CSME-CFDSC Congress 2019
Joint Congress of the Canadian Society for Mechanical Engineering and CFD Society of Canada

Congress Program

Western University, London, ON, June 2-5, 2019

Department of Mechanical and Materials Engineering
# PROGRAM AT GLANCE

## June 2, 2019 (Sunday)
- **4:00 PM - 7:00 PM**
  - Registration and Welcome Reception (Amit Chakma Engineering Building Atrium)

## June 3, 2019 (Monday)
- **8:00 AM - 4:00 PM**
  - Conference Registration (Amit Chakma Engineering Building Atrium)
  - **8:30 AM - 9:30 AM**
    - Plenary Session (Ivey BMO Auditorium): "Artificial Knees: Can They Benefit from New Technologies?"  
      - Peter Walker (New York University)

## June 4, 2019 (Tuesday)
- **8:00 AM - 4:00 PM**
  - Conference Registration (Amit Chakma Engineering Building Atrium)
  - **8:30 AM - 9:30 AM**
    - Plenary Session (Ivey BMO Auditorium): "Advances in Numerical Modelling of Flow, Heat, and Mass Transfer in Heterogeneous Media"
      - Marcelo de Lemos (Instituto Tecnológico de Aeronáutica)

## June 5, 2019 (Wednesday)
- **8:30 AM - 9:30 AM**
  - Plenary Session (Ivey BMO Auditorium): "Resilient Manufacturing System"

## June 6, 2019 (Thursday)
- **8:30 AM - 9:30 AM**
  - Plenary Session (Ivey BMO Auditorium): "Advanced Materials for Energy Storage and Conversion: From Nano Scale to Single Atoms"

## Coffee Break (Amit Chakma Engineering Building Atrium)

### Technical Sessions (CSME Track)

<table>
<thead>
<tr>
<th>Time</th>
<th>Session A-1</th>
<th>Session B-1</th>
<th>Session C-1</th>
<th>Session D-1</th>
<th>Session E-1</th>
<th>Session F-1</th>
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<td>ACEB 1410</td>
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<td>12:15 PM</td>
<td>Session L-1 Large Eddy Simulation</td>
<td>Session M-1 Free Surface Flows</td>
<td>Session N-1 Heat and Mass Transfer I</td>
<td>Session O-1 Applications I</td>
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### Technical Sessions (CFDSC Track)

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<tr>
<th>Time</th>
<th>Session L-2 Algorithms</th>
<th>Session M-2 Environmental Flows</th>
<th>Session N-2 Heat and Mass Transfer II</th>
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<tr>
<td>12:15 PM</td>
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### Lunch (Amit Chakma Engineering Building Atrium)
- **1:00 PM - 2:00 PM**
  - Coffee Break (Amit Chakma Engineering Building Atrium)
  - Session A-2 Advanced Manufacturing I
  - Session B-2 Advanced Energy Systems II
  - Session C-2 Additive Manufacturing I
  - Session D-2 Biomedical Engineering II
  - Session E-2 Energy Materials II
  - Session F-2 Fluid Mechanics II
  - Session G-2 Heat Transfer I
  - Session H-2 Micro-Nano-Technologies II
  - Session J-2 Materials Engineering II
  - Session K-2 Solid Mechanics II

### Plenary Session (Ivey BMO Auditorium): "Petascale SuperCell Thunderstorm Simulations and New Hypothesis for Tornado Formation and Maintenance"
- Leigh Orf (University of Wisconsin)

### Lunch (Amit Chakma Engineering Building Atrium)
- **12:15 PM - 1:00 PM**

### Congress Banquet (Great Hall, Somerville House), Cash Bar (5:30 PM - 6:00 PM)
- **5:30 PM - 6:00 PM**
  - Registration and Welcome Reception (Amit Chakma Engineering Building Atrium)

## End of the CSME-CFDSC Congress 2019
Welcome to the 2019 CSME International Congress. The Congress is hosted by the Department of Mechanical and Materials Engineering at the Western University. We have the privilege to host the CSME Congress again after 15 years. We are very pleased to co-host this year’s Congress with the CFD Society of Canada. This joint Congress provides a unique opportunity to bring researchers and students whose interests align with both societies to a common platform that facilitates the dissemination of results from cutting-edge research as well as networking opportunities among academia, government agencies and industry. We hope that this joint Congress will further strengthen the ties between the two societies.

This two and a half day Congress has an extensive technical program featuring plenary lectures from internationally-recognized distinguished speakers, technical symposia, CSME Student Paper Competition, CSME Student Design Competition, NSERC Workshop on grants and scholarships, Annual General Meeting of the CSME Board, meetings of various Technical Committees of CSME and tours of various state-of-the-art research facilities.

CSME is sponsoring three of the five plenary lectures covering a broad range of mechanical engineering topics. Dr. Peter Walker, Professor at the New York University in the area of Biomechanics will speak about the recent advancements in artificial knees. Dr. Andy Sun, Professor at the Western University in the area of Nano-materials will talk about novel applications of Nano-materials for energy storage. Dr. Ruxu Du, Professor at South China University of Technology in the area of Advanced Manufacturing will talk about a new idea of resilient manufacturing.

The CSME Congress has 17 technical symposia covering all key areas in the mechanical engineering discipline. These symposia are comprised of 282 technical presentations including eight Keynote presentations, all run in 10 parallel sessions. The Congress has also organized tours of various state-of-the-art research facilities at Western and collaborating institutes including Fraunhofer Project Centre, the WindEEE Dome, the Boundary Layer Wind Tunnel, National Research Council, Canadian Centre for Product Validation, Wolf Orthopedic Biomechanics Lab and Energy Materials Lab.

A large number of CSME-CFDSC Congress participants are also attending the co-located Industry 4.0 Symposium. This symposium provides an opportunity to learn about new trends in Industry 4.0, and meet and network with relevant academic and industry people.

I would like to thank all individuals who have contributed to the organization of the Congress, especially, the members of the Congress Organizing Committee, Western Conference Services, symposia organizers, student volunteers and session chairs.

We also gratefully acknowledge the generous sponsorships from the Faculty of Engineering, Western University, High Speed Imaging, FLIR, Delta Photonics, Bombardier and Canadian Science Publishing.

I hope you have a great time at the Congress

Kamran Siddiqui
2019 CSME Congress Chair
On behalf of the Computational Fluid Dynamics Society of Canada (CFDSC), we welcome you to the 2019 Joint Congress of the Canadian Society for Mechanical Engineering and the CFD Society of Canada. This is the 27th Annual Conference of the CFDSC and marks the second time that the event has been hosted by Western University. Much of the event will be hosted within the newly-opened Amit Chakma Engineering Building, which is pursuing LEED® Platinum Certification for its sustainable design. A number of tours have been organized to showcase the state-of-the-art facilities at Western, including the Fraunhofer Project Centre, the WindEEE Dome, and the Boundary Layer Wind Tunnel. We are excited for all of the conference participants to experience and enjoy the picturesque Western campus and all of its facilities.

We are very pleased to have had the opportunity to co-locate our conference with that of the Canadian Society for Mechanical Engineering (CSME). By combining the strengths of our two distinct events, we believe that we have created a technical program for the Joint Congress that is greater than the sum of its parts. We hope that this event will help foster further collaboration between the two Societies.

The Joint Congress features five plenary lectures from internationally-recognized distinguished speakers. The CFDSC speakers include Leigh Orf (University of Wisconsin) and Marcelo de Lemos (Instituto Tecnológico de Aeronáutica, Brazil). Dr. Orf will speak on his recent work involving petascale simulations of supercell thunderstorms and will discuss his latest hypothesis for tornado formation and their maintenance. Dr. de Lemos will be speaking about recent advances that have been made by his research group in numerical modelling of flow, heat, and mass transfer in heterogenous media. Both of these plenary lectures, as well as the three CSME-themes lectures, are sure to be fascinating. The CFDSC technical program includes 16 symposia with a total of 83 presentations from CFD researchers in all parts of Canada, as well as several other countries around the world. Additionally, we will feature several undergraduate posters and three-minute thesis talks.

We gratefully acknowledge the sponsors of the conference, including Bombardier, Delta Photonics, High Speed Imaging Inc., FLIR, Canadian Science Publishing and Western Engineering. Additionally, we thank all of the volunteers, session chairs, and the scientific committee for helping to make this event a success.

Sincerely,

Chris DeGroot
Co-Chair, CFDSC 2019 Conference

Chao Zhang
Co-Chair, CFDSC 2019 Conference
Congress Organizing Committee

Kamran Siddiqui  
Chair  
CSME International Congress and Technical Program  
Western University

Christopher DeGroot  
Co-Chair  
CFDSC Annual Conference  
Western University

Chao Zhang  
Co-Chair  
CFDSC Annual Conference  
Western University

Ryan Willing  
Communications Chair  
Western University

Liying Jiang  
Publications Chair  
Western University

Remus Tutunea-Fatan  
Exhibitions Chair  
Western University
Plenary Speaker (Sponsored by CSME and Western’s Bone & Joint Institute)

Artificial Knees: Can They Benefit from New Technologies?

Peter S. Walker, PhD
Professor, New York University Langone Orthopaedic Hospital
Director, Laboratory for Orthopaedic Implant Design
Professor, Dept. of Mechanical & Aerospace Engineering, New York University

ABSTRACT
The volume of total knee replacements in North America has reached about 700,000 per year and several billion dollars. The early designs of total knee were produced in the 1970's based on collaboration between surgeons and bioengineers, with companies providing the manufacturing technology. The basic engineering principles of the laxity and stability, the kinematics, the fixation of the components to the bone, and the factors affecting wear, were developed in parallel. Since 1980, there has been an ever-increasing amount of research and clinical evaluations, including new design concepts, but 90% of the total knees used by surgeons today are still of two types designed in the 1970's, the posterior cruciate-retaining and the posterior-stabilized designs. The main application of the research since then has mainly been directed to refinements with the result that survivorship has reached a level of around 90 percent at 20 years. Since about the year 2000, a computer-assisted approach has produced several methods for improving the accuracy and consistency of the surgical technique, yet the uptake has been only around 10 percent. An important question today is to what extent technology can further improve the treatment of the arthritic knee and in what ways bioengineers can have a significant further impact. Two areas will be discussed as possible approaches. The first is to develop new methodologies for evaluating the performance of total knees in a way which will identify the optimal result achievable for each individual patient. The second is to formulate implant designs, manufacturing technologies, and surgical techniques, which will deliver those optimal results on an individual basis at a cost affordable to the health care system.

BIOGRAPHY
Dr. Peter Walker has completed a PhD at the University of Leeds. Since then he has been an active participant in the field of biomechanics of joints and the design of joint replacements, with a major emphasis on the knee. He has collaborated with surgeons and bioengineers at renowned institutions, including the Hospital for Special Surgery, Howmedica (Stryker), Brigham & Women’s Hospital, Royal National Orthopaedic Hospital, University College London, and currently at New York University Langone Orthopaedic Hospital. He has co-authored over 300 articles with almost 12,000 citations. The basic research has contributed to innovative ideas for total knee design, while many of the test machines and methodologies have been emulated by other labs. Dr. Walker has been a co-designer of several successful total knee systems, the most notable being the Total Condylar, Graduated Knee System, Kinematic & Kinemax, Smiles Bone Tumor System, NexGen and Persona. In 2018, Dr. Walker was chosen as the recipient of the Lifetime Achievement award by The Knee Society, a high honor only given every two years.

Monday, June 3rd (8:30 am – 9:30 am), Ivey BMO Auditorium
Plenary Speaker (Sponsored by CSME)

Advanced Materials for Energy Storage and Conversion: From Nano Scale to Single Atoms

Andy (Xueliang) Sun, PhD
Professor and Canada Research Chair (Tier I)
Department of Mechanical and Materials Engineering
Western University

ABSTRACT
In this talk, Dr. Sun will talk about application of nanotechnology such as atomic layer deposition (ALD) to address challenges in both lithium ion batteries and low temperature fuel cells. The advanced rechargeable batteries have attracted intensive research attention as one promising solution to solve the global energy and environment problems due to high energy density and long working life. A few successful examples from his work will be given including lithium-sulfur (Li-S) batteries, alkali metal-oxygen (Li-O2, Na-O2) batteries and all-solid-state batteries. In addition, fuel cells still have challenges ahead which are hindering the market implementation of low temperature fuel cell technology, mainly high cost of materials and the durability during fuel cell life-time operation. The high cost is primarily associated with precious metal catalysts (Pt or Pt alloys). His group used ALD to control the size of Pt down to single Pt atom catalysts. Dr. Sun will also discuss some future perspectives.

BIOGRAPHY
Dr. Andy (Xueliang) Sun is a Professor and senior Canada Research Chair (Tier I) for the development of nanomaterials for clean energy, at the Western University. Dr. Sun received his Ph.D degree in Materials Chemistry at the University of Manchester, UK, in 1999. Dr. Sun's research is focused on advanced nanostructured materials for energy conversion and storage including fuel cells and Li batteries. Dr. Sun was named as Web of Science "Highly Cited Researchers" in 2018 by Clarivate Analytics. Dr. Sun is an author and co-author of over 370 refereed-journals with citations of over 20,000 times and H-index of 72. He edited 3 books and published 16 book chapters as well as filed 18 US patents. Dr. Sun is actively collaborating with industries and government labs such as Ballard Power Systems, General Motors, Lithium Phostech Inc., 3M, and GLABAT Solid-State Battery Inc. He also serves as an Editor-in-Chief of “Electrochemical Energy Review” under Spring-Nature and an Associate Editor for Frontier of Energy Storage (2013-present). Dr. Sun received various awards such as Early Researcher Award, Canada Research Chair, University Faculty Scholar Award, Western Engineering Prize for Achievement in Research, Fellow of Royal Society of Canada, Fellow of the Canadian Academy of Engineering, Professional Achievement Awards from Cross-cultural Professionals Association of Canada, Award for Research Excellence in Materials Chemistry Winner from Canada Chemistry Society and Award of Merit of the Federation of Chinese Canadian Professionals.

Tuesday, June 4th (1:00 pm – 2:00 pm), Ivey BMO Auditorium
Resilient Manufacturing System

ABSTRACT
In the past two years, the world’s manufacturing environment has been completely changed from in-favor of globalization to that of nationalization. As a result, companies large or small will have to face ever increasing government regulation, resources restriction and market limitation. To survive such a harsh environment, companies will have to make their manufacturing system resilient. In this talk, we introduced the idea of resilient manufacturing system. It consists of four parts: (1) Product design and optimization, (2) Manufacturing system modeling and optimization, (3) Advanced manufacturing methods, and (4) Market and supply-chain management. The talk includes a couple of examples, which demonstrates the uses of reconfigurable machines and buffers as well as prioritizing resources can improve the resilience of manufacturing systems.

BIOGRAPHY
Dr. Ruxu Du has received his Ph.D. degree from the University of Michigan in 1989. He has taught at the University of Windsor, in Windsor, Ontario, Canada, the University of Miami, in Coral Gables, Florida, USA, and the Chinese University of Hong Kong, in Hong Kong SAR. He has built several institutes, including the Institute of Precision Engineering of in the Chinese University of Hong Kong, and Guangzhou Chinese Academy of Sciences Institute of Advanced Technology. Currently, he is a Professor and the founding Dean of S. M. Wu School of Intelligent Engineering in the South China University of Technology. His area of research include: design and manufacturing, as well as robotics and automation. He has published over 450 papers in various academic journals and international conferences. He is the associate editor / the members of editorial board of six international journals. He has received a number of awards including Fellow of Canadian Academy of Engineering; Fellow of SME (Society of Manufacturing Engineers); Fellow of ASME (Society of American Mechanical Engineers); Fellow of HKIE (Hong Kong Institute of Engineers).

Wednesday, June 5th (8:30 am – 9:30 am), Ivey BMO Auditorium
**ABSTRACT**

Each year tornadoes wreak devastation throughout the world. The United States experiences the highest frequency of thunderstorms that produce the strongest tornadoes, those ranked EF4 and EF5 on the Enhanced Fujita scale. Leigh Orf's current research focuses on the nature of these violently tornadic supercell thunderstorms primarily through the use of high resolution numerical modeling and visualization. In this presentation he will report on recent simulations of supercell thunderstorms conducted on the Blue Waters supercomputer, at up to 10 meter isotropic grid spacing. Simulations include violently tornadic supercells in two different environments based upon observations where real tornadoes formed. A new hypothesis for tornado formation and maintenance will be presented. In addition to presenting animations of highly resolved thunderstorms, the software and technology behind the simulations will be explained, with some discussion about the use of physical cloud models in wind engineering research.

**BIOGRAPHY**

Dr. Leigh Orf is an atmospheric scientist at the Cooperative Institute for Meteorological Satellite Studies at the University of Wisconsin. Leigh received his PhD in 1997 at the University of Wisconsin and was faculty at the University of North Carolina - Asheville and Central Michigan University before returning to the UW in 2015. His research focuses on the dangerous winds that occur in thunderstorms, primarily through the use of numerical models run on supercomputers to simulate entire thunderstorm clouds and their surrounding environment. He is primarily interested in the processes involved in the formation of downbursts and the genesis and maintenance of tornadoes. He has developed routines to manage and visualize, with very high fidelity, the tremendous of data produced in these simulations to provide new insight into the most dangerous storms.

**Monday, June 3\(^{rd}\) (1:00 pm – 2:00 pm), Ivey BMO Auditorium**
Plenary Presentation (Sponsored by CFDSC)

Advances in Numerical Modelling of Flow, Heat, and Mass Transfer in Heterogeneous Media

Marcelo J.S. de Lemos, PhD, FASME
Professor
Departamento de Energia – IEME
Instituto Tecnológico de Aeronáutica – ITA
São José dos Campos, Brazil

ABSTRACT
Engineering and natural systems of practical relevance can be modelled as a porous structure through which a working fluid permeates. Engineering equipment design and environmental impact analyses can benefit from appropriate modeling of turbulent flow in permeable media. Turbulence models proposed for such heterogeneous media depend on the order of application of time and volume average operators. Two developed methodologies, following the two orders of integration, lead to different governing equations for the statistical quantities. This lecture reviews recently published methodologies to mathematically characterize turbulent transport in porous media. The concept of double-decomposition is discussed and models are classified in terms of the order of application of time and volume averaging operators, among other peculiarities. Thermal non-equilibrium between phases is discussed. For hybrid media, involving both a porous structure and a clear flow region, difficulties arise due to the proper mathematical treatment given at the interface. This lecture discusses numerical solutions for such hybrid medium. In addition, macroscopic forms of buoyancy terms are presented for both mean and turbulent fields. Cases reviewed include heat transfer in porous enclosures, cavities partially filled with porous material, moving bed systems, combustion in porous burners and double-diffusion effects in porous media.

BIOGRAPHY
Prof. de Lemos has obtained his PhD degree from Purdue University, USA. He spent a year as Assistant Professor at PUC-RJ in 1984, followed by two years as Resident Associate at Argonne National Laboratory, Illinois. In 1986, he joined the Aeronautical Institute of Technology -ITA in São José dos Campos, Brazil. He is Full Professor at ITA, founder and head of the Computational Transport Phenomena Laboratory -LCFT and the newly established Competence Center for Energy – CCE. He also serves as Head of the Department of Energy. Prof. de Lemos has set a new mathematical framework for novel treatment of turbulent flow, heat, and mass transfer through permeable media. He has published more than 370 articles in conference proceedings and journals in addition to ten book chapters and five books. He is member of the Honorary Editorial Advisory Boards of Int. J. Heat & Mass Transfer and Int. Comm. Heat & Mass Transfer, member of the Editorial Advisory Board of J. Porous Media and Editorial Board Member of Int. J. Dynamics of Fluids and Int. J. Applied Engineering Research. He has coordinated several joint research projects with DLR and Uni-Erlangen, Germany, and has delivered seminar lectures in Brazil, USA, Portugal, Tunis, Lebanon, Italy, France, Germany, South Korea, Romania, UAE and Japan. He is Consultant to Brazilian Education Ministry (CAPES), Brazilian National Research Council (CNPq) and São Paulo State Research Foundation (FAPESP). Prof. de Lemos is the Fellow of American Society of Mechanical Engineers –ASME.

Tuesday, June 4th (8:30 am – 9:30 am), Ivey BMO Auditorium
Organizational and Technical Committee Meetings

Monday, June 3rd

- Meeting of Chairs/Heads of Mechanical Engineering Departments at Canadian Universities (By invitation only)
  - 9:30 am – 2:00 pm, Room: ACEB 4405

- CSME Technical Committees’ meetings (12:15 pm – 1:00 pm)
  - Advanced Energy Systems (Room: ACEB 2440)
  - Advanced Manufacturing (Room: ACEB 1410)
  - Biomechanics and Biomedical Engineering (Room: ACEB 1420)
  - Environmental Engineering (Room: SEB 1056)
  - Fluid Mechanics (Room: ACEB 1415)
  - Materials Technology (Room: SEB 2099)
  - Transportation Systems (Room: ACEB 2435)

- Meeting of the Editor and Associate Editors of CSME-Transactions (By invitation only)
  - 2:00 pm – 4:00 pm, Room: ACEB 4405

Tuesday June 4th

- 166th CSME (Outgoing) Board of Directors Meeting (By invitation only)
  - 8:30 am – 1:00 pm (Room: ACEB 4405)

- 167th CSME AGM / Board of Directors Meeting (Open to CSME members),
  - 1:30 pm – 2:00 pm (Room: ACEB 4405)

- 168th CSM (Incoming) Board of Directors Meeting (By invitation only)
  - 2:00 pm – 4:00 pm (Room: ACEB 4405)

- CFDSC Annual General Meeting
  - 1:00 pm – 2:00 pm (Room: ACEB 1410)

Wednesday June 5th

- CSME Student Chapters Workshop (By invitation only)
  - 9:00 am – 12:00 pm (Room ACEB 4405)
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<td>Session Chair: Alex Czeksinski</td>
<td>Session Chair: Xianguo Li</td>
<td>Session Chair: Ali Ahmadi</td>
<td>Session Chair: George Knoop</td>
<td>Session Chair: Yang Zhao</td>
<td>Session Chair: Syeda Tasnim</td>
<td>Session Chair: Paul Henshaw</td>
<td>Session Chair: Michael Boutilier</td>
<td>Session Chair: Ali Nasit</td>
<td>Session Chair: Hamid Akbarzadeh</td>
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**June 3, 2019 (Monday) - CSME TRACK**

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<tr>
<th>Session</th>
<th>Title</th>
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<th>Speakers</th>
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<tbody>
<tr>
<td>B-1</td>
<td>Computational Modeling of Passive Ankle Exoskeleton Biomechanics</td>
<td>Jinhui Zhu (University of Ottawa); Marc Doutin (University of Ottawa)</td>
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<tr>
<td>C-1</td>
<td>Multiscale Fluid Flow Analysis of Decellularized Mouse Lungs to Improve Lung Regeneration</td>
<td>Eric Chadwick; Mohammad Ali Ahmadpour; Takuya Suzuki; Gohzah Karoubi; David Romero; Cristina Amor; Thomas Waddell; Amy Bazylak (University of Toronto);</td>
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<tr>
<td>D-1</td>
<td>Phase Inversion: A Universal Method to Create High-Loading Porous Electrodes for Energy Storage Devices</td>
<td>Xiaofei Yang (Western University); Xiaoyang Sun (Western University);</td>
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<td>E-1</td>
<td>Heat Flux Analysis of a Li-Ion Cell during Charging and Discharging Periods</td>
<td>Shohel Mahmud (University of Guelph); S. Andrew Gadsden (University of Guelph); Bil Van Heyst (University of Guelph);</td>
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<tr>
<td>F-1</td>
<td>Development of BioMEMS 3D Stress/Strain Sensing Mechanism</td>
<td>Mohammad Keyed (University of Alberta); Amir Balbola (University of Alberta); Waled Moussa (University of Alberta);</td>
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<td>G-1</td>
<td>Mechanics of Active Fluids: Fluid Mechanics Refashioned by Microorganisms</td>
<td>Hassan Peeshoossani (Western University);</td>
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<td>H-1</td>
<td>Novel Welding Processes and Joint Evaluation Techniques in Pipeline Construction</td>
<td>Adrian Gerlich (University of Waterloo);</td>
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<td>J-1</td>
<td>Modelling of Creep Recovery in Carbon Fiber Reinforced Polymer Composites</td>
<td>Spencer Cabel (University of Manitoba); Raghavan Jayaraman (University of Manitoba);</td>
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<td>K-1</td>
<td>Using Lime/Hemp Concrete as a Multi-Fonction Material</td>
<td>E. Fotsing (Polytechnique Montréal); A. Ross (Polytechnique Montréal); T. Leconte (Université Bretagne Sud);</td>
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<td>A-1</td>
<td>Exergy Analysis of Renewable Resources for Energy Production in Remote Communities</td>
<td>Mudit Nijhawan (University of Windsor); Ofeiia Jianu (University of Windsor);</td>
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<td>B-1</td>
<td>Computational Investigation into Materials with Lower Stiffness for Hemiarthroplasty</td>
<td>Carolyn Berkremel (University of Western Ontario); Daniel Langfr (University of Western Ontario); James Johnson (University of Western Ontario); Graham King (Saint Joseph’s Healthcare);</td>
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<td>C-1</td>
<td>3D Bio-Printing of Starch-Chitosan Scaffolds for Neuron Cells</td>
<td>Hely Butler; Emad Nasiri; Debra Macdonald; Andrew Tasker; Ali Ahmadi; (University of Prince Edward Island);</td>
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<td>D-1</td>
<td>Sulfide Solid-State Electrolyte Protection Layer In-Situ Formed on the Surface of Metallic Li for High-Performance Li Batteries</td>
<td>Jianwen Liang (Western University); Xueliang Sun (Western University);</td>
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<td>E-1</td>
<td>The Impacts of Exterior Surface Convective Heat Transfer Coefficients on High-Rise Building Energy Consumption</td>
<td>Meseret Kahiya (Western University); Girma Bituamak (Western University); Fitum Tanku (British Colombia Institute of Technology);</td>
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<td>F-1</td>
<td>Microfluidic Oil-Water Separation Using a Hydrophobic-Oleophilic Stainless Steel Membrane</td>
<td>Tantita Akayayil (University of Prince Edward Island); Bradley Halti (University of Prince Edward Island); Russell Kerr (University of Prince Edward Island); Ali Ahmadi (University of Prince Edward Island);</td>
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<td>G-1</td>
<td>Microfluidic Devices Separation Using a Hydrophobic-Oleophilic Stainless Steel Membrane</td>
<td>Tantita Akayayil (University of Prince Edward Island); Bradley Halti (University of Prince Edward Island); Russell Kerr (University of Prince Edward Island); Ali Ahmadi (University of Prince Edward Island);</td>
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<tr>
<td>H-1</td>
<td>Development of BioMEMS 3D Stress/Strain Sensing Mechanism</td>
<td>Mohammad Keyed (University of Alberta); Amir Balbola (University of Alberta); Waled Moussa (University of Alberta);</td>
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<td>J-1</td>
<td>Novel Welding Processes and Joint Evaluation Techniques in Pipeline Construction</td>
<td>Adrian Gerlich (University of Waterloo);</td>
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<td>K-1</td>
<td>Modelling of Creep Recovery in Carbon Fiber Reinforced Polymer Composites</td>
<td>Spencer Cabel (University of Manitoba); Raghavan Jayaraman (University of Manitoba);</td>
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<td>A-1</td>
<td>A Data-Driven Thermal Fault Detection Method in Lithium-Ion Batteries</td>
<td>Qasim Ali (University of Ontario Institute of Technology); Xianke Lin (University of Ontario Institute of Technology); Haoxiang Liang (University of Ontario Institute of Technology);</td>
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<tr>
<td>B-1</td>
<td>Artificial Intelligent Examination of DXA Image Quality for Automatic Finite Element Assessment of Hip Fracture Risk</td>
<td>Wanzhi Yu (University of Manitoba); Yunhua Luo (University of Manitoba);</td>
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<td>C-1</td>
<td>Carbon-based pH Biosensors for Monitoring Infections</td>
<td>Dogan Sinar (Western University); George Knoop (Western University);</td>
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<td>D-1</td>
<td>Organic/Inorganic Composite Electrolyte for Dendrite-Free Solid-State Lithium Batteries</td>
<td>Hanyu Huan (Western University); Xiaoyang Sun (Western University);</td>
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<td>E-1</td>
<td>Experimental Investigation of a Loop Heat Pipe with a Two-Way Pressure Regulated Valve</td>
<td>Hooman Jazebizadeh (Carleton University); Tarik Kaya (Carleton University); Susan Gaskin (McGill University);</td>
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<td>F-1</td>
<td>Effect of Background MEMS Membrane-Rod Based Hydrophone</td>
<td>Tara Akhavan (University of Windsor); Mohamed Jalal Ahamed (University of Windsor); John Magliao (University of Windsor); Morten Jensen (CerSIS LLC);</td>
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<tr>
<td>G-1</td>
<td>Design of a High Density MEMS Membrane-Rod Based Hydrophone</td>
<td>Matthew Bondy (University of Windsor); William Allerhof (University of Windsor); John Magliao (University of Windsor); Morten Jensen (CerSIS LLC);</td>
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<tr>
<td>H-1</td>
<td>Experimental Characterization of Anisotropic Mechanical Properties of the Predicted Elastic Modulus</td>
<td>Matthew Bondy (University of Windsor); William Allerhof (University of Windsor); John Magliao (University of Windsor); Morten Jensen (CerSIS LLC);</td>
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<td>J-1</td>
<td>Molecular Dynamics Simulations of Nanoindentation - The Effect of Force-Field Choice on the Predicted Elastic Modulus</td>
<td>Douglas Pratt (Memorial University); Sam Nakia (Memorial University);</td>
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Multi-Objective Optimization During Sustainable Machining of Difficult-to-Cut Materials
A. Salem (University of Ontario Institute of Technology); H. Hegab (University of Ontario Institute of Technology); A. Kishawy (University of Ontario Institute of Technology); S. Rahnamayan (University of Ontario Institute of Technology)

Energy and Exergy Analysis of a Combined Brayton/Brayton Power Cycle with Humidification
Abdoul Kader Mossi-Idrissa (Royal Military College of Canada); Kari Goni Boulama (Royal Military College of Canada)

Impact Location Affects Brain and Neck Strain During Football Sport
Kewei Bian (Western University); Harjeet Mao (Western University)

A Novel Microfluidic Device for Real-Time Microscopic Imaging of Endothelial Cell Responses to Laminar and Disturbed Fluid Flow
Daniel Lonussos; Kayla Soon; HitoshiKokov; Jaques Milner, John de Bryun; J. Geoffrey Pickering; S. Jeffrey Dixon; David Holdsworth; Tamie Poepping (Western University)

Stabilization of Solid-state Electrolyte by Atomic Layer Deposition for High Performance All-solid-state Li-S Battery
Jianneng Liang (Western University); Xueling Sun (Western University)

Experimental Investigation of Phase Change Material in Concrete and Bentonite-Based Thermal Energy Storage Media
Pedram Atefraz (Ryerson University); Hiep Nguyen (Ryerson University); Reza Daneshzaharian (Ryerson University); Aggey Meysinge (Ryerson University); Seth D Fiorin (Ryerson University); David Salt (Capture Technologies)

CfD and CAA Analysis of the SD 7037 Airfoil for Low Reynolds Number Flow
Alison Zdra (University of Waterloo); David Johnson (University of Waterloo)

Encapsulation of Single Cells with Gelatin-Methacryloyl (GelMA) on Microfluidic Device using a Stratified Flow with Viscosity Contrast
Thu Nguyen (University of Waterloo); Sarah Chan (University of Waterloo); Evelyn Yin (University of Waterloo); Carolyn Ren (University of Waterloo)

Failure Characterization of Heavily Cross-linked Epoxy Part I: Testing
Ahmed Eiruby (Memorial University); Sam Nakhi (Memorial University)

Wave Propagation in Anisotropic Elastic Metamaterials with Broad Bandgaps
Zhengwei Li (University of Alberta); Huan Hu (University of Alberta); Xiaodong Wang (University of Alberta)

Machining Studies on High Silicon Content Al-Si Alloys for the Aerospace Industry
Oluwole A Olufayo (École de Technologie Supérieure); Oussama Cheba (École de Technologie Supérieure); Victor Songmene (École de Technologie Supérieure); Mohammad Jahadi (École de Technologie Supérieure)

Numerical Modelling of Helical Steel Piles as In-Ground Heat Exchangers for Ground-Source Heat Pumps
Sarah Nicholson (Ryerson University); Aggey Meysige (Ryerson University); Seth D Fiorin (Ryerson University)

Design of a 3D Printed Knee Wearable for Biomechanical Monitoring ofLocomotor Activities of Daily Living
Calvin Young (University of Guelph); Michele Oliver (University of Guelph); Karen Gordon (University of Guelph)

Design of a Custom Bioreactor for the Dynamic Culture of Perfused Cell-Laden Alginate Scaffolds Obtained by 3D Printing
Simon Collin (Université Laval); André Bégin-Drolet (Université Laval); Julie Fradette (Université Laval); Cindy Hayward (Université Laval); Jean Ruel (Université Laval)

Optimizing Porous Transport Layer Structures for Polymer Electrolyte Membrane Fuel Cells Using Stochastic and Pore Network Models
Jason Lee (University of Toronto); Aimi Bazyak (University of Toronto)

Characterization of Transient Flow Velocities During Melting of PCM in a Uniformly Heated Circular Cavity
Kyle Teather (Western University); Kamaran Siddiqui (Western University); Farhad Ein-Mozaffari (Ryerson University)

Effect of Anchor Impeller Speed on Gas Dispersion in Highly Viscous non-Newtonian Fluids Using Coaxial Mixers: A Peculiar Phenomenon
Sinhunrn Jegatheeswaran (Ryerson University); Carolyn Ren (University of Waterloo)

A Quantitative Study of the Dynamic Response of Soft Tubing in a Microfluidic Context
Marie Hebert (University of Waterloo); Hiep Nguyen (University of Waterloo); Jan Huissoon (University of Waterloo); Carolyn Ren (University of Waterloo)

failure Characterization of Heavily Cross-linked Epoxy Part II: Multiscale Modeling
Ahmed Eiruby (Memorial University); Sam Nakhi (Memorial University)

Multiscale Analysis of Ferroelectric Cellular Metamaterials
Jahao Shi (McGill University); Hamid Akbarzadeh (McGill University)

Investigation of Hybrid MQL-Nano Fluid Performance When Machining Inconel 718 Super Alloy
Shaiki Chauhan (University of Guelph); Abdellraham Eltegaz (University of Guelph); Ibrahim Deab (University of Guelph); Khail Khanarfi (Australian College of Kuwait); Akram Abdulatif (University of Paris 8)

Amin Gholibey (Shehriard College)

Using Kinematic Signals Features of Body-Worn Inertial Sensor For Temporal Events Detection of Locomotion
Nitouf Ahmadin (University of Alberta); Milad Nazarzadi (University of Alberta); Jacke Whittaker (University of Alberta); Hossein Rouhani (University of Alberta)

In Vitro Assessment of Aerosol Delivery via the Spiriva Respimat Soft Mist Inhaler Using the ODAP™ Adaptor with Face mask
Rym Mehr; Abubaker Alatash; Edgar Matida; (Carleton University); Frank Fiorenze (McArthur Medical Sales Inc.)

High-Performance All-Solid-State Li-S and Li-SeS Batteries
Xuona Li (Western University); Xueling Sun (Western University)

Inverse Heat Transfer Application in a Scalable Model of a Power Transmission Line Tower Foundation
Daqian Zhang (Memorial University); Xili Duan (Western University)

Laminar Boundary Layer Response to an Impulse Forcing by a Spanwise Array of Plasma Actuators
Hossein Khanjar (York University); Ronald Hanson (York University); Philippe Lavoie (University of Toronto)

Wave Propagation in Anisotropic Elastic Metamaterials
Zhengwei Li (University of Alberta); Huan Hu (University of Alberta); Xiaodong Wang (University of Alberta)

Verification and Validation of a Finite Element Model for Structural Health Monitoring of Aluminum Structures using Guided Wave Ultrasonic Testing
Muhammad Tanjir Vatao; Remon Pop 11ev; Ghaus Rizvi; (University of Ontario Institute of Technology)
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<td>Room: ACEB 1410</td>
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<td>Room: ACEB 1415</td>
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**Monday, June 3, 2019 - CSME TRACK**

**Session Chair:** MohsenMohammadi  
**Session Chair:** Thomas Cooper  
**Session Chair:** Eric Lanteigne  
**Session Chair:** Aimi Bayzlyak  
**Session Chair:** Chandra Vee Singh  
**Session Chair:** Martin Agelin-Chaab  
**Session Chair:** Amir Aliabadi  
**Session Chair:** Carlos Escobedo  
**Session Chair:** Adrian Gerlich  
**Session Chair:** Lijian Jiang

**2:30 PM - 2:50 PM**  
**Multi-Element Slicing Approach for Intelligent Additive Manufacturing**  
Dylan Bender (University of Ontario Institute of Technology); Ahmad Barani (University of Ontario Institute of Technology)

**Natural Gas Engine Drive System Design**  
Farshad KimiaMahlagham (Ryerson University); Ali Mousavi; Rakesh Kumar (Ryerson University); Juan Li Ma (Ryerson University); Alan Fung (Ryerson University)

**A Novel Method to Improve Estimation of Tissue Displacement Field in Ultrasound Elastography**  
Nisha Kherikah (Western University); Ali Sadeghi-Naeni (York University); Abbas Samani (Western University)

**Multilayer Viscoelastic Fluid Flows in Axially Rotating Pipes**  
Seyed Mohammad Taghavi (Université Laval); Shab Lu (Université Laval)

**PIV Analysis of Flow around a Simplified Ship Hull**  
Roshan Kumar (University of Manitoba); Baafour Nyantakyi-Kwaky (Memorial University); Xingun Fang (University of Manitoba); Mark Tache (University of Manitoba)

**On the Influence of the Environmental Factors on Corrosion Behavior of 13Cr Stainless Steel Using Box-Behnken Design**  
Mostafa KazemiPour (Memorial University); Salar Salari (Memorial University); Ali Nasiri (Memorial University)

**3:00 PM - 3:20 PM**  
**A New Anisotropic Elastic Metamaterial (Keynote Presentation)**  
Xiaodong Wang (University of Alberta)

**Experimental and Numerical Modelling of a One-Degree of Freedom Non-Smooth Mechanical System**  
Solom Kojtych (Polytechnique Montréal); Yann Colaïtis (Polytechnique Montréal); Elsa Piolet (Polytechnique Montréal); Alan Battyly (Polytechnique Montréal)

**Modelling of Flow-Induced Shear Stress to Predict Targeted Delivery of Cells in the Decellularized Lung**  
Jason Chian; Eric Chadwick; Takaya Gohay; Karanu David; Romero Cristina; Amon Thomas; Waddell Aimy; Bayzlyak Ali (Western University)

**Pt Single Atom Electrocataylst by Atomic Layer Deposition for Fuel Cell Related Catalytic Reactions**  
Lei Zhang (Western University); Xuejiang Sun (Western University)

**Three-Dimensional Characterization of Bursting and Sweeping Phenomena in the Turbulent Boundary Layer**  
Kademe Dennis (Western University); Kamran Siddiqui (Western University)

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Mostafa KazemiPour (Memorial University); Salar Salari (Memorial University); Ali Nasiri (Memorial University)
<p>| 3:30 PM - 3:50 PM | Topology Optimization for Layered Material Daniel Pepper (University of Toronto); Craig Stevens (University of Toronto) | Utilizing Geothermal Looping for Thermal Regulation of an Aquaculture Pond Mitchell Ruska (University of Western Ontario); Christopher DeGroot (Western University); Kamran Siddiqui (Western University) | The Motion of a Curling Rock: Predictions using Ice Topography Megan Baldson (Western University); Jeffrey Wood (Western University) | Detailed Finite Element Analysis of Prosthetic Foot Amanda Ricketts (Memorial University); Sam Nakhia (Memorial University) | Novel Cell Configurations for High-Performance Superoxide Na₂O₂ Batteries Xiaoting Lin (Western University); Xueliang Sun (Western University) | On the Aerodynamic Performance of Tail Devices for Drag Reduction of Road Heavy Vehicles Mohammad Saedif (Amirkabir University of Technology); Ali Tarokh (Lakehead University); Stephen Whitaker (University of California at Davis) | Darcy’s Law for Moving Packed Beds Pedro Isaza (University of Toronto); Markus Bussmann (University of Toronto); Stephen Whitaker (University of California at Davis) | A Novel Continuous Electrotherapeutic PH Elution Separation Technique Jeff Farnese (University of Waterloo) | Thermal and Dynamic Mechanical Analysis of Biochar Filled Glassfiber Polymer Composite and Hemp-fiber Polymer Composite Raj Dahal (University of Guelph); Bishnu Acharya (University of Prince Edward Island) | Effect of Nonlinear Material Viscosity on the Dynamic Performance of Dielectric Elastomer Oscillators Yuaping Li (Western University); Liying Jiang (Western University) |
| 3:50 PM - 4:10 PM | Anisotropy in Mechanical Properties of a Wire Arc Additive Manufactured Low Carbon Low Alloy Steel Mahya Ghaflari (Memorial University); Ali Reza Vahedi Nemani (Memorial University); Mehran Rafieazad (Memorial University); Ali Nasiri (Memorial University) | The Effect of Couple Layout on Thermoelctric Generator Performance Xi Wang (University of Windsor); Paul Hershaw (University of Alberta); Morris Flynn (University of Alberta); Brad Vickers (International Cooling Tower) | An Experimental Cooling Tower Model for Performance Evaluation and 3D Airflow Measurement Lisa Clare (University of Alberta); Marc Secanell (University of Alberta); Morris Flynn (University of Alberta); Brad Vickers (International Cooling Tower) | A Novel Approach of Predicting Deep Brain Response Following Traumatic Brain Injury Yanir Levy (Western University); Kewei Bian (Western University); Haojie Mao (Western University) | Investigating the Impacts of Two-Dimensional Liquid Water Evolution in the PEM Fuel Cell Cathode Gas Diffusion Layers on Mass Transport Performance via Equivalent Circuit Modeling and Sychotron X-ray Radiography Nan Ge; Pranay Shrestha; Aimy Bazylak; (University of Toronto) | Developing More Accurate Models of Tornados through Computational Analysis of the Tornado Wind Fields Produced by Simulated Supercell Events Niall Bannigan (Western University); Eric Savory (Western University); Leigh Orf (University of Wisconsin-Madison) | Perfectly Subcritical Gravity Currents: Laboratory and Numerical Experiments and Two-Layer Shallow Water Solution Mitchell Baker (University of Alberta); Morris Flynn (University of Alberta); Marius Ungurah (Technion – Israel Institute of Technology) | Influence of Strength and Trapping Characteristics on Material Susceptibility to Hydrogen Embrittlement (HE) based on Experimental Investigations and Finite Element Analyses (FEA) Tuhin Das; Salmi Brahim; Jun Song; Stephen Yue; (McGill University) | The Fracture Toughness of Elastic-Plastic 3D Nanolattices Sahar Choate (University of Toronto); Chandra Veer Singh (University of Toronto) |
| 4:10 PM - 4:30 PM | Post-Printing Heat Treatment of a Wire Arc Additively Manufactured Low Carbon Low Alloy Steel Ali Reza Vahedi Nemani (Memorial University); Mahya Ghaflari (Memorial University); Mehran Rafieazad (Memorial University); Ali Nasiri (Memorial University) | Design and Modeling of MRF Impact Base Frequency Enhancement for a Piezoelectric Energy Generator Sylvester Djkoto; Hayford Azangbedi; Martin Agelina-Chaab; (University of Ontario Institute of Technology); Egidijus Dragalis; Vytautas Jünėnas; (Kaunas University of Technology) | Review and Data Consolidation of Ranque Hilsich Vortex Tube Mark Parker (Western University); Anthony Straubman (Western University) | A New Way to Link Animal Head Kinematics to Human Head Motion Lihong Lu (Western University); Kewei Bian (Western University); Haojie Mao (Western University) | Highly Efficient Protection by Atomic Layer Deposition/Molecular Layer Deposition for Lithium and Sodium Metal Anode Yang Zhao (Western University); Xueliang Sun (Western University) | Can we limit the passenger exposure to airborne contaminants in commercial aircraft cabins during the climb leg? Hossam Elmaghraby (University of Guelph); Yi Wai Chiang (University of Guelph); Amir Aliabadi (University of Guelph) | A Study on Vortex Dynamics in Laminar-Turbulent Transition by a Point Cloud Model Kazuo Matsusara (Ehime University) | Work of Fracture in Non-Crimp Fabric Carbon Fiber Reinforced Epoxy Composites Aadiyaa Suratk (Western University); Ying Fan (Western University); John Montesano (University of Waterloo); Jeffrey Wood (Western University) |
| 4:30 PM - 5:00 PM | Various Tours Meeting point (Amit Chakma Engineering Building Atrium) |</p>
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<th>Session C-3 (Biomechanics II)</th>
<th>Session D-3 (Environmental Engineering I)</th>
<th>Session E-3 (Energy Materials III)</th>
<th>Session F-3 (Heat Transfer II)</th>
<th>Session G-3 (Fluid Mechanics IV)</th>
<th>Session H-3 (Transportation Systems I)</th>
<th>Session J-3 (Materials Engineering III)</th>
<th>Session K-3 (Solid Mechanic III)</th>
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Coffee Break

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**Session Chair:** Farbod Khameneffar

**Session Chair:** Mehrdad Kermani

**Session Chair:** Hossein Rouhani

**Session Chair:** Animesh Dutta

**Session Chair:** Klanka Lin

**Session Chair:** Junbayer Choudhury

**Session Chair:** Ali Tarokh

**Session Chair:** Yuping He

**Session Chair:** Hamid Akbarzadeh

**Application of EWMA Control Chart on Volumetric Errors Change Recognition**

Kangin Xing (Polytechnique Montréal); Rene Mayer (Polytechnique Montréal); Achiche Sofiane (Polytechnique Montréal)

**Model Predictive Control, Identification and Implementation Design for a Pendubot: A Microcontroller-Based Architecture**

Ricardo Baustista Quintero (University of New Brunswick); Rickey Dubay (University of New Brunswick)

**Design of a Biaxial Mechanobioreactor for Engineering Pediatric Aortic Valves**

Edwin Wong (University of Toronto); Craig Simmons (University of Toronto)

**A Novel Option for City Water Recycle with Carbon Capture**

Bashhu Acharya (University of Prince Edward Island); Prabir Basu (Dalhousie University); Akash Kaulshreshtha (Dalhousie University)

**Performance Evaluation of Siding Materials Subjected to Radiant Heat Loads**

Eder Villa Coronel (University of Alberta); Razan Rafai (FPInnovations); André McDonald (University of Alberta)

**Influence of Trailing Edge Flap Pitching on Dynamic Stall in Pitching Airfoils**

Fard Samara (University of Waterloo); David Johnson (University of Waterloo)

**SDP-Based Energy Management Strategy with Lithium Plating Prevention for PHEVs**

Siyang Wang (University of Ontario Institute of Technology); Xiange Lin (University of Ontario Institute of Technology)

**Coffee Break**
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<th>Speakers</th>
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<td>11:00 AM -</td>
<td>Finite Element Model proud of Fracture in Ceramic Micro-Particles During Composite Coldspray Process</td>
<td>Rohan Chakrabarty (McGill University); Jun Song (McGill University)</td>
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<td>10:50 AM</td>
<td>Noise and Thermal Drift Reduction in MEMS Gyrososcopes With Predictive Error Modeling and Compensation Techniques</td>
<td>Matthew Shamoone (University of Windsor); Mohammed Jalal Ahamad (University of Windsor)</td>
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<td>11:20 AM -</td>
<td>Mechanical Properties of the Bicpiclal Aponoeosis</td>
<td>Emmanuel Ocran (University of Guelph); Michele Oliver (University of Guelph); Karen Gordon (University of Guelph); Anne Agur (University of Toronto)</td>
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<td>11:00 AM</td>
<td>A Vertical Diffusion Model to Predict Profiles of Temperature within the Lower Atmospheric Surface Layer: Simple or Complicated?</td>
<td>Mohsen Moradi; Manoj Kishakkeniy; Amir Nazem; Md. Rafaan Nahian; William Lubitz; Amir Aliaibadi (University of Guelph); Benjamin Oyer (McMaster University); E. Scott Krayenhoff (University of Guelph)</td>
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<tr>
<td>11:40 AM</td>
<td>High Performance 3D Li Metal Anodes Enabled by Lithiophilic Cu Nanowire Networks</td>
<td>Keegan Adair (Western University); Xueliang Sun (Western University)</td>
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<td>12:00 PM</td>
<td>Thermal Management of the Hotspot on the Spray Cooled Surface Using Jet Impingement</td>
<td>Yankang Xiu (The University of British Columbia); Ri Li (The University of British Columbia)</td>
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<td>1:00 PM</td>
<td>A Numerical Investigation on the Fundamentally Different Mechanisms of Circular Hydraulic Jump for High and Low-Viscosity Liquids</td>
<td>Yunpeng Wang (Western University); Roger Khayat (Western University)</td>
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<td>2:00 PM</td>
<td>3D Random Road Implementation in Motionview® Full Car Simulation</td>
<td>Zhe Ma (University of Windsor); Bruce Minaker (University of Windsor)</td>
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<td>2:30 PM</td>
<td>Effect of Plastic Deformation on the Corrosion Behavior of 13Cr Stainless Steel</td>
<td>Ali Nasiri (Memorial University); Mostafa Kazemipour (Memorial University)</td>
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<td>3:00 PM</td>
<td>Vibration Method for Very High Cycle Fatigue in Aluminum Alloy</td>
<td>M. Sentissi (Polytechnique Montréal); A. Ross (Polytechnique Montréal); M. Brochu (Polytechnique Montréal); E. Pessant (Arts et métiers ParisTech)</td>
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<tr>
<td>2:00 PM</td>
<td>Global Statistics Based Method for Denoising of Planar Point Clouds</td>
<td>Cody Berry (University of Ontario Institute of Technology); Ahmad Barani (University of Ontario Institute of Technology)</td>
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<td>2:30 PM</td>
<td>A Payload-Quadrotor System Modelling Analysis</td>
<td>Hugh Liu (University of Toronto); Longhao Qian (University of Toronto)</td>
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<tr>
<td>3:00 PM</td>
<td>Role of Medial Ligamentous Structures on PCL-Deficient Knee Kinematics During Simulated Clinical Stability Tests and Activities of Daily Living</td>
<td>Alireza Mostoenian (Western University); Ryan Wilking (Western University); Alan Gelgood (Western University)</td>
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<tr>
<td>3:30 PM</td>
<td>Bio-Carbon Production by Oxidation Process of Pulp and Paper Byproducts</td>
<td>Zanab AL-Kaabi (University of Guelph); Naresh Thevathan (University of Guelph); Animesh Dutta (University of Guelph); Ranjan Pradhan (University of Guelph)</td>
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<td>4:00 PM</td>
<td>Nanomechanical Study of Atomic Layer Deposited Solid-state Electrolytes Using A/F</td>
<td>Mohammed Alamamala; Changhong Cao; Teng Cui; Yu Sun; Tobin Filer (University of Toronto); Bingqiong Wang; Yang Zhao; Xueliang Sun (Western University); Jason Tam (University of Toronto)</td>
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<tr>
<td>4:30 PM</td>
<td>The Effect of Changing the Main Compressor Inlet temperature on the Overall Cycle Efficiency</td>
<td>Ibrahim Ali (Carleton University); Henry Saat (Carleton University)</td>
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<td>5:00 PM</td>
<td>Comparison of Commonly Used Atomization Models</td>
<td>Siyu Chen (University of Toronto); Nasser Ashgriz (University of Toronto)</td>
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<td>5:30 PM</td>
<td>Free Vibration Properties of Ring Gears</td>
<td>Jial Tian (Carleton University); Janmmang Yang (Memorial University)</td>
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<td>6:00 PM</td>
<td>Assessing Fibre Metal Laminate Materials for their Impact Characteristics</td>
<td>Nicholas Teply (Carleton University); Bob De Sio (Carleton University); Xiao Huang (Carleton University); Calvin Rains (Deft University of Technology)</td>
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<tr>
<td>6:30 PM</td>
<td>Time Response of a Cylindrical Fused Silica Resonator Subjected to Very High Cycle Fatigue</td>
<td>Yiming Loo; Mohamed Bognash; Ibrahim Gebrel; Samuel Askkanathan; (Western University); Tianlang Qu (National University of Defense Technology)</td>
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<td>2:00 PM</td>
<td>Machinability Studies of Ferritic, Austenitic and Martensitic Stainless Steels</td>
<td>Osama Eltawi (École de Technologie Supérieure); Victor Songmene (École de Technologie Supérieure)</td>
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<td>2:30 PM</td>
<td>On-Line Crack Detection in High Pressure Pipelines Using Distributed PZT Sensors</td>
<td>Khaled M Al-Arbe (Abu Dhabi University); Abdulah Abdullah (Abu Dhabi University)</td>
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<td>3:00 PM</td>
<td>Vibration Analysis of a Bone-Conduction Hearing Implant</td>
<td>Seyed Alireza Rohani (Western University); Sumit Agrawal (Western University); Hanif Dadk (Western University)</td>
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<td>3:30 PM</td>
<td>Kinetics of Oil Uptake Using Plastic Waste</td>
<td>Junaid Saleem (Hamad Bin Khalifa University); Gordon McKay (Hamad Bin Khalifa University)</td>
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<tr>
<td>4:00 PM</td>
<td>Numerical Investigation of the Effects of Coke on Transport Properties in an Ethanol Fuel Cell Reformer</td>
<td>Precious Arku (University of Guelph); Animesh Dutta (University of Guelph)</td>
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<tr>
<td>4:30 PM</td>
<td>Plane Couette Flow of Heavy Water with Variable Viscosity</td>
<td>Robert L Varty (Consultant in Engineering Science)</td>
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<tr>
<td>5:00 PM</td>
<td>Fogging Simulation of Humid Air on the Surface of Windshield in Electric Car Room</td>
<td>Zhou Qingshi; Liyan Liu; Xiao Long; Su Yongxuan; Xi Yan (Beijing University of Civil Engineering and Architecture)</td>
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<tr>
<td>5:30 PM</td>
<td>Nanoindentation of WC-Co Cemented Carbides Fabricated by Selective Laser Sintering</td>
<td>Joseph Agyapong (York University); Alex Czankinski (York University); Solomon Boakye-Yiadom (York University)</td>
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<tr>
<td>6:00 PM</td>
<td>Dynamics of a Monostable Ring-based Vibratory Energy Harvester</td>
<td>Ibrahim Gebrel (Western University); Liang Wang (Harbin Engineering University); Samuel Askkanathan (Western University)</td>
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**12:15 PM - 1:00 PM** Lunch (Amit Chakma Engineering Building Atrium)
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<td>3:30 PM -</td>
<td>Additively Manufactured DMLS-ALSi10Mg Using Recycled Powder: The</td>
<td>Impact of Microstructure and Corrosion Properties</td>
<td>Mehran Rafieiazad (Memorial University); Abhijit Chatterjee (Memorial University); Ali Nasiri (Memorial University)</td>
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<td>6:00 PM</td>
<td>NSERC Panel on Grants and Scholarships (Room: ACEB 1410)</td>
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<td>3:50 PM -</td>
<td>AcoustoTopological Insulators in a Flow-Free Symmetry-Broken Resonator</td>
<td>Aortic Wall Stresses in Correlation to Potential of Rupture</td>
<td>Stephanie Gibbons (Memorial University); Sam Nakhla (Memorial University); Jun Yang (Western University)</td>
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<td>6:00 PM</td>
<td>5:30 PM</td>
<td>Physics and control of landfill gas flow collection by horizontal</td>
<td>Yana Nec; (Thompson Rivers University); Greg Huculak (GNH Consulting Ltd.)</td>
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<td>4:00 PM -</td>
<td>Biore affected Printability study</td>
<td>Bed Voidage Predictions for Inverse Liquid-solid Fluidized Beds</td>
<td>Saleh Sabet (Western University); Jesse Zhu (Western University); Dominic Pjonet (Western University)</td>
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<td>6:30 PM</td>
<td>5:30 PM</td>
<td>Experimental Investigation of an Archimedes Screw Pump</td>
<td>Murray Lyons (University of Guelph); Scott Simmons (University of Guelph); William Lubitz (University of Guelph)</td>
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<td>4:30 PM -</td>
<td>5:15 PM</td>
<td>Comparison of Different Steering Ratios on Steering by Wire Vehicle</td>
<td>Huiyong Zhao (Hubei University of Automotive Technology); Baohua Wang (Hubei University of Automotive Technology); Guangde Zhang (Wuhan University of Science and Technology); Mutaz Keldani (University of Ontario Institute of Technology)</td>
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<td>5:15 PM</td>
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<td>Kinetics of Detwinning Arising from Annealing in Chemical Vapor</td>
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<td>Depositioned Nickel</td>
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<td>Kinetics of Detwinning Arising from Annealing in Chemical Vapor</td>
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<td>4:30 PM -</td>
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<td>GEU (University of Toronto); Chandra Veer Singh (University of Toronto)</td>
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<td>Application of the Theory of Configurational Mechanics in Soft</td>
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<td>4:30 PM -</td>
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<td>Dielectrics</td>
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<td>5:45 PM</td>
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<td>Multiscale Synergistic Damage Mechanics Methodology for Predicting</td>
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<td>4:30 PM -</td>
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<td>Progressive Failure of Composite Structures</td>
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<td>Chandra Veer Singh (University of Toronto)</td>
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**Coffee Break**

**Effect of Tool Paths on Fine & Ultrafine Particles Emission & Distribution During Polishing of Medium Silica Content Granite**

Defimjo (Western University); O. Remus Tutunee-Fatan (Western University); Nicolas Miliken (National Research Council); Evgenii Bordatchev (National Research Council)

**Axial Strategy for Ultraprecise Single Point Cutting of V-grooves with Constant Cross-Sectional Cutting Area**

S. Andrew Biglarbegian (University of Manitoba); Mohammadreza Faiegi; Siddiqui (University of Sheffield)

**Online monitoring of built-up edge formation in turning stainless steel using acoustic emission signals**

Yassmin Ahmed (McMaster University); A.F.M. Arif (McMaster University); S.C. Veldtbus (McMaster University)

**Performance of QCT-Derived Scapula Finite Element Models in Predicting Local Displacements Using Digital Volume Correlation**

Nikolas Knowles; Jonathan Kosinus; Mohammadreza Faeigi; Yasih Ferreira; (Western University); Melissa Ryan; Enrico Dalfara; (University of Sheffield)

**Experimentation of the Effect of Organic and Mineral Content on Some Mechanical Properties**

Gheorgheodorocoru Amromcan (University of Manitoba); Yunhua Luo (University of Manitoba); David W Holdsworth (Western University)

**Comparing Artificial Neural Networks (ANN) with REFPROP Software in Predicting the Carbon Dioxide (CO2) Properties as a Working Fluid for the 10 MW Gas Turbine Power Plant**

Ibrahim Ali (Carleton University); Henry Saat (Carleton University)

**Interfacial Engineering of Solid-State Batteries using Atomic Layer Deposition (Keynote Presentation)**

Neil P. Dasgupta (University of Michigan, Ann Arbor)

**Experimental Study of Natural Convection in a Horizontally Heated Cylinder**

Kyle Teather (Western University); Kamran Siddiqui (Western University)

**A Non-Local Crystal Plasticity Finite Element Model for Simulating Irradiation Growth in α-Zirconium Polycrystals**

Omid Sedaghah (Western University); Hamid Abdolvand (Western University)

**Effect of Heat Treatment on the Micro-structural Evolution and Mechanism of Wear of 3D Printed Ti6Al4V Aloy**

Niyousha Azgomi; Solomon Baouye-Yadom (University of Waterloo); Markus Paraschivou (Concordia )
### Analysis of Remelted Line Formation During Laser Polishing of H13 steel
Srdjan Cvijanovic (Western University); O. Remus Tutuneea-Fatan (Western University); Evgueni Bordatchev (National Research Council of Canada)

### Plant Irrigation Water Sprinkler Robot
Adel Younis; Datal Al Salahi; Ahmad AlKhudher; Hamoud AlBajian; Eissa AlFalakawi; Mohamed Ahmed (Australian University of Kuwait)

### The Effects Of Demographics on Shoulder Shape and Density for Population-based Design of Orthopedic Implants
Pendar Soltanmohammadi (Western University); Ryan Willing (Western University)

### Finite Element Analysis of Porous Titanium Alloy Construction Matching the Mechanical Properties of Mandibular Bone: A Pilot Study
Khaled Hijazi; Yara K. Hosse; Haojie Ma; David Holdsworth; S. Jeffrey Dixon; Jerold Armstrong; Ann Rukalla; (Western University)

### Dual-layer LiPO4 Coating Supported Ni-Rich Layered Cathodes for All-Solid-State Li-Ion Batteries
Sixu Deng (Western University); Xueliang Sun (Western University)

### The Effect of Geometry on the Strength, Storage and Combustion Characteristics of Biochar and Hydrochar Pellets
Trishan Deb Abhi (University of Guelph); Animesh Dutta (University of Guelph)

### Minimum Fluidization Velocity of Inverse Liquid-solid Fluidized Bed With Using Light Solid Particles
Saleh Sabel (Western University); Jesse. Zhu (Western University); Dominic Pirotek (Western University)

### Plastic Deformation Evolution at a Crack Tip in Zirconium Foil
Zhoyao Wang (Queen's University); Mark Raymond (Queen's University)

### Study on the behaviour of Aluminium Metal Matrix Composites Reinforced with Hexagonal Boron Nitride and Cubic Boron Nitride
Naveen Easwaran; Rohith G.B; Sudharshan Raghunathan (Sri Sairam Engineering College); Ramanan N (Sharda Motors Industries Ltd.); Jagathish Umamathy (University of Windsor)

### Wind Loads on Low-Rise Buildings in Tornado-Like Vortices
Jubayer Chowdhury (Western University); Peter Vickery (Applied Research Associates, Inc.); Horia Hangan (Western University); Sudhan Banik (Applied Research Associates, Inc.)

### Additive Manufacturing of Electroactive Polymer Actuated Patient-Specific Arterial Phantoms Simulating Stenosis and Dilatation
Benjamin Hainen (Western University); Aaron Price (Western University); Tamie Poeppeing (Western University)

### The Effect of Short Stem Humeral Implant Varus-Valgus Position on Bone Stress Following Total Shoulder Arthroplasty
Amir Tavakoli (Western University); Kenneth Faber (Wetstein University); G. Daniel Langohr (Western University)

### Development of a Disposable Single-Nozzle Multi-material 3D Bioprinting System
Tiffany Cameron; Ben MacCallum; Emad Naser; Ali Ahmad; (University of Prince Edward Island)

### Ultra-Stable Anode Interface Performed by Incorporating LiF in LiP2Cl-Based Sulfide Electrolytes
Feapeng Zhao (Western University); Xueliang Sun (Western University)

### Effects of Avocado Ripeness and Extraction Temperature on Polyphenolics Yield Using Subcritical Water Extraction
Wald Mazyan; Ali Ahmad; (University of Prince Edward Island); Elia Martin; Anja Vogt; (National Research Council); Edward Charter (BioFoodTech)

### Experimental Measurements of Dough Airflow in the Far-Field
N. Dudalski (Western University); A. Mohamoud (Western University); E. Savory (Western University); S. Mubareka (Sunnybrook Research Institute)

### Depth Dependence of Indentation Stress of Helium Implanted Inconel X-750 Loabat Shokey-Kavan (Western University); Robert Klassen (Western University)

### Effect of Graphene and Zirconia on Wear And Fracture Behaviour Of Alumina Nanocomposites
Solomon Dutu (York University); Solomon Boakeye-Yadom (York University); Mohammad Islam (King Saud University)

### Tornado-Induced Internal and External Pressures on Low-Rise Building with Multiple Openings
Aya Kassabi (Western University); Peter J. Vickery (Applied Research Associates, Inc.); Jubayer Chowdhury (Western University); Sudhan S. Banik (Applied Research Associates Inc.); Horia Hangan (Western University)

### Optimizing Cutting Tool Rake and Clearance Angles based on a Simplified Cantilever Beam Model
C. Hopkins (University of Ontario Institute of Technology); M. Imad (University of Ontario Institute of Technology); A. Hosseini (University of Ontario Institute of Technology)

### Validity of the Clinician Rated Drop Vertical Jump Scale for Patients following Anterior Cruciate Ligament (ACL) Reconstruction
Morgan Jennings (Western University); Dianne Bryant (Western University); Trevor Birmingham (Western University); Alan Getgood (Western University)

### Assessing Finger Force and Grip Configuration Variability of Various Standard and Artificical Golf Grips in Individuals with and without Hand Arthritis
Sara Holland (Western University); Emily Lalone (Western University); Louis Ferrera (Western University)

### A Fast Two-Way Coupled Integral Approach for Impingement Heat Transfer
Yunpeng Wang (Western University); Roger Khayat (Western University)

### Generation of Self-Organized Bubble Train Flow
Aly Gadallah (Tanta University); Kamran Siddiqui (Western University)

### Synchrontron X-ray diffraction for extracting µ-level full stress tensors in three dimensions
Karim Louca (Western University); Hamid Abdolvand (Western University)

### Quantifying the Effect of Hydrogen Charging on the Microstructure of Steel using Computed Tomography Imaging
Liam Morrissey (Western University); Stephen Handiran (Memorial University); Sam Nakhla (Memorial University)

### Evaluating Structural Design Loads under Thunderstorm Winds
Haitham Aboshosha (Ryerson University); Talek Ghazal (Ryerson University); Moustafa Aboulaitsh (Ryerson University)

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**End of the CSME-CFDSC Congress 2019**
June 3, 2019 (Monday) - CFDSC TRACK

8:00 AM - 4:00 PM
Conference Registration (Amit Chakma Engineering Building Atrium)

8:30 AM - 9:30 AM
CSME-CFSDS Congress Opening Ceremony
Plenary Session (Key BMO Auditorium): “Artificial Knees: Can They Benefit from New Technologies?”
Peter Whiter (New York University)

9:30 AM - 10:00 AM
Coffee Break (Amit Chakma Engineering Building Atrium)

Session L-1 (Large Eddy Simulation)
Session M-1 (Free Surface Flows)
Session N-1 (Heat and Mass Transfer I)
Session O-1 (Applications I)

Session Chair: James MacDonald
Session Chair: Olga Trichtchenko
Session Chair: Jozsef Rogenski
Session Chair: Ronald Barron

Room: SEB 1200
Room: SEB 2200
Room: SEB 2202
Room: SEB 3109

10:00 AM - 10:20 AM
Large Eddy Simulation Using the High-Order Flux Reconstruction Approach
Olga Trichtchenko (Western University); Efimio Piras (University of East Anglia)
Computing Waves Under Ice
Jiakai Yi (Michigan State University), Yiyang Peng (University of Waterloo)

10:20 AM - 10:40 AM
Simulations of Self-Propulsion Model Tests of a Fishing Vessel Using a Body-Force Method Coupled With a RANS Solver
M. Arish Al-Maayah (Memorial University), Heather Peng (Memorial University), Wei Gu (University of Waterloo)

10:40 AM - 11:00 AM
Modelling Requirements for Dynamic Multimode Ship Simulations
Chunlin Liu (University of Waterloo), Xiaohua Wu (Royal Military College), Kevin McGregor (SDRC), Jean-Pierre Hickey (University of Waterloo)
A Numerical Study of the Effect of Thin Horizontal and Vertical Ablative Side Extensions on Natural Convective Heat Transfer From a Downward Facing Heated Horizontal Isothermal Surface
Patrick Oosthuizen (Queen’s University)

11:00 AM - 11:20 AM
Stabilizing Filters for High-Order Implicit Large Eddy Simulation
Michael Hammond (Concordia University); Brian Vermeire (Concordia University)
Numerical Simulations of Two-Body Interaction in Waves
Wa Meng (Memorial University), Heather Peng (Memorial University), Wei Gu (University of Waterloo)

11:20 AM - 11:40 AM
Assessment of Error Estimators for Grid Adaptation for LES Application
Yao Jiang (McGill University); Nina Nadagouda (McGill University)
Study of Inertial Coalescence of Drops on a Solid Substrate Using Lattice Boltzmann Modelling
Khaled El-Egah (TIF Delft), Sumeet Bhatia (TIF Delft), Sunil Kale (TIF Delft)

11:40 AM - 12:00 PM
Influence of Rib Height in a Rib-Roughened Square Duct on Turbulent Flow Using Large Eddy Simulation
Alex Cashen (University of Manitoba); Vahid Mahmodi (University of Manitoba), Bing-Chen Wang (University of Manitoba)
Performance Analysis of a Vertical Axis Hydrokinetic Turbine Array
Bayan Mohamed (University of Calgary), Aitam Kornbom (University of Calgary)

12:15 PM - 1:00 PM
Lunch (Amit Chakma Engineering Building Atrium) and CSME Technical Committee Meetings

1:00 PM - 2:00 PM
Plenary Session (Key BMO Auditorium): “Petascale Supercell Thunderstorm Simulations and New Hypothesis for Tornado Formation and Maintenance”
Leigh Off (University of Wisconsin)

2:00 PM - 3:30 PM
Coffee Break (Amit Chakma Engineering Building Atrium)

Session L-2 (Algorithm)
Session M-2 (Environmental Flows)
Session N-2 (Heat and Mass Transfer II)

Session Chair: Brian Vermeire
Session Chair: Netham Abraham
Session Chair: Gerry Schneider

Room: SEB 1200
Room: SEB 2200
Room: SEB 2202

2:30 PM - 2:50 PM
Vorticity-Based Polygonal Adaptation for Moving and Deforming Domains
Ramen Ghoseh (Concordia University); Brian Vermeire (Concordia University)
Mixing in the Boston Basin
Kelly Ogden (Western University), Nathalie Ferrant (KwaZulu-Natal University of Technology)

2:50 PM - 3:10 PM
Deep Neural Networks for Non-Ideal Property Evaluation in SuperCritical Flows
Petro Junier Milian (Georgia Institute of Technology); Jean-Pierre Hickey (University of Waterloo), Zheng Xu (Georgia Institute of Technology), Vicgro Yang (Georgia Institute of Technology)
BMS-CFD Integrated Design Process Examples For Northern Architecture
Mina Younis (Western University), Gima Bousaada (Western University), Meezan Kaya (Western University)

3:10 PM - 3:30 PM
Investigation of Advection-Diffusion Problems and Simulations Using the Lattice Boltzmann Method and the ArrayFire Library for High-Performance Computing on GPU
Michael Ho; Jesús Pérez; Sébastien Lacoste; Mercadi Reggi; Jean-Yves Tlepeter; (Polytechnique Montréal)
A More Reliable Estimate For External Convective Heat Transfer Coefficient From Building Surfaces in an Urban Setting
Iswor Avdi (Western University), Gima Bousaada (Western University), Faisal Turki (British Columbia Institute of Technology)

3:30 PM - 3:50 PM
Paired Explicit Runge-Kutta Schemes For Computational Aerodynamics
Sivash Naik (Concordia University); Brian Vermeire (Concordia University)
The Actuator Line Method For Wind Turbine Modelling Applied To A Variation Multi-Scale Framework
Michael Rasmussen (University of Calgary), Arni Kornbom (University of Calgary)

3:50 PM - 4:10 PM
Improved Approximations For The Maximum-Entropy Fourteen-Moment Closure Of Gas Dynamics
Fatem Gouin (University of Ottawa), James McDonald (University of Ottawa)
Flutter Instability of a Flat Plate Deforming With Large Amplitude to Align With the Fluid Flow
Mohammad Tan (Polytechnique Montréal), Frederick Grooten (Polytechnique Montréal), Eric Laurented (Polytechnique Montréal)

4:15 PM - 4:35 PM
Undergraduate Poster 3-Minute Thesis Presentations (SEB 1200)

Various Tours
(Meeting Point: Amit Chakma Engineering Building Atrium)

5:00 PM - 7:30 PM
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<td>8:30 AM - 9:30 AM</td>
<td>Unsteady Simulation of the Rotor Caradonna &amp; Tung with SU2</td>
<td>Revolving Solid-Liquid Mixing Through The Development Of An Open-Source CFD-DEM Model (Keynote Presentation) Bruno Blais (Polytechnique Montréal)</td>
<td>Numerical Simulation of the Forced Oscillations of a Wire In Newtonian and Shear-Thinning Fluids (Keynote Presentation) Cameron Hopkins (Wisdom University), John de Bruyn (Western University)</td>
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<td>9:30 AM - 10:00 AM</td>
<td>Session Chair: Chris DeGroot</td>
<td>Session Chair: Alexandra Komrakova</td>
<td>Session Chair: Kelly Ogden</td>
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<td>10:00 AM - 10:20 AM</td>
<td>Ahmed Mkaouar (École de Technologie Supérieure); François Morency (École de Technologie Supérieure)</td>
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<td>10:20 AM - 10:40 AM</td>
<td>Numerical Simulation of Parallel Airfoil Vortex Interactions at Low Reynolds Number Using Detached-Eddy Simulation Nicholas Ogrodnik (Carleton University); Edgar Mattila (Carleton University)</td>
<td>Development of a CFD-DEM Model in Non Inertial Frame for Solid-Liquid Mixing Applications Xavier Delacroix (Polytechnique Montréal); Bruno Blais (Polytechnique Montréal); Local/Fixed (Polytechnique Montréal); François Bertrand (Polytechnique Montréal)</td>
<td>Stability Analysis Of Viscoplastic Fluids with Wall Slip Boundary Conditions Seyed Taghavi (Université Laval); Hossein Rahmani (Université Laval)</td>
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<td>10:40 AM - 11:00 AM</td>
<td>Hybrid Flow Control for Micro Aerial Vehicle Ali Esmaeili (Sharif University of Technology); Massoud Darbandi (Sharif University of Technology); Gary Schneider (University of Waterloo)</td>
<td>An Introduction to the Real Based Method for 3D Aerodynamic Analysis of the Insect Flyers at Low Reynolds Numbers Nasim Chitsaz (University of South Australia); Natania Yap (University of South Australia); Romos Maran (University of South Australia); Jesus Chans (University of South Australia)</td>
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<td>11:00 AM - 11:20 AM</td>
<td>Development of a CFD-DEM Model to Simulate Two-Particle Settlement in a Newtonian Fluid: A Grid Comparison Fakher Razaee (University of Alberta); Alexandre Komrakova (University of Alberta); Carlos Lange (University of Alberta)</td>
<td>Effect of Flow and Elasticity on Nematic Liquid Crystals Lubricants: Anesh Mishra (University of British Columbia); Dana Greco (University of British Columbia)</td>
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<td>11:20 AM - 11:40 AM</td>
<td>Variational Data Assimilation Using a Polydisperse Gaussian Model for Short Range Atmospheric Dispersion Of Radioactivity François Forgues; James McDonald; University of Ottawa; Vladimir Konakovich; Luke Lebel; Lucian Iovan (Canadian Nuclear Laboratories)</td>
<td>Variational Data Assimilation Using a Polydisperse Gaussian Model for Short Range Atmospheric Dispersion Of Radioactivity François Forgues; James McDonald; University of Ottawa; Vladimir Konakovich; Luke Lebel; Lucian Iovan (Canadian Nuclear Laboratories)</td>
<td>Analyzing the Effect of Rheology of Non-Newtonian Fluids in Gas Dispersion With a Coastal Bore Through Tomography and CFD Marjam Jamsheibzadeh (Ryerson University); Farhad Eni-Mozaffari (Ryerson University); Ali Lohi (Ryerson University)</td>
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<td>11:40 AM - 12:00 PM</td>
<td>Numerical Solution of Multiphase Flow Using New High-Order Moment-Based Subcell Methods Andree-Aim Demeulenaere (University of Ottawa); François Forgues (Université Laval); James McDonald (University of Ottawa); Lucian Iovan (Canadian Nuclear Laboratories)</td>
<td>Large Eddy Simulation of Taylor-Couette Flow Mohammad Mohammad (University of British Columbia); Joshua Brinkerhoff (University of British Columbia)</td>
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End of the CSME-CFDSC Congress 2019
## CSME Symposia Organizers

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