



KITCHENER-WATERLOO SECTION

November 2010

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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>

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KW Section Executives

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

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Consultants Network	Dr. Shahab Ardalan
LM (Life Members)	Vacant

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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>.

Burlington PEO Joint Networking Session

November 24, 2010, 6:00 PM
Boston Manor, 4460 Fairview Street
Burlington, ON
Hamilton IEEE Section

Join and enjoy a night of pool, wings, pizza and networking. A Joint Networking Session with the IEEE Hamilton Section sponsored by Hamilton-Burlington PEO. Cost is \$15.

RSVP: Araceli Hernandez, P.Eng. (Araceli.h.hernandez@gmail.com)
<http://ewh.ieee.org/r7/hamilton/y2010/2010events.htm#a20101124>

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

Recent Events

Engineering Lists its Award Winners

September 30, 2010
University of Waterloo Bulletin

Names of this year's major award winners in the faculty of engineering have been made public by the dean, after they were celebrated at the faculty's by-invitation dinner.

The 2010 Faculty of Engineering Teaching Excellence Award was presented to Michael Fowler of chemical engineering, Andrew Heunis of electrical and computer engineering and Hamid Jahed of mechanical and mechatronics engineering.

There were four Faculty of Engineering Research Awards presented this year. The En-hui Yang Engineering Research Innovation Award for 2010 was awarded to Susan Tighe of civil and environmental engineering. The Engineering Research Excellence Award in the assistant professor category was received by Carolyn Ren of mechanical and mechatronics engineering; the Engineering Research Excellence Award in the

associate professor category was awarded to Murat Uysal of electrical and computer engineering; and the Engineering Research Excellence Award in the professor category was received by Daniel Stashuk of systems design engineering.

Mary McColl of electrical and computer engineering and Erick Engelke of engineering computing were honoured with the Faculty of Engineering Outstanding Staff Award for 2010. McColl was recognized in the award's administrative staff category and Engelke in the technical staff category.

The Friend of the Faculty Award, two Young Alumni Achievement Medals and four Alumni Achievement Medals were also presented. The Friend of the Faculty Award was presented to Xerox Research Centre of Canada "in recognition of the centre's support of Waterloo Engineering over the past 35 years through the hiring of engineering co-op students and graduates, providing research support and grants, and organizing and participating in joint research seminars and conferences".

The Young Alumni Achievement Medal was received by John Baker (BASc '00, systems design), president and CEO of Desire2Learn, a company which provides an online environment for teaching and learning to universities and other institutions around the world; and Carlos de Oliveira (BASc '04, civil), co-founder of Cast Connex, an industry leader in the design of customized cast steel structural components for building structures.

The Alumni Achievement Medal in the professional achievement category was presented to Bruce Bodden (BASc '69, civil), president and CEO of MMM Group Ltd., a multi-disciplinary engineering company; Fred Grigsby (BASc '71, electrical), who recently retired as senior vice-president of information technology for CN Rail; Kevin Negus (BASc '84, MASc '85, PhD '88, mechanical), a general partner with Camp Ventures, a venture capital investment firm that specializes in early-stage technology start-up companies.

The Alumni Achievement Medal in the community service category was presented to George Newton (BASc '64, electrical), "whose volunteer leadership and humanitarian endeavours have made a significant difference to Waterloo Engineering and communities throughout Ontario and Quebec".

Tour of Microwave and Terahertz Photonics Integrated System Lab

October 8, 2010

EMB Chapter Report, IEEE KW Section

The tour of Microwave and Terahertz Photonics Integrated System Lab has provided a great opportunity for graduate students, and faculties to visit a world-class characterization facility in the field of millimeter-wave and terahertz (THz) photonics with emphasis on the THz applications in pharmaceutical and life sciences, communications, and radio astronomy. The visitors had the chance to see the high-tech facility and interact with the scientists with focuses on the development of THz photonics devices and systems for biological and pharmaceutical spectroscopy and sensing and medical imaging applications.

Official Opening of Energy Building

October 4, 2010

University of Waterloo Bulletin

Government and corporate dignitaries as well as university officials gathered for the “official opening” of the Energy Research Centre — a building that’s actually been in partial use for some two years, but is now ready for celebrating.

Located between Matthews Hall and the powerhouse smokestack, the ERC was originally to be known as the Photovoltaic Research Centre, but was assigned the broader name when it was expanded to include other labs for energy and related research. In its final form it provides a focal point for energy research groups in the faculty of engineering at Waterloo.

The Centre for Advanced Photovoltaic Devices and Systems occupies the first floor of the building, providing space for technology development in all aspects of PV energy conversion, from base materials synthesis to modules.

University of Waterloo to Celebrate Opening of Engineering 5 Building

October 15, 2010

University of Waterloo News Release

The faculty of engineering at the University of Waterloo will next week celebrate the grand opening of its new \$55-million Engineering 5 building, which contains a world-leading student design centre and an electromagnetic radiation laboratory.

The six-storey Engineering 5 also provides much-needed space for students, professors and researchers in the departments of mechanical and mechatronics engineering, systems design engineering, and electrical and computer engineering.

The 176,000-square-foot (16,000-square-metre) building, designed by Shore Tilbe Perkins+Will of Toronto, is one of the largest on campus. Engineering 5, located on the east side of campus, features fritted glass, a green roof area and native landscaping. An enclosed pedestrian bridge connects the building to Engineering 3.

The focal point of Engineering 5 is the 20,000-square-foot student design centre on the building's first two floors. The student design centre offers the space and tools needed to make it easier for student teams to design and showcase such award-winning vehicles as solar and hydrogen fuel cell cars, along with many other projects. The centre includes multiple bays, sand and paint shops, engine test labs and much more.

“We have built one of the best undergraduate design facilities in the world for our outstanding student projects,” said Adel Sedra, dean of the faculty of engineering. “I’m extremely proud of the work that faculty, staff and external contractors have put into building Engineering 5 and I am most grateful for the support received from our many volunteers and donors.”

The upper four floors of the building provide office and teaching space for the engineering faculty. The department of mechanical and mechatronics engineering is

located on the third floor, while the fourth and fifth floors accommodate the department of electrical and computer engineering. The department of systems design engineering takes up the sixth floor.

At its north end, Engineering 5 contains an electromagnetic radiation laboratory, featuring an anechoic chamber - a shielded room designed to attenuate radio frequency and microwaves. The chamber, which received funding from Research In Motion and other sources, will be used for research in wireless communications. Supporters who have contributed \$1,000 or more since May 1, 2006 to Waterloo Engineering will be recognized on a donor display.

Engineering 5 results from the Vision 2010 strategic plan, which aimed to move Waterloo Engineering to a level of excellence on par with the leading North American schools of engineering. Other achievements during the Vision 2010 plan period (from 2005 to 2010) include significant increases in graduate students, faculty members and research activity. Three new buildings, beginning with Engineering 5, were planned to support this strategic growth.

Significant funding for Engineering 5 has come from the Vision 2010 Campaign, a \$120-million fundraising effort targeted at helping achieve the faculty's ambitious strategic goals. With two years remaining, the campaign has raised \$76 million to date.

Tour of Robarts Research Institute

July 8, 2010

EMB Chapter Report, IEEE KW Section

Co-sponsored by IEEE KW Section of KW, University of Waterloo ECE Department, and Robarts Research Institute

The tour of Robarts Research institute has provided a great opportunity for University of Waterloo undergraduate students, graduate students, and faculties to visit one of the world leading Institutes in the field of biomedical research. The visitors had the chance to see the high-tech facility and interact with the scientists who are applying the new technologies to put end on many of today's devastating diseases.

The following laboratories were visited: lung imaging, vascular imaging, 3D ultrasound, small animal imaging, functional MRI, image-guided surgery and therapy laboratories.

Engineers and the World

Federal Funding to Speed Electric Cars

October 18, 2010

University of Waterloo Bulletin

Peter Braid, the Member of Parliament for Kitchener–Waterloo, came to campus Friday morning and announced \$3.6 million in new funding over five years for research by the Waterloo Centre for Automotive Research (WatCAR).

Industry Canada says the money, under its Automotive Partnership Canada initiative, “will help address the challenges hindering widespread adoption of electric vehicles. Research will focus on reducing environmental impacts while accelerating fabrication of Canadian-made electric vehicles and related systems.” The project is headed by mechanical and mechatronics engineering professor Amir Khajepour, who serves as Canada Research Chair in Mechatronic Vehicle Systems.

Altogether, Automotive Partnership Canada is a five-year, \$145 million initiative that includes such efforts as reducing vehicle weight by using more plastic parts in engines, improving the efficiency of transmissions, and advancing the state-of-the-art longer-range electric vehicles.

Khajepour and his colleagues say electric cars are increasingly recognized as the most promising road transportation solution to the global energy crisis and increasingly stringent requirements for environmental protection and vehicle safety. But electrification of automotive systems presents radical challenges, especially for drivetrain systems, chassis design and layout, multidisciplinary power management and optimization, system integration, and vehicle dynamics and safety.

With the latest \$3.5 million, the Waterloo researchers will undertake a four-year project, in collaboration with General Motors of Canada and Maplesoft Inc. The project is to complement and extend research on electric vehicle system development done by the researchers under an \$8 million Ontario Research Fund project entitled Green Intelligent Transportation Systems that was announced last spring.

The plan is to speed up development of new highway-capable electric vehicles, developing key components and systems, including thermal management, health monitoring and charging control devices for Li-ion batteries, in-wheel motor concepts, and vehicle stability and control technologies.

<http://www.mri.gov.on.ca/english/programs/ResearchFund.asp>

Professor Helps Lead Automotive Software Project

October 26, 2010

University of Waterloo CS News

Thanks to \$10.5 million in funding from Automotive Partnership Canada, and \$6.1 million from industry partners General Motors of Canada Ltd, IBM Canada, and Malina Software Corp, CS professor Jo Atlee and her newly announced national research network can now begin their five-year mission to tackle the technological challenges related to the growing complexity of automotive software systems.

With eighteen years of research and teaching experience at Waterloo, Atlee will be co-leading the Network on Engineering Complex Software Intensive Systems for Automotive Systems with McMaster University’s Tom Maibaum, Canada Research Chair in the Foundations of Software Engineering. Other universities in the network include McGill, Queen’s, British Columbia, Toronto, Victoria and the Centre de Recherche Informatique de Montréal.

NECSIS will focus on the advancement of an emerging methodology called model driven engineering. MDE reduces the complexity of developing software by focusing

on models and their relationships, reflected in the designs, code and documents that developers work with, enabling them to test and verify models even before the code exists.

"The idea of a network of researchers working on model-based software engineering has been brewing for a number of years," explains Atlee, "but there were few software companies that practiced this style of software development and therefore we had few models of real-world software to work with. That has changed in the last few years. The automotive domain is now the key adopter and driver of this new paradigm of software development."

Paper by ECE Professor Featured in IEEE Publication

October 13, 2010

University of Waterloo ECE News

A paper written by Ladan Tahvildari of electrical and computer engineering and director of the software technologies applied research lab, Siavash Mirarab (MAsc '09, Elect) and two other colleagues was featured in the September/October issues of IEEE Transactions on Software Engineering. The Effects of Time Constraints on Test Case Prioritization: A Series of Controlled Experiments is highlighted as the Spotlight Paper on the journal's home page.

<http://www.computer.org/portal/web/tse>

U of G Links with Business to Accelerate Innovation, Application

October 14, 2010

University of Guelph News Release

The University of Guelph has received \$750,000 from the federal government to help bridge the gap between research and commercialization.

The funding comes from the Applied Research and Commercialization Initiative, started by the Federal Economic Development Agency for Ontario (FedDev Ontario) to boost the region's economic recovery. It's part of the federal government's economic action plan.

The \$15-million pilot program encourages collaboration and partnerships among colleges and universities and the private sector. U of G's share of the funding was announced Tuesday by Gary Goodyear, minister of state (science and technology) in Kitchener.

"The goal is for universities to work with smaller businesses to help develop their innovative ideas, practices or products, and get them to market," said Rich Moccia, U of G's associate vice-president (research).

Small and medium-sized companies often lack internal research and development expertise. This new initiative will link postsecondary institutions and companies in everything from testing new products to developing technology to helping with the engineering of a concept, Moccia said.

"As a result, ideas will evolve into products and action faster and more efficiently,"

he said, adding that the program might encourage additional private-sector investment in university research.

“Our students will benefit by being exposed to a variety of entrepreneurial opportunities, creative ideas and industry trends.”

U of G will participate in 10 industry-academia partnerships starting this fall and continuing through 2012. The collaborations will involve industries involved in food and health, environmental science, water quality and treatment, human and animal health, and biodiversity.

In related news, Michael Chong, MP for Wellington-Halton Hills visited campus Wednesday to announce another FedDev Ontario program, Scientists and Engineers in Business. It's intended to help recent graduates and graduate students develop entrepreneurial skills. The program will fund young researchers in science, technology, engineering and mathematics to improve their business and management skills, and help them develop their ideas into businesses, new products or services.

Funding is provided both to universities for commercialization fellowships and to not-for-profit organizations for skills development and training. Applications for projects are being accepted on an ongoing basis.

Hydro One Chair' Named as Building Opens

October 5, 2010

University of Waterloo News Release

The Energy Research Centre was formally opened yesterday, with a ceremony that included an announcement of electrical and computer engineering professor Claudio Cañizares as the inaugural Hydro One Chair in Power Engineering.

The Hydro One Chair in Power Engineering is funded by a \$2.5-million agreement signed last year with Hydro One Networks Inc. As Hydro One chair, Cañizares will support research in smart grid power distribution and management, alternative energy and sustainability projects, along with graduate student investigations. The chair is expected to contribute significantly to work on how to integrate clean energy technologies into the grid as well as address specific issues of the electricity sector through research, development and deployment projects.

The Waterloo Institute for Sustainable Energy will oversee the Hydro One Chair agreement. WISE includes more than 80 faculty members with graduate students and postdoctoral fellows working in multi-disciplinary research teams across engineering, science and environment. Researchers investigate innovative technologies and alternatives to existing energy production and delivery systems, along with energy efficiency and environmental sustainability.

Medals Awarded to Outstanding Graduate Students

October 22, 2010

University of Waterloo Bulletin

A highlight of fall convocation is always the presentation of two Alumni Gold Medals for the year's top graduates at the PhD and master's degree levels. This year's

winner for "outstanding academic performance in a master's program" is Jordache McLeod, of health studies and gerontology. At the PhD level the winner is Alexander Wong of systems design engineering.

Wong's doctoral thesis was supervised by David Clausi of the systems design department. Says his citation: "During his time at the University of Waterloo, Mr. Wong has distinguished himself as an outstanding scholar. He has an exceptional publication record with research productivity for 5 years of graduate studies that would rival that of many full time faculty members applying for tenure.

"As stated by his supervisor, 'Alex's research work is broad since he applies himself in multiple fields within computer vision including image compression, image registration, super resolution, tracking, and denoising. His core research contribution champions the use of statistical sampling instead of local windows for enhanced approaches to computer vision. This approach and the success of Alex's algorithms I expect will recognize him as a leading world-class researcher in the computer vision field early in his career.'

"Mr. Wong has excellent teaching and research abilities; he is very productive and takes initiative in a board range of interests, which leads to collaboration in a variety of fields."

The medal winners were chosen by the Advisory Committee on Graduate Scholarships and Awards, which also named five students to be recognized for "outstanding achievement": Faisal Al-Faisal of pure mathematics and David Norris of the global governance program, at the master's level; Andrew Doxey of biology, Joanna Jacob of sociology, and Shuai Cheng Li of computer science, at the PhD level.

For Fun...

Brain Teaser

You are faced with two iron bars, identical in weight, size and shape. You are told that one of them is magnetized. Given the following materials, what is the easiest way to determine which one is the magnet?

- A glass of water
- A 5 1/4" floppy disk
- A spool of thread

Engineering Humour

I was walking down by the waterfront the other day when I saw a man sitting by the docks muttering to himself. What interested me about him was that he was wearing a train conductor's uniform. When I asked him about it, he explained that he an intern for the local shipping company. He was particularly kind, complementing me on my outfit on a couple occasions. He then claimed that he had invented modern integrated circuit engineering practices, which led me to believe that he had lost his wits. It only later occurred to me that he was a complementary mental dock-side semi-conductor.