



2016 Peterborough Engineering Symposium

INTERNET OF THINGS



The IEEE Peterborough Section, the local PEO and OACETT Chapters presented the Engineering Symposium “The Internet of Things” at Fleming College Sutherland Campus, Peterborough on Saturday, October 22 and had over 80 attendees. The symposium was consisted of two separate events: Tour and Seminar events. First, a tour to Kawartha Trades and Technology Centre and a seminar on Internet of Things (IoT) topics.

Peterborough IEEE Section led this symposium and Helder F Pinheiro, who is Peterborough IEEE Section’s Industrial Relations leader, was chosen to Chair the working committee.

MISSION

The annual Peterborough Engineering Symposium (PES) is an initiative promoted by OACETT, PEO, and IEEE that reaches out to everyone! The Symposium is wide-open to professionals, life-long learners, educators and people with intellectual curiosity - at all levels - to explore, expand, and become enlightened and educated with leading-edge technologies.

The 2016 PES focused on the” Internet of Things” (IoT) as one of the most exciting technological innovations of our time. We are witness to an unprecedented era of connectedness



with the ability to transfer huge amounts of data between a myriad of highly diverse devices while enabling a multitude of separate functions to proceed simultaneously under separate and independent control.

The PES provided an enriched understanding surrounding the far-reaching benefits of this amazing tool and will effectively decrease and eliminate anxieties related the current areas of - "privacy and security".

The Symposium contained stimulating presentations and discourse focusing on a wide range of new and exciting applications. Agriculture production, digital industrial operations, tracking systems, privacy and information security, energy saving and medical application are among the many excellent presentations.

The 2016 Peterborough Engineering Symposium event was developed and delivered as a great opportunity to network, exchange ideas, discover new business opportunities, promote local business and increase our engineering employment options and opportunities in Peterborough and area!

Kawartha Trades and Technology Centre Tour



Fleming College Sutherland Campus, Peterborough.



2016 PES

Engineering Presentations

After an opening welcome by the Honourable MPP Jeff Leal, Minister of Agriculture, Food and Rural Affairs, presenters will speak regarding topics:

- Dr. Marjan Alavi on the " Internet of Things: The Disappearing Technology "
- Mr. David Whitehouse on " The Connect Home! How Connected Do You Want to Be?"
- Mr. Shawn LaPalm on "Telematics: Changing the Auto Insurance Industry"
- Mr. Jean-Simon Venne on "Internet of Things: An overview of the IoT Landscape, Technologies, Protocols, Issues and Applications"
- Ms. Karen Robinson on " GEOTAB GPS Fleet Management -Sales at Swish Maintenance Limited"
- Mr. Marc Levesque on "Sustainable Spectrum Management in a 5G Context"

Organizing Committee

- Roger Boutette, P.Eng.
- Maurice Coderre, A.Sc.T.
- Dan Demers, P.Eng.
- Sean Dunne, P.Eng.
- Lloyd Gorling, P.Eng., LSM-IEEE
- Pete Hynes, P.Eng.
- Clarence Klassen, P.Eng.
- Luc Matteau, P.Eng., LSM-IEEE
- Diane Northey, C.Tech
- Helder Pinheiro, P.Eng., M-IEEE
- Marcelo König Sarkis, P.Eng.
- Jean Wang, P.Eng.
- Ryan Worrall, P.Eng.
- Arash Yazdani, P.Eng.

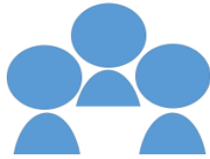


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SYMPOSIUM PROGRAM

TIME	PRESENTER	TOPIC
10:00	Fleming College Tours Registration	
10:30	Fleming College Tours	
11:00	Symposium Registration and Networking / Lunch	
12:00	Helder Pinheiro, IEEE <i>Symposium Chair</i>	Introduction & Housekeeping
12:05	Michael Skinner <i>President and CEO,</i> <i>Greater Peterborough Innovation Cluster</i>	Symposium Moderator
Government Liaisons (Introduced by Greater Peterborough Innovation Cluster)		
12:10	Jamie Schmale, MP <i>Member of Parliament for Haliburton – Kawartha Lakes - Brock</i>	
12:25	Jeff Leal, MPP <i>Member of Ontario Provincial Parliament for Peterborough - Minister of Agriculture, Food and Rural Affairs</i>	
Guest Speaker Group 1 (Introduced by Nexicom)		
12:45	David Whitehouse <i>Director, Customer & Corporate, Peterborough Utilities Group</i>	The Connect Home! How Connected Do You Want to Be?
13:15	Shawn LaPalm <i>Advisor and Owner, Shawn LaPalm Insurance Agency Inc. (The Cooperators Group)</i>	Telematics: Changing the Auto Insurance Industry
13:45	Dr. Marjan Alavi <i>Vice Chair, IEEE Industrial Applications Society</i>	Internet of Things: The Disappearing Technology
14:15	Additional Question Period for Guest Speaker Group 1	

TIME	PRESENTER	TOPIC
14:30	Refreshments and Networking (Sponsored by OSPE)	
Guest Speaker Group 2 (Introduced by WSP Canada)		
14:45	Marc Levesque <i>Vice President, Applications and Performance Communications Research, Innovation, Science and Economic Development Canada, Government of Canada</i>	Sustainable Spectrum Management in a 5G Context
15:15	Karen Robinson <i>GEOTAB GPS Fleet Management, Swish Maintenance Limited</i>	Innovation of Telematics: Understanding the 5 Core Pillars of GPS Fleet Management Today



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15:45	Jean-Simon Venne <i>Vice President, Solutions & IoT, Via Consultants</i>	Internet of Things: An Overview of the IoT Landscape, Technologies, Protocols, Issues and Applications
16:15	Additional Question Period for Guest Speaker Group 2	
16:30	Refreshments & Networking	

SPONSERS





PRESENTERS



DR. Marjan Alavi
Executive Chairman

Vice Chair of the IEEE Industrial Applications Society

Title: Internet of Things: The Disappearing Technology

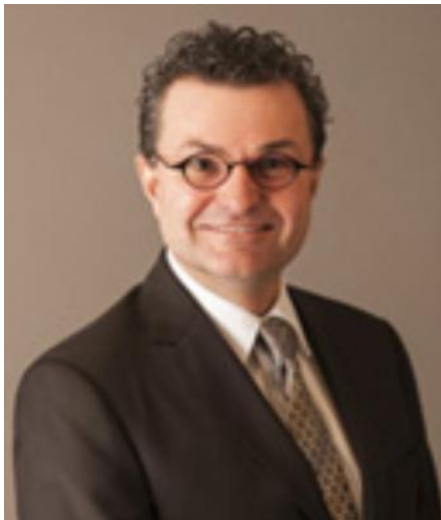
Abstract: “The most profound technologies are those that disappear.” (Mark Weiser’s, 1991). IoT will be the technology hidden into thousands of smart devices that will soon surround you in your daily life; More than 50 Billion connected devices that could potentially generate \$20 Trillion over the next ten years. To be successful in this market, implementation speed is a key factor. In this talk, new tools for rapid prototyping of IoT devices will be presented; Tools that helps you to convert your idea into reality without having in-depth hardware, software, or app

development skills. Case- studies with the application in health, energy saving, and agriculture will be demonstrated.

Biography: Dr. Alavi received her B.Sc. degree in Electrical Engineering (Control and Instrumentations) from the K.N. Toosi University of Technology, Tehran, in 2004, and M.Sc. in Electrical Engineering (Micro- and Nano- Electronic Devices) from Sharif University of Technology, Tehran, in 2007. She earned her Ph.D. degree in Electrical Engineering from Nanyang Technological University (NTU), Singapore in 2015. Dr. Alavi is a licensed P. Eng. in the province of Ontario. In 2015, she joined the Energy Systems Group, Department of Electrical and computer Engineering, University of Toronto, as a Postdoctoral Fellow. Since September 2015, she has been with the department of Mechanical Engineering, Centre for Construction & Engineering Technologies, George Brown College, as a partial load professor where she teaches Digital Electronics, Electronic devices, and Mathematics for Mechanical Engineering. Dr. Marjan is a member of IEEE Toronto Executive committee 2016, and Vice Chair of the IEEE Industrial



Applications Society since 2015. She has been serving as a reviewer of IEEE Transactions on Industrial Electronics since 2012. Her research interests include health monitoring and control for power electronic circuits, mechatronics, and instrumentations.



David Whitehouse
Director Customer / Corporate Services and Conservation
Officer Peterborough Utilities Group

Title: The Connect Home! How Connected do You Want to Be?

Abstract: The "Connected Home and Home Automation " are hot topics in the conservation and energy space (no pun intended). Peterborough Utilities was the first in the Province to deploy full two ways, broadband connected Smart Thermostats! We now live in a world of Nest, Lyric and Wink home automation. The promise of a completely connected and interactive home is a long way away. We will discuss the benefits and the pitfalls of this technology and what happens to all that data collected?

Biography: David Whitehouse has been in the Electric and Water Utility industry for 32 years. David has participated in the development of Province wide conservation programs as the former Co-Chair of the Residential working group with the IESO. David was part of the team that developed the Peak Saver Plus program for the province which was the first step in home automation. David has been with Peterborough Utilities Group for 17 years and previously with Scarborough Utilities and then Toronto Hydro post amalgamation.



Shawn LaPalm

Advisor and agency owner with The Co-operators

Title: Telematics: Changing the Auto Insurance Industry

Abstract: While still in its infancy, Telematics is changing the auto insurance landscape. New and innovative telematics allows auto owners to control their auto insurance premium. Telematics monitors your driving habits and you are rewarded based on good driving behavior. A telematics device is installed in a vehicle's OBD2 port (right under your steering wheel). The device tracks and transmits data about vehicle use and driving behaviour, such as mileage, travel time, location, and harsh braking and acceleration. The data is processed by a UBI rating system that promotes safety by rewarding good drivers with greater savings. In this presentation you will learn more about The Co-operator's telematics program called Enroute, and how the system works for the insured and the insurance company.

Biography: Shawn has over 20 years of experience in the insurance industry, and specializes with non-profit and charity risk management and insurance needs. Personal interaction is his top priority, and Shawn can be seen speaking at individual, district, Provincial and National Organizations across Canada.



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Jean-Simon Venne

Vice President Solutions & IoT at Via Consultants

Title: Internet of Things: An overview of the IoT Landscape, Technologies, Protocols, Issues and Applications

Abstract: This presentation provides an overview of the Internet of Things (IoT) with emphasis on enabling technologies, protocols, issues and real cases of implementations examples. The IoT is enabled by the latest developments in LPWAN,

smart sensors, computing power and data storage capabilities. The basic premise is to have smart sensors collaborate directly without human involvement to deliver a new class of applications. The current revolution in the Internet, mobile, and machine-to-machine (M2M) technologies can be seen as the first phase of the IoT. In the coming years, the IoT is expected to bridge diverse technologies to enable new applications by connecting physical objects together in support of intelligent decision making. This presentation starts by providing a horizontal overview of the IoT. Then, we give an overview of some technical details that pertain to the IoT enabling technologies, protocols, and applications. We also provide an overview of some of the key IoT challenges we are facing like the security issues and object maintenance issues to name a few. Finally, we present detailed use-cases to illustrate how the different concepts presented fit together to deliver desired IoT value added services.

Biography: Mr. Venne is an expert technology business builder with over 25 years of experience, and he acts in the field of fast and efficient migration of technology innovations to the market in the telecommunications, biotechnology and energy efficiency industries. Originally with an engineer background, he rapidly dedicated himself to optimizing the value created by the intersection of technology, business and markets.

Before arriving at Via Consultants, Mr. Venne began his career with Bell Canada where he was involved in the development of several new product concepts and in the optimization of the operations in the logistic support departments. He then joined the Metronet Telecommunication start up where he took charge of the data engineering of the Montreal



network. He later became Engineering Manager for Sprint Canada. In the following years, he joined Zero Knowledge Systems as Director of the Freedom Network, followed by VP Business Development of PerOs Systems Technology.

In his last years before Via Consultants, he led the development of SMi-Enerpro in the field of smart building with the utilization of M2M technology. With an install base of over 200 buildings in North America, Europe and the Middle East, Mr. Venne had the chance to develop a solid expertise base in the field of intelligent sensors applications.



Karen Robinson

GEOTAB GPS Fleet Management -Sales at Swish Maintenance Limited

Title: Internet of Things or Innovation of Telematics - Understanding the 5 Core Pillars of GPS Fleet Management Today

Abstract: SAFETY, PRODUCTIVITY, COMPLIANCE, OPTIMIZATION, EXPANDIBILITY. Someone once said

“Knowledge is power”. We like to say “management by measurement”. Your customers will look to you to incorporate this stream of data into viable business strategies. Understand the ROI and just as important, the COI (Cost Of Ignoring). You can have the “coolest” solution, but if you are not improving the bottom line of your customers’ business, it will not last. Today we have to prove to business owners the real value of implementing a fleet management system. For over a decade, Geotab has been a proven industry leader in the area of fleet management and vehicle tracking technology, also known as telematics. Geotab’s advanced telematics is used to manage employee productivity and significantly reduce accidents. Geotab helps manage the maintenance, inventorying and fuel management of the company’s fleet vehicles. Geotab data is open and is easily integrated into IT systems to automate. Many Fortune 500 companies rely on Geotab’s technology to provide measurable management data. Since Geotab provides end-to-end hardware and software solutions that are entirely scalable, both enterprise organizations and small-to-medium sized firms are active users. Geotab is the inventor and manufacturer of the products. Geotab has established itself as a world leader in helping businesses move forward.

What does this mean to each of you? How can you incorporate a telematics solution for your organization and what results can you expect? Is telematics a flash in the pan or is it here to stay. It is here to stay.

Biography: Karen has 35 plus years hands-on experience working with mechanical, electrical, hydraulic, and pneumatic parts and equipment in numerous business sectors. Assisting clients in a wide range of products and services, ranging from fasteners and hardware to design-building utility man lift systems. For the past 12 years she has put her business and technical



knowledge to use, representing the Geotab GPS fleet management solution in Canada and the Northeast United States. Karen is recognized as a specialist in the Municipal telematics market, focused on how to best use telematics to improve efficiency and accountability.



Marc Levesque

**VP, Applications and Performance, Communications
Research Centre Canada
Innovation, Science and Economic Development
Canada / Government of Canada**

Title: Sustainable Spectrum Management in a 5G Context

Abstract: The radio frequency (RF) spectrum is invisible to us. Despite this, these invisible waves are critical to our daily lives and Canada's prosperity. Whether texting a friend, navigating by GPS, landing in a commercial aircraft or waiting for an ambulance to arrive in response to a 911 call, you are depending on wireless communications that are carried by waves in the RF spectrum.

In Canada, the department of Innovation, Science and Economic Development Canada manages the spectrum. Some bands are licensed. Your cellphone carrier, for example, has a license giving them exclusive use of a specific band of the spectrum. Other bands are designated unlicensed, giving anyone with the right equipment access to them. Baby monitors, garage door openers, radio-controlled toys and your home WiFi all use unlicensed spectrum.

Over the next 10 years, the number of devices requiring wireless network connectivity – everything from your refrigerator to self-driving cars – is expected to increase exponentially. Not only will there be more devices connected through the Internet of Things (IoT), but consumers are demanding that their devices deliver more information, more quickly, requiring



even more spectrum. But the RF spectrum is a limited resource. A specific band can only carry so much information, and not all bands can be used for commercial mobile communications that are so rapidly expanding.

To avoid a spectrum crisis, we need to: better understand how our spectrum is currently being used; find new ways to manage our existing spectrum and; develop innovative technologies that open up new bands of spectrum for commercial mobile communications.

Biography: Mr. Marc Levesque is Vice-President, Applications and Performance. He joined the CRC in 2015, with over 20 years of experience spanning engineering, technical sales, business development and management.

Mr. Levesque joined the CRC from Altera Corporation, where he served as a Global Account Manager, leading an international team focusing on telecommunications customers.

Earlier in his career, he worked in various engineering capacities – including hardware design, software development, system verification and field support – for companies supplying telecommunications equipment, such as Nortel. This experience in research and development (R&D) formed the engineering base that propelled him into technical sales, business development and senior management. It also provided him with an in-depth understanding of guiding scientific principles that he applies in R&D team leadership today.

Mr. Levesque also brings to the CRC a strong track record interfacing with stakeholders, from internal experts tackling technical issues and team members managing business functions, to external collaborators and global clients.

Mr. Levesque has a BSc in Electrical Engineering from the University of New Brunswick and a Master's Degree in Engineering Management from the University of Ottawa. He is a Professional Engineer with the Association of Professional Engineers of Ontario.