechanical & Materials Engineering program at UWO who have at least a 60 percent yearly weighted average with no failures may apply for PEME following their 2nd or 3rd years of study. Since PEME is offered every year, students can combine PEME with a concurrent degree program, summer Co-op or Industry Internship; there are no limitations!

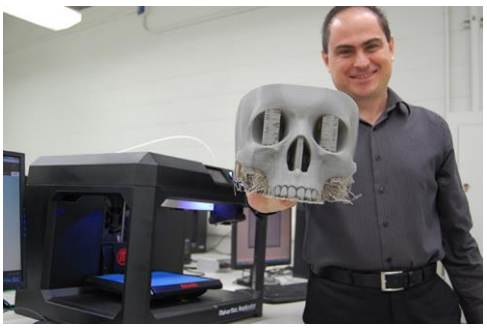
Our major industrial employers are thrilled with the introduction of PEME in the MME program at UWO. PEME gives our students incredible insight into how things are made and enables our graduates to have an immediate impact in industry.

10. UNDERGRADUATE STORIES

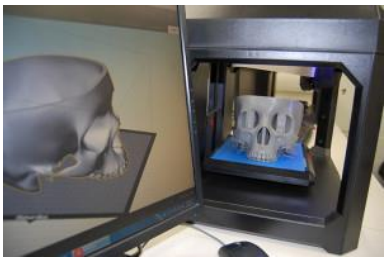
Industry-sponsored undergraduate design projects
There were six externally-sponsored capstone design projects in this year's edition of MME 4499. The projects covered a broad range of engineering applications and their sponsors were: Pure Energy Fitness, FAG Aerospace, Presstran Industries, McCormick Canada, Labatt Brewery and Moore Chiropractic.

Engineering adds new dimensions with 3D printers

If you dream it, you can build it. This is not just a mantra; it has become a reality for Mechanical and Materials Engineering students thanks to a new 3D printing lab.Featuring eight 3D printers, the Spencer Engineering Building lab was integrated into the department's undergraduate curriculum this fall. While the primary users of the lab will be the Mechanical and Materials Engineering students enrolled in design and manufacturing-oriented courses, the 3D printers will serve a broader variety of activities ranging from outreach events to student megaprojects. Students can now take designs from "inside their heads to inside their hands," said Mechanical and Materials Engineering professor O. Remus Tutunea-Fatan. "With additive manufacturing, you can produce almost anything you can think of," he continued. "You can produce almost any shape, which was, and still is, never the case with conventional subtractive manufacturing technologies."



The use of 3D printers is similar to traditional printers, except they rely on spools of plastics – rather than paper, ink and toner – to 'print,' 'build' or 'make' the design. Smaller objects can take only a few minutes; larger-size objects can take up to few days. 3D printing technology has been around for decades. Within the last few years, however, the printer prices have dropped significantly leading to their widespread adoption by 'do-it-yourself' enthusiasts and hobbyists."3D printing is a true instance of lights-out manufacturing," Tutunea-Fatan said. This means the user does not have to be present to monitor the building process – far from a reality for most conventional fabrication processes. "I have been teaching the CNC (Computer Numerically Controlled) machining course for several years now. The one question that often comes from students, who are not familiar enough with this technology, is 'Where is the *make-it-now* button?' Unfortunately, machining is not yet there and – who knows – it might never be," Tutunea-Fatan said. "Because of this, anyone looking for a way to quickly materialize a design should be seriously looking into 3D printing – that is already a 'one-push button' technology." The incorporation of the 3D printing laboratory into the Western Engineering curriculum is aligned with the changing demands in mechanical engineering education. For



example, the University of Pennsylvania announced an upgrade to its 3D printing facility this summer, while Carleton University launched its Discovery Centre in the spring, featuring 3D printers. Similarly, Ryerson University recently established its own Advanced Manufacturing, Design and 3D Printing Lab. While Western Engineering may not be the first to set up such a lab, this facility gives students the opportunity to explore and use the 3D printers for their own design projects, in addition to the structured curriculum applications, said J. Maciej Floryan, chair of Mechanical and Materials Engineering. “We are working hard to build this equipment into the curriculum,” he continued. “I think we are likely the first to bring this technology to the level where students just go to the lab and make parts – sort of like going to library and taking books out.” The 3D printers will help students have a better understanding of the challenges of moving from design to manufacturing. “When you make several parts and try to put them together, you will see immediately, if they fit together or not,” Tutunea-Fatan said. “For students, this new opportunity will give them a totally new perspective on the fabrication and assembly of a mechanical system comprised of multiple components.” The use of 3D printers as part of the academic curriculum is expected to help students develop skills that will directly benefit them in the workforce, especially because companies have started to use additive manufacturing on a growing scale either for their prototyping or even serial production needs.“3D printers will help our students to better experience and employ hands-on skills,” Tutunea-Fatan said. “At the end of the day, this is what additive manufacturing means: one starts with nothing on the 3D printer’s platform and a continuous deposit of material slowly turns an initial design idea into a physical component that can be then better understood and analyzed.”

11. VISITING STUDENTS

Funded through *Science without Borders*

Henrique Brighenti
Federal University of Minas Gerais, Brazil
Dates: May–August 2014

Mateus Pinheiro Camargo, Department of Electrical Engineering
University of Campinas (UNICAMP), Campinas, SP, Brazil
Dates: May 5, 2014 to August 29, 2014

Francielle Lemos Cruz, Electronic Engineering Department
Control and Automation Engineering, Federal University of Minas Gerais (UFMG), Bel Horizonte, MG - Brazil
Dates: May 5, 2015 to August 29, 2015

Amaur Aires Filho
Instituto Federal de Educação, Brazil
Dates: May 4, 2015 to August 28, 2015

Jehovah Tavares Coelho Neto, Department of Electrical Engineering
Universidade Federal do Ceara, Brazil
Dates: May 5, 2015 to August 29, 2015

Pedro Minoru Sakaguchi, Department of Instrumentation, Automation and Robotics Engineering
Universidade Federal do ABC, São Paulo, Brazil
Dates: May 5, 2014 to August 29, 2014

Funded through *Mitacs Globalink*

Reyes Hurtado José Antonio, Department of Electronics and Communication Engineering
The University of Guadalajara, Guadalajara, Jalisco México
Dates: May 5, 2015 to August 29, 2015

Western-Soochow Synchrotron Centre

Changhai Wang, Soochow University (China)
Dates: November 1, 2014 to March 31, 2015

Co-op Student(s)

Kaixi (Cathy) Wang, University of Waterloo
Dates: May 1, 2015 to August 31, 2015

Visiting Undergraduate (Research only) students

Jerome Bedouret
INSA Toulouse, France
Date: Summer 2015

Mathias Daval, Energy and Environment Engineering Department
INSA, Lyon, France
Dates: April 6, 2015 to August 31, 2015

Damien Guivarch
INSA Toulouse, France
Date : Summer 2014

Sarah Himdi
INSA Toulouse, France
Date: Summer 2015

Pierre-Yves Mao, Electricity and Thermal Energy Department
Polytech Nantes
Dates: June 28, 2015 to August 28, 2015

Pedro Mota
Escola de Minas, Universidade Federal de Ouro Preto, Brazil
Date:, Summer 2014

Emmanuelle Orreindy, Energy, Risk and Environment Enginering
INSA Centre Val de Loire, France
Dates: June 29, 2015 to August 30, 2015

Juliette Porto
ENSE3 (Ecole de l'Energie l'Eau et l'Environnement) Grenoble, France,
Date : Summer 2015

Bertrand Solaz
INSA Toulouse, France
Date : Summer 2015

ICRC Internship at FPC

Matthew Bondy, Ph. D. student from University of Windsor
Zeinab Mousavi, M. E. Sc. student from McMaster University
Xu Zhang, M. E. Sc. student from University of Windsor

Students from KIT/Fraunhofer ICT on Internship at FPC

Alex Seiffer, M.E.Sc.

Tobias Betz, M.E.Sc.
Anja Riester, M.E.Sc.
Robert Maertens, M.E.Sc.
Björn Beck, M.E.Sc.
Marielouise Zaiβ, M.E.Sc.

GRADUATE EDUCATION

The Department offers two types of graduate programs, i.e., research programs leading either to the Master of Engineering Science (M.E.Sc.) degree or to the Doctor of Philosophy degree (Ph.D.) and course-based Professional Degree Programs leading to the degree of Master of Engineering (M.Eng.) All programs are fully accredited by the Ontario Council of Graduate Studies.

1. GRADUATE RESEARCH PROGRAMS

The M.E.Sc. program is structured to assist high achieving students in acquiring specialized knowledge and to train them in research and development techniques. The objective of this program of study is to introduce the student to research and to permit some modest degree of specialization in the chosen field. The requirements for completion of the program are four half courses, through specialist training by the thesis supervisor, by attendance at research seminars and through preparation and successful Master's thesis defense. Participation, where applicable, as a teaching assistant for the undergraduate courses adds further strength.

The Ph.D. program is structured to assist high achieving students in acquiring specialized, state-of-the-art knowledge and to train them in research and development techniques. The graduates should expect careers in academia as well as in industrial research and development organizations. Graduates are expected to develop the ability to undertake independent research, to prepare papers for publication, and to develop leading edge expertise in one specific sub discipline. Specialized training is undertaken by the professor supervising the research, in addition to other faculty members acting to advise the student. The requirements for completion of the program are a combination of formal course work (4 "half courses"), teaching assistantships, independent research, participation in research seminars, journal papers, and preparation and successful thesis defense.

The M.E.Sc. and Ph.D. programs are offered in the following subject areas:

(1) Thermo-fluids,

(2) Materials and Solid Mechanics,

(3) Automation Technologies and Systems,

(4) Mechanical Engineering.

Thermo-fluids

The *Thermo-fluids Graduate Research Program* offers training in many areas of thermodynamics and fluid mechanics including: **theoretical fluid mechanics of Newtonian and non-Newtonian flows, hydrodynamic stability, Computational Fluid Dynamics (CFD), convective heat transfer, turbulence modeling, microfluidics, energy systems** and **experimental techniques**, in additional to applications in all of the mentioned areas. Students interested in the admission to the M.E.Sc. program should have a Bachelor's degree in Engineering, or an equivalent degree, from an accredited University with a minimum A grade average. In some cases, students with a similar degree from another scientific discipline may be admitted. In exceptional circumstances, students in the final year of their undergraduate studies can be admitted into the accelerated M.E.Sc. program. Students interested in the admission to the Ph.D. program should have completed the M.E.Sc. degree. In exceptional circumstances, students can be transferred directly from the M.E.Sc. into the Ph.D. program without completing the M.E.Sc. program. All students admitted into the graduate research programs are offered full financial support.

Students registered in the Thermo-fluids M.E.Sc. graduate program must complete four graduate-level half courses, and must prepare a research thesis. The program requires approximately two years for completion. The Ph.D. program requires four additional half courses and a research dissertation, and requires approximately four years to complete. Courses available in the Thermo-fluids area are:

- MME 9617 Energy Conversion
- MME 9611 Continuum Mechanics
- MME 9613 Aerodynamics for Engineers
- MME 9614 Applied Computational Fluid Dynamics and Heat Transfer
- MME 9710 Advanced Computational Fluid Dynamics
- MME 9711 Convection Heat Transfer
- MME 9712 Experimental Measurements in Fluid Mechanics
- MME 9713 Hydrodynamic Stability
- MME 9714 Introductory Computational Fluid Dynamics and Heat Transfer
- MME 9715 Mechanism and Theory of Turbulent Flow
- CEE 9639 Viscous and Boundary Layer Theory
- MME 9724 Microfluidics and Lab-on-a-Chip
- MME 9732 Biotransport Phenomena

Students may also select elective courses offered by other research groups from the Department of Mechanical and Materials Engineering, other Departments from the Faculty of Engineering and other Faculties from the University of Western Ontario upon consultation with the advisor and approval of the MME Associate Chair Graduate.

Materials and Solid Mechanics

Materials and Solid Mechanics offers advanced research in experimental and theoretical aspects of traditional materials engineering, with specific emphasis on: **mechanical properties, microstructural characterization, nano-structured materials, materials modeling, microfabrication methods, electroactive materials, MEMS, and mechanics at small scales**. Students interested in the admission to the M.E.Sc. program should have a Bachelor's degree in Engineering, or an equivalent degree, from an accredited University with a minimum A grade average. In some cases, students with a similar degree from another scientific discipline may be admitted. In exceptional circumstances, students in the final year of their undergraduate studies can be admitted into the accelerated M.E.Sc. program. Students interested in the admission to the Ph.D. program should have completed the M.E.Sc. degree. In exceptional circumstances, students can be transferred directly from M.E.Sc. into Ph.D. program without completing the M.E.Sc. program. All students admitted into the graduate research programs are offered full financial support.

Students registered in the Materials and Solid Mechanics graduate program must complete four graduate-level half courses, and must prepare a research thesis. The program requires approximately two years for completion. The Ph.D. program requires four additional half courses and a research dissertation, and requires approximately four years to complete. Courses available in the Materials and Solid Mechanics areas are:

- MME 9611 Continuum Mechanics
- MME 9612 Finite Element Methods
- MME 9616 Composite Materials
- MME 9618 Fracture of Materials
- MME 9619 Fundamentals of MEMS and NEMS
- MME 9620 Nanomaterials and Nanotechnology
- MME 9624 Modelling and Interfacing of sensors and actuators
- MME 9716 Mechanics of Thin Films
- MME 9717 Deformation of Polymers
- MME 9719 Microstructure of Polymers
- MME 9720 Strengthening Methods in Materials
- MME 9721 X-ray Diffraction in Engineering
- MME 9722 Fuel Cell Science and Engineering
- MME 9725 Piezoelectric Materials

- MME 9726 Advanced Nanomaterials

Students may also select elective courses offered by other research groups from the Department of Mechanical and Materials Engineering, other Departments from the Faculty of Engineering and other Faculties from the University of Western Ontario upon consultation with the supervisor and approval of the MME Associate Chair Graduate.

Automation Technologies and Systems

The *Automation Technologies and Systems Graduate Research Program* offers interested students the opportunity to investigate novel techniques, devices and systems to address challenging problems related to **automation technologies, inertial systems and control, machine vision, sensor development and micromachining**. Students interested in admission to the M.E.Sc. program should have a Bachelor's degree in Engineering, or an equivalent degree, from an accredited University with a minimum A grade average. In some cases, students with a similar degree from another scientific discipline may be admitted. In exceptional circumstances, students in the final year of their undergraduate studies can be admitted into the accelerated M.E.Sc. program. Students interested in the Ph.D. program should have completed the M.E. Sc. degree. In exceptional circumstances, students can be transferred directly from the M.E.Sc. into the Ph.D. programs without completing the M.E.Sc. degree. All students admitted into the graduate research program are offered full financial support.

Students registered in the M.E.Sc. program must take four half courses and complete a research thesis. This program of study takes approximately two years to complete. Registrants in the Ph.D. program must take an additional four half courses and complete a dissertation based on original research. A typical Ph.D. program will require four years to complete. Graduate Courses available for the Automation Technologies and Systems Program are:

- MME 9610 Applied Measurement and Sensing Systems
- MME 9612 Finite Element Methods
- MME 9619 Fundamentals of MEMS and NEMS
- MME 9622 Advanced Kinematics and Dynamics
- MME 9624 Actuator Principles, Integration and Control (ECE 9509)
- MME 9727 Computer-Aided Design and Manufacturing
- MME 9728 Computer-Aided Geometric Modelling
- MME 9729 Optomechatronic Systems: Techniques and Applications
- MME 9730 Principles and Applications of Neural Networks
- MME 9731 Stochastic Dynamics and Stability of Mechanical Systems

Students may also select elective courses offered by other research groups from the Department of Mechanical and Materials Engineering, other Departments from the Faculty of Engineering and other Faculties from the University of Western Ontario upon consultation with the advisor and approval of the MME Associate Chair Graduate.

Mechanical Engineering

The General *Mechanical Engineering Program* offers students opportunity to follow personalized program within the general area of Mechanical Engineering. Course can be selected according to the needs of the individual program and within research areas of the Department. Three of the available research areas discussed above are complemented by **Biomechanics**, which exposes students with an opportunity for graduate level training in both in the theory and application of mechanical engineering to primarily orthopaedic and cardiovascular medicine. Students interested in the admission to the M.E.Sc. program should have a Bachelor's degree in Engineering, or an equivalent degree, from an accredited University with a minimum A grade average. In some cases, students with a similar degree from another scientific discipline may be admitted. In exceptional circumstances, students in the final year of their undergraduate studies can be admitted into the accelerated M.E.Sc. program. Students interested in the admission to the Ph.D. program should have completed the M.E.Sc. degree. In exceptional

circumstances, students can transfer directly from M.E.Sc. into Ph.D. program without completing M.E.Sc. degree. All students admitted into the graduate research program are offered full financial support.

2. PROFESSIONAL DEGREE PROGRAMS

Master of Engineering, Mechanical and Materials

The M.Eng. program is specially structured to assist qualified engineers in the advancement of their professional careers and to provide students with the skills necessary to address key technological challenges. The program may be taken with or without an optional qualified work term component. If enrolled full-time, a student can complete the degree in one year. The M.Eng. program is focused to become an effective tool to address the significant need for education and integration of internationally trained engineers. It provides new Canadians who are trained further in engineering outside Canada, with a venue to update their knowledge in accordance with the needs of the Canadian technology sector. The requirement for completion of the program is ten half courses, or eight half courses and a project. Term start dates are September 1st, January 1st, and May 1st.

The MME MEng program is structured into seven streams of specialization. The MEng student selects one area of specialization and takes either i) ten courses from a list specific to the area or ii) eight courses from the list along with completing an engineering project (MME 9500) which constitutes two courses. The lists of required courses (each is one term duration) for the seven areas of specialization are described below.

Master of Engineering (M.Eng.) program in Automation Technologies and Systems

The program is comprised of either 10 half courses, or 8 half courses plus a MEng Project (MME 9600) as follows:

A) 4 core half courses in Automated Technologies and Systems.

MME 9521a	Modern Control Systems	MME 9603a	Solid Mechanics
MME 9601a	Design and Manufacturing	MME 9624a	Actuator Principles: Integration and Control

B) 2 of the 4 core half courses in Professional Engineering (offered in Summer term);

ES 9185L	Risk Assessment and Management in Engineering Systems	ES 9010L	Intellectual Property for Engineers
ES 9510L	Engineering Planning and Project Mgmt	ES 9670L	Engineering Communication

C) Elective half courses, chosen from the list below, such that the total number of courses taken is 10 (if not enrolling in the MME 9600 MEng Project), or 8 with the MEng Project.

MME 9512b	Computer Integrated Manufacturing	MME 9640b	Medical Device Design
MME 9520b	Robotics and Manufacturing Automation	MME 9654b	Applied Mechatronic Systems
MME 9527b	Advanced CAE: Reverse Engineering		

Master of Engineering (M.Eng.) program in Composite Materials

The program is comprised of either 10 half courses, or 8 half courses plus a MEng Project (MME 9600) as follows:

A) 4 core half courses related to Composite Materials.

MME 9602a	Engineering Materials	MME 9616a	Composite Materials
MME 9603a	Solid Mechanics	MME 9643b	Composite Processing

B) 2 of the 4 core half courses in Professional Engineering (offered in Summer term);

ES 9185L	Risk Assessment and Management in Engineering Systems	ES 9010L	Intellectual Property for Engineers
ES 9510L	Engineering Planning and Project Management	ES 9670L	Engineering Communication

C) 4 elective half courses (if not enrolling in the MME 9600 MEng Project), or 2 elective half courses with the MEng Project.

MME 9601a	Design and Manufacturing	MME 9620b	Nanomaterials and Nanotechnology
MME 9612b/L	Finite Element Methods	MME 9623b	Theory and Practice of Plasticity
CBE 9455	Advanced Polymerization Engineering		

Master of Engineering (M.Eng.) program in Heating, Ventilating and Air Conditioning (HVAC) Systems

The program is comprised of the following:

D) 4 mandatory core half courses related to HVAC.

MME 9516a	HVAC I	MME 9641b	Thermal Systems Engineering
MME 9517b	HVAC II	MME 9646b	Energy Modeling of Buildings

E) 2 of the 4 core half courses in Professional Engineering (offered in Summer term);

ES 9185L	Risk Assessment and Management in Engineering Systems	ES 9010L	Intellectual Property for Engineers
ES 9510L	Engineering Planning and Project Mgmt	ES 9670L	Engineering Communication

F) 4 elective half courses (if not enrolling in the MME 9600 MEng Project), or 2 elective half courses with the MEng Project.

The elective courses are chosen from the list below:

MME 9515a	Fluid Machinery	MME 9617b	Energy Conversion
MME 9524b	Pressure Vessel Design	MME 9653L	Industrial Piping System Design
MME 9604a	Fluid Dynamics	CEE 9532a	Building Sustainability
MME 9614a	Applied Computational Fluid Mechanics and Heat Transfer	CEE 9518L	Building Information Modelling

Master of Engineering (M.Eng.) program in Mechanical Engineering

The program is comprised of either 10 half courses, or 8 half courses plus a MEng Project (MME 9600) as follows:

G) Minimum 2 of the 4 core half courses in Mechanical and Materials Engineering.

MME 9601a	Design and Manufacturing	MME 9603a	Solid Mechanics
MME 9602a	Engineering Materials	MME 9604a	Fluid Mechanics

H) 2 of the 4 core half courses in Professional Engineering (offered in Summer term);

ES 9185L	Risk Assessment and Management in Engineering Systems	ES 9010L	Intellectual Property for Engineers
ES 9510L	Engineering Planning and Project Mgmt	ES 9670L	Engineering Communication

I) Elective half courses, chosen from the list below, such that the total number of courses taken is 10 (if not enrolling in the MME 9600 MEng Project), or 8 with the MEng Project.

MME 9511b	Biomechanics of the Musculoskeletal System	MME 9616a	Composite Materials
MME 9512b	Computer Integrated Manufacturing	MME 9619b	Fundamentals of MEMS and NEMS
MME 9515a	Fluid Machinery	MME 9620b	Nanomaterials and Nanotechnology
MME 9516a	HVAC I	MME 9621b	Computational Methods in Engineering
MME 9517a	HVAC II	MME 9622b	Advanced Dynamics and Kinematics
MME 9519a	Production Management	MME 9623b	Theory and Practice of Plasticity
MME 9520b	Robotics and Manufacturing Automation	MME 9624a	Actuator Principles: Integration and Control
MME 9521a	Modern Control Systems	MME 9639b	Viscous Layer and Boundary Flow
MME 9524b	Pressure Vessel Design	MME 9640b	Medical Device Design
MME 9525a	Fundamentals of MEMS	MME 9641b	Thermal Systems Engineering
MME 9526a	Advanced CAE: Manufacturing Technologies	MME 9643b	Composite Processing
MME 9527b	Advanced CAE: Reverse Engineering	MME 9646b	Energy Modeling of Buildings
MME 9611a	Continuum Mechanics	MME 9653L	Industrial Piping System Design
MME 9612b/L	Finite Element Methods	MME 9654b	Applied Mechatronic Systems
MME 9614a	Applied Computational Fluid Mechanics & Heat Transfer		

Master of Engineering (M.Eng.) program in Materials and Solid Mechanics

The program is comprised of either 10 half courses, or 8 half courses plus an MEng Project (MME 9600) as follows:

J) 4 core half courses in Mechanical and Materials Engineering.

MME 9602a	Engineering Materials	MME 9623b	Theory and Practice of Plasticity
MME 9603a	Solid Mechanics	MME 9622b	Advanced Dynamics and Kinematics

K) 2 of the 4 core half courses in Professional Engineering (offered in Summer term);

ES 9185L	Risk Assessment and Management in Engineering Systems	ES 9010L	Intellectual Property for Engineers
ES 9510L	Engineering Planning and Project Mgmt	ES 9670L	Engineering Communication

L) Elective half courses, chosen from the list below, such that the total number of courses taken is 10 (if not enrolling in the MME 9600 MEng Project), or 8 with the MEng Project.

MME 9524b	Pressure Vessel Design	MME 9619b	Fundamentals of MEMS and NEMS
MME 9611a	Continuum Mechanics	MME 9620b	Nanomaterials and Nanotechnology
MME 9612b/L	Finite Element Methods	MME 9621b	Computational Methods in Engineering
MME 9616a	Composite Materials	MME 9653L	Industrial Piping System Design

Master of Engineering (M.Eng.) program in Thermofluids

The program is comprised of either 10 half courses, or 8 half courses plus a MEng Project (MME 9600) as follows:

M) 3 core half courses in Fluid Mechanics.

MME 9604a	Fluid Mechanics
MME 9614a	Applied Computational Fluid Mechanics and Heat Transfer
MME 9515a	Fluid Machinery

N) 2 of the 4 core half courses in Professional Engineering (offered in Summer term).

ES 9185L	Risk Assessment and Management in Engineering Systems	ES 9010L	Intellectual Property for Engineers
ES 9510L	Engineering Planning and Project Mgmt	ES 9670L	Engineering Communication

O) 5 elective half courses (if not enrolling in the MME 9600 MEng Project), or 3 elective half courses with the MEng Project.

MME 9516a	HVAC I	MME 9621b	Computational Methods in Engineering
MME 9517b	HVAC II	MME 9639b	Viscous Layer and Boundary Flow
MME 9524b	Pressure Vessel Design	MME 9641b	Thermal Systems Engineering
MME 9611a	Continuum Mechanics	MME 9646b	Energy Modeling of Buildings
MME 9617b	Energy Conversion	MME 9653L	Industrial Piping System Design

Master of Engineering (M.Eng.) program in **Mechanical Engineering** with an option in ***Engineering in Medicine***

The program is comprised of the following:

A) Two introductory half-courses on Engineering in Medicine:

MME 9511	Biomechanics of the Musculoskeletal System	BME 9520	Fundamentals of BioMEMS
MME 9640	Medical Device Design	BME 9525	Introduction to Biomaterials Engineering
BME 9502	Eng. Analysis of Physiological Systems		

B) Two core half-courses in Mechanical and Materials Engineering:

CBE 9170	Mathematical Methods in Engineering	CBE 9170	Mathematical Methods in Engineering
CBE 9190	Advanced Statistical Process Analysis	CBE 9190	Advanced Statistical Process Analysis
ECE 9056	Linear Systems and Modern Control Theory	ECE 9056	Linear Systems and Modern Control Theory

C) Four half-courses that cover advanced topics (or 2 courses plus a MEng. project in related topic):

BME 9509	Introduction to Digital Image Processing	MME 9620	Nanomaterials and Nanotechnology
BME 9526	Tissue Engineering	MME 9621	Computational Methods in Engineering
CBE 9160	Transport Processes	MME 9624	Actuator Principles, Integration & Control
ECE 9992	Telerobotics	MME 9724	Microfluidics and Lab-on-a-Chip
MME 9612	Finite Element Methods	MME 9728	Computer Aided Geometric Modeling
MME 9615	Biomechanics of Human Joint Motion	MME 9729	Optomechatronic Systems

Students who satisfy the course prerequisites, and obtain permission from both the instructor and MME Associate Chair, Graduate MEng Professional, may substitute up to 2 courses in category D with the following:

CBE 9544	Pharmaceuticals Manufacturing Processes	ECE 9057	Advanced Digital Control Systems
ECE 9200	Software Engineering for Human-Computer Interface Design	MME 9725	Piezoelectric Materials
ECE 9022	Advanced Image Processing and Analysis	MME 9726	Advanced Nanomaterials
ECE 9023	Random Signals, Adaptive and Kalman Filtering	MME 9732	Biotransport Phenomena
ECE 9053	Robot Manipulators	MME 9733	Current Topics in Biomechanical Engineering

Interested students may also enroll in some advanced BME courses and 9xxx-level courses offered by the MME Department with the approval of both the course instructor and the MME Associate Chair, Graduate MEng Professional.

D) Two half-courses in Professional Engineering (offered in Summer term):

CBE 9185L	Risk Assessment & Mgmt in Eng. Systems
ECE 9010L	Intellectual Property for Engineers

3. GRADUATE ENROLLMENT

	M.Eng	M.E.Sc.	Ph.D.	Visiting	Total
Summer 2014	36	35	36	5	112
Fall 2014	38	34	37	6	115
Winter 2015	46	34	37	6	123

4. GRADUATE DEGREES GRANTED

OCTOBER 2014 CONVOCATION – Mechanical and Materials Engineering Program

Student name	Degree	Completion Date	Thesis Exam Date	Supervisor/ Co-supervisor	THESIS TITLE
Abedin, Nujhat	MESc	September 27, 2014	August 14, 2014	Asokanthan, S.	Uncertainty Quantification for a Class of MEMS-based Vibratory Angular Rate Sensors
Blackman, Karin	MESc	August 5, 2014	July 30, 2014	Savory, E.	Influence of approach flow conditions on urban street canyon flow
Blandford, Claudia	MESc	August 26, 2014	August 18, 2014	Jenkyn, T.R.	Design and Assessment of an Experimental Test Setup for Use in Studies on the Vibrational Response of the Head to Impact

Chen, Hongfei	MEng	August 11, 2014	n/a	n/a	n/a
Dong, Xiao	MEng	September 2, 2014	n/a	n/a	n/a
Feng, Chuang	PhD	August 25, 2014	August 14, 2014	Jiang, L.	Micromechanics Modeling of the Electrical Conductivity of Carbon Nanotude (CNT)-Polymer Nanocomposites
Foster, John	MEng	August 13, 2014	n/a	n/a	n/a
Hassanzadeh Jobehdar, Mona	PhD	August 29, 2014	August 19, 2014	Siddiqui, K.	Experimental Study of Two-Phase Flow in a Liquid Cross-Flow and an Effervescent Atomizer
Jamali, Jamaloddin	PhD	August 5, 2014	June 9, 2014	Wood, J.	Mechanical Failure Criterion for Unidirectional and Random Fibre Polymer Composites
Jiang, Jian	MEng	September 2, 2014	n/a	n/a	n/a
Jonnalagadda, Deepika Sai	MEng	September 16, 2014	n/a	n/a	n/a
Joshi, Shallendra	MEng	September 2, 2014	n/a	n/a	n/a
Mirzabeygi, Pooya	MESc	September 19, 2014	August 14, 2014	Zhang, C.	Numerical Analysis of Two Phase Flow and Heat Transfer in Condensers
Li, Mingyu	MEng	August 11, 2014	n/a	n/a	n/a
Loulou, Mohamed	MEng	August 11, 2014	n/a	n/a	n/a
Luo, Zhiyuan	MEng	August 19, 2014	n/a	n/a	n/a
Maitri, Rohit	MESc	July 25, 2014	July 23, 2014	Zhang, C. Jiang, J.	A CFD assisted control system design for supercritical water cooled reactor
Padmore, Claire	MEng	September 2, 2014	n/a	n/a	n/a
Pellar, Allison	MEng	September 3, 2014	n/a	n/a	n/a
Rowles, Christopher	MEng	August 11, 2014	n/a	n/a	n/a
Saber, Omar	MEng	August 11, 2014	n/a	n/a	n/a
Swentek, Ian	PhD	August 29, 2014	August 25, 2014	Wood, J.	On the Interfacial Fracture Mechanics of Long-fibre Reinforced Polymer Composites
Su, Xiaohui	MEng	September 2, 2014	n/a	n/a	n/a
Zhang, Yang	MEng	September 2, 2014	n/a	n/a	n/a
Zhang, Zhengrong	MESc	August 25, 2014	August 18, 2014	Jiang, L.	Size-Dependent Electroelastic Properties of Piezoelectric Nanoplates

JUNE 2015 CONVOCATION – Mechanical and Materials Engineering					
Student Name	**Degree**	**Completion Date**	**Thesis Exam Date**	**Supervisor/ Co-supervisor**	**THESIS TITLE**
Adapa, Sairam	MEng	May 7, 2015	n/a	n/a	n/a
Baghaei Anaraki, Hooman	MESc	April 1, 2015	March 3, 2015	Wood, J.	Characterization of High-Pressure-Die-Cast Magnesium Alloy AM60
Chai, Wenyue	MEng	January 6, 2015	n/a	n/a	n/a
Deng, Li	MEng	January 6, 2015	n/a	n/a	n/a
Djulbic, Amar	MEng	January 7, 2015	n/a	n/a	n/a
Dyck, Nolan	MESc	November 1, 2014	September 23, 2014	Straatman, A.G.	Digital Generation and Radiation in Spherical-Void-Phase Porous Media
Gubbala, Shiva Chaitanya	MEng	May 12, 2015	n/a	n/a	n/a
Hu, Yuhai	PhD	September 18, 2014	September 16, 2014	Sun, X.	Nanomaterials for Lithium Ion Batteries
Khalaji, Iman	PhD	December 16, 2014	December 10, 2014	Naish, M.D. Patel, R.	Vibration-Assisted and Robotics-Assisted Soft Tissue Intervention
Liu, Yang	MEng	May 12, 2015	n/a	n/a	n/a
Lowry, Russell	MEng	January 8, 2015	n/a	n/a	n/a
Mody, Rohan	MEng	January 5, 2015	n/a	n/a	n/a
Mohammadhasani Khorasany, Rahim	PhD	November 1, 2014	September 16, 2014	Khayat, R.	Thermal Convection of Non-Fourier Fluids
Mohammed, Raziuddin	MEng	January 6, 2015	n/a	n/a	n/a
Niknami Esfahani, Mohammad	PhD	January 29, 2016	January 22, 2015	Khayat, R.	Thermal Convection in Non-Fourier Fluids and Application to Liquid Helium II
Patel, Jay	MEng	January 12, 2015	n/a	n/a	n/a
Raj, Vijairaj	PhD	October 10, 2014	September 11, 2014	Singh, A.V.	Structural Response Analyses of Piezoelectric Composites using NURBS
Sharma, Parshant	MEng	January 7, 2015	n/a	n/a	n/a
Singh, Hargobind	MEng	January 6, 2015	n/a	n/a	n/a
Sood, Ashish	MEng	January 7, 2015	n/a	n/a	n/a
Stranges, Daniel	PhD	December 11, 2014	November 24, 2014	Khayat, R.	Studies in Small Scale Thermal Convection
Tian, Peiyan	MEng	January 6, 2015	n/a	n/a	n/a

Wang, Siyuan	MEng	January 6, 2015	n/a	n/a	n/a
Xiao, Junfeng	MEng	May 7, 2015	n/a	n/a	n/a
Zhang, Boxiang	MEng	January 7, 2015	n/a	n/a	n/a
Zhang, Luyang	MESc	November 1, 2014	September 22, 2014	Yang, J.	Development and Integration of MEMS Based Inductive Sensors

5. GRADUATE AWARDS

Qualified students in MESc and PhD programs have access to a financial support package, which may consist of a combination of program-based funding (e.g. from a supervisor's research grant or Graduate Research Assistantship), scholarships from the Faculty of Engineering (Western Engineering Scholarship), and income from employment (e.g. a Graduate Teaching Assistantship). This package is designed to cover a substantial portion of a student's expenses for the eligible period of funding in his/her program. To be eligible for this financial support, students must be registered full-time. Incoming students must have a minimum admission average of 78% as determined by the Faculty of Graduate Studies. Continuing students must meet the graduate program conditions for progression towards the degree, as well as a minimum requirement of 78% based on all graduate courses completed in the current program. Students in Master's Engineering (M.Eng.) program is expected to fund their own education, for example, through OSAP.

Minimum Support Level

May 1, 2014	Tuition	TA/GRA	Total/term
Canadian/Perm	$2504.03	$4,000	$6504.03
International	$5835.69	$4,000	$9,835.69

September 1, 2014	Tuition	TA/GRA	Total/term
Canadian/Perm	$2989.85	$4,000	$6,989.85
International	$6,496.51	$4,000	$10,496.51

January 1, 2015	Tuition	TA/GRA	Total/term
Canadian/Perm	$2,554.20	$4,000	$6,554.20
International	$6,060.86	$4,000	$10,060.86

External Scholarships

During their period of fundability, i.e., 6 terms for MESc, and 12 terms for PhD, students may apply for external scholarships for which they are eligible, such as National Sciences and Engineering Research Council (NSERC), Ontario Graduate Scholarship (OGS), and Ontario Graduate Scholarships in Science and Technology (OGSST).

Ontario Graduate Scholarship (OGS):

The Ontario Graduate Scholarship (OGS) program is designed to encourage excellence in graduate studies at the master's and doctoral levels. Each award is tenable at the Ontario University of the student's choice. The value of the OGS is $5,000 per term to be held for two or three consecutive terms. One-term awards are not granted.

Ontario Graduate Scholarships in Science and Technology (OGSST):

Master's students can receive the scholarship for a maximum of two years and doctoral students for a maximum of four years, subject to a lifetime maximum of 4 years per student. The value of this scholarship is $5,000 per term,

and may be held for either two or three full terms. One term awards are not allowed. OGSST awards must be held for at least 2 full consecutive terms and are paid monthly through Human Resources.

National Sciences and Engineering Research Council (NSERC):

NSERC is the national instrument for making strategic investments in Canada's capability in science and technology. NSERC's products are innovations, scientific discoveries, and highly qualified people. NSERC's unique Industrial Postgraduate Scholarship (IPS) provides financial support for highly qualified science and engineering graduates to gain research experience in industry while undertaking advanced studies in Canada. These scholarships are aimed at encouraging scholars to consider research careers in industry where they will be able to contribute to strengthening Canadian innovation.

External Scholarships Recipients: 2014-2015

Name	Program	Award	Award Duration
Islam, A.Z.M. Ariful	PhD	OGS	May 1, 2014-April 30, 2015
Khan, Furqan Ahmad	PhD	NSERC	May 1, 2014-April 30, 2015
Kusins, Jonathan	MESc	Queen Elizabeth II Graduate Scholarship in Science	May 1, 2014-April 30, 2015
Lawes, Stephen Daniel	MESc	Queen Elizabeth II Graduate Scholarship in Science	May 1, 2014-April 30, 2015
Lawes, Stephen Daniel	MESc	NSRC	May 1, 2015-April 30, 2016
Lushington, Andrew	PhD	NSERC	May 1, 2014-April 30, 2015
Lushington, Andrew	PhD	NSERC	May 1, 2015-April 30, 2017
Neurt, Mark Alan Carmine	PhD	NSERC	September 1, 2011-August 30, 2015
Oreskovic, Christopher	MESc	OGS	May 1, 2014-April 30, 2016
Reeves, Jacob Mackenzie	PhD	NSERC	September 1, 2014-August 30, 2018
Riese, Adam	MESc	Queen Elizabeth II Graduate Scholarship in Science	September 1, 2014-August 30, 2015
Hamilton, Benjamin	MESc	NSERC	May 1, 2015-April 30, 2016
Hussein, Sama	MESc	OGS	May 1, 2015-April 30, 2016
Kalbfleisch, Alan	MESc	Queen Elizabeth II Graduate Scholarship in Science	May 1, 2015-April 30, 2016
Langford, Craig	PhD	OGS	May 1, 2015-April 30, 2016
Zhang, Tengyuan	PhD	Vanier Canada Graduate Scholarship-NSERC	May 1, 2015-Apri 30, 2018

6. GRADUATE SEMINAR

Fall 2014				
Date	**Student or Guest Lecturer Name**	**Supervisor/ Co-Supervisor**	**Presentation Title**	**Seminar Facilitator**
Sept. 15	Avari, H.	Savory, E.	Response of Endothelial Cells to Quantified Hemodynamic Shear Stresses	Rajakumar, H.

	Shao, L.	Yang, J.	Micro-Inductive Position Sensor	
	Babhaei, H.	Wood, J.	Characterization of Die Cast Magnesium Alloy AM60	
Sept. 22	Prof. J. Berg Technical University of Denmark, Dept of Wind Energy		The Effect of Gaussian vs non-Gaussian Turbulence on Wind Turbine	
Sept. 29	Niknami, M.	Khayat, R.	Non-Fourier Heat Conduction	Sharifi, P.
	Rajakumar, H.	Klassen, R.	Irradiation Damage and the Thermal Recovery of AISA 310 for Gen. IV Supercritical Water Reactors	
Oct. 6	G. Kelly Office of Research Ethics, Western University			
Oct. 20	Dr. H. Rouhani Toronto Rehabilitation Institute, University of Toronto		Clinical application of daily activity monitoring using wearable sensors	
Oct. 27	Khalaji, I.	Naish, M.D. Patel, R.V.	Motion Compensation for Robotics-Assisted Needle Insertion	Bognash, M.
	Yadegari, H.	Sun, X.	Synthesis and Application of Nanostructured Materials for Metal Air Batteries	
Nov. 3	A. Haque Language and Communication Instructor, Western University		The Art of Self-Promotion: Interview Strategies for Success	
Nov. 10	Ramadan, A.	Siddiqui, K.	Parametric Study of Vertical Ground Loop Heat Exchangers for Ground Source Heat Pump Systems	Sakib, Md
	Islam, A.Z.M.	Klassen, K.	Strain Rate Sentitivity Volume of Gold Micro-Spheres	
	Adamosky, M.	Tutunea-Fatan, R. Wood, J.	Investigation of Knife Sharpness, Geometry, and Material on Fiber Cutter Performance in the D-SMC Process	
Nov. 17	Prof. P. Lavoie Institute for Aerospace Studies University of Toronto		Feedback Control of Transient Growth Instabilities in a Laminar Boundary Layer by an Array of Plasma Actuators	
Nov. 24	Sharifi, P.	Wood, J.	High Pressure Die Casting of Magnesium Alloys Process-Structure-Property Relationships	Steen, B.
	Alexander, R.	Tutunea-Fatan, R. Wood, J.	Investigation of the Effect of Backing on the performance of a Fibre Cutter for the D-SMC Process	
Dec. 1	Dr. J. Ociepa OCI Microengineering Inc.		High Technology Business based on making LEED-AES Instrumentation	

Winter 2015				
Jan. 12	Li, X.	Sun, X.	Development of Atomic and Molecular Layer Deposition Coated Cathods for Highly Stable Lithium-Sulfur Batteries	Knowles, N.
	Roberts, M.	Savory, E.	Laboratory Simulation of Density-Driven Downbursts	
	Sinar, D.	Knopf, G.	Interdigitated Capacitive Sensors Printed on Flexible Substrates Using Conductive Aqueous Graphene Links	
Jan. 19	Prof. K. Siddiqui Department of Mechanical and Materials Engineering Western University		Imaging Techniques in Fluid Mechanics Research	
Jan. 26	Khan, F.	Straatman, A.G.	Numerical Modeling of Convective Drying of Apple Slices	Roberto, M.
	Akon, A.F.	Kopp, G.	Surface Pressures Distribution and Flow-Field Within Separation Bubbles for Surface-Mounted Prisms	
	Bashar, M.	Siddiqui, K.	Investigation of the Heat Transfer Process in a Phase Change Material During Melting Phase	
Feb. 2	Steen, B.	Siddiqui, K.	Investigation of Thermo-Fljid Behaviour in a Channel Immersed in a Hot Fluid	Lia, X.
	Neuert, M.	Jenkyn, T.	The Development of a Statistical Shape Model of the Human Craniofacial Skeleton for Use in a Probabilistic Finite Element analysis of the Skull	
Feb. 9	Prof. S. Yarusevych Department of Mechanical and Mechatronics Engineering University of Waterloo		Natural and Forced Transition in Separation Bubbles	
Feb. 23	Xiao, B.	Sun, X.	Advanced Coatings on High Voltage Cathode Material LiNi0.5Mn1.504 for High Performance Li Ion Batteries for Electric Vehicles	Langford, C.
	Bognash, M.	Asokanthan, S.	Transient Dynamics of MEMS Based Switching Systems	
	Knowles, N.	Ferreira, L.	Improving Shoulder Implant Fixation Through Understanding of the Osteoarthritic Joint	
Mar. 2	Prof. R. Peltier Department of Physics University of Toronto		Breaking Wave Induced Irreversible Turbulent Mixing in Stratified Flows	

Mar. 9	Andruschenko, A.	Knopf, G.	Laser Material Processing of Printed Graphene and Graphene-Oxide Films	
	Ali, S.	Zhang, C. Savory, E.	Numerical Investigation of Blockage Development in an Aeroengine Transonic Axial Compressor Stage	Elhalwagy, M.
	Zhou, J.	Jiang, L. Khayat, R.	Performance Evaluation on Viscoelastic Dielectric Elastomer Resonators and Generators	
Mar. 16	Prof. A. Price Department of Mechanical and Materials Engineering Western University		Smart Material Actuators	
Mar. 23	Kelly Sexsmith Career Services Officer Western Engineering		Steps to Career Planning	
Mar. 23	Dr. Naomi Wisenthal Psychologist, Student Development Centre Western University		Emotional Wellbeing,Academic Success and the Student Development	

7. GRADUATE STORIES

L. Ferreira

Nikolas Knowles - NSERC Alexander Graham Bell Canada Graduate Scholarship – Doctoral – $105,000

Jonathan Kusins - Ontario Graduate Scholarship (OGS) - $15,000

Nikolas Knowles - Dr. Suzanne Bernier Memorial Award in Skeletal Biology – Western University - $3,500

Nikolas Knowles - Best Poster, Shoulder and Elbow Classification, American Academy of Orthopaedic Surgeons (AAOS) Annual Meeting, Las Vegas, NV

A.G. Straatman

Christian Fischer, MESc 201 - Accepted position at Fisher & Paykel Healthcare, New Zealand

Chelsea Johnson, MESc 2013 - Accepted position at Fisher & Paykel Healthcare, New Zealand

Mehdi Farrokhnejad, PhD 2013 - Accepted position at Meridian Magnesium

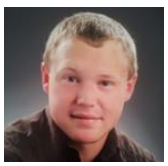
Chris DeGroot, PhD 2012 - Accepted position at Trojan Technologies

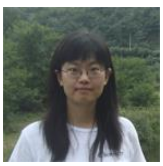
X. Sun


Andrew Lushington


Adam Riese


Craig Langford


Stephen Lawes


Xia Li


Yuhai Yu

Andrew Lushington- current Ph.D student received NSERC CGS, 2015
Stephen Lawes-current MESc. Student received NSERC CGS-M, 2015

Craig Langford- current MESc. Student received OGS, 2015
Adam Riese-current MESc. Student received NSERC CGS, 2015
Xia L-current Ph.D student received “Outstanding Research Award” from Chinese Consulate in Toronto in Toronto.
Each of them received $6000 in May, 2015
Yuhai Hu- previous Ph.D student received NSERC industrial fellow after graduation, 2014.

Industrial Co-op: three graduate students obtained industrial Co-op opportunities:
Adam Riese - Ballard Power Systems, Vancouver, May 1, 2014-August 31, 2014
Craig Langford - General Motors, Detroit, USA, May 1, 2014-August 31, 2014
Biwei Xiao - General Motors, Detroit, USA, May 1, 2015-August 31, 2015

O.R. Tutunea-Fatan

After successfully defending his PhD thesis in Apr. 2014, Kamal Mostafavi started in Nov. 2014 a new Senior Mechanical Engineer position with Coolit Systems in Calgary.

The following students were awarded national or provincial scholarships:
- Ben Hamilton: NSERC CGS-M
- Sama Hussein: OGS

J. T. Wood

Ian Swentek graduated with a Ph. D. and accepted a research engineer position at FPC.

J. Yang

Tengyuan Zhang, was awarded the Vanier Canada Graduate Scholarship. He joined us as a M.Sc student. Now he continues PhD student in my group.

8. VISITING STUDENTS

Name	University	Start Date	End Date
Betz,Tobias	Karlsruhe Inst. Of Tech, Germany	Sept 1/14	Feb 28/15
Bondy,Matthew	University of Windsor, Canada	Sept 1/14	Dec 31/14
Changhai,Liu	Soochow University, China	Nov 1/14	Apr 30/15
Ding,Bing	Nanjing University, China	Sept 1/13	Sept 30/14
Goris,Sebastian	University of Wisconsin, US	May 25/15	Aug 21/15
Li,Wei	University of Sheffield, UK	May 1/14	July 31/14
Maertens,Robert	Karlsruhe Institute of Technology, Germany	Mar 1/15	Aug 31/15
Mousavi Khalkhali,Zeinab Sadat	McMaster University, Canada	May 1/15	Aug 31/15
Porto,Juliette	Grenoble INP-ENSE3, France	Feb 1/14	July 31/15
Riester,Anja	Karlsruhe Institute of Technology, Germany	Mar 1/15	Sept 30/15
Seiffer,Alexander	Karlsruhe Institute of Technology, Germany	Sept 1/14	Feb 28/15
Shah,Syed Tayyab Hussain	Quaid i Azam University, Pakistan	June 1/14	Dec 19/14
Shih,Chia-Nan	National Defence, China	June 1/13	May 31/14
Ul Haq,Rizwan	Quaid i Azam University, Pakistan	June 1/14	Dec 19/14
Zhang,Xiaohui	Guangxi University, China	Apr 1/15	Mar 31/16
Zhang,Xu	University of Windsor, Canada	Sept 1/14	Dec 31/14

RESEARCH

1. MAJOR RESEARCH AREAS

The current graduate program in the Faculty of Engineering is fully accredited by the Ontario Council of Graduate Studies. This brief seeks to further the decentralization of the program as recommended in the previous accreditation cycle by requesting the accreditation through the departmental graduate programs. Each Department has restructured the Graduate Research Programs by focusing on the individual areas of strength. In the case of the Department of Mechanical and Materials Engineering the Master's and PhD programs comprise the following fields:

- Mechanical Engineering
- Thermofluids
- Materials and Solid Mechanics
- Automation Technologies and Systems

2. FACILITIES

Laboratory Facilities

The description of laboratory facilities is divided into sections dealing separately with each of the four research groups. Note that there may be an overlap in the facilities listed as different groups may be using the same facilities, and the individuals may be contributing to different groups. There are in excess of 30,000 sq. ft. of laboratory and office spaces for the members of the program with state of the art research infrastructure and computing facilities (PCs and Workstations).

The description of laboratory facilities is divided into sections dealing separately with each of the four research groups. Note that there may be an overlap in the facilities listed as different groups may be using the same facilities, and the individuals may be contributing to different groups.

Thermofluids Group

Experimental facilities:

- Low-disturbance wind tunnel
- Hydraulic flume
- High speed imaging system
- Thermal imaging system
- Planer PIV and StereoPIV system
- Laser Induced Florescence system
- Unique small-scale downburst outflow simulator
- Automotive cooling fan module underhood rig simulator and plenum chamber
- Unique hemodynamic flow rig
- 3-component laser Doppler velocimetry system and additional lasers
- 2D wall jet wind tunnel
- Plenum chamber airflow facility for axial flow fan testing

Micro/Nano Fluids Laboratory facilities:

- OLYMPUS IX81 Inverted Fluorescence Microscopy
- Photometrics Cascade high speed Imaging system
- Patchman NP2 Micromanipulation system

Specialized computing resources:

- 4 SUN Blade 2000 workstations and 1 SUN Ultra 60 workstation and 12 high-end, single processor PCs.

- 4 dual core PCs with 4 Gb memory each, 2 dual core PCs each with 2Gb memory, 4 single core PCs each with 2 Gb memory each, one 4-processor Compaq machine (9Gb memory), one 2-processor Compaq machine (2 Gb memory), network and printing facilities.
- Server network (2 Tb, with additional 2 Tb back-up storage) and 5 PC workstations
- Commercial CFD codes, notably FLUENT and CFX
- Portal to Sharcnet

Materials and Solid Mechanics Group

Metal Forming Laboratory:

- Four combined bending and torsion test labs
- Four beam bending labs
- Four buckling test labs
- Four Asymmetric bending labs
- Two thick cylinders testing labs
- Eight P3 Vishay strain gauge indicators
- Five PCs with windows7 and data acquisition labs
- Five variable power supplies
- Various temperature and pressure sensors
- Thick Cylinder Apparatus (no. 1)
- Thick Cylinder Apparatus (no. 2)
- Unsymmetrical Bending Apparatus (no. 1)
- Unsymmetrical Bending Apparatus (no. 2)
- Column Buckling Apparatus (no. 1)
- Column Buckling Apparatus (no. 2)
- Combined Bending and Torsion Apparatus (no. 1)
- Combined Bending and Torsion Apparatus (no. 2)

Biotechnology Research Laboratory

- Three AFMs (Dimension, Multimode, CSPM 5500)
- Olympus 1X81 Inverted Fluorescence Microscope with environmental chamber, high-speed camera (Photometrics Cascade), Micro-manipulator (Patchman NP2)
- Three optical MIcroscopes
- Two laser systems including Micropoint laser
- Varian UV-Vis spectrophotometer
- Three Ocean Optics spectrometers
- Probe station for MEMS and Microelectronics
- Dimatix materials printer DMP-2800
- Acoustic Measurement System
- Hot-embossing lithography
- Spin coater
- Six high-precision multi-channel pumps
- High-speed centrifuge
- Electrochemistry station
- Furnace
- Oven
- Water bath and shaken water bath
- Fume hood
- Two Biological Safety Cabinets
- Cell culture room

Heat Treating Laboratory:

- Megatronic e42wri quartz quad elliptical radian heating furnace model 30393-2 with controller
- Lindberg blue box furnace maximum temperature 1100 degree centigrad serial no x01f313762xf
- Lindberg box furnace maximum temperature 1100 degree centigrad model no 59545

- Lindberg box furnace maximum temperature 1200 degree centigrad model no T51333
- Lindberg tube furnace maximum temperature 1200 degree centigrad
- 6 thermolyne tube furnaces model 21100 maximum temperature 1200 degree centigrad
- Lindberg tube furnaces model 55035a maximum temperature 1100 degree centigrad
- Hardness testing
- Vickers pyramid hardness tester serial no 255032
- Clark rockwell type hardness tester model c8a 50340
- Clark rockwell type hardness tester model c8a
- 3Macromet rockwell type hardness tester
- Satec Impact tester model Si-1B

Composite Fabrication Laboratory:

- Freezer
- oven,
- autoclave and heated platen press for two- and three-dimensional wet lay-up and prepreg processes.

Nanomaterials Fabrication and Characterization Laboratories:

- Chemical Vapour Deposition and sputtering facilities
- Inverted Fluorescence Microscopy
- NanoScope V MultiMode SPM
- Photometrics Cascade high speed Imaging system
- Patchman NP2 Micromanipulation system
- Cell Culture Room
- Photonic Instrument
- MicroPoint Laser System
- Fuel Cell station
- High-resolution scanning
- Electronic Microscope (Hitachi 4800)
- Environmental scanning
- Electronic Microscope(Hitachi 3400N)
- Transmission Electronic Microscope (Hitachi 7000)
- Raman Spectrometer (HORIBA)
- Scientific LabRam
- Micromeritics Tristar II
- Nicolet 380 FTR

Equipment for Electrochemical Characterization/Analysis

- Hot presser
- Potentiostat/Galvanostat (autolab)
- Electrochemical station (CHI)
- Fuel Cell test station
- Glove box
- Potentiostat/Galvanostat/EIS (VMP3)
- Batteries test station (Arbin BT2000)

Mechanical Testing Laboratories

- Mechanical and servohydraulic load frames ranging from 1kN to 500kN capacity
- Variety of fixtures for compression, flexure shear and mixed-mode bending
- Instron 9250HV instrumented drop tower for moderate rate impat testing up to 1600J
- Grindosonic ultrasonic modulus measurement device

Properties of Materials Laboratory

- Shopcraft bench grinder
- Unitek spot welder model 113203
- Atlas 6 inch lathe

- Drill press canadian blower co size 18
- Drill press rockwell beaver
- Oliver rolling mill
- Imptech C-10 Cut off Machine (5 year)
- Carver press model C-24,000 lbs, 11 metric tons

Polymer Engineering Laboratory

- FTIR, micro-indenter (DMTA, deep penetration)
- thin film tensile tester
- grad student desks

Tribology Laboratory

- A variety of wear testing machines including a Plinth and a Direct Observation Wear Machine.
- High-temperature nanodindentation testing machine (Micro Materials Ltd)

Materials Characterization Laboratories

- Optical and Electron microscopy
- X-ray diffractometer
- Differential scanning calorimeter
- Electrical resistivity (4-300K),
- “Grindosonic” ultrasonic probe
- High-temperature nanoindentation

Optical Microscopy Laboratory

- Buehler micromet automatic polishers 2
- Leitz stereo microscope
- Unitron stereo microscope
- Olympus stereo microscope
- Leitz aristophot
- Reichert bench type microscope with micro hardness tester 005 263
- Olympus bh2 microscope
- Sony monitor pvm 1340
- Sony video printer up850
- Microscope video black and white camera dage mti nc65
- Leitz laborlux microscope
- Fibre optics light source intralux 150 watt
- Technical copy stand TCI
- Clemex Vision Pe Image Analyzer
- Microscope xillix digital camera 0042
- Leitz microscope with discussion attachment model laborlux (2)
- Wild stereo microscopy with discussion attachment
- Unitron metallurgical inverted microscope model mec (2)
- Wild metallurgical inverted microscope model m50 (6)
- Microgram atic balance maximum 19 grams 5 decimal places resolution
- Sartorius digital micro balance maximum 120 grams 4 decimal places resolution
- Sartorius micro balance 160 grams maximum
- Metler micro balance model p1200n
- Leitz Laborlux Microscope

Polymer Engineering Laboratory

- DSC
- DMTA
- thin film/microprobe dielectric spectrometer
- Brabender high shear mixer
- Centrifuge

- annealing ovens
- thin film spinner
- grad student desks

Equipment for Synthesis of Nanomaterials

- Direct liquid injection CVD
- Aerosol-assisted CVD
- Rapid thermal CVD
- Joule-heating CVD
- Plasma-Enhanced CVD
- Microwave-assisted hydrothermal oven
- Atomoic layer depsotio (ALD)
- Ball milling machine
- Laboratory ovens

In addition to the departmental facilities, faculty and students in the Materials and Solid mechanics group have access to the following major equipment and common facilities:

Fraunhofer Project Centre

- 2500 tonnes press
- Direct SMC
- 2 extruder configuration (Dieffenbacher process)
- High pressure RTM

The Automation Technologies and Systems Group

Dynamic and Sensing Systems Laboratory

- Vibration transducers
- Micron-scale and macroscopic vibration transducers
- Electro-dynamic shakers
- Real-time signal analyzers and modal analysis software
- Real-time control hardware/software
- Accelerometers,
- Precision rate table and controller for angular rate characterization
- Power amplifiers/conditioners for structural vibration measurement

CNC Machining Laboratory

- The Fadal 4020-5 Axis CNC Machine with tooling package.
- Tormach three-axis compp0uter numerically controlled mills
- The “Swift” DEA-Coordinating Measuring machine with Controllers and PC-Pentium I-120 MHz and “Tutor” Software.
- PC-Pentium III-350 MHz with “Surfcam 99” CAD/CAM Package
- PC-Pentium II-233 MHz with “Surfcam 99” CAD/CAM Package
- Techno Isel, 3-Axis CNC Machine with Mac 200 Controller, connected to a Pentium 150 MHz Computer System
- Dyna Myte Model 2400, 3-Axis CNC machine with optional rotary axis, connected to a Pentium 150 MHz Computer System
- 40” LCD screen for demonstration and presentation purposes
- NextEngine 3D laser scanner (2)
- Makerbot Replicator 2 x 3D printer (2)

Geometric Modeling & Virtual Sculpting Laboratory

- Immersion MicroScribe G2 hardware/software

- PHANTOM Omni haptic device
- VRMesh 3.5 Studio software
- Claytools for Rhino modeling software
- Rhino3D NURBS modeling software
- Matlab tools

Bioelectronics and Biosensor Laboratory: (Note: This laboratory contains equipment not readily available elsewhere on campus)

- Optical Bench (2 types) – including various optical breadboards and plates
- Micralyne biochip toolkit
- Optikon High-Speed Sensicam VGA cooled color digital CCD camera
- Tunable ArKr laser system
- Argon-Ion laser (457nm)
- He-Ne yellow laser (594nm)
- Infiniium oscilloscope (2GSa/s)
- Wavestar U spectrometer
- Broadband amplitude modulator (3 units)
- Electro-optical modulator and drivers (2 units)
- Acousto-optic deflector and driver
- Radiometer ION 450
- Linear and rotational precision stages (multiple)

Visualization and Virtual Reality Laboratory:

- Cyberware 3D RGB head & shoulder scanner
- Fakespace Immersadesk R-2 virtual reality display

Sensing and Mechatronic Systems Laboratory:

- Active modular omnidirectional vision systems with multiple Firewire cameras
- Modular sensor/actuator building blocks

Biomechanics Group

The Jack McBain Biomechanical Testing Laboratory:

The Biomechanical Testing Laboratory primarily conducts experimental in vitro research related to orthopaedic biomechanics. The current lab (660 sq. ft) BioHazard Level 1 facility is equipped to conduct both experimental testing and computational modelling. The focus includes orthopaedic implant fixation and implant design for the upper limb and spine, as well as the assessment of lower limb impact injury. The primary equipment available includes two Instron materials testing machines, one of which is tension-compression and the other which has three actuators (tension-compression, as well as 2 torque axes). Data acquisition is achieved through National Instruments hardware and custom-written LabVIEW software, Solidworks, Mimics, FEA software (Abacus, Truegrid) LS-DYNA).

- Finite Element analysis workstations
- Strain gauges and circuitry
- IEEE 1394 (firewire) camera
- Digital microscribe

The Wolf Biomechanics and Imaging Laboratories:

The two facilities described below conduct basic and clinical biomechanics research into in vivo human motion in health, sport, disease (primarily osteoarthritis, ligament and other soft tissue injuries) and the result of surgery, bracing and other clinical interventions. Primarily studied is the lower limb, but research is being conducted on spine and upper limb biomechanics as well.

The Wolf Orthopaedic Biomechanics Lab (WOBL) is located adjacent to the Fowler-Kennedy Sports Medicine Clinic. Composed of an 8-camera motion analysis system (Motion Analysis Corp, Santa Rosa, CA, USA), a floor-mounted forceplate (AMTI, Amherst, NY, USA) and a telemetric electromyography system (Telemyo, Noraxon, MA, USA). This facility is one of only eight in Canada.

The Wolf Orthopaedic Quantitative Imaging Lab (WOQIL) is located immediately adjacent to WOBL. The WOQIL is equipped with 2 x-ray fluoroscopes (Siremobil Compact-L C-arm, Siemens Inc, Mississauga, ON), a 4-camera motion analysis system (Motion Analysis Corp, Santa Rosa, CA, USA) and a forceplate instrumented treadmill (Kistler Gaitway, Amherst, NY, USA). This facility is unique in Canada and one of only 3 worldwide. This facility is developing the technique of dynamic radiostereometric analysis (RSA).

Both of these facilities are located within the Fowler Kennedy Sport Medicine Clinic and tests clinical patients as part of their standard care by primary care physicians, orthopaedic surgeons and physiotherapists. This arrangement is unique in Canada.

The facilities have desktop computers for 8 graduate students or research assistants and are equipped with wireless networking for additional use of student laptops (table space is available for up to 3 laptops). This has been recently expanded with external funding from a national agency. There are no plans in the next 3 years to expand further, but expansion is possible in the longer term into the adjacent Zimmer Conference room (3M bldg).

The Bioengineering Research Laboratory

The Bioengineering Research Laboratory of the Hand and Upper Limb Centre is located in Lawson Health Research Institute of St. Joseph's Health Care London. The proximity of this laboratory to the outpatient clinics, therapy department and operating rooms allows a close interaction between researchers, clinicians and patients. This has resulted in a fertile environment for our graduate and medical students, and residents who have been stimulated by the clinical correlations of their research. All surgeries are conducted by Dr. King (PI) with surgical fellows and residents, and all engineering components are managed by Dr. Johnson (co-applicant), research engineers and graduate students.

The electromagnetic tracking device has six sensors and is linked to LabView on a personal computer. We have recently developed "Motion Station", a Lab View based program that provides a real-time graphical description of bone and joint motion. We have access to advanced imaging facilities in house.

A sample of equipment is as follows:

- Instron materials testing machine
- Elbow testing simulator
- Shoulder testing system
- Wrist testing system
- Data Aquisition Systems (HP)
- LabView virtual instruments (HP)
- 20 PTOtrack 3D tracking systems (Norther Digital)
- Flock of Birds Magnetic tracking system
- Tekscan pressure measurement system

Surgical Mechatronics

- 500 sq. ft. laboratory located in Lawson Health Research Institute
- 460 sq. ft surgical skills laboratory (adjacent to main lab) for cadaveric testing
- KUKA 4+ robot 7-axis (6+1 independent)
- Four PC workstations (4GB RAM0
- Two Optotrack Certus 6-degree-of-freedom optical motion tracking systems (NDI, Waterloo)

3. RESEARCH SUPPORT

2014/2015	Sum of AY Award
Association/Institute/Society	$165,000.00*
Government	$2,287,143.31
Federal	$2,204,931.01

Provincial – Ontario	$82,212.30
Industry	$256,867.40
Private Donation	$3,000.00
Grand Total	$2,712,010.71
**this includes $40,000 from the Faculty of Engineering.	

4. RESEARCH IN THE NEWS

T.R. Jenkyn

My lab at the Fowler Kennedy Clinic, the 'Wolf Orthopaedic Biomechanics Laboratory or WOBL' has been expanded with a Canada Foundation for Innovation (CFI) Leading Edge Fund grant entitled "Facility for load-bearing imaging, biomechanics and orthopaedics research". This is a collaboration with David Holdsworth, the Sandy Kirkley Chair in Musculoskeletal Research at Robarts, and Trevor Birmingham, Professor in Physical Therapy. This facility now includes our own CT machine, 3 x-ray machines, a split belt treadmill, optical motion capture system and virtual reality system. This is the only one of its kind in Canada.

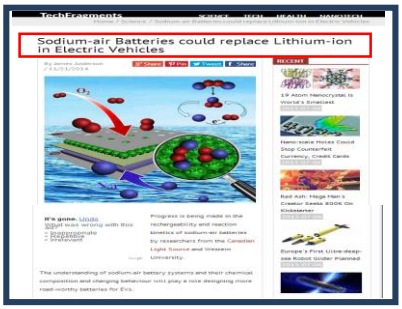
M.D. Naish

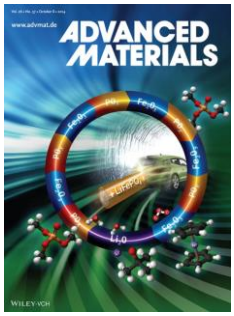
A. Naidu, C.D.W. Ward, A. Escoto, S. Bhattad, M.D. Naish and R.V. Patel, "A Dual-Modality Instrument for Minimally Invasive Robotic Palpation to Localize Tumours," Hamlyn Symposium on Medical Robotics, London, UK, June 20–23, 2015 ** Winner of the Best Innovation Prize in the Surgical Robotics Challenge, held in conjunction with Hamyln Symposium on Medical Robotics **

http://hamlyn.doc.ic.ac.uk/hsmr/news/winners-surgical-robot-challenge-announced
http://news.westernu.ca/2015/07/team-takes-top-prize-at-surgical-robot-challenge/

X. Sun

Dr. Sun's work about Sodium-Air Batteries, published in **Energy Environ. Sci.7**, 3747-3757 (2014) [Impact Factor =20.5], was highlighted by various media:



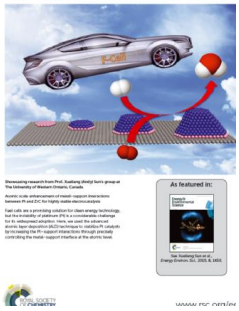


Highlighted by Inside front cover of Journal "Advanced Materials" [Impact factor:17.5]: Lithium-Ion Batteries: Rational Design of Atomic-Layer-Deposited LiFePO4 as a High-Performance Cathode for Lithium-Ion Batteries (Adv. Mater. 37/2014).

The atomic layer deposition technique is successfully applied to synthesize lithium iron phosphate using rationally designed surface reactions, as demonstrated form the first time by X. Sun and co-workers on page 6472. The lithium iron phosphate exhibits high powder density, excellent rate capability, and ultra-long lifetime, showing great potential in vehicular lithium batteries and 3D all-solid-state microbatteries.

Highlighted by Back Cover of Journal "Energy & Environmental Science" [Impact factor:20.5]: Atomic Scale Enhancement of Metal-support Interactions between Pt and ZrC for highly Stable Electrocatalysts (Energy Environ. Sci., 8/2015)

Fuel cells are a promising solution for clean energy technology, but the instability of platinium (Pt) is a considerable challege for its widespread adoption. Here, we used the advanced atomic layer deposition (ALD) technique to stabilize Pt catalysts by increasing the Pt-support interactions through precisely controlling the metal-support interface at the atomic level



Dr. Sun was highlighted by Newsletter from The International Academy of Electrochemical Energy Science (http://www.iaoees.org/**)**

J.T. Wood

Was awarded $925,000.00 APC grant for project entitled *"Structural long-fibre thermoplastics for automotive applications"*

J. Yang

Podcast: A new Approach to 3D Printing
https://www.asme.org/engineering-topics/media/manufacturing-processing/podcast-new-approach-3d-printing

Jun Yang, associate professor, Department of Mechanical and Materials Engineering, The University of Western Ontario, is working on a new technology called the initiator-integrated 3D printing, or i3DP, which could enhance the functionality of 3D printed objects. In this podcast recorded at ASME's 2014IMECE, Prof. Yang discusses the benefits and challenges of i3DP.

5. RESEARCH COLLABORATION WITH EXTERNAL PARTNERS

R.O. Buchal

Mitacs Accelerate Internship Program, Bridging the Gap – Health and Safety Engineering Student Teaching Modules – Stage 2, $10,000. The project was to develop a learning module on Safety Management Systems. The Western co-investigators were R. O. Buchal and S. Barghi. The industry partner was **Minerva Canada Safety Management.**

L. Jiang

Dr. Jiang is collaborating with **Ford Motor Company** USA to conduct computational mechanics modeling on the mechanical properties of fiber reinforced composites.

R. Klassen

Over the past year I have completed several research contracts with scientists from the **Canadian Nuclear Laboratories (CNL**) to study the use of heavy ion irradiation to simulate neutron irradiation of materials used in Canadian nuclear reactors. I make use of Western's unique high energy Tandetron ion accelerator, Nanofabrication, and EBSD crystallographic mapping facilities to ion irradiate small samples of alloys used by the Canadian nuclear industry and then assess their mechanical properties by performing a variety of

nanomechanical tests at my laboratory in the Faculty of Engineering. These projects have been funded by two contracts with CNL and through two NSERC CRD grants co-sponsored by UNENE and NRCAN (Gen IV program).

I completed a research project on assessing the mechanical properties of polymeric coatings on oil/gas pipelines. This project was supported through and NSERC Engage grant with **Nova Chemicals Ltd.**

I am currently undertaking a project to assess various fabrication techniques for the creation of tenacious nickel diboride layers on nickel-based alloys. This project is supported though an NSERC Engage grant with **Surface Heat Treatment Ltd (Hamilton).**

G. Knopf

National Research Council of Canada
Collaborating Researchers: Drs. Suwas Nikumb and Evgueni Bordatchev (NRC, London Ont.)
Laser material processing and microfabrication
Laser material processing is a complex nonlinear process with numerous stochastic parameters related to the laser apparatus, optics, and the material specimen. Researchers at Western and the National Research Council of Canada (NRCC) have developed nonlinear models to predict the laser pulse energy requirements for micromachining and laser micro-polishing (LμP). Current research involves the development of electrically conductive graphene-based inks and novel fabrication processes for printing bioelectronic circuitry on a variety of mechanically flexible surfaces (polymers, paper, and biocompatible silk). In this work, laser microfabrication techniques are used for material removal and thermally reducing graphene-based thin films to produce conductive microcircuits. The work is supported, in part, by the Natural Sciences and Engineering Research Council (NSERC).

National Research Council of Canada
Collaborating Researcher: Dr. Evgueni Bordatchev (NRC, London Ont.)
Controlled light guidance and distribution in a flexible large area waveguides
Mechanically flexible large area polymer waveguide systems are being developed by researchers at Western and the National Research Council of Canada (NRCC).The primary function of the poly(dimethylsiloxane) waveguide system is to collect natural or artificial light over a large area (concentrator) and redirect it to the illuminating boundary region of the flexible sheet (diffuser). Photo-sensor arrays, photovoltaic cells, or illumination windows may be located at the light diffusing regions. The work is supported, in part, by the Natural Sciences and Engineering Research Council (NSERC).

Pharmax Research
Collaborating Researcher: Dr. Edward (Ted) Petroff (Pharmax Research)
Wireless biosensor for detecting sepsis in ICU catheter drainage systems
Most cases of urinary sepsis occur to patients in hospital intensive care units (ICU) or long-term care facilities. If detected early, mild forms of the bacterial sepsis can be treated with the administration of antibiotics and large amounts of intravenous fluids. However, untreated or severe sepsis has a mortality rate of nearly 50%. This collaborative research involves the design and manufacture of a novel wireless, printed bioelectronic sensor platform that is capable of detecting the early stages sepsis by monitoring the presence of bacteria in urinary catheter drainage systems. Western researchers are developing new low-cost conductive inks and inkjet printing technologies that permit the fabrication of wireless microcircuits on non-rigid substrates. Although at an early stage, this research may have a high impact on the quality of healthcare in Canada and around the world.

E. Savory

James Scott (Public health science and mycology, **University of Toronto)** – research concerning hidden mould growth in buildings and the consequential bio-deterioration of building materials.

Samira Mubareka (Virology and infectious diseases, **Sunnybrook Hospital and University of Toronto**) – research concerning person-to-person airborne transmission of influenza virus.

Leigh Orf (Meteorologist, **Central Michigan University, USA)** – research concerning the evolution of downburst-producing thunderstorms and tornado-producing supercell storms.

Panagiota Karava (Building scientist, **Purdue University, USA**) – research concerning the wind-induced flow and convective heat transfer associated with Building Integrated Photo-Voltaic systems.

Robert Martinuzzi (Dept of Mech Eng, **University of Calgary**) – research on experimental and numerical modelling of aerospace engine compressor stages.

Laurent Perret (Fluid Mechanics, **Ecole Centrale de Nantes, France**) – research on the dynamics of the flow over obstacle arrays and urban street canyons.

Zhitao Yan (Structural engineering, **Chongqing University, China)** – research on the modelling of electricity transmission line conductor dynamics due to wind action.

K. Siddiqui

Gas Turbine Laboratory, Institute of Aerospace Research, National Research Council, Ottawa

Project: Development of an air-fuel control system for Effervescent Atomization Fuel Injector
The internal two-phase flow structure in an effervescent atomizer and hence the spray quality changes with the gas-to-liquid flow rates ratio (GLR). In a practical application of an aircraft gas turbine engine, the flow rate of liquid fuel changes during different stages of the flight and hence the GLR changes, which affects the spray quality and hence the combustion efficiency. In order to maintain the same spray quality during different flight stages, the air flow rate needs to be changed to maintain the same GLR. This work is focused on the development of a control mechanism to adjust the gas flow rate when the liquid flow rate is changed to meet the power demand.

Technical University of Denmark

Project: Characterization of the near-surface flow field over Boland Island
Boland Island is located off the cost of Denmark. The island is considered as a test side for field measurements focusing on the investigation of the near-surface flow produced by the wind approaching the island from the sea. This collaborative project with the Wind Engineering Group at the Technical University of Denmark is focused on the near-surface flow characterization over a $1/100^{th}$ and $1/50^{th}$ scaled model of the island in the lab (BLWTL and WindEEE) using Particle Image Velocimetry (PIV).

Wind Energy Institute of Canada (WEICan), PEI

Project: Investigation of wake and topography effects on a wind farm performance
WEICan owns and operates a wind farm in Prince Edward Island (PEI) consisting of five 2 MW wind turbines, which are grid connected. WEICan has an issue with the underperformance of a wind turbine, which is suspected to be due to local topography. This project is focused on field measurements to characterize the topography and wake effects on the wind field and wind turbine performance in a wind farm.

Line-X London Inc

Project: Thermal characterization of polyurethane-cement composites
The accumulation of snowfall and ice on driveways can pose physical and health hazards to home residents. Line-X is currently developing a novel heating system based on conductive polyurethane-cement composites as a retrofit for snowmelt applications. This project is focused on the characterization of the thermal behavior of polyurethane-cement composites.

A.G. Straatman

St. Mary's Cement - The project we are collaborating on involves an energy audit of the St. Mary's cement production facility. The project considers all energy inputs and outputs of the plant including hydrocarbon fuel (coke), natural gas, electricity, compressed air and water. We are working in collaboration with Enviro-Stewards of Elmira, Ontario to produce a report that can be presented to the ministry. Support for the project was provided by MITACS and used to support one MESc student (Chris Csernyei)

General Dynamics Land Systems (GDLS) - A project was initiated to develop an engineering model to predict the heat load on light armored vehicles under all environmental and operating conditions. Support for the project was provided by MITACS and used to support on MESc student (Marc-Andre Brooks)

Illinois Toolworks (ITW) - This project concerns the development of a refrigeration system for compressed air and is based on technology developed and patented by Prof. Straatman and Dr. J. Polihronov with funding provided by Worldiscoveries.

X. Sun

General Motors of Canada (Fuel Cell and Li Ion Batteries for Electric Vehicles): Since 2005, we have been collaborating with GM scientists to develop one-dimensional nanomaterials in fuel cell applications. Through Automobile Partnership of Canada (APC), we are working on "In Situ Studies of Electrochemical Processes in Automotive Materials" involving five research teams from McMaster University, McGill University, Univerisity of Quebec and Western, supported by GM. Recently, we successfully obtained NSERC Strategic grant in 2014, supported by GM.

Ballard Power Systems (Fuel cell studies): After an NSERC CRD and NSERC Strategic grants on carbon nanotubes as Pt catalyst support for fuel cells, recently, working on "Low Pt catalysts for PEM fuel cells research network" – through Automobile Partnership of Canada (APC), involving 20 research teams from seven universities and NRC supported by several industrial partners such as Ballard Power Systems.

Lithium Phostech Inc.(Li Ion Batteries for Electric Vehicles): Over the past few years, there is a dramatic increase of interest in large scale batteries for energy storage, especially for the transportation sector and energy storage (smart grid). Lithium-ion battery (LIB) is one of the most promising power systems because it can offer a higher operative voltage and energy density. Recently, in collaboration with scientists in Phostech, we are working on another project titled "Scale-up of a novel melt synthesis process for manufacturing of C-$LiFePO_4$ for automotive applications' from Automobile Partnership of Canada. It deals with five research teams from University Polytechnique Montreal, University of Montreal, Western and CANMET national lab supported by Phostech Lithium Inc..

O.R. Tutunea-Fatan

Collaboration with National Research Council (R. Tutunea-Fatan and E. Bordatchev): We are working in collaboration with researchers from the National Research Council's Centre for Automotive and Surface Transportation in London to investigate multi-axis CNC laser polishing operations, in an attempt to determine correlations between process parameters and quality of the surface produced, typically characterized by an average roughness in the nanometer domain. The applications of this technology span over a broad range of engineering applications, from mold and die to biomedical industries.

Collaboration with Hand and Upper Limb Center from St. Joseph Hospital (R. Tutunea-Fatan, J. Johnson and Louis Ferreira)**:** We are working in collaboration with surgeons and researchers from the Hand and Upper Limb Centre from St. Joseph Hospital in London to develop computer assisted techniques capable to enhance the precision and efficiency of upper limb joint replacement procedures (*e.g.* elbow and shoulder). This work will translate into preoperative computer assisted software to be used for surgical simulation and training, as well as implant shape optimization purposes.

Collaboration with Dieffenbacher North America (R. Tutunea-Fatan and J. Wood): We are working in collaboration with research engineers from the Windsor-based company to develop more efficient means to sever carbon fibers to be subsequently embedded in a high strength composite material for automotive applications. The industrial partner of the project is interested to integrate the some or all project findings in the chopper that represents one of the components of the D-SMC line installed at the Fraunhofer Project Centre from the local Advanced Manufacturing Park.

Collaboration with Centerline Inc. (R. Tutunea-Fatan and E. Bordatchev): We are working in collaboration with a Canadian Windsor-based industry partner to develop and/or identify more efficient methods to improve the esthetic appearance of cold-spray surfaces.

J.T. Wood

ORF: "Advanced Polymer Composite Materials and Technologies"
Developing new polymer composite materials and processes for automotive application.
Industrial partners:
- Dieffenbacher North-America
- General Motors of Canada Ltd.
- BASF Corporation
- Reichhold LLC2
- Ford Motor Company

Academic Partners:
- University of Windsor
- McMaster University
- University of Toronto

APC: "Structural Long-Fibre Thermoplastics for Automotive Applications"
Development of a structural automotive component based on the Direct-Long-fibre Thermoplastic manufacturing process
Industry partners:
- Johns Manville Europe GmbH
- Powder Coating Solutions
- Elring Klinger Canada Inc.
- Dieffenbacher North-America
- General Motors of Canada Ltd.
- BASF Corporation

MFERD: "Magnesium Intensive, fron-end research and development"
Research consortium (Western, Waterloo, McMaster) working on research questions surrounding the implementation of a magnesium-intensive automotive fron-end
Industrial Partners:
- Promatek Research Centre
- Meridian Lightweight Technologies Inc.
- 3M Canada Company and Affiliates
- Huys

J. Yang

Dr. Jun Yang has been collaborating with R&D teams of **Rosstech Inc. and Topnotch Building Maintenance Ltd.** to develop new technologies of printable electronics.

Dr. Jun Yang (Department of Mechanical and Materials Engineering), Dr. John de Bruyn (Department of Physics and Astronomy), Dr. Gianluigi Botton (Department of Materials Science & Engineering, McMaster University) and Dr. Liying Jiang (Department of Mechanical & Materials Engineering) have been collaborating with researchers of **LANXESS**, the world's second largest producer of butyl rubber, on developing new green chemistry and engineering methods for the fabrication of conductive polymers and self-cleaning polymer products. These projects have been funded by ORF-RE and LANXESS.

Dr. Jun Yang has been collaborating with R&D team of **Mixshop Inc.** to develop new 3D printing materials and 3D printers.

Dr. Jun Yang has been collaborating with R&D team of **Marwood Metal Fabrication** to develop new coating technology.

C. Zhang

Research project with **OMTEC**, Ridgetown, Ontario. The objectives of this study are (1) to develop a computational fluid dynamics (CFD) model which could be used to predict important process parameters, such as the pressure drop due to the porous filter, at different operating conditions and (2) to investigate the effect of the geometric parameters of the coalescer and separator on the pressure drop and filtration efficacy..

PUBLICATIONS

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2. REFEREED CONFERENCE PROCEEDINGS

1. **Asokanthan S F**, Kamalizonouzi B and Valiathan A (2014) Motion Detection Strategies for Epileptic Seizure Patients based on Inertial Sensor Data, Proc. ASME International Design and Technical Conferences (IDETC), Buffalo, NY, August 2014, Paper # 2014-35678

2. **Asokanthan S F**, Wang X H and Baik S (2014) Torsional Vibration Control of a Hooke's Joint Driven Flexible Shaft System, Proc. ASME International Mechanical Engineering Congress and Exposition (IMECE), Montreal, November 2014, Paper # 2014-40006.

3. Arghavan S, Bognash M and **Asokanthan S F** (2015) Stochastic Dynamics and Stability of a Class of MEMS Gyroscopes, Proc. Canadian Congress of Applied Mechanics(CANCAM), London, ON, June 2015.

4. Bognash M, Wang T and **Asokanthan S F** (2015) Bouncing Dynamics Considerations for Micro Switch Design, Proc. Canadian Congress of Applied Mechanics(CANCAM), London, ON, June 2015.

5. Knowles NK, **Ferreira LM,** Keener JD, Athwal GS. (June 2015) Quantification of the Position, Orientation and Surface Area of Posterior Bone Loss in Type B2 Glenoids. 2015 Annual Meeting of the Canadian Orthopaedic Association (COA). Vancouver, BC. (International) (Podium)

6. Knowles NK, **Ferreira LM,** Athwal GS. (June 2015) A Comparison of Augmented Glenoid Component Designs for Type B2 Erosions: Evaluation by Volume of Bone Removal, and Quality of Remaining Bone. 2015 Annual Meeting of the Canadian Orthopaedic Association (COA). Vancouver, BC. (International) (Podium)

7. Knowles NK, Carroll MC, **Ferreira LM,** Keener JD, Athwal GS. (June 2015) An Anatomic Study of Normal and Osteoarthritic Humeral Head Size. 2015 Annual Meeting of the Canadian Orthopaedic Research Society (CORS). Vancouver, BC. (International) (Podium)

8. Knowles NK, **Ferreira LM**, Keener JD, Athwal GS. (June 2015) Regional Bone Density Variations in Osteoarthritic Glenoids: A Comparison of Symmetric to Asymmetric (Type B2) Erosion Patterns. 2015 Annual Meeting of the Canadian Orthopaedic Research Society (CORS). Vancouver, BC. (International) (Podium)

9. Knowles NK, **Ferreira LM,** Keener JD, Athwal GS. (March 2015) Quantification of the Position, Orientation and Surface Area of Posterior Bone Loss in Type B2 Glenoids. 2015 Annual Meeting of the American Academy of Orthopaedic Surgeons (AAOS). Las Vegas, NV. (International) (Poster)

10. Knowles NK, Athwal GS, Keener JD, **Ferreira LM**. (October 2014) Regional Bone Density Variations in Osteoarthritic Glenoids: A Comparison of Symmetric to Asymmetric (Type B2) Erosion Patterns. American Shoulder and Elbow Surgeons Closed Meeting. Pinehurst, NC (International) (Poster)

11. Knowles NK, Athwal GS, Keener JD, **Ferreira LM**. (July 2014) Morphology and Density Variations in Osteoarthritic Glenoids.7th World Congress of Biomechanics, Boston, MA (International) (Poster)

12. Kope R, Bashar S, **Ferreira LM.** A comparison of standard and telecentric lenses for use in 3D Digital Image Correlation (DIC) strain measurements. World Congress of Biomechanics, 7th. Boston, MA. July 6-11, 2014. (Podium)

13. "Characteristics of new mode of instability in a channel with longitudinal grooves" by A. Mohammadi and **J.M.Floryan**. Proceedings of the 25th CANCAM, London, Ontario, Canada, May 31 – June 4, 2014.

14. "Spectral Algorithm for Linear Stability Analysis of Flow in Ribbed Annuli" by H.V. Moradi and **J.M.Floryan.** Proceedings of the 25th CANCAM, London, Ontario, Canada, May 31 – June 4, 2014.

15. Thermal drift due to modulated dual heating" by M.Z. Hossain and **J.M.Floryan**. Proceedings of the 25th CANCAM, London, Ontario, Canada, May 31 – June 4, 2014.

16. "Three-dimensional spectrally-accurate algorithm for the Navier-Stokes equations" by Md. Sakib and **J.M.Floryan**. Proceedings of the 25th CANCAM, London, Ontario, Canada, May 31 – June 4, 2014.

17. "Spectral Algorithm for Analysis of Flows in Vibrating Channels" by S. Zandi, A. Mohammadi and **J.M.Floryan**, Proceedings of the 25th CANCAM, London, Ontario, Canada, May 31 – June 4, 2014.

18. "A Study of Mixed Convection in a Heated Channel" by M.Z. Hossain and **J.M.Floryan**. To appear in the Proceedings of the 67th Annual DFD Meeting, American Physical Society, Nov.23-25, 2014, San Francisco, USA.

19. "A Study of Laminar Drag Reducing Grooves" by A. Mohammadi and **J. M. Floryan**. To appear in the Proceedings of the 67th Annual DFD Meeting, American Physical Society, Nov.23-25, 2014, San Francisco, USA.

20. "Effects of Longitudinal Grooves on the Stability of Channel Flow" " by H. V. Moradi and J.M.Floryan. To appear in the Proceedings of the 67th Annual DFD Meeting, American Physical Society, Nov.23-25, 2014, San Francisco, USA.

21. "Stability of flow in a channel with drag reducing grooves" by H. V. Moradi and **J.M.Floryan**. Proceedings of the IUTAM Symposium on the Laminar-Turbulent Transition, Sept. 8-11, 2014, Rio de Janeiro, Brasil.

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23. Liu, H., **Jiang, L.Y.**, Zeng, D., and Li, Y., Numerical prediction on elastic properties of chopped fiber reinforced composites, 25th Canadian Congress of Applied mechanics, London, Canada, May 31-June 4, 2015.

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25. Nie, W., Huang, L., and **Jiang, L.Y.**, A novel microfluidic switch design with response characteristics to high acceleration, 25th Canadian Congress of Applied mechanics, London, Canada, May 31-June 4, 2015.

26. Pang, K., Dong, C. Yuan, F., and **Jiang, L.Y.**, Experimental Investigation on overpressures in a Scale Model of Sidedraw Silo During Emptying, 25th Canadian Congress of Applied mechanics, London, Canada, May 31-June 4, 2015.

27. Giles JW, Langohr GD, **Johnson JA,** Athwal GS. The Influence of Reverse Shoulder Arthroplasty Implant Variables on Muscle Activation and Joint Load. 2014 Conference of Mechanical Engineering Centres & Bioengineering Society. September 2014.

28. Langohr GD, Giles JW, **Johnson JA,** Athwal GS. An In-Vitro Study of the Effect of Reverse Shoulder Arthroplasty Sizing on Active and Passive Abduction and Internal-External Rotation. 2014 Conference of Mechanical Engineering Centres & Bioengineering Society. September 2014.

29. Langohr GD, Willing R, Medley JB, **Johnson JA,** King GJW. The Effect of Radial Head Hemiarthroplasty Geometry on Radiocapitellar Joint Contact Mechanics. American Shoulder and Elbow Surgeons Closed Meeting. Pinehurst, North Carolina, October 2014.

30. Langohr GD, Giles JW, Athwal GS, **Johnson JA.** An in-Vitro Study of the Effect of Reverse Shoulder Arthroplasty Glenosphere Size on Joint Load, Muscle Force, and Range of Motion. Orthopaedic Research Society Annual Meeting. Las Vegas, Nevada, March 2015.

31. Razfar N, Reeves JM, Langohr GD, Willing R, Athwal GS, **Johnson JA**. The Effect of Shoulder Humeral Component Length on Bone Stresses: A Finite Element (FE) Analysis. Orthopaedic Research Society Annual Meeting. Las Vegas, Nevada, March 2015.

32. Giles JW, Langohr DG, **Johnson JA,** Athwal GS. The Influence of Reverse Shoulder Arthroplasty Implant Variables on Muscle Activation and Joint Load. Orthopaedic Research Society Annual Meeting. Las Vegas, Nevada, March 2015.

33. Khayat A, Langohr GD, Medley JB, King GJW, **Johnson JA**. The Effect of Hemiarthroplasty Implant Shape on Early Cartilage Wear in Linear Reciprocal Sliding. Orthopaedic Research Society Annual Meeting. Las Vegas, Nevada, March 2015.

34. Reeves JM, Razfar N, Langohr GD, Athwal GS, King GJW, **Johnson JA**. The Effect of Material Selection and Implant Positioning on Cartilage Stresses Following Partial Joint Resurfacing: A Finite Element Study. Orthopaedic Research Society Annual Meeting. Las Vegas, Nevada, March 2015.

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36. Khayat A, Langohr GD, Medley JB, King GJW, **Johnson JA**. The Effect of Hemiarthroplasty Contact Geometry on Early in-vitro Cartilage Wear. Canadian Orthopaedic Association 70th Annual Meeting. Vancouver, British Columbia, June 2015.

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39. Reeves JM, Razfar N, Athwal GS, **Johnson JA**. The Effect of Orientation of Stemless Implants on Proximal Humerus Bone Stresses: A Finite Element Study. Canadian Orthopaedic Association 70th Annual Meeting. Vancouver, British Columbia, June 2015.

40. Abdulla IF, Langohr DG, Giles JW, **Johnson JA**, Athwal GS. An in vitro Study of the Effect of Humeral Cup Constraint in Reverse Shoulder Arthroplasty. Canadian Orthopaedic Association 70th Annual Meeting. Vancouver, British Columbia, June 2015.

41. Giles JW, Langohr DG, **Johnson JA,** Athwal GS. The Influence of Reverse Shoulder Arthroplasty Implant Variables on Muscle Force and Joint Load. Canadian Orthopaedic Association 70th Annual Meeting. Vancouver, British Columbia, June 2015.

42. V. Bhakhri, M. Haghshenas, R. Oviasuyi, **R.J. Klassen**; "Indentation-induced Deformation Behaviour of Magnesium", 25th CANCAM Conference, May 31 – June 4, 2015 London, Canada.

43. H. Rajakumar, **R.J. Klassen**;" Effect of irradiation and thermal recovery on the hardness of Inconel 800H and AISI 310 alloys", 25th CANCAM Conference, May 31 – June 4, 2015 London, Canada.

44. AZM Ariful Islam, V. Bhakhri, **R.J. Klassen;**" Plastic deformation of gold micro spheres", 25th CANCAM Conference, May 31 – June 4, 2015 London, Canada.

45. **R.J. Klassen**, H. Rajakumar;"Combined effect of irradiation and temperature on the mechanical strength of Inconel 800H and AISI 310 alloys for in-core components of a GEN-IV SCWR", 7th International Symposium on Supercritical Water-Cooled Reactors, March 15-18, 2015, Helsinki, Finland.

46. Sinar, D., **Knopf, G.K.** and Nikumb, S. (2014, August). Laser assisted reduction of printed GO films and traces. In Nanotechnology (IEEE-NANO), 2014 IEEE 14th International Conference on (pp. 549-553). IEEE.

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49. Chow, M. T., **Knopf, G.K**. and Bordatchev, E.V. (2014, November). Impact of overlapping trajectories in laser micro-polishing. In Optomechatronic Technologies (ISOT), 2014 International Symposium on (pp. 174-178). IEEE.

50. Sareen, K.K., **Knopf, G.K.** and Canas, R. (2014, November). Detecting discontinuous and occluded boundaries from point clouds of building interiors. In Optomechatronic Technologies (ISOT), 2014 International Symposium on (pp. 234-238). IEEE.

51. **Knopf, G.K.**, Sinar,D., Andrushchenko, A. and Nikumb, S. (2015, April). Variable conductive micro-patterns printed on flexible substrates. In 2015 Canadian Printable Electronics Symposium, Montréal QC.

52. Jonnalagadda, D. S. and **Kuboki, T.** Effects of Wood and Cellulose Flours on Crystallization Behaviors of Poly(3-hydroxybutyrate-co-3-hydroxyhexanoate). Annual Technical Conference 2015 of Society of Plastics Engineers, Paper #2097203, 23-25 March 2015, Orlando, Florida, USA.

53. Arifin, W. and **Kuboki, T.** Effect of Glass Fiber on Mechanical Properties of Poly(3-hydroxybutyrateco-3-hydroxyhexanoate). Annual Technical Conference 2015 of Society of Plastics Engineers, Paper #2097529, 23-25 March 2015, Orlando, Florida, USA.

54. D.S. Yurkewich, A. Escoto, A.L. Trejos, M.-E. LeBel, R.V. Patel and **M.D. Naish**, "Low-Cost Force-Sensing Arthroscopic Tool Using Threaded Fiber Bragg Grating Sensors," IEEE International Conference on Biomedical Robotics and Biomechatronics, São Paulo, Brazil, pp. 28–33, August 12–15, 2014

55. M. Hadavand, **M.D. Naish** and R.V. Patel, "A Parallel Remote Center of Motion Mechanism for Needle-Based Medical Interventions," IEEE International Conference on Biomedical Robotics and Biomechatronics, São Paulo, Brazil, pp. 1–6, August 12–15, 2014.

56. A.L. Trejos, A. Escoto, D. Hughes, **M.D. Naish** and R.V. Patel, "A Sterilizable Force-Sensing Instrument for Laparoscopic Surgery," IEEE International Conference on Biomedical Robotics and Biomechatronics, São Paulo, Brazil, pp. 157–162, August 12–15, 2014. **Best paper finalist—selected as one of the four best papers presented at the conference.**

57. T.A. Bracken and **M.D. Naish**, "Multimodal Noncontact Tracking of Surgical Instruments," IEEE International Conference on Robotics and Automation, Seattle, WA, pp. 4729–4735, May 26–30, 2015.

58. I. Khalaji, **M.D. Naish** and R.V. Patel, "Articulating Minimally Invasive Ultrasonic Tool for Robotics-Assisted Surgery," IEEE International Conference on Robotics and Automation, Seattle, WA, pp. 573–578, May 26–30, 2015.

59. A. Escoto, S. Bhattad, A. Shamsil, A. Sanches, A.L. Trejos, **M.D. Naish**, R.A. Malthaner and R.V. Patel, "A Multi-Sensory Mechatronic Device for Localizing Tumors in Minimally Invasive Interventions," IEEE International Conference on Robotics and Automation, Seattle, WA, pp. 4742–4747, May 26–30, 2015.

60. Lin W E; Ozyoruk A N, **Savory E** & Orf L G (2015) "Analysis of an EF5 tornado embedded within a simulated supercell wind storm", Proc 14th Int Conf on Wind Eng (ICWE14), Porto Alegre, June.

61. Lin W E, Mara T G & **Savory E** (2015) "Wind velocity profiles from a pulsed wall jet over ground roughness", Proc 14th Int Conf on Wind Eng (ICWE14), Porto Alegre, Brazil, June.

62. Roberto M, **Savory E** & Porto J (2015) "Laboratory simulation of density-driven thunderstorm downbursts", under review for Proc 14th Int Conf on Wind Eng (ICWE14), Porto Alegre, June.

63. Oreskovic C; **Savory E** & Orf L G (2015) "Temporal evolution of a simulated downburst-producing thunderstorm outflow", Proc 14th Int Conf on Wind Eng (ICWE14), Porto Alegre, June.

64. Blackman K, Perret L & **Savory E** (2015) "Comparison of idealized field and wind tunnel street canyon flows", Proc 14th Int Conf on Wind Eng (ICWE14), Porto Alegre, Brazil, June.

65. Ali S, **Savory, E** & Zhang C (2015) "Numerical investigation of blockage development in an aeroengine transonic axial compressor stage", Proc 25th CANCAM, London, Canada, May-June.

66. Avari H & **Savory E** (2015) "Laser Doppler Velocimetry measurements of wall shear stress under steady and pulsatile flow conditions in a parallel plate flow chamber", Proc 25th CANCAM, London, Canada, May-June.

67. **Savory E,** Perret L & Blackman K (2015) "Spatio-temporal dynamics of a street canyon flow from combined field and wind tunnel experiments", Proc 25th CANCAM, London, Canada, May-June.

68. Roberto M, Oreskovic C, **Savory E** & Porto J (2015) "Unsteady RANS modelling of density driven experimental thunderstorm downbursts", Proc 25th CANCAM, London, Canada, May-June.

69. Lin W E, Ozyoruk A N, **Savory E** & Orf L G (2015) "The flow field of an EF5 tornado in a supercell windstorm", Proc 25th CANCAM, London, Canada, May-June.

70. Scott J A, Motavaze K, Summerbell R C, Lin W E, Spiler K, Dooreleyers M, **Savory E** & Pogacar J (2014) "Improved biodeterioration resistance tests for building materials", Proc Indoor Air 2014, Hong Kong, July.

71. Bashar, M. and **Siddiqui, K.,** "Transient heat transfer behavior in the liquid domain of a PCM during phase change", Canadian Congress of Applied Mechanics (CANCAM), London, May 31-June 4, 2015.

72. Jobehdar, M.H. Gadallah, A.H., **Siddiqui, K.,** and Chishty, W.A. "Characterization of the two-phase flow due to a holed bubble breaker inside an effervescent atomizer using high speed imaging", Canadian Congress of Applied Mechanics (CANCAM), London, May 31-June 4, 2015.

73. Kelbfleisch, A., and **Siddiqui, K.**, "The effect of mesh-type bubble breaker on two phase vertical co-current flow", Canadian Congress of Applied Mechanics (CANCAM), London, May 31-June 4, 2015.

74. Kilpatrick, R., **Siddiqui, K.**, and Hangan, H., "Experimental characterization of flow around an escarpment", Canadian Congress of Applied Mechanics (CANCAM), London, May 31-June 4, 2015.

75. Bashar, M. and **Siddiqui, K.**, "Investigation of heat transfer process in a PCM during melting phase", ASME 4th Joint US-European Fluids Engineering Summer Conference, Chicago, August 3-7, 2014.

76. Jobehdar, M.H. Gadallah, A.H., **Siddiqui, K**., and Chishty, W.A. "Investigation of two-phase flow in an Effervescent Atomizer", ASME 4th Joint US-European Fluids Engineering Summer Conference, Chicago, August 3-7, 2014.

77. Elatar, A. and **Siddiqui, K.,** "Characteristics of coherent structures in channel flows during low Reynolds number mixed convection", ASME 4th Joint US-European Fluids Engineering Summer Conference, Chicago, August 3-7, 2014.

78. Refan, M., Hangan, H. and **Siddiqui, K.** "Particle Image Velocimetry Measurements of Tornado-Like Flow Field in Model WindEEE Dome", ASME 4th Joint US-European Fluids Engineering Summer Conference, Chicago, August 3-7, 2014.

79. Refan, M., Hangan, H. and **Siddiqui, K.** "Particle Image Velocimetry Measurement of Tornado-like Vortices Compared with Doppler Radar Data", 17th International Symposium on Applications of Laser Techniques to Fluid Mechanics Lisbon, Portugal, 07-10 July, 2014.

80. Csernyei, C**., Straatman, A. G.,** "Convective heat transfer due to multiple circular jets impinging on a large cylinder," Proceeding of CANCAM 2015, London, Canada, June 1-4.

81. Khan, F., **Straatman, A. G.**, "Numerical Modeling of Indirect Evaporative Cooling using a Conjugate Domain Approach," 23nd Annual Conference of the CFD Society of Canada, Waterloo, June 9-10, 2015.

82. **Straatman, A. G.,** "Practical Elements of Mechanical Engineering – An enrichment to University engineering education," Proceedings of 2015 CEEA Conference, Hamilton, Canada, May 29-June 3, 2015.

83. Polihronov, J. G., DeGroot, C. T., **Straatman, A. G.**, "On the thermodynamics of angular propulsion," HEFAT 2014, Orlando FL, July 14-16, 2014.

84. Xiaobing Cai, **Jun Yang**, "Sound Absorption by Multilayer of Microperforated Membranes", Proceedings of the 25rd CANCAM, 2015.

85. Qiuquan Guo, Mingjun Hu, Xiaobing Cai and **Jun Yang**, "A Rapid Method for Preparation of Metal Coated 3D Printing Objects", Proceedings of the 25rd CANCAM, 2015.

86. Dongxing Zhang and **Jun Yang**, "Remote Manipulation of 3D Printed Complex Magnetic Architecture after Surface Modification", Proceedings of the 25rd CANCAM, 2015.

87. Qiuquan Guo, Xiaobing Cai and **Jun Yang**, "Facile and Effective Phononic Structures for Ultrasound Focusing Application", ASME 2014 International Mechanical Engineering Congress and Exposition, Volume 13: Vibration, Acoustics and Wave Propagation, 2014.

3. ORAL AND POSTER PRESENTATIONS

1. Orr, V., Barhi, S., **Buchal, R**., Process Safety Management Learning Module, Presented at the 2015 Chemical Industry Association of Canada (CIAC) conference, Toronto, April 22, 2015.
2. **Buchal, R.O**., Safety Education at Western, Panel discussion, Minerva Learning Forum, York University, Toronto, April 23, 2015.
3. "Characteristics of new mode of instability in a channel with longitudinal grooves" by A. Mohammadi and **J.M.Floryan.** Presented during the 25th CANCAM, London, Ontario, Canada, May 31 – June 4, 2014.
4. "Spectral Algorithm for Linear Stability Analysis of Flow in Ribbed Annuli" by H.V. Moradi and **J.M.Floryan**. Presented during the 25th CANCAM, London, Ontario, Canada, May 31 – June 4, 2014.
5. "Thermal drift due to modulated dual heating" by M.Z. Hossain and **J.M.Floryan.** Presented during the 25th CANCAM, London, Ontario, Canada, May 31 – June 4, 2014.
6. "Three-dimensional spectrally-accurate algorithm for the Navier-Stokes equations" by Md. Sakib and **J.M.Floryan**. Presented during the 25th CANCAM, London, Ontario, Canada, May 31 – June 4, 2014.
7. "Spectral Algorithm for Analysis of Flows in Vibrating Channels" by S. Zandi, A. Mohammadi and **J.M.Floryan**. Presented during the 25th CANCAM, London, Ontario, Canada, May 31 – June 4, 2014.
8. "A Study of Mixed Convection in a Heated Channel" by M.Z. Hossain and **J.M.Floryan**. Presented during the 67th Annual DFD Meeting, American Physical Society, Nov.23-25, 2014, San Francisco, USA.
9. "A Study of Laminar Drag Reducing Grooves" by A. Mohammadi and **J. M. Floryan**. Presented during the 67th Annual DFD Meeting, American Physical Society, Nov.23-25, 2014, San Francisco, USA.
10. "Effects of Longitudinal Grooves on the Stability of Channel Flow" " by H. V. Moradi and **J.M.Floryan**. Presented during the 67th Annual DFD Meeting, American Physical Society, Nov.23-25, 2014, San Francisco, USA
11. "Stability of flow in a channel with drag reducing grooves" by H. V. Moradi and **J.M.Floryan**. Presented during the IUTAM Symposium on the Laminar-Turbulent Transition, Sept. 8-11, 2014, Rio de Janeiro, Brasil.
12. A.M. Shamsil, A. Escoto, S. Bhattad, **M.D. Naish**, R.V. Patel, "Towards Lung Tumor Localization via Tactile Image Fusion," 36th Annual International IEEE EMBS Conference of the IEEE Engineering in Medicine and Biology Society, Chicago, IL, August 26-30, 2014.
13. Kilpatrick, R., **Siddiqui, K.**, and Hangan, H., "Wind tunnel modelling of complex topography using PIV", 1000 Islands Fluid Dynamics Meeting, Gananoque, Ontario, May 1-3, 2015.
14. Jubayer, C., **Siddiqui, K.**, and Hangan, H., "Investigation of wind flow around a ground mounted PV panel using PIV", 1000 Islands Fluid Dynamics Meeting, Gananoque, Ontario, May 1-3, 2015.
15. **Siddiqui, K.**, Hangan, H., Bitsuamlak, G., Mann, J., Berg, J., Refan, M., Jubayer, C., Kilpatrick, R., Romanic, D., and Lange, J. "Energy-related research at the WindEEE Research Institute" 1000 Islands Energy Research Forum, University of Ottawa, October 23-25, 2014.
16. Jian Liu, Xifei Li, Mohammad N. Banis, Andrew Lushington, Ruying Li, **Xueliang Sun**, and Tsun Kong Sham, Superior High-Voltage Cycling Behavior of Cathode Materials Coated with Solid-State Electrolyte by ALD, ALD 2014, June 28 – July1, 2014. Kyoto, Japan
17. Andrew Lushington, , Engineering Thin Films via ALD/MLD for Application in Energy Storage System, SLAC workshop, May 1st 2015 Palo Alto, USA
18. Andrew Lushington, Design and Control of Lithium Battery Interfaces Through Atomic Layer Deposition and Molecular Layer Deposition, 5th ECS Montreal Student Symposium, June 5th 2015 Montreal, Canada

19. Andrew Lushington, Jian Liu, Yulong Liu, Mohammad Bannis, Craig Langford, Biwei Xiao, Stephen Lawes, Kaiqi Nie, Yifan Ye, Jinghua Guo and **Andy Xueliang Sun**, Designing and Tailoring Inorganic-Organic Films for Application in Lithium Storage Materials, ALD 2015, June 29th – July 1st 2015 Portland, USA

20. Jian Liu, Mohammad N. Banis, Biwei Xiao, Qian Sun, Ruying Li, Jinghua Guo, Tsun-Kong Sham, **Xueliang Sun**, Atomic layer deposition of sodium-containing anode and cathode materials for sodium-ion batteries, 15th International Conference on Atomic Layer Deposition, June 28-July 1, 2015 Portland, Oregon, USA (Oral)

21. Jian Liu, Mohammad N. Banis, Xia Li, Karthikeyan Kaliyappan, Biqiong Wang, Andrew Lushington, Xifei Li, Xiangbo Meng, Dongniu Wang, Ruying Li, Tsun-Kong Sham, **Xueliang Sun**, Atomic layer deposition technique to enable high-performance batteries for vehicular applications, CAMBR (Distinguished Lecturer and Materials & Biomaterials Research Showcase Day), April 27th, 2015 London, ON, Canada (Oral)

22. Mohammad N. Banis, Niancai Cheng, Qian Sun, Biwei Xiao, **Xueliang Sun**, Prof. T. K. Sham's Group, HXMA Beamline Scientists (Ning Chen, Weifeng Chen), Unraveling the Hidden Potential of Nanomaterials for Energy Storage and Conversion Systems by Hard-X-ray Absorption Spectroscopy, 10th Canadian Light Source open house and Partners in Science Festival , Saturday, June 27, 2015 Saskatoon, Canada (Poster)

23. Xia Li, Andrew Lushington, Jian Liu, Ruying Li, **Xueliang Sun,** Development of Atomic and Molecular Layer Deposition Coated Cathodes for Highly Stable Lithium-sulfur Batteries, CAMBR distinguished lecturer 2015, APRIL 27, 2015, LONDON, POSTER

24. Yulong Liu, Ruying Li, **Xueliang Sun**, Carbon coating on the surface of LiFePO4, APC kickoff meeting, May 4-6, 2015. Montreal, Canada (Oral)

25. Wei Xiao, Biqiong Wang, Mohammad Norouzi Banis, Dongniu Wang, Jiajun Wang, Jinli Yang, Jian Liu, Xia Li, Hossein Yadegari, **Xueliang Sun**, Tsun Kong Sham, Synchrotron-based X-ray characterizations for nanomaterials in advanced electrochemical energy storage and conversion systems, Canadian Light Sources 18th Annual Users Meeting , May 4 – 6, 2015. Saskatoon, SK, Canada (Poster)

26. Hossein Yadegari, Mohammad. Norouzi Banis, Qian Sun, Biwei Xiao, Xia Li, Andrew Lushington, Biqiong Wang, Ruying Li, Tsun Kong Sham, Xiaoyu Cui and **Andy X. Sun**, Chemical and Electrochemical Reaction Mechanisms of Sodium-Oxygen Batteries, Surface Canada 2015 & ECS Canada Section Meeting, May 19-22, 2015. University of Saskatchewan, Saskatoon, Saskatchewan, Canada (Oral)

27. Niancai Cheng, Adam Riese, Mohammed Banis, Jian Liu, Tsun-Kong Sham, Siyu Ye, Shanna Knights, **Xueliang Sun**, Design of High Performance Catalysts for Fuel cells Using Atomic Layer Deposition, 4th Annual CaRPE-FC Review Meeting , May 7 – 8, 2015. Vancouver, BC, Canada (Poster)

28. Stephen Lawes, Qian Sun, Andrew Lushington, Biwei Xiao, Yulong Liu, and **Xueliang Sun,** High performance inkjet-printed silicon anodes for Li-ion batteries, CAMBR Distinguished Lecturer and Materials & Biomaterials Research Showcase Day, April 27, 2015. London, Canada (Poster)

29. Biwei Xiao, Xifei Li, Jian Liu, Qian Sun, Mohammad Norouzi Banis, Karthikeyan Kalliyappan, Biqiong Wang, Zhiqiang Wang, Ruying Li, Xiaoyu Cui, T.-K Sham and **Xueliang Sun**, Advanced Surface/Sub-surface Engineering of Cathode Materials for Lithium Ion Batteries via Atomic Layer Deposition, CAMBR, April 27, 2015, London, ON, Canada (Poster)

30. Mohajerani, S., Bordatchev, E.V., and **Tutunea-Fatan, O.R.**, 2015, "Current State-of-the-Art in Modeling and Simulation of Laser Polishing Process," USB Proceedings of the 25th Canadian Congress of Applied Mechanics (CANCAM 2015), Jun. 2015, London, Canada, pp. 84-87.

31. Hussein, S., Hamilton, B., Bordatchev, E.V., and **Tutunea-Fatan, O.R.**, 2015, "Parameter-Driven Geometric Modeling of Retroreflective Features," USB Proceedings of the 25th Canadian Congress of Applied Mechanics (CANCAM 2015), Jun. 2015, London, Canada, pp. 96-99.

32. Hamilton, B., Hussein, S., **Tutunea-Fatan, O.R.**, and Bordatchev, E.V., 2015, "Strategies in Single Point Inverted Cutting for Fabrication of Structured Surfaces," USB Proceedings of the 25th Canadian Congress of Applied Mechanics (CANCAM 2015), Jun. 2015, London, Canada, pp. 108-111.

33. Kusins, J., **Tutunea-Fatan, O.R.**, Ferreira, L., 2015, "Experimental Apparatus for Analysis of Bone Removal During Surgical Resurfacing Procedures," USB Proceedings of the 25th Canadian Congress of Applied Mechanics (CANCAM 2015), Jun. 2015, London, Canada, pp. 230-233.

34. **Jun Yang**, "Design and Micro/Nano-Engineering of Functional Materials, Surfaces and Devices: from Fundamentals to Applications", Plenary lecture, 25th Canadian Congress of Applied Mechanics (CANCAM 2015), London, Ontario, Canada, May 31 – June 4, 2015.

35. Xiaobing Cai, **Jun Yang,** "Sound Absorption by Multilayer of Microperforated Membranes", Proceedings of the 25rd CANCAM, 2015.

36. Qiuquan Guo, Mingjun Hu, Xiaobing Cai and **Jun Yang**, "A Rapid Method for Preparation of Metal Coated 3D Printing Objects", Proceedings of the 25rd CANCAM, 2015.

37. Dongxing Zhang and **Jun Yang**, "Remote Manipulation of 3D Printed Complex Magnetic Architecture after Surface Modification", Proceedings of the 25rd CANCAM, 2015.

38. **Jun Yang** "New Developments of Atomic Force Microscopy for Characterizations of Properties and Functions of Nanomaterials", ASME 2014 IMECE (ASME 2014 International Mechanical Engineering Congress & Exposition), Nov. 14-20, 2014, Montreal, Canada.

39. Xiaobing Cai **and Jun Yang**"Optimization on microlattice materials for noise control", ASME 2014 IMECE (ASME 2014 International Mechanical Engineering Congress & Exposition), Nov. 14-20, 2014, Montreal, Canada.

40. **Jun Yang** i3DP, an Enabling 3D Printing Method for Generic Post-printing Surface/Material Modifications", ASME 2014 IMECE (ASME 2014 International Mechanical Engineering Congress & Exposition), Nov. 14-20, 2014, Montreal, Canada.

41. **Jun Yang** 'Electrically Conductive and Semiconductive Bacterial Nanowires: Fundamentals and Applications for Energy", ASME 2014 IMECE (ASME 2014 International Mechanical Engineering Congress & Exposition), Nov. 14-20, 2014, Montreal, Canada.

42. Qiuquan Guo, Xiaobing Cai, **Jun Yang** "Facile and Effective Phononic Structures for Ultrasound Focusing Application", ASME 2014 IMECE (ASME 2014 International Mechanical Engineering Congress & Exposition), Nov. 14-20, 2014, Montreal, Canada.

4. INVITED LECTURES/WORKSHOPS

J.M. Floryan

May 2015	Ecole Polytechnique, Montreal, Canada ("Use of Surface Roughness for Flow Control")
	Concordia University, Mechanical and Industrial Engineering, Canada ("Effects of Surface Topography on the Dynamics of Shear Layers and its Use for Flow Control").
April 2015	University of Waterloo, Applied Mathematics, Canada ("Use of Surface Roughness for Flow Modulations").
March 2015	University of Kentucky, USA ("Flow over Rough Surfaces")

February 2015	Carolina Coastal University, South Carolina, USA ("Flow over Surface Topography").
	McGill University, Dept. of Mechanical Engineering, Montreal, Quebec, Canada ("Flows over Rough Walls").
	Carleton University, Dept. of Mechanical and Aerospace Engineeering, Ottawa, Ontario, Canada ("Flows over Surface Topography").
November 2014	Warsaw University of Technology, Dept. of Aerospace and Power Engineering, Warsaw, Poland ("Effect of Distributed Surface Roughness on the Laminar-Turbulent Transition Process").
October 2014	Bombardier Aerospace, Montreal, Canada ("Effect of Distributed Surface Roughness on the Laminar-Turbulent Transition Process").
	University of Waterloo, Dept. of Mechanical and Mechatronics EDngineering, Waterloo, Canada ("Effect of Distributed Surface Roughness on the Laminar-Turbulent Transition Process").
September 2014	Faculdade de Engenharia Mecânica, UNICAMP, Campinas, Brasil ("Effect of Distributed Surface Roughness on the Laminar-Turbulent Transition Process").
	Laboratório de Matemática Aplicada e Computação Científica - LMACC/SME/ICMC-USP Av. do Trabalhador São-Carlense, Brasil ("Effect of Distributed Surface Roughness on the Laminar-Turbulent Transition Process").
September 2014	EMBRAER Aerospace, São José dos Campos, Brasil ("Effect of Distributed surface roughness on the Laminar-Turbulent Transition Process").
August 2014	Technical University of Denmark, Lyngby, Denmark ("Effect of Distributed Surface Roughness on the Laminar-Turbulent Transition Process").

M.D. Nash

May 2015	"Mechatronics for Clinical Applications", Bone and Joint Annual Research Retreat, London, ON,
October 2014	"Mechatronics for Clinical Applications", *Biomedical Engineering Research Day*, London, ON,

A.D. Price

May 2014	Smart material actuators and sensors, Session on Smart Technologies and Devices for Surgery & Rehab, Bone & Joint Retreat on Innovations in Musculoskeletal Health Research, May 6, 2015, London, ON
April 2014	Introduction to Smart Materials: Actuators, sensors and energy harvesting, Invited talk at General Dynamics Land Systems London, April 1, 2015, London, ON

E. Savory

December 2014	"Modelling of downbursts for wind engineering applications", Faculty of Engineering, Presented at UNAM, Mexico City, Mexico, December 2014.

X. Sun

June 2015	"Applications of Atomic Layer Deposition for Li ion Batteries and Fuel Cells", PNNL National Lab, USA, June 25, 2015.
	"Nanostructured Materials for Energy Storage and Conversion", Chengdu Green Energy Centre, June 15, 2015, Chengdu, China
	"Nanostructured Materials for Batteries", Chinese Academy Engineering Physics, June 14, 2015, Mianyang, China
	"Nanostructured Materials for Batteries and Fuel Cells", Suzhou University, June 10, 2015, Suzhou, China
	"Nanostructured Materials for Batteries and Fuel Cells", Tianjin University of Technology, June 8, 2015, Tianjin, China
May 2015	"Nanostructured Materials for Energy Storage and Conversion ", Xiamen University, May 1, 2015, Xiamen, China
March 2015	"How to Use Nanostructured Materials for Energy Storage and Conversion ", CAMET Canada National Lab, March 10, 2015, Hamilton, Canada.
	“Na-Air batteries: understanding of Chemistry and Rechargeability” 2015 TMS Annual Meeting & Exhibition, Orlando, March 15-19, 2015.
January 2015	"Design of Surface and Interface of Electrodes for High-Performance Li Ion Batteries", International Battery Association and Pacific Power Source Symposium Joint Meeting 2015, Jan. 5-9, 2015, Hawaii
November 2014	"Applications of Atomic Layer Deposition for Li ion Batteries and Fuel Cells", AVS 61th conference, Maryland, Baltimore, USA, Nov. 9-14, 2014.
	"Design of Surface and Interface of Electrodes for High-Performance Li Ion Batteries", Energy Workshop, Henan University, Henan, China, Nov. 4-7, 2014.
October 2014	"Nanostructured Materials for Energy Storage and Conversion", University of Ontario Institute of Technology, Oshawa, Ontario, Oct. 4th, 2014. (departmental seminar)
	Co-Chair organizing the conference and Keynote talk on "Surface Engineering of Electrode Materials for Li ion Batteries", 1st International Electrochemical Energy and Materials Science and Technology, Shanghai, China, Oct. 31-Nov. 4, 2014.
	"Rational Design of Surface of Cathode Materials for Highly Stable Li Ion Batteries", 9th International Conference of Batteries for Electric Vehicles, Fujian, China, Oct. 25-27, 2014.
July 2014	"Surface Interactions of LiFePO4 for Li ion Batteries", International conference of Solid Ion, Baotou, China, July 20-25, 2014.

J. Yang

June 2015	“The Next Wave of Additive Manufacturing for the Upcoming Industrial Revolution”, IEEE Toronto Chapter, Toronto, June 10, 2015
May 2015	“Design and Micro/Nano-Engineering of Functional Materials, Surfaces and Devices: from Fundamentals to Applications”, Plenary lecture, 25th Canadian Congress of Applied Mechanics (CANCAM 2015), London, Ontario, Canada, May 31 – June 4, 2015.

	'Nanostructured SPR and SERS Optical Sensors: From Lab-on-a-chip to Lab-on-a-tip Sensing", Shanxi University, Taiyuan, Shanxi, China, May 19, 2015.
	i3DP approach adds a new dimension to 3D printing", Sichuan University, Sichuan, China May 18, 2015.
	"The Next Wave of Additive Manufacturing", Harbin Institute of Technology Shenzhen Graduate School, Shenzhen, China, May 6, 2015.
April 2015	"i3DP, an enabling method extends 3D printing to 4D printing", Beijing Institute of Technology, Beijing, China, April 27, 2015.
November 2014	"Engineering Micro/nanostructured Hierarchical Materials, Surfaces and Devices for Fundamental and Applied Research", the Institut National de la Recherche Scientifique (INRS) Montreal, Canada, Nov. 18, 2014.
	"New Developments of Atomic Force Microscopy for Characterizations of Properties and Functions of Nanomaterials", ASME 2014 IMECE (ASME 2014 International Mechanical Engineering Congress & Exposition), Nov. 14-20, 2014, Montreal, Canada.
October 2014	"When Nanotechnology Meets Biology: from Fundamental to Applied Research", The University of Science and Technology Beijing, October 20, 2014, Beijing, China

5. TECHNICAL REPORTS

K. Siddiqui

Kornas, C. and Siddiqui, K. "Development of an air-fuel control system for effervescent atomization fuel injector". Technical Report for NRC, March 2015.

J. Yang

A number of technical reports about collaborative projects have been submitted to supporting companies.

6. BOOKS AND BOOK CHAPTERS

Kurowski, P. "Engineering Analysis with SOLIDWORKS Simulation 2015" SDC Publications, ISBN: 978-1-58503-933-3

Kurowski, P. "Vibration Analysis with SOLIDWORKS Simulation 2015" SDC Publications, ISBN: 978-1-58503-938-8

Kurowski, P. "Thermal Analysis with SOLIDWORKS Simulation 2015" SDC Publications, ISBN: 978-1-58503-939-5

7. PATENTS

L. Ferreira: Navigation by Bending Forces. US Provisional Granted. Serial Number 61/110,935. Filing Date: 2015-02-02.

L. Ferreira: Long Stem Implant Extractor. US Provisional Granted. Serial Number 61/ 135,175. Filing Date: 2015-03-19.

Polihronov, J. G., **Straatman, A. G.**, "Mechanism for enhanced energy extraction and cooling of pressurized gas at low flow rates," Continuation in part (CIP) to patent number 1018P011US01, April 2015.

A method for Mass Production of Silicon Nanowires and/or Nanobelts, and Lithium Batteries and Anode using the Silicon Nanowires and/or Nanobelts. International Application Application Published Under The Patent Cooperation Treaty (PCT). WO2105/051442A1 **X. Sun**, H. Yu, X. Li, R. Li, Q. Yang.

Jun Yang, Xiaolong Wang, Xiaobing Cai, Qiuquan Guo, "Surface modification of printed objects", US patent and Canadian patent.

PROFESSIONAL SERVICES

L. Ferreira

Manuscript Reviews for the following Journals:
- Journal of Biomechanics (1 manuscript review)
- Journal of Biomechanical Engineering (1 manuscript review)
- Journal of Shoulder and Elbow Surgery (1 manuscript review)

K. Siddiqui

Chair of Thermo-fluids Technical Committee, Canadian Society for Mechanical Engineering (CSME)

Organizer of the Symposium of Turbulent Flows at the 4th Joint US-European Fluids Engineering Summer Conference, Chicago, August 3-7, 2014.

1.REVIEW OF REFEREED JOURNALS AND BOOK CHAPTERS

S. Asokanthan

International Journal of Nonlinear Mechanics
Nonlinear Dynamics

R.O. Buchal

Reviewed 8 abstracts for the 2015 Canadian Engineering Education Association Conference, Hamilton ON, May 31 – June 3, 2015.

L. Jiang

IEEE Transactions on Nanotechnology
International Journal of Applied Mechanics
Journal of Applied Physics
ASME Journal of Applied Mechanics
Shock and Vibration
Acta Mechanica Sinica
Composites Science and Technology
Journal of Mechanical Science and Technology
Nanoscale; Physica E
International Journal for Applied Electromagnetics and Mechanics
Proceedings of the Royal Society A
International Journal of Non-linear Mechanics.

R. Klassen

Journal of Nuclear Materials

G. Knopf

International Standards Organization (ISO) - Member of the Standards Council of Canada advisory committee (CAC) on *Robots for Manufacturing Environment* (TC184/SC2)

NSERC Research Tools and Instruments (RTI) Grants – Committee member (2014, 2015)

Associate Editor of Refereed Journals

International Journal of Control and Intelligent Systems (Editor: C. de Silva, UBC),
International Journal of Optomechatronics (Editor: H.-S. Cho, KIAST)

Book Reviews (Proposal and/or Complete Text)

Taylor and Francis, CRC Press (2014, 2015)

Reviewer of Refereed Journals (multiple papers reviewed for some journals)

Biosensors and Bioelectronics
Computer Aided Design
IEEE Sensors Journal
International Journal of Advanced Manufacturing Technology
Journal of Biomedical Optics
Journal of Computational and Applied Mathematics
Journal of Physics: Condensed Matter
Optical Engineering
Sensors and Actuators: B Chemical

T. Kuboki

1 journal paper (Journal of Natural Fibers)
1 journal paper (Journal of Polymer Engineering)
3 journal papers (Polymer Composites)
1 journal paper (Composites Science and Technology)
2 conference papers (25th Canadian Congress of Applied Mechanics)

M.D. Naish

IEEE Transactions on Biomedical Engineering
IEEE Transactions on Robotics
Journal of Engineering in Medicine

E. Savory

Reviewer of numerous papers for:
Journal of Wind Engineering and Industrial Aerodynamics
Wind and Structures, Atmospheric Environment
Building and Environment
Boundary Layer Meteorology
Journal of Turbulence
Experiments in Fluids.

K. Siddiqui

Solar Energy

A.G. Straatman

Journal of Fluid Mechanics
International Journal of Heat and Fluid Flow
International Journal of Heat and Mass Transfer Energy
International Journal for Numerical Methods in Fluids
Thermal Sciences

X. Sun

Review about 40-50 research papers for these scientific journals: Referee for various scientific journals such as
Nature Nanotechnolog
Nature Communications
Nature Materials
Journal of American Chemical Society
Adv. Materials
ACS Nano, "Angewandte Chemie International Edition
Nanotechnology, Materials of Chemistry
J. Phys. Chem.
Electrochemistry Communication
Electrochemical Solid-State Letter
Appl. Phys. Lett.
Carbon
Langumir, etc.

Associate editor, Editorial Board of Journal of Frontier on Energy Storage, 2013-
Member, Editorial Board of Journal of ISRN Nanomaterials, 2012-
Member, Editorial Board, Journal of Material Sciences & Engineering, 2011-present
Vice President, The International Academy of Electrochemical Energy Science (IAOEES)

BOOK EDITING:“Advanced Materials and Technologies for Electrochemical Energy”, Co-edited by:Pei-Kang Shen, Chao-Yang Wang, **Xueliang Sun,** San-Ping Jiang, and Jiujun Zhang, Published by CRC Publisher in Book Series of Electrochemical Energy Storage and Conversion, 2015.

Dongsheng Geng and **Xueliang Sun**, “Doped graphene as electrocatalysts for oxygen reduction reaction”, in a book of “Nanocarbons for Advanced Energy Conversion”, Edited by Xinliang Feng, published by Wiley-VCH in Weinheim, Germany, 2015.

Xifei Li and **Xueliang Sun**, “Recent Progresses in Understanding of Lithium Storage Behavior of Graphene Nanosheet Anode for Lithium Ion Batteries”, Dr. Edited by Z.A. Niknam, Graphene Science Handbook - CRC press. 2015

Hossein Yadegari and **Xueliang Sun**, “Advanced materials for Li-Air rechargeable batteries”, in a book of “Advanced Materials and Technologies for Electrochemical Energy”, Co-edited by:Pei-Kang Shen, Chao-Yang Wang, Xueliang Sun, San-Ping Jiang, and Jiujun Zhang, Published by CRC Publisher in Book Series of Electrochemical Energy Storage and Conversion, 2015.

Yongliang Li, Hossein Yadegari, Jianhong Liu, **Xueliang Sun**, “Advanced Materials for Na-air Batteries”, in a book of “Advanced Materials and Technologies for Electrochemical Energy”, Co-edited by:Pei-Kang Shen, Chao-Yang Wang, Xueliang Sun, San-Ping Jiang, and Jiujun Zhang, Published by CRC Publisher in Book Series of Electrochemical Energy Storage and Conversion, 2015.

Qizheng Li and **Xueliang Sun**, “Advanced technologies for Li-ion rechargeable batteries”, in a book of “Advanced Materials and Technologies for Electrochemical Energy”, Co-edited by:Pei-Kang Shen, Chao-Yang Wang, Xueliang Sun, San-Ping Jiang, and Jiujun Zhang, Published by CRC Publisher in Book Series of Electrochemical Energy Storage and Conversion, 20145

O.R. Tutunea-Fatan

Proceeding of the Journal of Engineering Manufacture
Mechanics and Industry
International Journal of Production Research
Medical & Biological Engineering & Computing
International Journal of Advanced Manufacturing Technology
Computer-Aided Design and Applications
Computer-Aided Design
Machining Science and Technology
International Journal of Machine Tools and Manufacture
Journal of Materials Processing Technology
International Journal of Mechanical Sciences.

J. Yang

Review more than 20 research papers per year for these scientific journals:
Nature Nanotechnology
Advanced Materials
ACS Nano
ACS Applied Materials & Interfaces
Lab on a Chip
Applied Physics Letter
Nanotechnology
Journal of Micromechanics and Microengineering
IEEE Transactions on Industrial Electronics
IEEE Transactions on Nanotechnology
ACS Advances
Langmuir
The Journal of Physical Chemistry
Journal of Applied Physics; Sensors & Actuators: B. Chemical
Biomedical Materials
Soft Matter
Chemical Communications
Organic Electronics
Chemistry of Materials
Environmental Science & Technology

C. Zhang

Reviewer for Engineering Computations
Reviewer for Computer and Fluids
Reviewer for International Journal of Heat and Mass Transfer
Reviewer for Powder Technology

2. REVIEW OF GRANT APPLICATIONS

S. Asokanthan

NSERC Discovery Grant

R.O. Buchal

NSERC Discovery Grant application

L. Ferreira

NSERC Discovery (1 review)

Grant Application Reviews:

Lawson Health Research Institute, Internal Research Fund (Fall 2013 Competition) Nov 25, 2013.
Primary reviewer for two applications and secondary reviewer for two applications.
Lawson Health Research Institute, Internal Research Fund (Fall 2013 Competition) June 9, 2014. Primary reviewer for three applications.
Joint Motion Program: CIHR Training Program in Musculoskeletal Health and Leadership. Summer Studentship Funding applications review committee. April 2013.
Joint Motion Program: CIHR Training Program in Musculoskeletal Health and Leadership. Summer Studentship Funding applications review committee. Primary reviewer for one application and secondary reviewer for three applications. April 2014.

L. Jiang

NSERC Discovery Grant review (1 application)
Proposal review for Manitoba Medical Service Foundation (1 application)
Proposal review for Israel Science Foundation (1 application)
Mitacs Elevate proposal review (1 application).

G. Knopf

Reviewer of Grant Applications

Canada Research Chair (Tier II, Tier I) – **Canada** (2014, 2015)
Ministry of Science, Technology and Space - **Israel** (2015)
Natural Sciences and Engineering Research Council (Strategic Grants) – **Canada** (2014, 2015)
NSERC Discovery Grant – **Canada** (2014, 2015)
Romanian Executive Agency for Higher Education, Research, Development and Innovation Funding (UEFISCDI) **- Romania** (2014, 2015)

M.D. Naish

NSERC Discovery Grants
MITACS Accelerate

E. Savory

NSERC

K. Siddiqui

ORF-RE Grant
NSERC Discovery Grant
NSERC CRD Grant
MITACS Elevate Grant

A.G. Straatman

NSERC Discovery grant applications (2)

X. Sun

NSERC Strategic
CRD I2I
Discovery
CFI
OCE
ORF

J. Yang

Serve on NSERC-CIHR CHRP program Grant Selection Committee

Review
NSERC Discovery grant applications
NSERC Strategic grant applications
NSERC CRD grant applications
NSERC I2I applications
NSERC-CIHR CHRP applications

Review grant applications for funding agency of other countries
The Terry Fox Foundation
Khalifa University Internal Research Fund

C. Zhang

External Grant Reviewer: MITACS, NSERC