



## KITCHENER-WATERLOO SECTION

March 2011

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The Kitchener-Waterloo Section of the Institute of Electrical and Electronics Engineers serves members whose mailing address is in Bruce, Grey, Perth, Waterloo or Wellington counties. It collects news relevant to local engineers and is published monthly.

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<http://kw.ieee.ca>

IEEE KW Section, c/o Electrical & Computer Engineering (EIT 3028)

University of Waterloo

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## KW Section Executives

<http://www.ieeekw.com/executive.php>

### Officers :

|            |                      |
|------------|----------------------|
| Chair      | Dr. Shahab Ardalan   |
| Vice-chair | Dr. Amin Mobasher    |
| Secretary  | Vacant               |
| Treasurer  | Dr. Amir Khatibzadeh |

### Committee Chairs :

|   |                       |
|---|-----------------------|
| Membership Development                      | Mr. Tony Kormos       |
| Professional & Publicity Activities         | Vacant                |
| Student Activities (Conestoga College)      | Ms. Jane Carr         |
| Student Activities (University of Guelph)   | Vacant                |
| Student Activities (University of Waterloo) | Dr. Siva Sivoththaman |
| Educational Activities                      | Dr. Magdy Salama      |
| Newsletter Editor                           | Mr. Jameson Hyde      |
| Nominations                                 | Dr. Mauro Rossi       |
| Awards                                      | Dr. Alaa Khamis       |

### Chapter Chairs :

|   |                       |
|---|-----------------------|
| Aerospace and Electronic Systems (AES10)                  | Dr. Reza Dizaji       |
| Antennas and Propagation (AP03) /Microwave Theory (MTT17) | Dr. Raafat Mansour    |
| Circuits and Systems (CAS04)                              | Dr. Amir Khatibzadeh  |
| Communications (COM19)                                    | Dr. Raouf Boutaba     |
| Computational Intelligence Society (CIS11)                | Dr. Fakhri Karray     |
| Computer (C16)  | Dr. Ladan Tahvildari  |
| Control Systems (CS23)                                    | Dr. Fakari Karray     |
| Electron Devices (ED15)                                   | Dr. Siva Sivoththaman |
| Engineering in Medicine & Biology (EMB18)                 | Dr. Nezam Kachouie    |
| Information Theory (IT12)                                 | Dr. Amin Mobasher     |
| Photonics (PHO36)   | Dr. Simarjeet Saini   |
| Signal Processing (SP01)                                  | Dr. Mohamed Kamel     |
| Solid State Circuits (SSC37)                              | Dr. Shahab Ardalan    |
| Systems, Man, & Cybernetics (SMC28)                       | Dr. Mohamed Kamel     |
| Vehicular Technology (VT06)                               | Dr. Weihua Zhuang     |

### Affinity Group Chair :

|                                     |                      |
|-------------------------------------|----------------------|
| GOLD (Graduates of the Last Decade) | Vacant               |
| WIE (Women In Engineering)          | Dr. Ladan Tahvildari |
| Consultants Network                 | Dr. Shahab Ardalan   |
| LM (Life Members)                   | Vacant               |

### Student Branches :

|  |                   |
|--|-------------------|
| Conestoga College Student Branch                 | Mr. Justin Swance |
| University of Guelph Student Branch              | Vacant            |
| University of Waterloo Student Branch - Stream A | Mr. Haosen Cai    |
| University of Waterloo Student Branch - Stream B | Ms. Joanna Ma     |

## Upcoming Events

Updated information can be found at <http://www.ieeekw.com/activities.php>.

### International Conference on Autonomous and Intelligent Systems

June 22 – 24, 2011  
Burnaby, BC

The 2nd International Conference on Autonomous and Intelligent Systems (AIS 2011) is held in conjunction with the 8th International Conference on Image Analysis and Recognition in the beautiful city of Burnaby on the outskirts of Vancouver, Canada. It aims at providing a platform for researchers, engineers, academics and industrial professionals to present their recent research work and to explore future trends in various areas of autonomous and intelligent systems. The conference will address recent advances in theory, methodologies and applications in the field.

The scientific program will include keynote and invited speakers and fully refereed contributions. The organizers are working with Springer to have the proceedings published as a special volume in Springer Lecture Notes in Computer Science Series. It will be also indexed in major indexing sites. As with the first edition of AIS, selected articles will be published in the International Journal of Robotics and Automation and The International Journal on Control and Intelligent Systems, among other journals. AIS 2011 is technically co-sponsored by the IEEE.

<http://www.ais.uwaterloo.ca/ais11/>

### Canadian Conference on Electrical and Computer Engineering – Technology Driving Innovation

May 8 – 11, 2011  
Niagara Falls, ON

CCECE provides researchers, students, and practicing professionals in the area of Electrical and Computer Engineering with a Canadian venue in which they can present the latest technological advancements and discoveries. It is also a valuable opportunity to network, exchange ideas, strengthen existing partnerships and foster new collaborations. CCECE 2011 will feature mini-symposia with papers presented from a broad range of areas in Electrical and Computer Engineering. There will be tutorial sessions in leading topics, plenary talks from senior executives in industry and academia, special sessions in hot topics, social programs, the IEEE Canada Awards and Banquet night, best student paper awards luncheon, and industrial exhibitions.

This conference, organized by local IEEE sections, provides a forum for Canada's best emerging Engineering talent and industrial leaders to present, participate, sponsor and network between partners in Canada's High Technology Frontier.

[http://www.ieee.ca/ccece11/index\\_en.php](http://www.ieee.ca/ccece11/index_en.php)

## 1st IEEE Canada Women in Engineering National Conference

Symposium on Future Friendly Technologies  
April 30, 2011  
Mississauga, ON

The Women in Engineering National Conference (WIENC) provides researchers, students, and practicing professionals in diverse range of engineering, science and technology with a valuable opportunity to network, exchange ideas, strengthen existing partnerships and foster new collaborations.

WIENC 2011 will feature papers presented from a broad range of engineering, science and technology with the focus on future friendly technologies. There will be multitude of guest speakers from senior executives in industry and academia, roundtable discussions, workshop, poster presentations, best poster award, and industrial exhibitions.

You are invited to participate in WIENC 2011 by submitting a one page abstract in one of the specified areas. Both male and female delegates are encouraged to participate. The deadline to receive the abstracts is Sunday, February 20, 2011. For more information please refer to Submission Guideline.

<http://www.ieee.ca/wie/wienc11/>

## 10th International Conference for Upcoming Engineers

May 5, 2011  
Ryerson University, Toronto, ON

The International Conference for Upcoming Engineers (ICUE) was initiated by members of Ryerson University in 2001 to explore different options after graduation and to network with successful professionals in various engineering fields. To benefit upcoming engineers from a wide range of locations, the conference has been hosted by different universities each year. This year IEEE student branch at Ryerson University is proud to be hosting the ICUE conference for the third time.

ICUE has been developed as an International Conference to provide young engineers with the opportunity to expand their understanding of both academic and industrial sections of their field, and to present students with the opportunity to express their technical knowledge in public.

ICUE 2011 will feature industrial speakers, academic speakers, panel discussions, short course, design projects demonstrations, and social gatherings. This one day conference will focus on emerging technologies in all areas of engineering design and innovations. On behalf of the ICUE 2011 organizing committee, we are delighted to invite you to join us on May 5, 2011 at Ryerson University for the 10th annual International Conference for Upcoming Engineers.

<http://www.rnet.ryerson.ca/icue2011/>

## 2nd International Workshop on Real-Time Measurement, Instrumentation and Control

June 2 – 3, 2011

University of Ontario Institute of Technology, Oshawa, ON

Speakers:

Computer-aided Safety Engineering

Professor Paul Chung

Associate Dean (Research), Faculty of Science &

Director, Research School of Informatics,

Loughborough University, UK

Dynamic Analysis and Monitoring of Process Control Loops

Professor Yoshiyuki Yamashita

Department Chair Department of Chemical Engineering Tokyo University of Agriculture and Technology, Tokyo, Japan

Topics:

The workshop will have papers in the area of real-time measurement, instrumentation and control, which include (but not limited to) the following topics:

- Real time measurement techniques
- Advanced energy systems
- Oil & gas process systems
- Advanced risk and reliability engineering
- Advanced safety design
- Advanced instrumentation technologies
- Control system design and analysis
- Applications on radiation detection & protection
- Nuclear reactor internal and external measurements
- Advanced nuclear power systems
- Advanced plant inspection & maintenance
- Real time monitoring & diagnosis
- Applications on health physics
- Applications on space

[http://ewh.ieee.org/conf/rtmic/2011/#\\_Venue](http://ewh.ieee.org/conf/rtmic/2011/#_Venue)

## 21st International Conference on Noise and Fluctuations

June 12 – 16, 2011

Toronto, ON

The International Conference on Noise and Fluctuations (ICNF) is a biennial event, with the aim of bringing together specialists in fluctuation phenomena from different fields in science and engineering, to address both fundamental and applied issues. Recent past conferences in this series were organized in St. Louis (1993), Palanga (1995), Leuven (1997), Hong Kong (1999), Gainesville (2001), Prague (2003), Salamanca (2005), Tokyo (2007), and Italy (2009).

For queries about ICNF 2011 you can use the e-mail address

[icnf2011@icnf2011.org](mailto:icnf2011@icnf2011.org)

## IEEE Educational Outreach Program National Workshop Calling all IEEE Members in Region 7

April 28 – 29, 2011  
Mississauga, ON

The IEEE Educational Outreach Program a.k.a "Teachers in Service Program" or TISP for short, is planning a major Canada-Wide Workshop.

The TISP programme has been running now for about six years. The main activity of TISP is to bring to the attention of science teachers, the availability of a whole spectrum of fully developed lesson plans, FREE on the net. These lesson plans are being developed jointly by the IEEE and IBM, truly a powerful combination. Currently there are a total of 86 plans available and they are proving very popular with teachers because of the preparation time saved. This applies equally to newer teachers as well as those who have been teaching something other than science recently but are now re-entering the science field.

The objective of the workshop is to bring together IEEE members and science teachers. We are anticipating about 75-80 IEEE members plus maybe 8-10 representatives of the teaching profession and the Ontario Ministry of Education. It has been suggested that Section Chairs try to attend, as well as others from the 21 IEEE Sections across Canada. Please note that the Region 7 Board Meeting will be held in the same hotel on the days of Friday and Saturday April 29 and 30. This overlapping of schedules has been deliberately set in order to facilitate informal "get-acquainted meetings" of both groups during the breakfast and lunch breaks on Friday April 29.

[www.tryengineering.org](http://www.tryengineering.org)

### Hamilton ISA Expo

Experience the future of Instrumentation, Systems and Automation  
March 22, 2011  
Burlington, ON

A "Must Attend" for: Process Engineers, Control Systems Engineers, Operations and Maintenance Personnel, Technical or Engineering Support, Information Systems Engineers, Corporate Management, Measurement, Testing, and Quality or Standards Engineers, Technologists and Technicians, Software Engineers, Systems Designers, Systems Integrators, Research and Development, Production Engineers, Purchasing and Educators.

[www.isahamilton.com/expo.html](http://www.isahamilton.com/expo.html)

### EPTECH Hi-Tech Electronics Show

April 7, 2011  
Thornhill, ON

EPTECH regional professional electronics shows are produced in major high-technology centers across Canada.

EPTECH is the only series of coast-to-coast national electronics shows in Canada. The series is sponsored by EP&T, Canada's largest professional electronics trade publication, and is produced by Business Information Group, a leading technology and information provider.

Employing a highly time-efficient table-top display format, EPTECH shows target electronics designers, engineers, technicians, technologists, purchasers, technical managers and researchers.

EPTECH exhibitors cover a very broad spectrum within the electronics industry, displaying such products as semiconductors and ICs; passive and electromechanical components; test equipment and electronic instrumentation; connectors; design, test and technical software; technical computer systems and products; design, testing and contract manufacturing services; electronic chemicals and materials production equipment; and industrial electronics products.

<http://www.ept.ca/eptech/>

## Tesla's Wireless Power Transmission System

March 24, 2011, 7:00 PM

McMaster University, Hamilton, ON

Speaker: Steve Jackson, SMIEE

Come and be amazed! Tesla knew a way to isolate a frequency and "suck" all the energy transmitted on that frequency with minimum losses. Steve will be demonstrating Tesla's Wireless Power Transmission System, specifically a 1-amp fan operating 20 feet away from the power source! Tesla said, "The present is theirs; the future, for which I really worked, is mine." Steve's talk will be about this Tesla future.

Registration: [http://meetings.vtools.ieee.org/meeting\\_view/list\\_meeting/5611](http://meetings.vtools.ieee.org/meeting_view/list_meeting/5611)

Demonstration of Tesla's Wireless Power Transmission System duplicated at the Tesla Tech Conference in 2007:

[www.youtube.com/watch?v=SxZKqhDQujk&feature=related](http://www.youtube.com/watch?v=SxZKqhDQujk&feature=related)

## Solar Panel Installation for Feed-In Tariff

April 14, 2011, 6:00 PM

Speaker: Mike Triska, Direct Current

Hamilton, ON

Generating Electricity with Photovoltaic Cells and Connecting to the Grid.

An introduction on the technology of, and how to sell clean, green, renewable power back to the grid. The Laidlaw United Church has recently installed a solar panel system under the Government of Ontario's "Green Initiatives" Feed-In-Tariff program. The meeting includes a tour of the completed installation, an opportunity to learn about the process of solar installation from start to finish, and a look at their payments from Horizon Utilities for solar power generated.

[http://meetings.vtools.ieee.org/meeting\\_view/list\\_meeting/4767](http://meetings.vtools.ieee.org/meeting_view/list_meeting/4767)

## IEEE UW Guest Speakers

IEEE UW Student Branch

Keep an eye on the IEEE UW Student Branch website for further details on two very exciting guest speakers that will be visiting in the fall.

Canadian astronaut, Dr. Robert Thirsk will be sharing his experiences with the American and Russian space programs and his recent involvement on the International Space Station.

A representative from Blizzard Entertainment will be returning to Waterloo for the second year to talk about products and career opportunities.

[http://ieee-sb.uwaterloo.ca/upcoming\\_events.aspx](http://ieee-sb.uwaterloo.ca/upcoming_events.aspx)

## Engineers and the World

### Professor and Alumni Named to 40 under 40 List

February 25, 2011

University of Waterloo ECE News

Slim Boumaiza of electrical and computer engineering has been honoured as one of the Waterloo Region Record's 40 Under 40 for 2011. Boumaiza leads the university's Emerging Radio Systems Group which encourages the early involvement of undergraduate students in its research activities. Alumni Kurtis McBride, Eric Vieth and Joseph Fung are also part of this year's top 40 list.

### ECE Paper Wins Award

February 17, 2011

University of Waterloo ECE News

A paper written by electrical and computer engineering grad students and faculty has been selected as one of the best received by the International Symposium on Quality Electronic Design. The authors of the paper entitled the Design and Analysis of Metastable-Hardened and Soft-Error Tolerant High-Performance, Low-Power Flip-Flops include graduate students David Li, David Rennie and Pierce Chuang and professors David Nairn and Manoj Sachdev. The authors will be acknowledged at the ISQED symposium in March.

<http://www.isqed.org/>

## A Crowd of Quantum Entanglements

March 1, 2011

Saswato R. Das, IEEE Spectrum



**BILLIONS OF BITS:** This tiny chip of silicon produced a record 10 billion pairs of quantum entanglements.

Photo: John Morton/Oxford University

In a flurry of research reports during the past six months, physicists have proven that silicon, the basis of computers today, could also be the best platform for tomorrow's quantum computers.

Such computers would use the quantum properties of atoms or molecules to perform calculations in a fraction of the time it would take conventional computers. However, so far only rudimentary quantum computers have been built, comprising only a few quantum bits (qubits) and built in exotic systems such as ion traps, cryogenically cooled superconductors, and optical tweezers.

Silicon could provide a useful path to systems with 100 or more qubits, say some scientists, because it would make quantum computers easily compatible with conventional ones. The silicon solution originated in 1998, when Bruce Kane, a physicist at the University of Maryland, in College Park, suggested making a qubit from the nuclear spin—a quantum property similar to magnetic moment—of the phosphorus atoms with which silicon is often doped.

In the past few months, researchers have reported progress in using the phosphorus-in-silicon system. In the latest development, a team of physicists led by John Morton of the University of Oxford reported that by using bursts of radio waves, they have managed to entangle the spins of 10 billion pairs of electrons and nuclei in

a crystal of phosphorus-doped silicon. Entanglement is a phenomenon that allows quantum particles to be interlinked even if they are separated. It is used in quantum computing, along with another quantum phenomenon called superposition, to create qubits that can exist in many different states at the same time. The experiment is being hailed in the quantum computing community as a promising step toward silicon-based quantum computers.

According to Morton, the main advantages of his group's design are that it integrates easily with ordinary silicon circuits and that it produces qubits that last for a few seconds. In many other quantum systems, qubits last only milli- or microseconds, which makes it difficult to perform calculations.

Dane McCamey of the University of Sydney, whose research involves a similar system, says that what is important about Morton's work "is the generation of a large number of identical entangled pairs." McCamey and other experts, such as Stephen Lyon of Princeton, say these pairs could pave the way to a form of quantum computing where large entanglements are generated and then a series of precise measurements on individual qubits lead to massively parallel processing.

Though the Oxford experiment produced 10 billion sets of entangled pairs, the number that were usable as qubits was small, and that is unlikely to change soon. Raymond Laflamme, executive director of the Institute for Quantum Computing at the University of Waterloo, in Ontario, Canada, cautions: "Some people are making the leap that we will have silicon quantum computers soon. We are on the right track, but the track is a long one."

## For Fun...

### Brain Teaser

Joe McCrea (Logain), The Grey Labyrinth

During an excavation of an ancient ruin, you come across a room that has several objects in it. You know this culture had some pretty odd traditions and they usually kept things on display that had some unique or even funny significance to them.

The objects laid out, in no particular order, that you come to recognize are: 1) a fine piece of section, or log, from an oak tree, 2) what looks to be a primitive die from a child's game, 3) a globe of the earth, 4) a decorative wooden block that you think resembles a door stop wedge, 5) what could only be described as a closed doll house, 6) a piece of yellow aged paper, and 7) a piece of glass.

You study the piece of glass and notice how the light reflects very strangely from it and suddenly realize what it is...or at least think it is, and say to yourself it is broken. However, after looking back at the other items, a revelation occurs and you realize it's not broken, it was purposely cut in half at the tip to fit in.

What is it and how does it relate to with the rest of the objects?

### Engineering Humour

A group of Polish tourists is flying on a small airplane through the Grand Canyon on a sightseeing tour. The tour guide announces: "On the right of the airplane, you can

see the famous Bright Angle Falls." The tourists leap out of their seats and crowd to the windows on the right side. This causes a dynamic imbalance, and the plane violently rolls to the side and crashes into the canyon wall. All aboard are lost. The moral to this episode is: always keep your poles off the right side of the plane.