



KITCHENER-WATERLOO SECTION

August 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>

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University of Waterloo

Waterloo, ON, N2L 3G1

KW Section Executives

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

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Dr. Amin Mobasher

Vacant

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Professional & Publicity Activities

Student Activities (Conestoga College)

Student Activities (University of Guelph)

Student Activities (University of Waterloo)

Educational Activities

Newsletter Editor

Nominations

Awards

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Antennas and Propagation (AP03)

/Microwave Theory (MTT17)

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Communications (COM19)

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Computer (C16)

Control Systems (CS23)

Electron Devices (ED15)

Engineering in Medicine & Biology (EMB18)

Information Theory (IT12)

Photonics (PHO36)

Power and Energy (PE31)

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Dr. Mohamed Kamel

Dr. Weihua Zhuang

Affinity Group Chair :

GOLD (Graduates of the Last Decade)

WIE (Women In Engineering)

Consultants Network

LM (Life Members)

Vacant

Dr. Ladan Tahvildari

Dr. Shahab Ardalan

Vacant

Student Branches :

Conestoga College Student Branch

University of Guelph Student Branch

University of Waterloo Student Branch - Stream A

University of Waterloo Student Branch - Stream B

Mr. Justin Swance

Vacant

Mr. Haosen Cai

Ms. Joanna Ma

Vacant Positions

The IEEE Kitchener-Waterloo Section is looking for interested volunteers to fill a number of available positions on the board. Anyone interested should contact one of the executive for further details.

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

Upcoming Events

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

IEEE IAS PCIC Technical Conference

September 19 – 21, 2011
Toronto, ON

The Petroleum and Chemical Industry Committee (PCIC) of the Industry Applications Society of IEEE invites you to attend its 58th annual conference in Toronto. The 2011 conference is scheduled for September 19-21, 2011. The Conference Tutorials will be held on September 22. Under the sponsorship of the Industry Applications Society, the PCIC Conference has become the premier annual application meeting for practicing electrical engineers. Following conferences in Calgary, Cincinnati, Anaheim and San Antonio the Committee is planning an equally outstanding event for 2011.

The conference is noted for the high quality and practical application of its technical papers. The technical program this year will continue to feature papers focusing on the technology and issues faced by electrical engineers in the petroleum and chemical industry.

http://www.ieee-pcic.org/Conferences/2011_Toronto/index.html

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 o COMMUNICATE o 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>

Recent Events

Waterloo Engineers Inducted as CAE Fellows

Waterloo ECE News
June 8, 2011

Eight engineers with Waterloo ties were recently recognized as new fellows of the Canadian Academy of Engineering. Those honoured include Tom Fahidy, distinguished professor emeritus for chemical engineering, John McPhee (MAsc '86, PhD '90, Mech), a systems design engineering professor, and Weihua Zhuang, an electrical and computer engineering professor. Also inducted were Andreas Athienitis (PhD '85, Mech), Dennis Becker (BAsc '75, Civil), Thomas Oxland (BAsc '86, MAsc '87, Civil), Anthony Rosati (BAsc '85, Elect) and Christopher Young (PhD '93, MSci).

Provincial Funding Announced For Engineering Projects

Waterloo ECE News
August 8, 2011

Four engineering researchers will benefit from the \$12.7 million in provincial research funding to be received by the University of Waterloo and Wilfrid Laurier University. The grants announced August 2 by Kitchener-Conestoga MPP Leeanna Pendergast in Waterloo's Engineering 5 building will fund a total of 25 Waterloo and WLU projects. The engineering researchers receiving funding for their work are Slim Boumaiza and Patrick Mitran, both of electrical and computer engineering, James Craig of civil and environmental engineering, and Maud Gorbet of systems design engineering. Boumaiza, who spoke at the announcement, was awarded \$2.4 million to investigate technologies to make cell phone towers smaller and more energy efficient.

Engineers and the World

Kitchener Home Celebrates Green Award

Ashley Csanady, Waterloo Record
July 6, 2011



Green house Derek and Jackie Satnik show off a LEED certification plaque in their Kitchener kitchen Monday. The island counter top is made from reclaimed structural wood, the counter tops are recycled glass and the cabinets are real wood with no glue.

Mathew McCarthy/Waterloo Record staff

Pulling into the driveway, Derek Satnik's Kitchener home looks like any other. The Helena Feasby Drive abode is not a normal house, but only three small metal plaques to the lower right of Satnik's front door belie its hidden features and tout its sustainability.

As the first Leadership in Energy and Environmental Design (LEED) platinum-level building in Waterloo Region, the house is more than a home for Satnik's growing family — his wife is due with their fifth child today.

The dwelling is so green it rivals Kermit the Frog — and like the Muppet said, it's not always easy. From shingles and carpet made from recycled materials to an "all-off" switch at the front door that kills power to any non-essential outlets, it's a lot of little things that combine to create a remarkably energy-efficient home. Even the \$1,200 water softener is low-energy and uses half the average amount of salt.

"We did a lot of things like that, where we were looking for inexpensive but smart," said Satnik, an electrical engineer who graduated from the University of Waterloo

and works as an environmental and energy-efficiency consultant with Mindscape Innovations. "I wanted to walk my talk."

His house is part of Eby Estates, an entirely Energy Star-certified subdivision (a government-backed low-energy certification) by Williamsburg Homes that offers buyers packages to LEED certify their homes. Basic certification costs \$3,500, while platinum requires a \$30,000 investment.

He added that because he works in the industry, it's easier for him than it is for outsiders to understand how the costs even out in the long run.

But the average consumer isn't buying in. Williamsburg Homes has yet to sell another LEED package, which suggests homebuyers are much slower than the public and private sectors to jump on the green bandwagon.

"It's not that builders don't want to build energy-efficient homes, but how do you get the marketplace?" said Glen Woolner, general manager of Community Renewable Energy Waterloo (CREW), which supports sustainable building initiatives. "We have to create the appetite to sustain the industry and move it forward."

"It's not that it's that expensive, it's just different," Woolner said, adding that what costs \$30,000 today would have cost \$150,000 five years ago. If the market keeps growing, prices will continue dropping, but Woolner says it requires a paradigm shift and people like Satnik to demonstrate that you can live green and live well.

"For a coffee a day ... we would rather put the money in the house and our kids' health," said Satnik. Two of his four-going-on-five children have asthma and they all have mild allergies.

He explained that many of his environmentally friendly choices also make for a friendlier environment. For example, the kitchen cabinetry is real wood and naturally treated; the custom-made kitchen island is even coated with beeswax. Normal new cabinets emit an off-gas — think new-car smell — that's carcinogenic and can exacerbate allergies and asthma.

Satnik's home is also the first recipient of the City of Kitchener's Green Housing Incentive Program grant for LEED certification. But it's far from the only LEED-certified building in the region.

In fact, Waterloo Region council voted in 2005 to ensure all new construction projects over 500 square metres would meet, at minimum, LEED's silver standard. A recommendation that Waterloo city council adopt a similar policy is in the works. The cities of Waterloo and Kitchener are also working together to create a green building policy.

The young family's house doesn't just top LEED certification, it's also the first Built Green home in Ontario, rated Energy Star and solar ready, which means the house is equipped for solar panels should Satnik decide to install them in the future.

Both LEED and Built Green are third-party environmental sustainability certification bodies that divide their accreditation into categories, with platinum being the highest category. A building must meet at least 90 out of 136 criteria to be platinum certified.

"That's the benefit of a program like LEED, it gives us a guide," said Satnik.

<http://www.therecord.com/news/local/article/558663--kitchener-home-celebrates-green-award>

<http://www.cagbc.org>

New 3D Laser Scanner Profiles Wreck

Daily Bulletin
July 12, 2011

A Waterloo-based robotics startup is playing an important role in documenting the status of HMS Investigator, a British ship sent out a century and a half ago to search for Sir John Franklin's lost Arctic expedition.

Investigator never did locate Franklin, and her crew had to abandon her to the crushing sea ice in 1853 (as shown in the image above, courtesy of Toronto Public Library Special Collections). Her exact resting place remained unknown until Parks Canada archaeologists discovered the wreck last July, eight metres deep in Mercy Bay near the shore of Aulavik National Park on Banks Island, Northwest Territories.

This summer, Parks Canada is conducting the first archaeological survey of the site, July 10 to 25. Divers will record and assess the wreck using video and other sensors – notably, a one-of-a-kind robotic underwater laser scanner developed by 2G Robotics, a University of Waterloo spinoff company.

Jason Gillham, a University of Waterloo alumnus (BASc '07) and master's candidate in mechanical and mechatronics engineering, founded 2G Robotics after graduation to commercialize his master's research. Also on staff are Daniel Charbonneau, a Waterloo computer engineering grad (BASc '09) and former co-op student, and Neil Cavan, a classmate (BASc '07) of Gillham's, now also working on his master's degree.

The robotic laser technology that will be used to scan HMS Investigator was developed especially for this project, and, Gillham says, it's the first time ever that this technology has been applied to an undersea shipwreck.

The firm was already marketing ULS-100, a robotic laser scanner designed to inspect underwater concrete structures for cracks and erosion. 2G Robotics worked with Parks Canada to develop ULS-500, a longer-range system capable of covering a larger area more quickly. The device will scan the vessel's surface and produce a precise, highly detailed three-dimensional digital recording of the structure.

"Traditional underwater inspection techniques are sonar, video, and hand measurements," Gillham says. "These techniques do not provide the level of measurement detail that the ULS-500 is capable of collecting."

It's extremely rewarding, he adds, for a small startup like his to develop a technology that could have a significant impact on our understanding of history. He predicts that as the technology develops, "this increased level of knowledge about anything under water, from shipwrecks to underwater oil structures," will help ensure the longevity and safety of those structures.

<http://www.pc.gc.ca/eng/culture/expeditions%202011/sec02.aspx>

<http://www.2grobotics.com/>

Engineers Vie to Win Berth in OEC

Daily Bulletin

July 13, 2011



From left: Senior Design Competition first* and second-place winners with judges Prof. Sanjeev Bedi, Prof. Steve Lambert, and UWAFT team member Mike Giannikouris. From right: Benjamin Tan*, Prof. Bedi, Yiling Wang*, Nevin McCallum, Martin Lui*, Jeff McClure, Cody Prodaniuk, Maple Leung, Prof. Lambert, Shahid Haider*, and Mike Giannikouris.

More than 160 competitors and volunteers took part in the spring iteration of the Waterloo Engineering Competition, writes Angelo Alaimo, 4A electrical engineering, executive director of the WEC organizing committee.

Undergraduate competitors, in teams of four, were given a previously unreleased engineering problem and had the rest of the night to come up with a solution.

In Senior Team Design, each team was considered to be "fresh out of Waterloo Engineering" with a high student debt load and required to create a contraption within six hours capable of retrieving riches from the side of a mountain in order to pay down their student loans. In Junior Team Design, competitors had to create a device in four hours to deploy an emergency road across an "earthquake-damaged" section. And in Consulting Engineering, teams were "hired" by the Government of Ontario to investigate ways to reduce energy consumption from commercial and industrial buildings.

Presentation and judging took place Saturday morning. This term's winners:

- Senior Team Design: Shahid Haider, Benjamin Tan, Yiling Wang, and Martin Lui, all in systems design engineering.

- Junior Team Design: Kumar Singh, electrical engineering; Ayush Kapur, mechatronics engineering; and Drupandh Manjunath, chemical engineering.
- Consulting Engineering: Amir Taleghani, Caitlin Speicher, Matthew Casswell, and Stuart Pearson, all in civil engineering.

Each first-place team will represent Waterloo at the Ontario Engineering Competition in Toronto next February where, if they place in the top two, they will progress to the Canadian Engineering Competition next March in Vancouver.

The Waterloo Engineering Competition is held twice a year, in the spring and fall terms. The competition is organized by undergraduate engineering students from the Engineering Society with sponsorship from EngSoc and the Sandford Fleming Foundation.

<http://wec.uwaterloo.ca/index.html>

<http://oec2012.ca/>

PAMI expands into wide-ranging centre

Daily Bulletin
July 14, 2011

The official launch of the newly established University of Waterloo Centre for Pattern Analysis and Machine Intelligence (CPAMI) was held yesterday at the Davis Centre in the presence of George Dixon, vice-president university research; Adel Sedra, dean of engineering; and Manoj Sachdev, chair of electrical and computer engineering, as well as professors from different faculties, grad students, and industrial partner representatives.

CPAMI is a centre of excellence in the field of pattern analysis and machine intelligence. The centre is interdisciplinary, bringing together experts from artificial intelligence, computer science, cognitive science, electrical engineering, mechanical engineering, systems design engineering, civil engineering, management sciences, chemical engineering, mathematics, and statistics. The centre will collaborate with a number of industrial partners from the area and will co-operate with other centres at Waterloo and at other universities worldwide.

The new centre, an expansion of the Pattern Analysis and Machine Intelligence (PAMI) research group, was approved by the University of Waterloo Senate earlier this year. The inaugural director is Mohamed Kamel; the inaugural co-director is Fakhri Karray; and the inaugural associate director is Otman Basir, all of whom are professors in the electrical and computer engineering department.

<http://pami.uwaterloo.ca/>

For Fun...

Brain Teaser

Joe McCrea (Logain), The Grey Labyrinth

Trying to break into a computer lab, you find that there are 4 scientists who have security access codes. An informant has discovered the four scientist's codes, and they are as follows:

- 753
- 825
- 690
- 921

You sneak into the building and knock out one of the scientists...but you don't know which one. You watch for the other three to enter the lab to observe their security codes, so that you can enter the one for the man you disabled. But, unfortunately for you, you watch in horror as the three scientists enter the lab using the following security codes:

- 1-1-4-3-1
- 3-2-2-2-1
- 2-2-3-2-1.

You try to rationalize what went wrong as you approach the security pad. You know your informant would not give you false information. Oddly, your informant mentioned the complete list of codes he saw never went above a 3 digit number, yet the security pad appears to allow for numbers up to ten digits. Also, more curious is that while numbers 1-9 are there, the pad lacks a 0 key. Is it possible that you should still know the code?

Engineering Humour

Truisms:

- Any circuit design must contain at least one part which is obsolete, two parts which are unobtainable, and three parts which are still under development.
- Nothing ever gets built on schedule or within budget.
- A failure will not appear till a unit has passed final inspection.
- If you can't fix it — document it.
- The primary function of the design engineer is to make things difficult for the fabricator and impossible for the serviceman.