



## KITCHENER-WATERLOO SECTION

February 2012

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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)

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## KW Section Executives

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

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## Upcoming Events

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

### Medical Device Reg. Regime in Canada – Overview and Practical Applications

Toronto Section  
February 13, 2012, 6:00PM  
Toronto, ON

#### Speakers:

David McCarthy and Matthew McCarthy, McCarthy Consultants

The EMBS Chapter is hosting this seminar, which includes an overview of the Canadian medical device regulatory regime. Learn how to prepare an application for regulatory approval and dealing with the Therapeutic Products Directorate.

Registration is required

<http://toronto.ieee.ca/events/feb1312.htm>

### Competition and Cooperation in Societal and Technological Systems of Systems

Toronto Section  
February 16, 2012, 12:00PM  
Ryerson University

#### Speaker:

Keith Hipel, Professor of Systems Design Engineering - University of Waterloo

An encompassing perspective on competition and cooperation is presented for multiple participants strategically interacting within societal and technological systems of systems according to their underlying value systems as they strive to reach their goals. By appreciating the reality that systems of systems are inhabited by multiple participants or agents having multiple objectives, one can adhere to adaptive and integrative decision making principles to properly design, construct, maintain, and operate systems of systems that serve the interests of stakeholders in a fair and sustainable manner throughout the systems' life cycles. An insightful way is explained for classifying systems of systems in the world according to environmental (natural world), societal (real life), intelligent (artificial life) and integrated (mixed life) systems of systems. To examine strategic behaviour in societal systems of systems, some of the latest contributions in systems thinking techniques are discussed for advancing the paradigm of the Graph Model for Conflict Resolution including modeling value systems, taking preference uncertainty and strength of preference into account, describing how emotions can affect decision making under conflict, and tracing the evolution of a conflict from a status quo situation to a final equilibrium. A real world environmental conflict is employed to illustrate how cooperation among decision makers can produce a more preferred win/win resolution which cannot be reached when they behave independently in a purely competitive manner. In fact, tremendous opportunities abound for researchers and practitioners in systems, man and cybernetics to develop flexible smart systems tools in multiple participant-multiple objective decision making for both cooperative and independent interactive situations to tackle pressing global

problems such as global warming, unemployment, globalization of trade, over-population, widespread pollution, poverty, terrorism, and proliferation of nuclear weapons, from a multidisciplinary viewpoint. Moreover, it is pointed out that universal multiple participant decision making techniques need to be developed or significantly expanded and improved for employment in many diverse kinds of systems of systems such that multi-agents' value systems and protocols governing competitive and cooperative behaviour among agents are based upon ethical principles such as the prioritization of societal well-being, social justice, environmental protection, and sustainable development. As exemplified by the devastating tsunami of December 26, 2004 in Southern Asia, created by the undersea Sumatra-Andaman earthquake, in which more than 230,000 people died, adaptive and integrative policy and governance systems are required such that decisions can be made in real time based upon enormous amounts of data being collected over widespread areas so that appropriate remedial actions, such as large-scale evacuations of people in low-lying coastal areas, can be immediately implemented.

Registration is required.

<http://toronto.ieee.ca/events/feb1612.htm>

## Hamilton Section Annual Dinner Evening

Hamilton Section

February 18, 2012, 6:00PM

Ancaster, ON

Speaker:

Sandy Manners,

Director of Corporate Communications, Guelph Hydro Inc.,

Author of "Westinghouse/Siemens Westinghouse - 100 Years in Canada"

From appliances and televisions to waterwheel generators and gas turbines for power generation - the "electrifying" role played by Westinghouse in the development of Canadian society.

1923 - Westinghouse in Hamilton was the first company in Canada to manufacture radios and electric air cleaners.

Registration is \$20 for members.

<http://ewh.ieee.org/r7/hamilton/y2012/2012events.htm#a20120218>

## IEEE GOLD Green Automotive Event

Toronto Section

February 29, 2012, 6:00PM

University of Toronto

Speakers:

Ian Forsyth, Director of Corporate Planning Nissan Canada

Matt Crossley, Director of Canadian Engineering for General Motors Canada

Chris Hill, President and CEO, Electric Mobility Canada

David Hunter, Medical Physicist at Sunnybrook Research Institute

IEEE GOLD will be hosting a Panel with distinguished speakers from industry and academia who will speak about the state of green technologies in the automotive sector. In particular, we are interested in discussing topics such as recent technological developments and offerings from the major car manufactures and changes occurring in this sector as concerns surrounding the environment and the price of gasoline escalate. This event will bring together experts in the field for brief presentations and will allow ample time for a panel discussion and networking. Anyone who is interested to learn more about this topic is welcome to attend.

Registration is \$5.00 for members.

<http://toronto.ieee.ca/events/feb2912.htm>

## Nuclear Energy and Health

Hamilton Section

March 22, 2012, 6:45PM

Burlington, ON

Speaker:

Jerry Cuttler, President of Cuttler & Associates Inc., Toronto

Energy needs worldwide are expected to increase for the foreseeable future. Nuclear energy plants could supply much of the demand in a safe, sustainable manner were it not for fear of potential releases of radioactivity. Releases to nearby residents would deliver a low dose or a low dose rate of radiation, within the range of naturally occurring radiation, to which life is already accustomed. The key areas of concern are discussed. Studies of actual health effects, especially thyroid cancers, following exposures are assessed. The response of living organisms to radiation is explained, pointing out that beneficial effects are expected following a low dose or a low dose level because protective responses against stresses are stimulated. The notions that no amount of radiation is small enough to be harmless and that a nuclear accident could kill hundreds of thousands are challenged in light of experience: more than a century with radiation and six decades with reactors. If nuclear energy is to play a role in meeting future needs, regulatory authorities must examine the scientific evidence and communicate the real health effects of nuclear radiation. Negative images and implications of health risks derived by unscientific extrapolations of harmful effects of high doses must be dispelled.

Registration is required.

<http://ewh.ieee.org/r7/hamilton/y2012/2012events.htm#a20120218>

## Bay Area Science & Engineering Fair

March 28 – 31, 2012

Mohawk College, Hamilton, ON

The Bay Area Science and Engineering Fair is an absolutely free science fair competition with incredible prizes open to all grade seven through twelve students from Hamilton, Halton Region and Haldimand, Norfolk and Brant Counties.

The science fair takes place over the course of four days, starting with project set up on Wednesday afternoon/evening, student activities and judging on Thursday, and culminating in the award ceremony and public viewing on Saturday. Top winners go

on to compete at the Intel International Science and Engineering Fair and the Canada-Wide Science Fair.

<http://www.basef.ca/>

## IEEE International Conference on Communications

June 10 – 15, 2012

Ottawa, ON

Since 1965 the IEEE International Conference on Communications has been one of the flagship conferences of the IEEE Communications Society. IEEE ICC brings together the world's leaders, scientists, policy makers from industry and academia. The IEEE Ottawa Section is proud to host IEEE ICC 2012 Conference and Exhibition from 10-15 June 2012 where recent advances in the field of communications will be presented.

The theme of the conference is "CONNECT COMMUNICATE COLLABORATE". For participants it promises to stimulate the scientific exchange of ideas, the identification of future trends in communications, and the illumination of business opportunities. The conference program will feature 12 technical symposia, 16 industrial forums, keynote presentations, several workshops, and tutorials.

<http://www.ieee-icc.org/2012>

# Engineers and the World

## New WISE Associate Directors Appointed

University of Waterloo ECE News  
January 11, 2012

Two electrical and computer engineering professors have been appointed as associate directors of the Waterloo Institute for Sustainable Energy (WISE). Claudio Canizares is the new associate director, external partnerships, and Kankar Bhattacharya is the new associate director, advanced training. Both were appointed to two-year terms effective January 1, 2012. In announcing the appointments Adel Sedra, dean of engineering, and Jatin Nathwani, executive director of WISE, said the positions further enhance the university's commitment to be a leader in energy research.

## Oscar Nod for Waterloo ECE Graduate

University of Waterloo ECE News  
January 16, 2012

Andrew Clinton (BASc '05, Comp) is among the 28 recipients of scientific and technical achievements for the Academy Awards 2012 Scientific and Technical Awards Presentation to be held February 11 in Beverly Hills, California. Clinton, along with Mark Elendt, are being awarded a Technical Achievement Award for their work on "the invention and integration of micro-voxels in the Mantra software." Clinton and Elendt work for Side Effects Software, a Toronto-based 3D animation firm whose work, according to a profile by the Toronto Region Research Alliance, has "been used in over 250 feature films including nine of the last 11 films to win the Academy Award for best visual effects." According to the Academy of Motion Picture Arts and Sciences' website, the Technical Achievement Awards are presented for accomplishments that contribute to the progress of the motion picture industry. Parts of the February 11 presentation will be aired during the Academy Awards telecast on February 26.

## IQC Postdoc Gives Clouds a Secure Lining

by Colin Hunter, Senior Communications Officer, Institute for Quantum Computing  
January 20, 2012

Anne Broadbent, a postdoctoral fellow at the Institute for Quantum Computing, is part of an international research team to have achieved a breakthrough in perfectly secure "cloud computing" using principles of quantum mechanics.

The result, published today in the journal Science, represents a crucial step toward secure globalized quantum computing.

Quantum computers are expected to revolutionize information processing, since they are known to outperform their present-day "classical" counterparts at many tasks.

First-generation quantum computers will likely be housed in a few specialized facilities, and therefore computation will be done in the "cloud" — that is, central remote servers will be used to process and store data. Because multiple users will

“outsource” their computations to these centralized facilities, protecting information security will be of paramount importance.

The new innovation achieved by researchers in Canada, Austria, Singapore and the UK is the implementation of “blind quantum computing,” which perfectly safeguards private information in this “cloud” scenario.

“This is a very strong security guarantee,” says Broadbent, who co-invented the theoretical protocol that was implanted in the recent experiments. “It holds no matter what computational power we ascribe to the ‘adversary’ attempting to spy on the communications.”

In the experiment, conducted in Vienna, data is encoded particles of light (photons), because quantum computation operations can be performed on them, and they can be transmitted over long distances. Photons are the quantum “bits,” or qubits, used for computation.

Thanks to the way the qubits are prepared and computed, an eavesdropper — or even the quantum computer itself — cannot gain any useful information without knowing the initial state. They are, in a very real sense, “blind” to the information being transmitted, and only the original user can interpret and utilize the results.

The theoretical work that led to this experimental implementation was published 2009 by Broadbent, Elham Kashefi and Joseph Fitzimons. The recent experiment in Austria was carried out by Stefanie Barz, Anton Zeilinger and Philip Walther.

“I think this collaboration is a great example of a theoretical result providing a new direction to experimental research,” Broadbent says. “I think such interactions are very positive for the future of science.”

## For Fun...

Entropy sure isn't what it used to be.

## Brain Teaser

Einstein's Challenge

from Kevin J. Lin, Grey Labyrinth

- There are five houses in five different colours.
  - In each house lives a person of a different nationality.
  - These five owners drink a certain beverage, smoke a certain brand of cigarette and keep a certain pet.
  - No owners have the same pet, smoke the same brand of cigarette or drink the same drink.
- 
- The Brit lives in the red house.
  - The Swede keeps dogs as pets.
  - The Dane drinks tea.
  - The green house is on the left of the white house.
  - The green house owner drinks coffee.
  - The person who smokes Pall Mall rears birds.
  - The owner of the yellow house smokes Dunhill.
  - The man living in the house right in the center drinks milk.
  - The Norwegian lives in the first house.
  - The man who smokes Blend lives next to the one who keeps cats.
  - The man who keeps horses lives next to the man who smokes Dunhill.
  - The owner who smokes Blue Master drinks beer.
  - The German smokes Prince.
  - The Norwegian lives next to the blue house.
  - The man who smokes Blend has a neighbour who drinks water.

Who owns the fish?