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Welcome Message from the Chairpersons

On behalf of the steering and organizing committees, it is our great pleasure to welcome you to the twenty-third annual IEEE International Conference on Computational Intelligence and Virtual Environments for Measurement Systems and Applications (IEEE CIVEMSA 2018), held in Ottawa, Canada, on June 12-13, 2018.

This conference is co-sponsored by the IEEE Computational Intelligence and IEEE Instrumentation and Measurement Societies. It focuses on all aspects of computational intelligence, virtual environments and human-computer interaction technologies for measurement systems and related applications. We believe that the organizing and steering committees have put together a very exciting and interesting program. This latter includes peer-reviewed papers that highlight standpoints on some latest recent advances to address some critical computational intelligence challenges for intelligent measurement, virtual reality systems, machine & deep learning for intelligent systems, and applications. In this twenty-third year of the conference, we have made a few changes to add to what was already previously a strong program. For one, we initiated opening this conference to external sponsors from academia, industry and organization entities, in addition to the two existing IEEE co-sponsors societies. Additionally, to acknowledge excellence and merit in a conference paper candidate, we also started an IEEE Best Paper Award, from the IEEE co-sponsors societies, based on paper novelty, clearness, ingenuity and groundbreaking research in the respective area.

We believe that the keynote speaker topic shelters a highly relevant set of materials that we trust will bring some conference participants to share viewpoints and thoughts on this topic. In particular, the two-day conference program aims to provide a forum for the attendees to carry out presentations, information exchanges, and extensive discussions on theory, methodology and application in the field of interest of the conference. This is as well as to foster networking, planning for future collaborations and new research projects that will further advance the use of computational intelligence and virtual environments in the instrumentation and measurement field and the related applications. We hope the conference will foster and discuss opportunities and challenges in using computational intelligence and virtual environments breakthroughs aiming to the advancement of instrument performance and measurement capabilities, and all related applications in a broad spectrum of areas. To promote interaction and discussion in the audience, sufficient time is allocated to presenters not only to introduce their achievements, but also to engage in extended discussions with the participants.

This year we have participants from more than twelve countries. Participants are welcome to benefit from the rich research work that will be presented and enjoy the hospitality and diversity of Ottawa. The town is the administrative heart of Canada and the University of Ottawa's main campus is located in the core downtown area, just minutes from the Parliament Hill, numerous museums, the world-renowned Rideau Canal, UNESCO World Heritage Site, and the ByWard Market with its vibrant cultural life, a wide variety of boutiques, restaurants and accommodations. May and June offer the most beautiful weather conditions of the year, making it the ideal time for exploring the capital.

Welcome Message from the Chairpersons

We hope you will find IEEE CIVEMSA 2018 a challenging and productive experience, celebrating the twenty second-year anniversary of this conference, since its inception in 1996 as "*IEEE Workshop on Emerging Technologies for Instrumentation and Measurement*". We trust that you will also enjoy the location, the culture and the food: Ottawa will be an exciting experience!

We are looking forward to meeting everyone at the conference in June.

Honorary Chair Rafik Goubran, *Carleton University, Ottawa, Canada*

General Chairs Ana-Maria Cretu, *Carleton University, Ottawa, Canada*
Dalila B. Megherbi, *University of Massachusetts, Lowell, USA*

Technical Program Chairs Pierre Payeur, *University of Ottawa, Canada*
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Gabriel Wainer, *Carleton University, Canada*

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Keynote Speaker

Tuesday, June 12, 10:45-12:00

Dr. Emil M Petriu

Professor, University Research Chair University of Ottawa
School of Electrical Engineering and Computer Science, Ottawa, Ontario, Canada

"Haptic Sensors and Interfaces for Interactive Dexterous Robotic Telemanipulation"



Abstract:

The presentation will discuss haptic sensors and human interfaces, and intelligent control algorithms for human-like multi-finger robot hands able to dexterously explore, grasp, and in-hand manipulate objects. These emergent technologies will allow the development of a new generation of remotely controlled intervention robots able to interactively perform complex tele-manipulation operations in high-risk operational environments like nuclear power stations, underwater, highly infectious rooms, robotic surgery, or war zones.

Dr. Petriu's Biography:

Dr. Emil M. Petriu, IEEE Fellow, is a Professor in the School of Electrical Engineering and Computer Science at the University of Ottawa, Canada. His research interests include biology-inspired robot sensing and perception, soft computing, and human-computer interaction.

Program Schedule – Tuesday, June 12

8:00 – 9:00	Registration
9:00 – 9:15	Opening Session, Chair Welcome
9:15 – 10:15	Session 1 Human Behavior and Performance Monitoring
10:15 – 10:45	Coffee Break
10:45 – 12:00	Plenary Talk Dr. Emil Petriu <i>“Haptic Sensors and Interfaces for Interactive Dexterous Robotic Manipulation”</i>
12:00 – 13:00	Luncheon
13:00 – 15:00	Session 2 Machine Learning and Classification
15:00 – 15:30	Coffee Break
15:30 – 16:30	Session 3 Virtual Environments
18:00 - 20:00	Dinner at the “Metropolitan Brasserie Restaurant” <i>700 Sussex Dr, Ottawa, ON K1N 1K4, Canada</i>

***All sessions will take place in the Demarais building, room 1110*

Program Schedule – Wednesday, June 13

8:30 – 9:00	Registration
9:00 – 10:00	Session 4 Decision Systems
10:00 – 10:30	Coffee Break
10:30 – 12:10	Session 5 Intelligent Measurement Systems
12:30 – 13:00	Luncheon
13:00 – 15:00	Session 6 Robotics and Autonomous Systems
15:00 – 15:30	Coffee Break
15:30 – 16:10	Session 7 Control Systems
16:10 – 17:00	Best Paper Awards Ceremony and Closing Remarks

***All sessions will take place in the Demarais building, room 1110*

Tuesday, June 12

8:00 – 9:00
Registration

9:00 – 9:15
Opening Session

9:15 – 10:15
Session 1: Human Behavior and Performance Monitoring
Room: Demarais building, room 1110
Session Chair: Marek Zaremba, *UQO, Canada*

Skill Assessment in Virtual Learning Environments

Nuket Nowlan (*Carleton University, Canada*)
Peggy Hartwick (*Carleton University, Canada*)
Ali Arya (*Carleton University, Canada*)

The study of driver's reaction for traffic information on actual driving and DS using fNIRS

Hideki Takahashi (*Central Nippon Highway Engineering NAGOYA Co., Ltd., Japan*)
Kouji Yamamoto (*Central Nippon Expressway Co., Ltd., Japan*)
Toshiyuki Sugimachi (*Tokyo City University, Japan*)
Yoshihiro Suda (*The University of Tokyo, Japan*)

Guided Learning of Pronunciation by Visualizing Tongue Articulation in Ultrasound Image Sequences

Mohammad Hamed Mozaffari (*University of Ottawa, Canada*)
Shenyong Guan (*University of Ottawa, Canada*)
Nan Wang (*University of Ottawa, Canada*)
Shuangyue Wen (*University of Ottawa, Canada*)
Won-Sook Lee (*University of Ottawa, Canada*)

10:15 – 10:45
Coffee Break

10:45 – 12:00
Keynote Speaker: Dr. Emil Petriu
"Haptic Sensors and Interfaces for Interactive Dexterous Robotic Manipulation"
Room: Demarais building, room 1110

12:00 – 13:00
Lunch

Tuesday, June 12

13:00 - 15:00

Session 2: Machine Learning and Classification

Room: Demarais building, room 1110

Session Chair: Ana-Maria Cretu, Carleton University, Canada

Discriminant Analysis of Industrial Gases for Electronic Nose Applications

Atiq ur Rehman (*Hamad Bin Khalifa University (HBKU), Qatar*)

Amine Bermak (*Hong Kong University Science and Technology, P.R. China*)

**Performance Analysis of Granular versus Traditional Neural Network Classifiers:
Preliminary Results**

Gerardo Felix (*Universidad Central de Las Villas, Cuba*)

Gonzalo Nápoles (*Hasselt University, Belgium*)

Rafael Falcon (*Larus Technologies Corporation, Canada*)

Rafael Bello (*Universidad Central de Las Villas, Cuba*)

Koen Vanhoof (*Hasselt University, Belgium*)

Virtual Reality and Tracking the Mating Behavior of Fruit Flies: a Machine Learning Approach

Mohammad Hamed Mozaffari (*University of Ottawa, Canada*)

Shuangyue Wen (*University of Ottawa, Canada*)

Won-Sook Lee (*University of Ottawa, Canada*)

A Novel Reduced-Layer Deep Learning System via Pixel Rearrangement for Object Detection in Multispectral Imagery

Dalila B. Megherbi (*University of Massachusetts, Lowell, USA*)

Anusha K. Vishwanathan (*University of Massachusetts, Lowell, USA*)

Adaptive Weighting with SMOTE for Learning from Imbalanced Datasets: A Case Study for Traffic Offence Prediction

Naga Prasanthi Bobbili (*Carleton University, Canada*)

Ana-Maria Cretu (*Carleton University, Canada*)

Model-Free Value Iteration Solution for Dynamic Graphical Games

Mohammad Abouheaf (*University of Ottawa, Canada*)

Wail Gueaieb (*University of Ottawa, Canada*)

Tuesday, June 12

15:00 – 15:30

Coffee Break

15:30 – 16:30

Session 3: Virtual Environments

Room: Demarais building, room 1110

Session Chair: Won-Sook Lee, *University of Ottawa, Canada*

Cognitive Ability Evaluation using Virtual Reality and Eye Tracking

Julius Pettersson (*Chalmers University of Technology, Sweden*)

Anton Albo (*Chalmers University of Technology, Sweden*)

Johan Eriksson (*Chalmers University of Technology, Sweden*)

Patrik Larsson (*Chalmers University of Technology, Sweden*)

Kerstin Falkman (*University of Gothenburg, Sweden*)

Petter Falkman (*Chalmers University of Technology, Sweden*)

Stimulation Conditions to Generate Velvet Hand Illusion through a Dot-matrix Display

Hiraku Komura (*Nagoya University, Japan*)

Masahiro Ohka (*Nagoya University, Japan*)

UWB TDOA/TOA measurement system with wireless time synchronization and simultaneous tag and anchor positioning

Bongyong Choi (*Entosoft Corporation, Korea*)

Koangkyun La (*Entosoft Corporation, Korea*)

Sangrok Lee (*Entosoft Corporation, Korea*)

18:00 – 20:00

Conference Dinner

Metropolitan Brasserie Restaurant

700 Sussex Dr, Ottawa, ON K1N 1K4, Canada

Wednesday, June 13

8:00 – 9:00

Registration

9:00 – 10:00

Session 4: Decision Systems

Room: Demarais building, room 1110

Session Chair: Luke Russell, *Carleton University, Canada*

Responding to Illegal, Unreported and Unregulated Fishing with Evolutionary Multi-Objective Optimization

Tolulope Akinbulire (*Carleton University, Canada*)

Rafael Falcon (*Larus Technologies Corporation, Canada*)

Rami Abielmona (*Larus Technologies Corporation, Canada*)

Howard Schwartz (*Carleton University, Canada*)

A Fuzzy Framework for System Diagnosis

Terrence P. Fries (*Indiana University of Pennsylvania, USA*)

Pictorial Visualization of EMR Summary Interface and Medical Information Extraction of Clinical Notes

Wei Ruan (*University of Ottawa, Canada*)

Naveenkumar Appasani (*University of Ottawa, Canada*)

Katherine Kim (*University of Ottawa, Canada*)

Joseph Vincelli (*University of Ottawa, Canada*)

Hyun Kim (*University of Manitoba, Canada*)

Won-Sook Lee (*University of Ottawa, Canada*)

10:00 – 10:30

Coffee Break

10:30 – 12:10

Session 5: Intelligent Measurement Systems

Room: Demarais building, room 1110

Session Chair: Ying Wang, *Kennesaw State University, USA*

Wooden Framed House Structural Health Monitoring by System Identification and Damage Detection under Dynamic Motion with Artificial Intelligence Sensor using a Model of House including Braces

Ryota Tanida (*Tokyo University of Science, Japan*)

Development of Finger Motion Reconstruction System Based on Leap Motion Controller

Xiaodong Li (*University of Hong Kong, Hong Kong*)

Kinto Wan (*University of Hong Kong, Hong Kong*)

Rongwei Wen (*University of Hong Kong, Hong Kong*)

Yong Hu (*University of Hong Kong, Hong Kong*)

Wednesday, June 13

A Robust Secure and High Capacity Image Watermarking Scheme for Information Exchange in Distributed Collaborative Networked Intelligent Measurement Systems
Swapnil Chaughule (*CMINDS Research Center, University of Massachusetts Lowell, USA*)
Dalila B. Megherbi (*University of Massachusetts, Lowell, USA*)

A Virtual Tactile Sensor with Adjustable Precision and Size for Object Recognition
Ghazal Rouhafzay (*Carleton University, Canada*)
Ana-Maria Cretu (*Carleton University, Canada*)

Computer vision-assisted human-in-the-loop measurements: augmenting qualitative by increasing quantitative analytics for CI situational awareness
Luke Russell (*Carleton University, Canada*)
Rafik Goubran (*Carleton University, Canada*)
Felix Kwamena (*Carleton University, Canada*)

12:10 – 13:00
Lunch

13:00 – 15:00
Session 6: Robotics and Autonomous Systems
Room: Demarais building, room 1110
Session Chair: Wail Gueaieb, University of Ottawa, Canada

Simulation of Industrial Bin Picking: An Application of Laser Range Finder Simulation
Shan Fur (*University of Stuttgart, Germany*)
Alexander Verl (*Stuttgart University, Institute for Control Engineering of Machine Tools, Germany*)
Andreas Pott (*University of Stuttgart, Germany*)

Teaching a Robot Sign Language using Vision-Based Hand Gesture Recognition
Da Zhi (*University of Ottawa, Canada*)
Thiago Eustaquio Alves de Oliveira (*University of Ottawa, Canada*)
Vinicius Prado da Fonseca (*University of Ottawa, Canada*)
Emil M. Petriu (*University of Ottawa, Canada*)

A Hybrid Architecture for Planning and Execution of Multi-Behaviour Data Acquisition Missions
Fadi Halal (*UQO, Canada*)
Marek Zaremba (*UQO, Canada*)

Mobile Robot Regulation with Position Based Visual Servoing
Abdulrahman Al-Shanoon (*University of Ontario Institute of Technology, Canada*)
Aaron H Tan (*University of Ontario Institute of Technology, Canada*)
Haixiang Lang (*University of Ontario Institute of Technology, Canada*)
Ying Wang (*Kennesaw State University, USA*)

Wednesday, June 13

Multivariable Super-Twisting Control in a Vision-based Quadrotor Utilized in Agricultural Application

Walid Alqaisi (*University of Quebec, Canada*)
Brahim Brahmi (*École de Technologie Supérieure, Canada*)
Jawhar Ghommam (*University of Sfax, Tunisia*)
Maarouf Saad (*University of Quebec, Canada*)
Vahe Nerguizian (*ETSMTL, Canada*)

Sliding Mode Controller and Hierarchical Perturbation Compensator in a UAV Quadrotor

Walid Alqaisi (*University of Quebec, Canada*)
Brahim Brahmi (*École de Technologie Supérieure, Canada*)
Jawhar Ghommam (*University of Sfax, Tunisia*)
Maarouf Saad (*University of Quebec, Canada*)
Vahe Nerguizian (*ETSMTL, Canada*)

15:00 – 15:30

Coffee Break

15:30 – 16:10

Session 7: Control Systems

Room: Demarais building, room 1110

Session Chair: Dalila Megherbi, *University of Massachusetts, Lowell, USA*

Autonomous Vehicle Tracking Control Using Deep Learning and Stereo Vision

Teng Zhao (*Kennesaw State University, USA*)
Ming Li (*Kennesaw State University, USA*)
Gabriel Chen (*Walton High School, USA*)
Ying Wang (*Kennesaw State University, USA*)

Reinforcement Learning Solution With Costate Approximation for a Flexible Wing Aircraft

Mohammad Abouheaf (*University of Ottawa, Canada*)
Wail Gueaieb (*University of Ottawa, Canada*)

16:10 – 17:00

Best Paper Awards and Closing Remarks

Room: Demarais building, room 1110
