2017 IEEE 30th Canadian Conference on Electrical and Computer Engineering (CCECE 2017)

Windsor, Ontario, Canada
30 April - 3 May 2017

Pages 1-592

Additional Copies of This Publication Are Available From:

CURRAN ASSOCIATES INC.
proceedings
.com

Monday, May 1, 10:20 – 11:00

A2 –Industry Keynote Speaker: Industry Keynote

Room: Augustus I

Monday, May 1, 11:00 – 12:30

BIO–A1: Bioengineering

Room: Augustus III
Chair: Ana Luisa Trejos (Western University, Canada)
11:00 A Sensorized Glove for Therapist Skill Performance Assessment During Neck Manipulation.....1
> Abelardo Escoto (The University of Western Ontario, Canada); Ana Luisa Trejos, David Walton and Jackie Sadi (Western University, Canada)

11:18 Development and Evaluation of a Sensorized Shoulder Simulator.....5
> Behnaz Poursartip (Western University & Canadian Surgical Technologies & Advanced Robotics (CSTAR), Canada); Laura McCracken (Western University, Canada); Abelardo Escoto (The University of Western Ontario, Canada); Rajni Patel (Canadian Surgical Technologies & Advanced Robotics, Canada); Marie–Eve LeBel and Ana Luisa Trejos (Western University, Canada); Michael D Naish (University of Western Ontario, Canada)

11:36 Tracking of the Internal Jugular Vein in Ultrasound Images Using Optical Flow.....9
> Ebrahim Karami and Mohamed S Shehata (Memorial University of Newfoundland, Canada); Andrew Smith (Memorial University, Canada)

11:54 Time–Domain Monitoring of EM Exposure During Medical Device Testing.....13
> Ali Attaran and William Handler (University of Western Ontario); Ravi Menon (University of Western Ontario, Canada); Blaine Chronik (University of Western Ontario)

12:12 Portable High–Frequency Device for Cosmetic and Clinical Fingernail Assessment.....17
> Rares Vacarescu (University of Windsor & Institute for Diagnostic Imaging Research, Canada); Bartosz Slak and Anna Maeva (Coworker, Canada); Roman Gr. Maev (University of Windsor, Canada)

IOT–A1: Mini–conference

Room: Augustus IV
Chair: Ahmed Refaey (Manhattan College, USA & Western University, Canada)
11:00 IOT: Advance Physical Signaling Methods for Power Line Networking System.....21
> Jason Falbo (Mircom Group, Canada); Ahmed Refaey (Manhattan College, USA & Western University, Canada); Raveendra Kolarramakrishna Rao (University of Western Ontario, Canada); Khaled Loukhaoukha (Laval University, Canada)

SP−A1: Signal Theory & Signal Processing

Room: Luna
Chair: Anh Dinh (University of Saskatchewan, Canada)

11:00 An Approach to Detect Branches and Seedpods Based on 3D Image in Low−Cost Plant Phenotyping Platform.....26

Anh Dinh, Thang Cao, Karim Panjvani and Khan A Wahid (University of Saskatchewan, Canada); Pankaj Bhowmik (National Research Council Canada, Canada)

11:18 Detection of Potato Diseases Using Image Segmentation and Multiclass Support Vector Machine.....30

Monzurul Islam, Anh Dinh and Khan A Wahid (University of Saskatchewan, Canada); Pankaj Bhowmik (National Research Council Canada, Canada)

11:36 Spatially Constrained Non−Gaussian Mixture Model for Image Segmentation.....34

Jai Puneet Singh and Nizar Bouguila (Concordia University, Canada)

11:54 Data−driven Image Stylization Using Graph−based Filtering.....38

Hamidreza Sadreazami, Amir Asif and Arash Mohammadi (Concordia University, Canada)

12:12 A Video Processing System for Automated Traffic Data Collection of Gap Size for Roundabouts.....42

Hai Dinh (University of Alabama in Huntsville, USA); Hua Tang (University of Minnesota Duluth, USA)

POW−A1: Power & Energy Circuits & Systems

Room: Martis
Chair: Ahmed Awad (University of Arkansas at Little rock & University of Arkansas at Little rock, USA)

11:00 Impact of Distributed Generation on the Operation of Load Tap Changers in Canadian Suburban Benchmark Distribution Network.....46

Ahmed Awad (CanmetENERGY, Natural Resources Canada, Canada & Faculty of Engineering, Ain Shams University, Egypt); Dave Turcotte (CanmetENERGY, Natural Resources Canada, Canada); Tarek El Fouly (Khalifa University, United Arab Emirates (UAE)); Alexandre Prieur (CanmetENERGY, Natural Resources Canada, Canada)

11:18 Performance Evaluation of Yaw and Stall Control for Small−Scale Variable Speed Wind Turbines.....51

Ebrahim Mohammadi (Graduate University of Advanced Technology, Iran); Roohollah Fadaeinedjad (Gaduate University of Advanced Technology, Iran); Hamid Shariatpanah (Graduate University of Advanced Technology); Gerry Moschopoulos (University of Western Ontario, Canada)

11:36 Linearized Power Flow for Stochastic Optimization.....55

Dawit Teshome (National Taiwan University of Science and Technology, Taiwan); Melkamsew

Enyew (University of Brescia, Italy)

11:54 Practical Method of Power Network Topology Analysis Based on Switch Classification.....59
Cheng Long, Dahai You, Li Dai and Zhen Mei (Huazhong University of Science and Technology, P.R. China); Guoyan Chen, Guojun Lu and Yong Wang (Guangzhou Power Supply Co., Ltd, P.R. China)

COM−A1: Communications and Networks

Room: Mercuri
Chair: Saneeha Ahmed (University of Windsor, Canada & NED University of Engineering and Technology, Pakistan)

COM−A1.1 11:00 An Efficient Solution to the Socialist Millionaires' Problem.....64
Maryam Hezaveh and Carlisle Adams (University of Ottawa, Canada)

COM−A1.2 11:18 A Stochastic Gamer's Model for On−Line Games.....68
Youry Khmelevsky and Hassan Mahasneh (Okanagan College, Canada); Gaétan J. D. R. Hains (Huawei Technologies Co. Ltd., France)

COM−A1.3 11:36 A Probabilistic Process Learning Approach for Service Composition in Cloud Networks.....72
Ismaeel Al Ridhawi (American University of the Middle East & University of Ottawa, Kuwait); Yehia Kotb (American University of the Middle east, Kuwait); Moayad Aloqaily (Carleton University, Canada); Burak Kantarci (University of Ottawa, Canada)

COM−A1.4 11:54 Iterative Multicast Scheduling Algorithm for Input−Queued Switch with Variable Packet Size.....78
Jie Xiao and Lawrence Kwan Yeung (The University of Hong Kong, Hong Kong)

COM−A1.5 12:12 Analysis and Design of Serial Error Correction Code with Crosstalk Avoidance Technique.....82
Ge Chen (University of new South Wales, Australia); Saeid Nooshabadi (Michigan Technological University, USA)

SS4−A1: Special Session 4

Computer Aided EM Based High Frequency Modeling and Design Optimization
Room: Saturni
Chairs: Mohamed Bakr (McMaster University, Canada), Vijay Devabhaktuni (The University of Toledo, USA)

11:00 Investigating the Effect of Arc Perturbation on SIW Cavity Backed Slot Antenna.....86
Elham Baghernia (Concordia University, Canada); Mohammad Reza Chaharmir (Communications Research Centre, Canada); Abdel R. Sebak (Concordia University, Canada)

11:18 A Slow−Wave Substrate Integrated Waveguide Dual−band Filter.....89
Abhishek Sahu (University of Toledo, USA); Vijay Devabhaktuni (The University of Toledo, USA); Osama Hussein and Blen Keneni (University of Toledo, USA); Khair Al shamaileh

(Purdue University, Northwest, USA)

11:36 Optimization of Miniaturized Single— And Multiband CPW—based Matching Transformers for RF Circuitry on LCP Substrates Transformers for RF Circuitry on LCP Substrates.....92

Abhishek Sahu, Osama Hussein and Blen Keneni (University of Toledo, USA); Khair Al shamaileh (Purdue University, Northwest, USA); Vijay Devabhaktuni (The University of Toledo, USA)

11:54 Maxwellian Formulation of Adjoint Sensitivity AnalysisUsing the FDTD Method.....95

Mohamed Bakr (McMaster University, Canada); Atef Elsherbeni (Colorado School of Mines, USA); Veysel Demir (Northern Illinois University, USA)

12:12 Second—Order Adjoint Sensitivities: An Alternative Formulation.....97

Mohamed Bakr (McMaster University, Canada); Atef Elsherbeni (Colorado School of Mines, USA); Veysel Demir (Northern Illinois University, USA)

Monday, May 1, 14:00 — 15:30

BIO—A2: Bioengineering

Room: Augustus III
Chair: Rashid Rashidzadeh (University of Windsor, Canada)

14:00 Two—Electrode ECG Measurement Circuit Using a Feed Forward CMRR Enhancement Method.....99

Esrafil Jedari, Rashid Rashidzadeh, Mitra Mirhassani and Majid Ahmadi (University of Windsor, Canada)

14:18 Weighted Informative Inverse Active Class Selection for Motor Imagery Brain Computer Interface.....103

Ibrahim Hossain, Abbas Khosravi and Saeid Nahavandi (Deakin University, Australia)

14:36 Small Footprint High Gain and Low Noise Figure Preamplifier for 7T MRI Scanner.....108

Ali Attaran, Kyle Gilbert and Blaine Chronik (University of Western Ontario); Ravi Menon (University of Western Ontario, Canada)

14:54 A Comprehensive Filter to Reduce Drift from Euler Angles, Velocity, and Position Using an IMU.....113

S. Amir Mousavi Lajimi and John McPhee (University of Waterloo, Canada)

15:12 Design, Fabrication, and Test of Flexible Thin—Film Microelectrode Arrays for Neural Interfaces.....N/A

Mohammad Sadegh Nahvi (K. N. Toosi University of Technology, Iran); Farhad Akbari Boroumand (KNTU, Iran); Mohammad Hossein Maghami (Shahid Rajaee Teacher Training University, Iran); Amir Sodagar (York University, Canada); Amir Shojaei and Javad Mirnajafi—Zadeh (Faculty of Medical Sciences, Tarbiat Modares University, Iran)

IOT-A2: Mini-conference

Room: Augustus IV
Chair: Ahmed Refaey (Manhattan College, USA & Western University, Canada)
14:00 Robust Rank Aggregation Method for Case-Base Effort Estimation.....119
    Ali Bou Nassif (University of Sharjah, United Arab Emirates (UAE)); Mohammad Azzeh
    (Applied Science University, Jordan); Shadi Banitaan (University of Detroit Mercy, USA)

14:18 IoT-Based Multifunctional Scalable Real-Time Enhanced Road Side Unit for Intelligent Transportation Systems.....124
    Arafat Al-Dweik (Khalifa University, United Arab Emirates (UAE)); Radu Muresan, Matthew
    Mayhew and Mark Lieberman (University of Guelph, Canada)

SP-A2: Signal Theory & Signal Processing

Room: Luna
Chair: Esam Abdel-Raheem (University of Windsor, Canada)
14:00 Time-Delay Lifts for Physiological Signal Exploration: An Application to ECG Analysis.....130
    Benjamin A Fraser, Mark Wachowiak and Renata Wachowiak-Smolikova (Nipissing University,
    Canada)

14:18 Regression Based Algorithms for Predicting Age of an Arabidopsis Plant.....134
    Anh Dinh, Karim Panjvani and Khan A Wahid (University of Saskatchewan, Canada); Pankaj
    Bhowmik (National Research Council Canada, Canada)

14:36 Robust Adaptive Beamforming Using Convex Optimization.....138
    Ahmad Khan (The University of Toronto, Canada); Zahid Ali (Centennial College, Toronto,
    Canada)

14:54 A Null Space Approach for Complete and Over-Complete Blind Source Separation of Autoregressive Source Signals.....143
    Luay Yassin Taha and Esam Abdel-Raheem (University of Windsor, Canada)

15:12 Multi-track 2D Joint Signal Detection and Decoding for TDMR System Using Single Parity-check Coding.....147
    Mohammed Almustapha (Plymouth University, United Kingdom (Great Britain))

POW-A2: Power & Energy Circuits & Systems

Room: Martis
Chair: Mohamed E. El-Hawary (Dalhousie University, Canada)
14:00 A New Technique to Locate Faults in Distribution Networks Based on Optimal Coordination of Numerical Directional Overcurrent Relays.....153
    Ali Al-Roomi (Dalhousie University & College of Engineering, Canada); Mohamed E. El-
    Hawary (Dalhousie University, Canada)

14:18 Optimal Coordination of Directional Overcurrent Relays Using Hybrid BBO-LP

Algorithm with the Best Extracted Time−Current Characteristic Curve.....159

Ali Al−Roomi (Dalhousie University & College of Engineering, Canada); Mohamed E. El−Hawary (Dalhousie University, Canada)

14:36 A New Realistic Optimization−Free Economic Load Dispatch Method Based on Maps Gathered from Sliced Fuel−Cost Curves.....165

Ali Al−Roomi (Dalhousie University & College of Engineering, Canada); Mohamed E. El−Hawary (Dalhousie University, Canada)

14:54 Bus Differential Protection Scheme Using Real−time Synchrophasor Data.....171

Yujie Yin and Zhiying Zhang (GE Grid Solutions, Canada); Yong Fu (Mississippi State University, USA)

15:12 GENTPJ Model Dynamic Performance: Analysis on D-axis Open Circuit Time Constants.....177

Wang and John Zong (Powertech Labs Inc., Canada)

COM−A2: Communications and Networks

Room: Mercuri
Chair: Kasun T. Hemachandra (University of Calgary, Canada)
14:00 Power Control Schemes for Full−Duplex Device−to−Device Networks Underlaying a Primary Full−Duplex Network.....181

Kasun T. Hemachandra and Abraham O Fapojuwo (University of Calgary, Canada)

14:18 Joint Resource Allocation and Dynamic Base Station Activation in Energy Harvesting HetNets.....185

Sudha Lohani (The University of British Columbia, Canada); Ekram Hossain (University of Manitoba, Canada); Vijay Bhargava (University of British Columbia, Canada)

14:36 User−Centric Network Selection in Wireless Heterogeneous Networks.....191

Hanaa AlNashwan and Anjali Agarwal (Concordia University, Canada)

14:54 Mobility Management for D4D in HetNet.....197

Allafi Omran (University of Quebec & Ecole de Technologie Supérieure, Canada); Abderrahmane BenMimoune (University of Quebec − ETS, Canada); Kadoch Michel (ETS University of Quebec, Canada)

15:12 An Efficient Flow Monitoring Scheme for SDN Networks.....202

Ze Yang and Lawrence Kwan Yeung (The University of Hong Kong, Hong Kong)

IF: Industrial Forum

Room: Saturni

Monday, May 1, 15:50 − 17:20

DEV−A3: Devices, Circuits, and Systems

Room: Augustus IV
Chair: Lei Zhang (University of Regina, Canada)

15:50 Design of a Neural Network Based Power System Stabilizer in Reduced Order Power System.....206
Mohamed Masrob (Memorial University, Canada); Aziz Rahman (IEMD − Chair, Canada); Glyn George (Memorial University of Newfoundland, Canada)

16:08 Artificial Neural Network Model Design and Topology Analysis for FPGA Implementation of Lorenz Chaotic Generator.....212
Lei Zhang (University of Regina, Canada)

16:26 Nonlinear Time−Domain Macromodeling Using Proper Orthogonal Decomposition and Feedforward Neural Networks.....216
Marwan Kanaan and Roni Khazaka (McGill University, Canada)

16:44 Cognitive Domain Ontologies in Lookup Tables Stored in a Memristor String Matching Architecture.....220
Nayim Rahman, Chris Yakopcic, Tanvir Atahary, Raqibul Hasan and Tarek Taha (University of Dayton, USA); Scott Douglass (Air Force Research Laboratory, USA)

17:02 Reconfigurable Self−Calibrated Multi−Sensing RFID−based Platform.....224
Mohamed Zgaren (Polytechnique Montreal, Canada); Abbes Amira (Qatar University, Qatar); Mohamad Sawan (Polytechnique Montréal, Canada)

BIO−A3: Bioengineering

Room: Luna
Chair: Mitra Mirhassani (University of Windsor, Canada)

15:50 Wearable Device for Increasing the Slow Wave Sleep Stage by Electrocutaneous Stimulation.....228
Francia Dauz, Emil Strumban and Roman Gr. Maev (University of Windsor, Canada)

16:08 Wearable Bio−instrument for Detecting Body Movement Based on Strain Gauges.....231
Cherif Zizoua (Ecole Polytechnique de Montréal & University of Sciences and Technololy Houari Boumediene, Canada); Sofiane Achiche (Ecole Polytechnique de Montréal, Canada); Samir Boukhenous and Mokhtar Attari (Houari Boumediene University, Algeria); Maxime Raison (École Polytechnique de Montréal, Canada)

16:26 A PCA Based Feature Reduction in Intracranial Hypertension Analysis.....235
Parisa Naraei and Alireza Sadeghian (Ryerson University, Canada)

16:44 Using Daubechies Wavelet Functions to Generate Masks for Accurate QRS Detection.....241
Mike Eklund and Xinqi Wang (University of Ontario Institute of Technology, Canada)

SP—A3: Signal Theory & Signal Processing

Room: Luna

Chair: Mounir Boukadoum (Université du Québec à Montréal, Canada)

15:50 Feature Fusion Techniques Based Training MLP for Speaker Identification System.....245

Najiya Omar (Dalhousie UNversity, Canada); Mohamed E. El—Hawary (Dalhousie University, Canada)

16:08 HMM/MLP Speech Recognition System Using a Novel Data Clustering Approach.....251

Lilia Lazli (École de Technologie Supérieure, Montreal, Canada); Mounir Boukadoum (Université du Québec à Montréal, Canada); Otmane Ait Mohamed (Concordia University, Canada)

16:26 Performance Evaluation of Mixtures of PLDA and Conventional PLDA for a Small—Set Speaker Verification System.....255

Qianhui Wan and Martin Bouchard (University of Ottawa, Canada)

16:44 Acoustic Environment Classification Using Discrete Hartley Transform Features.....259

Hitham Jleed and Martin Bouchard (University of Ottawa, Canada)

17:02 Speech Enhancement Using Both Spectral and Spectral Modulation Domains.....263

Julien Bosco (University of Sherbrooke, Canada); Eric Plourde (Université de Sherbrooke, Canada)

POW—A3: Power & Energy Circuits & Systems

Room: Martis

Chair: Gerry Moschopoulos (University of Western Ontario, Canada)

15:50 An Electrical Model for Energy Efficiency Evaluation of NiMH Batteries.....267

Ahmed Zurfi and Jing Zhang (University of Arkansas at Little Rock, USA)

16:08 A Novel High Gain DC—DC Full—Bridge Converter for Low Voltage Renewable Energy Applications.....273

Adel Alganidi and Adel Ali Abosnina (Western University, Canada); Gerry Moschopoulos (University of Western Ontario, Canada)

16:26 A Novel Gray System Theory Based Core Loss Estimation Method for VSI Fed Induction Machines.....277

Min Zhu, Wensong Hu, Jimi Tjong and Narayan Kar (University of Windsor, Canada)

16:44 A Seamless Control Scheme for a Microgrid with Renewable Energy Sources.....281

Hamed Taheri (École de Technologie Stupérieure, Canada); Shamsodin Taheri (Université du Québec en Outaouais, Canada); Edris Pouresmaeil (Polytechnic University of Catalonia, Spain)

COM—A3: Communications and Networks

Room: Mercuri

Chair: Qusay Mahmoud (University of Ontario Institute of Technology, Canada)

15:50 Normal and Anomalous Traffic Flow Pattern Analysis for Organizational Networks.....286
 Safia Rahmat, Quamar Niyaz, Ahmad Y Javaid and Weiqing Sun (University of Toledo, USA)

16:08 A Comparison of Low Cost Wireless Communication Methods for Remote Control of Grid−Tied Converters.....290
 Terashmila Kumbalatara Arachchige Lasagani, Tariq Iqbal and George Mann (Memorial University of Newfoundland, Canada)

16:26 An Intrusion Detection Framework for the Smart Grid.....294
 Imtiaz Ullah (UOIT, Canada); Qusay Mahmoud (University of Ontario Institute of Technology, Canada)

16:44 A Comparative Analysis of AES Common Modes of Operation.....299
 Sultan Almuhammadi (King Fahd University of Petroleum & Minerals, Saudi Arabia); Ibraheem Al−Hejri (King Fahd University of Petroleum and Minerals, Saudi Arabia)

17:02 Optimization of Secrecy Rate in Cooperative Device to Device Communication.....303
 Maryam Alibeigi and Abbas Taherpour (Imam Khomeini International University, Iran); Saeed Gazor (Queen's University, Canada)

WIE: Women in Engineering

Room: Saturni

Tuesday, May 2

Tuesday, May 2, 09:00 − 10:00

B1 − Keynote Speaker: Keynote 2

Recent Research Trends in Applied Electromagnetics

Electromagnetic theory is one of the greatest achievements of physics in the 19th century. Despite its long history of development, due to its fundamental nature and broad base, research in applied electromagnetics is still vital and going strong. In recent years electromagnetic has played a major role in wide range of disciplines, including communications, remote sensing of environment, defense, medicine, etc., with significant societal impact. To transform ideas into reality in many of these disciplines, the fundamental understanding of electromagnetic wave generation, propagation, and interaction with their environment over a wide spectrum is needed. The growth and vitality in EM research has been fueled by an increasing demand for anytime/anywhere information and data, security, and global monitoring of the environment, as well as significant advancements in other related science and engineering disciplines particularly in computers and materials. This lecture will provide an overview of recent research trends in applied electromagnetics. Many of the examples of research applications will be presented, all drawn from Professor Sarabandi's research activities.

Tuesday, May 2, 10:20 – 12:10

CMP-B1: **Computer & Software Techniques**

Room: Augustus III
Chair: Ebrahim Ghafar-Zadeh (York University, Canada)
10:20 A Context-Aware Authentication Framework for Smart Homes.....308
  Yosef Ashibani (UOIT, Canada); Dylan Kauling and Qusay Mahmoud (University of Ontario Institute of Technology, Canada)

10:38 Low-Cost and Open Source SCADA Options for Remote Control and Monitoring of Inverters.....313
  Sarinda Lahiru Jayasinghe (Memorial University of Newfoundland); Tariq Iqbal and George Mann (Memorial University of Newfoundland, Canada)

10:56 SAPPP: **The Software-Aware Power and Performance Profiler.....317**
  Saman Khoshbakht and Nikitas Dimopoulos (University of Victoria, Canada)

11:14 Toward Age-related Macular Degeneration (AMD) Big Data: **Hardware and Software Design and Implementation.....323**
  Navid Mohaghegh, Ebrahim Ghafar-Zadeh and Sebastian Magierowski (York University, Canada)

11:32 A Content-Based Data Masking Technique for A Built-In Framework in Business Intelligence Platform.....327
  Abdelkader Ouda and Osama Ali (University of Western Ontario, Canada)

11:50 A Framework for Extending Resources of Embedded Systems Using the Cloud.....331
  Mohammad Jassas, Jortin Mathew and Akramul Azim (UOIT, Canada); Qusay Mahmoud (University of Ontario Institute of Technology, Canada)

DEV-B1: **Devices, Circuits, and Systems**

Room: Augustus IV
Chair: Mitra Mirhassani (University of Windsor, Canada)
10:20 A CMOS Differential DCO with Amplitude Stabilization for 24GHz Automotive Radars.....336
  Iman Taha and Mitra Mirhassani (University of Windsor, Canada)

10:38 Are Standalone Gate Size and VT Optimization Tools Useful?.....340
  Anitha Kumari Yella (University of Texas at Dallas & Maxlinear, USA); Srivatsa Gunturi and Carl Sechen (University of Texas at Dallas, USA)

10:56 A New Scheme for High Frequency Ultrasound Generation.....346
  Sazzadur Chowdhury and Varshitha Yashvanth (University of Windsor, Canada)

11:14 An Efficient Optimal Clock Network Buffer Sizing with Slew Consideration.....350
  Ali Farshidi (University of Calgary & University of Calgary, Canada); Logan Rakai and Laleh

Behjat (University of Calgary, Canada)

11:32 A Study of Maximum Frequency in FPGA Chips Using Mesh and Toroid Circuit Topologies.....354

Naraig Manjikian (Queen's University, Canada)

11:50 Surface Micromachined RF MEMS SP9T Switch for 60 GHz ISM Band Antenna Sectoring Applications.....360

Anushruti Jaiswal (CARE, IIT Delhi, India); Sukomal Dey (Indian Istitute of Technology, Delhi, India); Mahesh Abegaonkar (IIT Delhi, India); Shiban K Koul (Indian Institute of Technology Delhi, India)

SP−B1: Signal Theory & Signal Processing

Room: Luna
Chair: Aryaz Baradarani (University of Windsor, Canada)

10:20 Implementation of Advanced Signal Processing Techniques on Line−Scan Thermography Data.....364

Fariba Khodayar, Fernando Lopez and Clemente Castanedo (Laval University, Canada); Xavier Maldague (Université Laval, Canada)

10:38 Efficient Feature Extraction in Ultrasonic Spot Weld Inspection.....368

Aryaz Baradarani (University of Windsor, Canada); Leili Mohammad Khanli (University of Tabriz); Andriy Chertov, W. P. Regalado and Roman Gr. Maev (University of Windsor, Canada)

10:56 Joint Power Control and Beamformer Design with Antenna Selection.....372

Faika Hoque (Ecole de Polytechnique, Canada); Yvon Savaria (École Polytechnique de Montréal, Canada); Christian Cardinal (Ecole Polytechnique de Montréal, Canada)

11:14 Realtime Implementation of an Internal−Model−Principle Signal Identifier.....376

Edris Mohsen and Lyndon J Brown (Western University, Canada)

11:32 Performance Analysis of Adaptive Widely Linear Beamformers.....381

Walter Orozco and Arturo Peralta−Sevilla (Universidad Politécnica Salesiana); Hector Perez−Meana (National Polytechnic Institute of Mexico, Mexico); Mariko Nakano−Miyatake (National Polytechnic Institute of Mexico & Mechanical−Electrical Engineering School, Mexico)

11:50 Detection of Unknown Applications in Smartphones: A Signal Processing Perspective.....387

Robin Joe Prabhahar Soundar Raja James (University Of Waterloo, Canada); Abdurhman Albasir, Kshirasagar Naik, Mohamed−Yahia Dabbagh and Prajna Dash (University of Waterloo, Canada); Marzia Zaman (Cistel Technology Inc., Canada); Nishith Goel (Cistel, Canada)

POW−B1: Power & Energy Circuits & Systems

Room: Martis
Chair: Magdy Salama (University of Waterloo, Canada)

10:20 A Study of Capacitor Element Failures in High Voltage Shunt Capacitor Banks.....393

Hessamoddin Jouybari−Moghaddam (Western Unuversity, Canada); Tarlochan Sidhu (University of Ontario Institute of Technology, Canada)

10:38 Review and Development of MMC Employed in VSC−HVDC Systems.....397

Hadi Alyami and Yasser Mohamed (University of Alberta, Canada)

10:56 A Stochastic−Based Algorithm for Optimal Feeder Routing of Smart Distribution Systems.....403

Haytham Ahmed, Ayman B. Eltantawy and Magdy Salama (University of Waterloo, Canada)

11:14 A Three−Phase AC−DC Converter with Transformer Isolation and Reduced Number of Switches.....407

Javad Khodabakhsh (University of Western Ontario); Gerry Moschopoulos (University of Western Ontario, Canada)

11:32 Adaptive Internal Model Control Based Ripple Rejection for Improved Response of PFC Rectifiers.....411

Zhenyu Zhao (Mohawk College, Canada)

11:50 The Effect of Alternative Power Distribution Supply to Reliability Indexes at Mahasawat Water Treatment Plant.....417

Soraphon Kigsirisin and Sirawit Pussawiro (Metropolitan Waterworks Authority, Thailand); Onurai Noohawm (Kasetsart University, Thailand)

COM−B1: Communications and Networks

Room: Mercuri
Chair: Farah Mohammadi (Ryerson University, Canada)

10:20 Three−Dimensional Path Planning Model for Mobile Anchor−Assisted Localization in Wireless Sensor Networks.....421

Abdullah Alomari (Dalhousie Uinversity, Canada & Albaha University, Saudi Arabia); Nauman Aslam (Northumbria University, United Kingdom (Great Britain)); William Phillips (Dalhousie University, Canada); Frank D Comeau (St. Francis Xavier University, Canada)

10:38 EAM: Energy Aware Mobility over Wireless Sensor Networks.....426

Amine Boubekri (Unievrsité du Québec à Montréal, Canada); Wessam Ajib and Mounir Boukadoum (Université du Québec à Montréal, Canada)

10:56 IMRP: Interference−aware Multicast Routing for Wireless Mesh Networks.....432

Behzad Farmani and Muhammad Jaseemuddin (Ryerson University, Canada); Omar Batarfi (Kau, Saudi Arabia)

11:14 Using Friendly Jamming to Improve Route Security and Quality in Ad Hoc Networks.....438

Mark Adams and Vijay Bhargava (University of British Columbia, Canada)

11:32 A Energy−efficient Routing Algorithm in ZigBee−Based Cluster Tree Wireless Sensor

Networks.....444
    Furat Al−Obaidy (Ryerson University, Canada); Hossien Zereshkian (Circuit Plus Inc., Canada); Farah Mohammadi (Ryerson University, Canada)

CTL−B1: Controls & Robotics

Room: Saturni
Chair: Roozbeh Razavi−Far (University of Windsor, Canada)
10:20 Microcontroller Based Supervisory Control of a Solar Tracker.....449
    Kevin Searle and Shahin Hashtrudi−Zad (Concordia University, Canada)

10:38 Design of an Adaptable Tooling System for Part to Part Variation Processing.....455
    Boris Novakovic (University of Windsor, Canada); Waguih ElMaraghy (University of windsor, Canada); Hoda El−Maraghy (, Canada)

10:56 Adaptive State−Space Model Approximation for Quadcopter Using Fast Orthogonal Search.....461
    Peter Travis Jardine (Queen's University, Canada); Sidney Givigi (Royal Millitary College of Canada, Canada); Shahram Yousefi and Michael Korenberg (Queen's University, Canada)

11:14 Modeling and Analysis of an HVAC System for the S.J. Carew Building at Memorial University.....467
    Almahdi Abdo−Allah (Memorial University, Canada); Tariq Iqbal and Kevin Pope (Memorial University of Newfoundland, Canada)

11:32 Prediction Interval−based Controller for Chemical Reactor.....471
    Mohammad Anwar Hosen (Institute for Intelligent Systems Research and Innovation (IISRI), Deakin University, Australia); Saeid Nahavandi and Abbas Khosravi (Deakin University, Australia); Peng Shi (University of Adelaide, Indonesia); Lachlan Sinnott (HPS Engineering, VIC, Australia)

11:50 Distinguishing Levels of Challenge from Physiological Signals for the Robot−Assisted Rehabilitation System, RehabRoby.....475
    Yunus Palaska (Yeditepe University, Turkey); Huseyin Erdogan (Middle East Technical University, Turkey); Hazim Ekenel (Istanbul Technical University, Turkey); Engin Masazade and Duygun Erol Barkana (Yeditepe University, Turkey)

Tuesday, May 2, 13:30 − 15:00

CMP−B2: Computer & Software Techniques

Room: Augustus III
Chair: Rashid Rashidzadeh (University of Windsor, Canada)
13:30 Decimal Floating−Point Multiplier With Binary−Decimal Compression Based Fixed−Point Multiplier.....479
    Dhamin Al−Khalili (Royal Military College of Canada, Canada); Pierre J.M. Langlois (Ecole

Polytechnique de Montreal, Canada); Noureddine Chabini (Royal Military College of Canada, Canada)

13:48 Fast Estimation of Tridiagonal Matrices Largest Eigenvalue.....485
Diego F G Coelho and Vassil Dimitrov (University of Calgary, Canada)

14:06 Utilizing Minecraft Bots to Optimize Game Server Performance and Deployment.....489
Matt Cocar, Reneisha Harris and Youry Khmelevsky (Okanagan College, Canada)

14:24 EYE on HMI: A Framework for Monitoring Human Machine Interfaces in Control Rooms.....494
Harsh Singh (UOIT, Canada); Qusay Mahmoud (University of Ontario Institute of Technology, Canada)

14:42 Continuous Integration Platform for Arduino Embedded Software.....499
Wade Penson (University of British Columbia, Canada); Eric Huang, Dana Klamut, Eliana Wardle and Graeme Douglas (University of British Columbia Okanagan, Canada); Scott Fazackerley (University of British Columbia, Canada); Ramon Lawrence (University of British Columbia Okanagan, Canada)

BIO-B2: Bioengineering

Room: Augustus IV
Chair: Arash Ahmadi (University of Windsor, Canada & University of Southampton, United Kingdom (Great Britain))

13:30 Optimizing Classifier Performance for Parkinson's Disease Detection.....503
Najiya Omar (Dalhousie UNversity, Canada); Mohamed E. El-Hawary (Dalhousie University, Canada)

13:48 Performance Evaluation of Denoising Based Approximate Message Passing (D-AMP) Algorithm from Noisy Under-sampled CT Images.....509
Ahmed Hasan, Khan A Wahid and Paul Babyn (University of Saskatchewan, Canada)

14:06 Using GA to Optimize the Explicitly Defined Skin Regions for Human SkinColor Detection.....513
Eman Hassan, Allaa R. Hilal and Otman Basir (University of Waterloo, Canada)

14:24 Lung Cancer Classification Using Deep Learned Features on Low Population Dataset.....517
Syed Moshfeq Salaken and Abbas Khosravi (Deakin University, Australia); Amin Khatami (Islamic Azad University, Parand Branch, Iran); Saeid Nahavandi (Deakin University, Australia); Mohammad Anwar Hosen (Institute for Intelligent Systems Research and Innovation (IISRI), Deakin University, Australia)

SP-B2: Signal Theory & Signal Processing

Room: Luna
Chair: Roberto Muscedere (University of Windsor, Canada)

13:30 Sparse Representation and Low−Rank Approximation for Sensor Signal Processing.....522
Yanping Zhu (Changzhou University, P.R. China); Aimin Jiang and Xiaofeng Liu (Hohai University, P.R. China); Hon Keung Kwan (University of Windsor, Canada)

13:48 Variable Tap−Length Algorithm Using Lattice Structured LMS Adaptive Filters.....527
Salem Alsaid, Esam Abdel−Raheem and Mohammed Khalid (University of Windsor, Canada); Khaled A Mayyas (Jordan University of Science and Technology, Jordan)

14:06 FIR Filter Design Using Multiobjective Artificial Bee Colony Algorithm.....532
Hon Keung Kwan and Rija Raju (University of Windsor, Canada)

14:24 Fusion of Structure Adaptive Filtering and Mathematical Morphology for Vessel Segmentation in Fundus Images of Infants with Retinopathy of Prematurity.....536
K. L. Nisha (National Institute of Technology Calicut, India); Sreelekha G (National Institute Of Technology, India); Sathidevi Puthumangalathu Savithri (National Institute of Technology Calicut, India); Poornima Mohanachandran (i2iTeleSolutions and TeleMedicine Pvt Ltd, Bangalore, India); Anand Vinekar (Narayana Nethralaya Postgraduate Institute of Ophthalmology, India)

14:42 Automated Epileptic Seizure Detection in EEGs Using Increment Entropy.....542
Xiaofeng Liu, Aimin Jiang and Ning Xu (Hohai University, P.R. China)

POW−B2: Power & Energy Circuits & Systems

Room: Martis
Chair: Vince Green (Stantec Consultant Company, Canada)
13:30 A Novel Approach in Smart Ventilation Using Wirelessly Controllable Dampers.....546
Anthony Forest (George Brown College, Canada); Amir Shabani (George Brown College & University of Waterloo, Canada)

13:48 BESS Connection Impact Assessment: Considerations, Modeling and Case Study.....550
Mehrdad Boloorchi and Mehrdad Rostami (Stantec Consultant Company); Vince Green (Stantec Consultant Company, Canada)

14:06 Two−Stage Cooperative Modular−Based Approach for Solving Online Optimal Power Flow Problems.....554
Jamal Busnaina and Ramadan ElShatshat (University of Waterloo, Canada)

14:24 Modeling and Analysis of Torque Ripple in a Brushless DC Motor Considering Spatial Harmonics.....558
Junxi Cai, Chunyan Lai and Narayan Kar (University of Windsor, Canada)

COM−B2: Communications and Networks

Room: Mercuri
Chair: Kemal Tepe (University of Windsor, Canada)

13:30 Energy Efficiency Analysis of a C−RAN with Distance−Based Power Control.....562

Fatemeh Ghods, Abraham O Fapojuwo and Fadhel Ghannouchi (University of Calgary, Canada)

13:48 Evaluating Trust Models for Improved Event Learning in VANETs.....567

Saneeha Ahmed (University of Windsor, Canada & NED University of Engineering and Technology, Pakistan); Kemal Tepe (University of Windsor, Canada)

14:06 Energy Aware Resource Allocation for Optical Grid Networks.....571

Jay Raichandani, Saja Al Mamoori and Arunita Jaekel (University of Windsor, Canada)

14:24 Minimizing Attack Radius of Scheduled Connections in WDM Networks.....575

Meenakshi Nizampatnam, Saja Al Mamoori and Arunita Jaekel (University of Windsor, Canada)

14:42 Dynamic Provisioning of Fault Tolerant Optical Networks for Data Centers.....579

Ruchisree Das, Subir Bandyopadhyay, Saja Al Mamoori and Arunita Jaekel (University of Windsor, Canada)

CTL−B2: Controls & Robotics

Room: Saturni
Chair: Ali Zilouchian (Florida Atlantic University, USA)

13:30 Data−driven Fault Detection, Isolation and Estimation of Aircraft Gas Turbine Engine Actuator and Sensors.....583

Esmaeil Naderi and Kash Khorasani (Concordia University, Canada)

13:48 Multi−Class Heteroscedastic Linear Dimensionality Reduction Scheme for Diagnosing Process Faults.....589

Shiladitya Chakrabarti and Roozbeh Razavi−Far (University of Windsor, Canada); Mehrdad Saif (University of Windsor & Faculty of Engineering, Canada); Luis Rueda (University of Windsor, Canada)

14:06 Data Fusion for Fault Diagnosis in Smart Grid Power Systems.....593

Mojtaba Kordestani (University of Windsor, Canada); Mehrdad Saif (University of Windsor & Faculty of Engineering, Canada)

14:24 Design and Implementation of Neuro−Fuzzy Controllers for PEM Fuel Cells.....599

Ali Zilouchian (Florida Atlantic University, USA)

14:42 One−Class Classifiers for Detecting Faults in Induction Motors.....603

Roozbeh Razavi−Far, Maryam Farajzadeh−Zanjani and Shokoofeh Zare (University of Windsor, Canada); Mehrdad Saif (University of Windsor & Faculty of Engineering, Canada); Jafar Zarei (Shiraz University of Technology, Iran)

Tuesday, May 2, 15:20 − 17:10

CMP−B3: Computer & Software Techniques

Room: Augustus III

Chair: Mohammed Shehata (Zagazig & Elsewedy, Egypt)

15:20 AEIPA: Docker−based System for Automated Evaluation of Image Processing Algorithms.....608

    Acil Abdel Naby, Mohamed S Shehata and Theodore S. Norvell (Memorial University of Newfoundland, Canada)

15:38 Multi−Criteria Task Scheduling in Distributed Systems Based on Fuzzy TOPSIS.....612

    Mirsaeid Hosseini Shirvani (Islamic Azad University, Sari Branch, Sari, Iran); Negin Amirsoleimani (Mazandaran Institute of Science and Technology, Iran); Saeideh Salimpour (University of Windsor, Canada); Ahmed Azab (University of windsor, Canada)

15:56 Black Ice Detection System Using Kinect.....616

    Younis Abdalla (Memorial University, Canada); Tariq Iqbal and Mohamed S Shehata (Memorial University of Newfoundland, Canada)

16:14 Prediction Interval with Examples of Similar Pattern and Prediction Strength.....620

    Hussain Mohammed Dipu Kabir (The Hong Kong University of Science and Technology, Bangladesh); Mohammad Anwar Hosen (Institute for Intelligent Systems Research and Innovation (IISRI), Deakin University, Australia); Saeid Nahavandi and Abbas Khosravi (Deakin University, Australia)

16:32 Keyword and Keyphrase Extraction Using Newton's Law of Universal Gravitation.....624

    Nicholas Giamblanco and Prathap Siddavaatam (Ryerson University, Canada)

16:50 Bloom Filter Acceleration: A High Level Synthesis Approach.....628

    Reem Khairy, Mona Safar and M. Watheq El−Kharashi (Ain Shams University, Egypt)

DEV−B3: Devices, Circuits, and Systems

Room: Augustus IV
Chair: Farah Mohammadi (Ryerson University, Canada)

15:20 A Hardware Accelerated Proportional Text Layout and Placement Engine.....634

    Soheil Servati Beiragh and Roberto Muscedere (University of Windsor, Canada)

15:38 Exploiting Non−uniformity of Write Accesses for Designing a High−Endurance Hybrid Last Level Cache in 3D CMPs.....638

    Pooneh Safayenikoo (Iran University of Science and Technology, Iran); Arghavan Asad (Ryerson University, Canada); Mahmood Fathy (Iran University of Science & Technology, Iran); Farah Mohammadi (Ryerson University, Canada)

15:56 On On−Chip Intelligence Paradigms.....643

    Omar Eldash, Kasem Khalil and Magdy Bayoumi (University of Louisiana at Lafayette, USA)

16:14 Rössler−Based Chaotic Communication System Implemented on FPGA.....649

    Jesse Schmitz and Lei Zhang (University of Regina, Canada)

16:32 Capacitive Physically Unclonable Function.....653

    Kamal Kamal and Radu Muresan (University of Guelph, Canada)

16:50 A New Traffic Compression Method for End−to−End Memory Access in 3D Chip−multiprocessors.....659

Pooneh Safayenikoo (Iran University of Science and Technology, Iran); Arghavan Asad (Ryerson University, Canada); Mahmood Fathy (Iran University of Science & Technology, Iran); Farah Mohammadi (Ryerson University, Canada)

SP−B3: Signal Theory & Signal Processing

Room: Luna
Chair: Shervin Erfani (University of Windsor, Canada)

15:20 Low Complexity H.264 List Decoder for Enhanced Quality Real−Time Video over IP.....663

Firouzeh Golaghazadeh (École de Technologie Supérieure, Université du Québec, Canada); Stéphane Coulombe (École de Technologie Supérieure, Canada); François−Xavier Coudoux and Patrick Corlay (University of Valenciennes, France)

15:38 Fusion of Transfer Learning Features and Its Application in Image Classification.....669

Akilan Thangarajah, Jonathan Wu, Yimin Yang and Amin Safaei (University of Windsor, Canada)

15:56 An Efficient FPGA Implementation of Optical Character Recognition for License Plate Recognition.....674

Yuan Jing, Bahar Youssefi, Mitra Mirhassani and Roberto Muscedere (University of Windsor, Canada)

16:14 Quantifiable Comparative Analysis of Vaccinated Versus Unvaccinated Patients in Dermatologic Applications.....678

Vesna Zeljkovic (Lincoln University, USA); Claude Tameze (Lincoln University of Pennsylvania, USA); Christopher Druzgalski (California State University Long Beach, USA); Pedro Mayorga (Instituto Tecnologico de Mexicali, Mexico)

16:32 Improving Right Whale Recognition by Fine−tuning Alignment and Using Wide Localization Network.....682

AbdulWahab Kabani and Mahmoud R El−Sakka (The University of Western Ontario, Canada)

POW−B3: Power & Energy Circuits & Systems

Room: Martis
Chair: Narayan Kar (University of Windsor, Canada)

15:20 Minimizing CO2 Emissions of Photovoltaic Thermal Model in North America.....688

Shadi Shehadeh, Hamed Aly and Mohamed E. El−Hawary (Dalhousie University, Canada)

15:38 Fuzzy Logic Controller for Hybrid Renewable Energy System with Multiple Types of Storage.....694

Majed Althubaiti (University of Alberta, Canada); Michael Bernard (University of Alberta − Edmonton, Alberta, Canada); Petr Musilek (University of Alberta, Spain)

15:56 Impact of Demand Response Management on Improving Social Welfare of Remote

Communities Through Integrating Renewable Energy Resources.....700
    Elham Karimi and Mehrdad Kazerani (University of Waterloo, Canada)

16:14 Impact of Renewable Energy Deployment in Canada's Remote Communities on Diesel Generation Carbon Footprint Reduction.....706
    Elham Karimi and Mehrdad Kazerani (University of Waterloo, Canada)

16:32 Effect of Large Solar Power Plant on Locational Marginal Prices in Oman.....711
    Mohammed Albadi (Sultan Qaboos University, Oman); Yousef El-Rayani (Can-Technologies Inc., Canada); Ehab El-Saadany (Waterloo University, Canada); Hisham Abdullah Al-Riyami (Oman Electricity Transmission Company, Oman)

COM-B3: Communications and Networks

Room: Mercuri
Chair: Vijay Parsa (University of Western Ontario, Canada)

15:20 PAPR Reduction in OFDM Systems Using Clipping Based on Symbol Statistics.....715
    Moftah Ali, Raveendra Kolarramakrishna Rao and Vijay Parsa (University of Western Ontario, Canada)

15:38 PAPR and BER Performance Analysis of OFDM System with Multi-h CPFSK Mapper.....720
    Abdulbaset Mustafa Hamed, Emammer Shafter and Raveendra Kolarramakrishna Rao (University of Western Ontario, Canada)

15:56 On the Performance of OFDM Index Modulation over Nakagami Fading Channels.....724
    Ibrahim Aboharba (University of Western Ontario, Canada); Houssein Boud (Western University, Canada); Quazi Rahman and Raveendra Kolarramakrishna Rao (University of Western Ontario, Canada)

16:14 Performance Analysis of a Low-Complexity Detection for OFDM Index Modulation over Nakagami-m Fading.....729
    Ibrahim Aboharba (University of Western Ontario, Canada); Houssein Boud (Western University, Canada); Quazi Rahman and Raveendra Kolarramakrishna Rao (University of Western Ontario, Canada)

16:32 Noise Power Estimation for Broadcasting OFDM Systems.....733
    Abid Khan (Universti Technology Petronas, Malaysia); Varun Jeoti (University Teknologi PETRONAS, Malaysia); Muhammad Zaka Ur Rehman and Muhammad Taha (Universiti Teknologi PETRONAS, Malaysia)

16:50 Energy and Spectral Efficiency in Cellular Networks Considering Fading, Path Loss, and Interference.....739
    Abdulbaset Mustafa Hamed and Raveendra Kolarramakrishna Rao (University of Western Ontario, Canada)

CTL−B3: Controls & Robotics

Room: Saturni
Chair: Bahram Shafai (Northeastern University, USA)

15:20 Multi−Step Parallel−Strategy for Estimating the Remaining Useful Life of Batteries.....744
Roozbeh Razavi−Far and Shiladitya Chakrabarti (University of Windsor, Canada); Mehrdad Saif (University of Windsor & Faculty of Engineering, Canada)

15:38 EKF and UKF Localization of a Moving RF Ground Target Using a Flying Vehicle.....748
Meysam Effati and Krzysztof Skonieczny (Concordia University, Canada)

15:56 Dynamics and Control of A Quadrotor with A Cable Suspended Payload.....752
Longhao Qian and Hugh Liu (University of Toronto, Canada)

16:14 Accurate UWB and IMU Based Indoor Localization for Autonomous Robots.....756
Alvin Marquez (University of Windsor, Canada); Brinda Tank (University Of Windsor, Canada); Sunil Kumar Meghani, Sabbir Ahmed and Kemal Tepe (University of Windsor, Canada)

16:32 Symmetric Positive Stabilization of Linear Time−invariant Systems.....760
Amirreza Oghbaee, Bahram Shafai and Sznaier (Northeastern University, USA)

16:50 A New On−line Observer−Based Controller for Wheeled Non−holonomic Mobile Robots.....767
Mohamed Hassan (KuwaitUniversity, Kuwait); Elham Aljuwaiser (Cairo University); Rajia Badr (Cairo University, Egypt)

17:08 Robust Observer−Based Backstepping Controller for a Quadrotor UAV.....772
Nuradeen Fethalla (ETS, Canada); Maarouf Saad (ETS); Hannah Michalska (McGill University, Canada); Jawhar Ghommam (Cartage University, Tunisia)

Wednesday, May 3

Wednesday, May 3, 09:00 − 10:00

C1− Keynote Speaker : Keynote 3

Geometric Measures in Signal Processing: From Euclid to Riemann
Room: Augustus I

Power spectral density (PSD) matrices of signals are important features and have been used extensively to extract information for detection, parameter estimation, adaptive filtering, beamforming, etc., in signal processing. Structurally, PSD matrices are constrained, being Hermitian symmetric and positive semi−definite, and hence they form a manifold in the signal space. Measurements on the similarities between these matrices must therefore be made along the surface of the manifold. The commonly used Euclidean distance is neither accurate nor informative in such cases. We introduce here two recently developed Riemannian distances and their weighted versions to facilitate the measurements. The concept of lifting two points on the manifold to an isometric

Euclidean subspace and the corresponding projection back onto the manifold is discussed and is illustrated by the newly developed algorithms of locating the mean and median of PSD matrices. Applications of the Riemannian measure to important problems in signal processing are presented: including robust beamforming, sonar signal detection, and MIMO radar signal design.

Wednesday, May 3, 10:20 − 12:10

SS5−C1: Special Session 5

Advances in Optimization Methods and Applications
Room: Augustus III
Chair: Ziad Kobti (University of Windsor, Canada)
10:20 Automatic IRNDT Inspection Applying Sparse PCA−based Clustering.....776
  Bardia Yousefi, Hossein Memarzadeh Sharifipour and Clemente Ibarra Castanedo (Laval University, Canada); Xavier Maldague (Université Laval, Canada)

10:38 A Deep−Structural Medical Image Classification for a Radon−Based Image Retrieval.....780
  Amin Khatami (Institute for Intelligent System Research and Innovation, Deakin University, Australia); Abbas Khosravi (Deakin University, Australia); Morteza Babaie (KIMIA Lab at the University of Waterloo, Canada); Syed Moshfeq Salaken and Saeid Nahavandi (Deakin University, Australia); Hamid R. Tizhoosh (University of Waterloo, Canada)

10:56 A Cognitive Dynamic System for Chemical Coagulation Control.....784
  Abhijit Sinha and Eric Morris (AUG Signals, Canada); Chuhong Fei (A.U.G. Signals Ltd., Canada); Xia Liu (AUG Signals Ltd, Canada); Sol Jin (AUG Signals, Canada)

11:14 Comparative Strategies for Knowledge Migration in Multi Objective Optimization Problems.....788
  Panth Parikh and Ziad Kobti (University of Windsor, Canada)

11:32 Self−Organized Neighborhood Restructuring in Social Fabric.....793
  Bahram Zaeri and Ziad Kobti (University of Windsor, Canada)

SS10−C1: Special Session 10

Engineering: Knowledge Representation, Extraction and Development
Room: Augustus IV
Chair: Lei Zhang (University of Regina, Canada)
10:20 Design of a Time Mode SerDes Using Differential Pulse Position Modulation (DPPM).....799
  Taha Mehrabi Shahsavari and Kaamran Raahemifar (Ryerson University, Canada)

10:38 Henon Map Chaotic System Analysis and VHDL−based Fixed−point FPGA Implementation for Brain Stimulation.....803
  Lei Zhang (University of Regina, Canada)

10:56 Chu Sequence Based Phasing Scheme for Low PAPR Multicarrier Waveform for Channel Sounding.....807

Asif Iqbal (Universiti Teknologi PETRONAS, Malaysia); Varun Jeoti (University Teknologi PETRONAS, Malaysia); Micheal Drieberg and Peng Wen Wong (Universiti Teknologi PETRONAS, Malaysia)

11:14 Reconfigurable Non−Maximally Decimated Filter Bank Based Wideband Channelizer for VLBI.....811

Sudhi Sudharman (National Institute of Technology, India); Bindiya TS (National Institute of Technology Calicut, India)

11:32 Nullors in Amplifier Design for Bandwidth Using Multiple Feedbacks.....815

Reza Hashemian (Northern Illinois University, USA)

SP−C1: Signal Theory & Signal Processing

Room: Luna
Chair: Nabih Jaber (Lawrence Technological University, USA)
10:20 A Comparative Study of Audio/Speech Steganalysis Techniques.....821

Catherine Paulin (Université de Moncton, Canada); Sid−Ahmed Selouani (Université de Moncton, Campus de Shippagan, Canada); Eric Hervet (Université de Moncton, Canada)

10:38 Single−ended Intelligibility Prediction of Noisy Speech Based on Auditory Features.....825

Ahmed Alghamdi and Wai−Yip Geoffrey Chan (Queen's University, Canada)

10:56 Correlation Method Based Bio−composite Material Temperature Estimation Utilizing Ultrasound Signals.....829

Ahmed Elseddawy (University of Windsor, Canada); Ina Seviaryna and Volf Leshynsky (Institute for Diagnostic Imaging Research, University of Windsor, Canada); Roman Gr. Maev (University of Windsor, Canada)

11:14 Speech Enhancement Using New Iterative Minimum Statistics Approach.....833

Tahmina Gouhar, Nabih Jaber and Pallavi Kuntumalla (Lawrence Technological University, USA)

11:32 Disordered Speech Quality Estimation Using the Matching Pursuit Algorithm.....837

Yousef Ali, Vijay Parsa, Phil Doyle and Soulaimane Berkane (University of Western Ontario, Canada)

11:50 Single Channel Speech Enhancement Using Adaptive Filtering and Best Correlating Noise Identification.....842

Athulya M. s., Vinayshankar Somalara Nataraj and Sathidevi Puthumangalathu Savithri (National Institute of Technology Calicut, India)

POW−C1: Power & Energy Circuits & Systems

Room: Martis

Chair: Esam Abdel−Raheem (University of Windsor, Canada)

10:20 Analaytics of Residential Electrical Energy Profile.....846
    Shiraz Latif (George Brown College, Canada); Amir Shabani (George Brown College & University of Waterloo, Canada); Allan Esser and Alex Martkovich (George Brown College, Canada)

10:38 Optimal Placement and Sizing of STATCOMs in Power Systems Using GHS Algorithm.....850
    Michal Koltun and Kaamran Raahemifar (Ryerson University, Canada)

10:56 A Comparative Study of Different Multilevel Converter Topologies for Battery Energy Storage Application.....856
    Atieh Delavari (Laval University, Canada); Innocent Kamwa (Hydro−Québec/IREQ, Canada); Amin Zabihinejad (Laval University, Canada)

11:14 Application of Ensemble Classification Method for Power Transformers Condition Assessment.....861
    Ayman Othman (University of Waterloo, Canada); Monsef Tahir, MA (Waterloo, Canada); Ramadan A. El Shatshat (University of Waterloo, Canada); Khaled Bashir Shaban (Qatar University & College of Engineering, Qatar)

11:32 An Energy Management System for Hybrid Microgrids in Remote Communities.....866
    Sherin Helal, Rawan Najee, Maria Hanna, Mostafa Shaaban, Ahmed Osman and Mohamed Hassan (American University of Sharjah, United Arab Emirates (UAE))

11:50 Power Quality Analysis of a Low−voltage Grid with a Solar Photovoltaic System.....870
    Bryan Salvatierra, Diego Dominguez, Ing., Diego Chacon−Troya and Walter Orozco (Universidad Politécnica Salesiana)

COM−C1: Communications and Networks

Room: Mercuri
Chair: Kaamran Raahemifar (Ryerson University, Canada)
10:20 Reduced−Complexity Implementation Scheme for OFDM Channel Estimation.....876
    Mohammed Zourob and Raveendra Kolarramakrishna Rao (University of Western Ontario, Canada)

10:38 Low Complexity LLR Metrics for Polar Coded QAM.....880
    Alaa Hasan (University of Carleton, Canada)

10:56 Middleware for the Integration of Bluetooth LE Devices Based on MQTT and ISO/IEEE 11073.....884
    Michael Schmidt and Roman Obermaisser (University of Siegen, Germany)

11:14 Real−time Heart Attack Mobile Detection Service (RHAMDS): An IoT Use Case for Software Defined Networks.....888
    Samr Samir Ali and Mohammed Ghazal (Abu Dhabi University, United Arab Emirates (UAE))

DEV-C1: Devices, Circuits, and Systems

Room: Saturni
Chair: Amir Shabani (George Brown College & University of Waterloo, Canada)

10:20 Design of a Portable Smart Connected Solar-Powered Charger for Consumer Electronics.....894

Matthew Dallard and Anthony Forest (George Brown College, Canada); Amir Shabani (George Brown College & University of Waterloo, Canada)

10:38 A PIWM-FSK Transmitter for Implantable Wireless Neural Recording Microsystems.....898

Amir Sodagar (York University, Canada); Sirous Farsiani (K. N. Toosi University of Technology, Iran)

10:56 A Memristor Based Binary Multiplier.....902

Saeed Haghiri, Ali Nemati and Soheil Feizi (Razi University, Iran); Amirali Amirsoleimani (University of Windsor, Canada); Arash Ahmadi (University of Windsor, Canada & University of Southampton, United Kingdom (Great Britain)); Majid Ahmadi (University of Windsor, Canada)

11:14 Analysis of PWM and PFM Control Schemes for Integrated Step-up DC-DC Converters.....906

Ahmed H. Shaltout, Mark Lipski and Stefano Gregori (University of Guelph, Canada)

11:32 Ultra-Low Power Op-Amp Design with Memristor-based Compensation.....911

Mohammad Rasekh Jahromi (Universität Siegen, Germany); Jafar Shamsi (Iran University of Science and Technology, Iran); Amirali Amirsoleimani (University of Windsor, Canada); Karim Mohammadi (Iran University of Science and Technology, Iran); Majid Ahmadi (University of Windsor, Canada)

11:50 Building Temperature-Insensitive Nanoscale CMOS Circuits with Adaptive Voltage Power Supplies.....915

Ming Zhu (University of Nevada Las Vegas, USA); Yingtao Jiang and Mei Yang (University of Nevada, Las Vegas, USA); Xiaohang Wang (South China University of Technology, P.R. China)

Wednesday, May 3, 13:30 – 15:00

IOT-C2: Internet of Things

Room: Augustus III
Chair: Shervin Erfani (University of Windsor, Canada)

13:30 An IoT Environmental Data Collection System for Fungal Detection in Crop Fields.....919

Anh Dinh, Thomas Truong and Khan A Wahid (University of Saskatchewan, Canada)

13:48 A CPU-based Algorithm for Traffic Optimization Based on Sparse Convolutional Neural Networks.....923

Zhizhou Li (University of Waterloo & Miovision Technologies, Canada); Justin Eichel, Akshaya

Mishra and Andrew Achkar (MIovision Technologies, Canada); Kshirasagar Naik (University of Waterloo, Canada)

14:06 A Note on Security Management of the Internet of Things.....928
Long Chen and Shervin Erfani (University of Windsor, Canada)

14:24 A ZigBee-Based Framework for Approximating Sensor Range and Bearing.....932
Md Suruz Miah, Kyle Hevrdejs and Jacob Knoll (Bradley University, USA)

14:42 The Importance of Human Dynamics in the Future User Authentication.....936
Abdelkader Ouda (University of Western Ontario, Canada); Wafaa Anani (The University of Western Ontario, Canada)

SS10-C2: Special Session 10

Engineering: Knowledge Representation, Extraction and Development
Room: Augustus IV
Chair: Roozbeh Razavi-Far (University of Windsor, Canada)
13:30 Millimeter-Wave CMOS PLL Using a Push-Push Oscillator.....941
Sanjeev Jain, Nan Zhang and Leonid Belostotski (University of Calgary, Canada)

13:48 Automated Use Case Diagram Generation from Textual User Requirement Documents.....945
Sandeep Vemuri, Sisay Chala and Madjid Fathi (University of Siegen, Germany)

14:06 Knowledge Extraction from Online Vacancies for Effective Job Matching.....949
Sisay Chala, Scott Harrison and Madjid Fathi (University of Siegen, Germany)

14:24 Advanced Vehicle Dynamic Model for EV Emulation Considering Environment Conditions.....953
Qingqing Xie (University of Windsor & D&V Electronics Ltd., Canada); Claudio Hartkopf Lopes filho and Guodong Feng (University of Windsor, Canada); William Clandfield (D&V Electronics Ltd., Canada); Narayan Kar (University of Windsor, Canada)

SP-C2: Signal Theory & Signal Processing

Room: Luna
Chair: Shervin Erfani (University of Windsor, Canada)
13:30 Deep Learning Fusion Algorithm for Arts Categorization.....957
Mohamed Masoud, Saeid Belkasim and Iman Chahine (Georgia State University, USA)

13:48 HEVC/H.265 vs. VP9 State-Of-The-Art Video Coding Comparison for HD and UHD Applications.....961
Vishal Deep (N/A, USA); Tarek Elarabi (Penn State University, USA)

14:06 Deep Algorithm Quality (DAQ): A Blind Computer Vision Algorithm Quality Assessment Technique.....965
Han Yin (University of Waterloo, Canada); Akshaya Mishra (Miovision Technologies Inc.,

Canada); Kshirasagar Naik (University of Waterloo, Canada)

14:24 Hopfield Network−Based Image Retrieval Using Re−ranking and Voting.....969
Farzad Sabahi, M. Omair Ahmad and M. N. S. Swamy (Concordia University, Canada)

14:42 Oblique Projection and Sparse Reconstruction Based DOA Estimation of Hybrid Completely and Partially Polarized Signals with Arbitrary Polarimetric Arrays.....973
Hui−jun Hou and Xing−peng Mao (Harbin Institute of Technology, P.R. China)

SS2−C2: **Special Session 2**

Advances in Digital Filter Design and Applications
Room: Martis
Chair: Hon Keung Kwan (University of Windsor, Canada)
13:30 FIR Filter Design Using Multiobjective Teaching−Learning−Based Optimization.....977
Hon Keung Kwan and Miao Zhang (University of Windsor, Canada)

13:48 Asymmetric FIR Filter Design Using Evolutionary Optimization.....981
Hon Keung Kwan (University of Windsor, Canada)

14:06 4D Kelly−Lochbaum junction−based digital filter.....985
Minas Kousoulis (BCC, USA); Constantine Coutras and George Antoniou (Montclair State University, USA)

14:24 Design of Reconfigurable Directional Filters Using McClellan Transformation and Spectral Approximation in 2D Space.....989
U K Shahanas (National Institute Of Technology, India); Bindima T (National Institute of Technology Calicut, India); Elizabeth Elias (NIT Calicut, India)

14:42 Minimax Design of Orthogonal Filter Banks with Sparse Coefficients.....993
Yuhua Yang (Nanjing University of Posts and Telecommunications, P.R. China); Weiping Zhu (Department of Electrical and Computer Engineering); Jun Yan (Nanjing University of Posts and Telecommunications, P.R. China)

CMP−C2: **Computer & Software Techniques**

Room: Mercuri
Chair: Arunita Jaekel (University of Windsor, Canada)
13:30 Manifold 2.0 A Hardware Description Language for Microfluidic Devices.....997
Nicholas Klassen, Michael Lyons, Michael Prysiazny, Paul Roth, Peter Socha, Murphy Berzish, Atulan Zaman and Derek Rayside (University of Waterloo, Canada)

13:48 Extreme Learning Machines and Support Vector Machines Models for Email Spam Detection.....1002
Sunday Olusanya Olatunji (University of Dammam, Kingdom of Saudi Arabia, Saudi Arabia)

14:06 Cognitive Priority Model for Advanced Telemedical Support in Limited Bandwidth

Applications.....1008

    Thomas E. Doyle (McMaster University, Canada); David Musson (Northern Ontario School of Medicine, Canada); Taralyn Schwering (McMaster University, Canada)

14:24 DCM: A Python−Based Middleware for Parallel Processing Applications on Small Scale Devices.....1014

    Michael Lescisin (UOIT, Canada); Qusay Mahmoud (University of Ontario Institute of Technology, Canada)

14:42 Efficient GPU Utilization in Heterogeneous Big Data Cluster Using Token−Based Scheduler.....1019

    Hazem A. Abdelhafez (University of British Columbia, Canada); Mohamed Mohamed Rehan (AvidBeam Technlogies, Egypt); Hossam A. H. Fahmy (Cairo University, Egypt)

DEV−C2: Devices, Circuits, and Systems

Room: Saturni
Chair: Rashid Rashidzadeh (University of Windsor, Canada)

13:30 A Secure Scan Chain Using a Phase Locking System and a Reconfigurable LFSR.....1023

    Yahia Ouahab, Rashid Rashidzadeh and Roberto Muscedere (University of Windsor, Canada)

13:48 A Software Tool for Generating Optimized Multipartite Table Parameters.....1027

    Roberto Muscedere and Mitra Mirhassani (University of Windsor, Canada)

14:06 Systolic Design Space Exploration of Polynomial Division over GF(m2).....1031

    Ibrahim Hazmi and Fayez Gebali (University of Victoria, Canada)

14:24 An Improved Algorithm for IMPLY Logic Based Memristive Full−Adder.....1037

    Shokat Ganjeheizadeh Rohani (Technical University of Vienna, USA); Nima TaheriNejad (TU Wien, Austria)

14:42 On the Design of Context−Aware Health Monitoring Without a Priori Knowledge; an AC−Motor Case−Study.....1041

    Maximilian Götzinger (University of Turku, Finland); Nima TaheriNejad, Hedyeh A. Kholerdi and Axel Jantsch (TU Wien, Austria)

Wednesday, May 3, 15:20 − 17:10

IOT−C3: Internet of Things

Room: Augustus III
Chair: Shervin Erfani (University of Windsor, Canada)

15:20 Cloud−Assisted Device Clustering for Lifetime Prolongation in Wireless IoT Networks.....1046

    Sabin Bhandari (Western University, Canada); Shree Krishna Sharma (University of Western Ontario, Canada); Xianbin Wang (Western University, Canada)

15:38 Indoor Visual Localization of a Wheelchair Using Shi−Tomasi and KLT.....1050

Marcus Lima and Paulo Kurka (University of Campinas, Brazil); Yuri Silva and Vicente F. Lucena, Jr. (Federal University of Amazonas, Brazil)

15:56 Tracking with a Fuzzy Logic Controller as Applied to a Pneumatic Robot for Polishing.....1054

Chandrakumar Mohan (Geometric Ltd, India); Brian Surgenor (Queen's University, Canada); Luciana Monteiro (Instituo Federal de Educaco, Canada); Vahid Nazari (Bluewrist, Canada)

16:14 Enhancing Suricata Intrusion Detection System for Cyber Security in SCADA Networks.....1060

Kevin Wong, Craig Dillabaugh and Nabil Seddigh (Solana Networks, Canada); Biswajit Nandy (Solana Networks & Carleton University, Canada)

SS9−C3: Special Session 9

Emerging Micro and Bio−Electronics
Room: Augustus IV
Chair: Rashid Rashidzadeh (University of Windsor, Canada)

15:20 Embedded CMOS Bioinformatics for Nanopore Sequencers.....1065

Chengjie Wang, Zhongpan Wu, Ebrahim Ghafar−Zadeh and Sebastian Magierowski (York University, Canada)

15:38 Wireless Device Identification Using Oscillator Control Voltage as RF Fingerprint.....1069

Rashid Rashidzadeh, Mahzad Azarmehr and Ankit Mehta (University of Windsor, Canada)

15:56 Measuring Heat Transport in Electronic Devices over Small Length Scales.....1073

Mohammadreza Shahzadeh and Simone Pisana (York University, Canada)

16:14 Compact, Battery−Powered, Eight−Channel Micro−Electrogorticography (uECoG) System.....1077

Ali Faizi−nejad and Ali Kia (K. N. Toosi University of Technology, Iran); Mohammad Hossein Maghami (Shahid Rajaee Teacher Training University, Iran); Soraya Nasiri and Reza Mohammadi (K. N. Toosi University of Technology, Iran); Amir Shojaei and Mahmoud Rezaei (Faculty of Medical Sciences, Tarbiat Modares University, Iran); Yousef Khazaei (K. N. Toosi University of Technology, Iran); Javad Mirnajafi−Zadeh (Faculty of Medical Sciences, Tarbiat Modares University, Iran); Ebrahim Nadimi (K. N. Toosi University of Technology, Iran); Amir Sodagar (York University, Canada)

16:32 A New Multidisciplinary Approach Towards Airplane Health Monitoring Using Cantilever Airflow Sensors.....1081

Abbas Panahi, Ebrahim Ghafar−Zadeh and Mohammad Sabour (York University, Canada)

16:50 Design Considerations in Development of Wireless Brain−Implantable Microsystems.....1085

Hossein Kassiri (York University, Canada)

17:08 Multimodal CMOS Based Biosenors for Lab−on−Chip Applications: A New Multidisciplinary Approach.....1089

Saghi Forouhi and Ebrahim Ghafar−Zadeh (York University, Canada); Rasoul Dehghani

(Isfahan University of Technology, Iran)

SP–C3: Signal Theory & Signal Processing

Room: Luna
Chair: Luay Yassin Taha (University of Windsor, Canada)

15:20 An FPGA Implementation of a Custom JPEG Image Decoder SoC Module.....1093
George Kyrtsakas and Roberto Muscedere (University of Windsor, Canada)

15:38 Sparse Minimum–Phase FIR Filter Design by SDP.....1097
Aimin Jiang (Hohai University, P.R. China); Hon Keung Kwan (University of Windsor, Canada); Xiaofeng Liu (Hohai University, P.R. China); Yanping Zhu (Changzhou University, P.R. China)

15:56 FIR Filter Design Using Multiobjective Cuckoo Search Algorithm.....1102
Jiajun Liang and Hon Keung Kwan (University of Windsor, Canada)

16:14 A Pipelined Architecture for User–defined Floating–point Complex Division on FPGA.....1106
Shaobing Huang, Li Yu, Fang–Jian Han and Yiwen Luo (National University of Defense Technology, P.R. China)

16:32 A Hybrid–based Filtering Approach for User Authentication.....1110
Abdelkader Ouda and Anas Ibrahim (University of Western Ontario, Canada)

POW–C3: Power & Energy Circuits & Systems

Room: Martis
Chair: Narayan Kar (University of Windsor, Canada)

15:20 Towards Reliable Intelligent Occupancy Detection for Smart Building Applications.....1115
Christopher Luppe (George Brown College, Canada); Amir Shabani (George Brown College & University of Waterloo, Canada)

15:38 An Optimized Platform for Performance Evaluation of Solar Battery Chargers.....1119
Anthony Forest and Matthew Dallard (George Brown College, Canada); Amir Shabani (George Brown College & University of Waterloo, Canada)

15:56 On Optimal Scheduling for Smart Homes and Their Integration in Smart Grids.....1123
Sherin Helal, Rawan Najee, Maria Hanna, Mostafa Shaaban, Ahmed Osman and Mohamed Hassan (American University of Sharjah, United Arab Emirates (UAE))

16:14 Skewing of Stator Windings for Reduction of Spatial Harmonics in Concentrated Wound PMSM.....1127
Himavarsha Dhulipati, Shruthi Mukundan, Lakshmi Varaha Iyer and Narayan Kar (University of Windsor, Canada)

16:32 Comparison of Inductance Determination Methods of PMSMs for EV Application.....1131
Shruthi Mukundan, Himavarsha Dhulipati, Lakshmi Varaha Iyer and Narayan Kar (University of Windsor, Canada); Kaushik Mukherjee (Indian Institute of Engineering Science and Technology,

Shibpur, India)

16:50 Khums Optimization Algorithm.....1135
Zakareya Hasan and Mohamed E. El−Hawary (Dalhousie University, Canada)

COM−C3: Communications and Networks

Room: Mercuri
Chair: Yasser M.H. Abdelhamed (Univiresity of Calgary, Canada)
15:20 Nash Equilibria of Deception Strategies in the IEEE 802.22 Cognitive Radio Networks.....1140
Ismail Ahmed and Abraham O Fapojuwo (University of Calgary, Canada)

15:38 Multi−Cycle Cyclostaionary Spectrum Sensing Using Canonical Correlation Analysis.....1145
Yasser M.H. Abdelhamed (Univiresity of Calgary, Canada); Abu B Sesay (University of Calgary, Canada)

15:56 Hierarchical Cluster−Based Cooperative Spectrum Sensing in Cognitive Radio Employing Soft−Hard Combination.....1149
Noor Salout, Faroq A Awin, Abeer Alqawasmeh and Esam Abdel−Raheem (University of Windsor, Canada)

16:14 Sensing TV Spectrum Using Software Defined Radio Hardware.....1153
Danilo Corral−De−Witt (University of Windsor & Universidad de las Fuerzas Armadas ESPE, Canada); Aarron Younan (University of Windsor & WiCIP Lab, Canada); Arooj Fatima (University of Windsor, Canada); José Matamoros (Universidad de las Fuerzas Armadas ESPE, Ecuador); Faroq A Awin, Kemal Tepe and Esam Abdel−Raheem (University of Windsor, Canada)

16:32 A Fuzzy Logic Approach for Cooperative Spectrum Sensing in Cognitive Radio Networks.....1157
Refga Elgadi, Allaa R. Hilal and Otman Basir (University of Waterloo, Canada)

16:50 Experimental Alamounti−STBC Using LDPC Codes for MIMO Channels over SDR Systems.....1161
Ricardo Prieto and Ana Abril (UPS, Ecuador); Andres Ortega (Universidad Politécnica Salesiana, Ecuador)

CMP−C3: Computer & Software Techniques

Room: Saturni
Chair: Emdad Ahmed (Lakehead University, Canada)
15:20 Development of Augmented Reality Training Simulator Systems for Neurosurgery Using Model−Driven Software Engineering.....1166
Hamza Ghandorh (University of Western Ontario, Canada & Taibah University, Saudi Arabia); Justin Mackenzie (University of Western Ontario, Canada); Roy Eagleson (The University of Western Ontario, Canada); Sandrine de Ribaupierre (Western University, Canada)