KITCHENER-WATERLOO SECTION

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Upcoming Events

Check http://kw.ieee.ca/activities.html for updated information.

Annual General Meeting

The IEEE general meeting will be held in early 2007. Details will be posted on the web site.

ATS Plant Tour

IEEE

A plant tour is being planned but details are not available yet.

Robotics event returns in March

UW media relations office

UW is inviting high school mech-heads from across southwestern Ontario to participate in the first round of an international competition in robotics.

The FIRST Robotics Competition challenges teams of high-school students and their mentors from around the world to solve a common problem in a six-week period using a standard parts kit and common set of rules. Teams build robots from the parts to play a game where the objective is to score points by completing such tasks as shooting balls, stacking boxes, climbing over obstacles or hanging from bars.

The competition, to be held March 22-24, will be open to the public, and admission is free.

http://www.firstroboticscanada.org/site/aboutfrc

Recent Events

Toyota Plant Tour in Cambridge
IEEE Vehicular Technology Chapter presentation submitted by M. Hulls

The tour took a full busload of engineers for an introduction to the robot-filled world of the Toyota plant. The tour started in the lobby where some of the produced cars (Lexus, Matrix, Corolla) as well as technical exhibits can be examined. A video then presented a number of the key events in the plant's history.

The tour of the plant takes you right onto the plant floor. Automated systems work together to make the plant an efficient system (over 90% automated on the Lexus line). The lines build different models of cars at the same time. Robots are used to provide specific duties (welding, assembly) and to give flexibility in the layout. The tour is definitely worth doing if you have any interest in robots or assembly operations.

The Patent process and protecting Intellectual Property
IEEE Gold seminar by Jeffrey W. Wong

The Waterloo Region office of Borden Ladner Gervais has grown from its original roots as a leading area intellectual property law firm, to become a full service business law firm offering a complete range of corporate, commercial and IP legal services. Part of one of Canada's largest law firms, with the full resources and expertise of over 675 professionals working in a wide range of practice areas, our Waterloo Region team is well positioned to support all the needs of the local business community.
The presentation included an overview of the world of Intellectual Property (IP), with a focus on patenting. Topics will include the patent process, tips on protecting IP and developing your patent portfolio.

Medical Imaging and Computing in the 21st Century
IEEE EMBS presentation by Professor Yongmin Kim University of Washington

Imaging technology has become pervasive in many facets of our lives: whether it is a digital camera or swallowable camera-in-a-capsule to take pictures as it travel through the digestive track; whether it is an X-ray CT, MRI or ultrasound scanner. Due to tremendous progress in IC, computing and algorithms, medical imaging has advanced over the past four decades from only conventional X-ray systems to today's wide array of medical imaging modalities. To enable this widespread use, there have been significant technological advances in improving the image quality and introducing new diagnostic capabilities. Recent progress and future trends will be presented in this talk, including panoramic imaging, real-time strain (elasticity) imaging, distributed screening and diagnosis, 3D and 4D imaging, ultrasound molecular imaging, and programmable ultrasound machines and their applications.

What is the Pixel?
IEEE SP/CIS PAMI presentation by Professor Djemel Ziou University of Sherbrooke

We present a data structure in which image is specified by its support, its quantities that are linked to the support and allowable generic operations. The algebraic structures of the support are defined using algebraic concepts such as chain and boundary. The quantities are organized in several layers and may be a scalar, vector, tensor or any other type. They are specified by the cochain. The generic operation corresponds to the coboundary operator. The image model has several advantages: it allows the derivation of efficient algorithms that operate in any dimension and the unification of mathematics and physics to solve classical problems in image processing and computer vision. It can be used for binary images as well as for several image acquisition systems. To show that this model is effective the problem of linear isotropic diffusion is tackled.

Trophy Solar Car Mounted in Davis Center
UW Eng-enews

The record-breaking Midnight Sun VII was officially "retired" to its now permanent home on the west wall near the fishbowl in the William G. Davis Computer Research Centre. The vehicle is mounted vertically to concrete beams on the wall with the nose of it about nine feet off the ground.

In 2004, Midnight Sun VII toured around North America for 41 days and journeyed over 15,000 km to capture the Guinness World Record for the longest distance travelled by a solar-powered car.

Although Midnight Sun VII has officially retired, the Midnight Sun team is still on the job designing Midnight Sun IX -- Midnight Sun VIII was the top Canadian entry in the 2005 American Solar Challenge which ran from Austin, Texas to Calgary, Alberta. In 2007, Midnight Sun IX will be put to the test at the World Solar Challenge in Australia. With any luck, the latest Midnight Sun model will shine just as brightly as its award-winning predecessors.

Space Hardware to Capture Ancient Light
The Record

Com Dev International is reaching new heights with the completion of a $10-million piece of space hardware that will help scientists explore the farthest reaches of the universe.

The device, a local oscillator source unit, is a key component of one of three scientific instruments that will be installed on the Herschel Space Observatory, a giant telescope the European Space Agency will launch 1.5 million kilometres into space in 2008.

It will help the telescope capture far infrared rays, hard-to-detect light generated by newly formed stars and planets billions of light years away. It will give scientists, including astronomers at the University of Waterloo, a look into parts of the universe we can't see

now, and help them understand how the universe was formed and whether it's possible for life to exist elsewhere.

The oscillator is the latest in a long line of scientific space instruments Com Dev has designed and built. It contains 50,000 space qualified parts. Three years in the making, it has been subjected to thousands of tests to ensure it will operate according to specifications, and withstand the rigors of space, including tremendous gravitational forces during launch and extreme temperatures.

The oscillator essentially is a radio tuner, designed to pick up the infinitesimally faint signals emitted by far-off stars, planets and galaxies.

"This can tune into signals that are billions of light years away at thousands of times the resolution, granularity and precision of any radio on Earth, and with zero background noise," Healy proudly declared.

Engineers and the World

Janna Levin on "A Madman Dreams of Turing Machines"
Tom East

At the Perimeter Institute public lecture on October 4th, Prof. Levin related the lives of Kurt Gobel, of Vienna, and Alan Turing of Cambridge. Both were concerned of matters of absolute truth, especially mathematical truth.

Gobel, who moved in circles which included Freud, was a schizophrenic and a hypochondriac. Turing was blunt, forthright and honest.

Both were agreed that there is no "absolute theory of everything", but it did seem as though there might be some absolute mathematical truths. However, what about the "Liar's paradox"? Starting from the premise that all Cretans are liars, if a Cretan says "I am lying", is he lying or speaking the truth?

Turing came up with the idea of machines handling numbers, and during World War 2 built an electronic computer to break German codes at Bletchley Park.

Gobel believed in transmigration of souls and Platonic reality. He starved himself to death. Turing was a materialist and believed that a human was a soulless biological machine. He was too honest for his own good: when giving evidence, he revealed that he was homosexual and was convicted, since that was a crime in the 1940s. He committed suicide by eating a poisoned apple.

BRILLIANT! The Blinding Light of Nikola Tesla
Tom East

On 17 October 2006, at the Centre in the Square, the Electric Company Theatre from Vancouver presented a play about Nikola Tesla, an electrical inventor who preceded

Fessenden by about 10 years. Born in Croatia, he spent most of his life in the USA. He was full of ideas, and championed the use of alternating current as opposed to the direct current favoured by Edison. He proposed to transmit electrical power without wires by EM radiation, but did not demonstrate it.

The play, a spectacular production which lasted an hour and a half, was full of special effects (though no lightning). Much of the dialogue, which got rather lost in the large theatre, was declaimed by each character in a bright spotlight with a dark background. Tesla and Edison performed a song and dance routine. A 5 foot diameter balloon wandered about the stage as if it had a life of its own. A party was held afterwards, with cake, to celebrate the 150th birthday of Tesla.

There was a good audience (~1000), including quite a lot of young people: I am not sure how much they got in the way of technical knowledge, but at least they should remember the name Tesla.

Alphabet Soup
Tom East

Many years ago, a school in England acquired its first Personal Computer. The teachers decided that the QWERTY keyboard was too complicated for their pupils, so they pulled the caps off all the keys and put them back on in alphabetical order. Then nothing worked, so they sent for technical support.

A technician arrived at the school and was greeted on the front steps by an eleven year old boy who said "I'm so glad you have come – they don't know what they are doing here! I told them they would have to move the switches about underneath, but they wouldn't listen to me!"