



# KITCHENER-WATERLOO SECTION

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# IEEE Executives

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## Upcoming Events

Check <http://ece.uwaterloo.ca/~ieeekw/presentations.html> for updated information.

### **CCECE 2004 - Technology Driving Innovation.**

Tony Kormos

The next Canadian Conference of Electrical and Computer Engineering will be held in Niagara Falls in May 2004. 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. For more information, see: <http://www.ieee.ca/ccece04> . For the complete Call for Papers & sponsorship info package, contact Tony Kormos at [a.kormos@ieee.org](mailto:a.kormos@ieee.org).

### **Circuits and Systems Society Nominations**

The IEEE Circuits and Systems Society Nominations Committee is requesting nominations for officers. The deadline for officers (ExCom) nominations is September 1, 2003. The nomination announcement and forms are also posted on the CAS web site at: <http://www.ieee-cas.org/> .

### **The Other 9 Reasons for obtaining U.S. Patents**

IEEE Seminar

Date, Sept. 17, 2003

There will be two identical talks, one from noon to 1:00pm, and the second from 5:30 to 6:30. Both will be held at the University of Waterloo, Davis Center DC1304

The ideas of employees are often the most valuable assets of your high-tech business. Most businesses already recognize that patent protection can prevent competitors from stealing those ideas, but there are many other reasons for obtaining US patents on your high-tech innovations. This seminar will explain ten reasons and give a brief overview of the requirements, procedures, deadlines and costs of the US Patent System. With this information, you will be better able to decide whether and when to file for a US Patent.

John E. Carlson is a U.S. patent attorney with the intellectual property firm of Carlson, Gaskey & Olds in Birmingham, Michigan. Mr. Carlson has an electrical engineering degree from the University of Michigan College of Engineering and a law degree from Wayne State University Law School. He handles a wide-variety of technology but specializes in electrical, computer-related, mathematical and software patent applications. He also litigates patent infringement matters in the U.S. Federal Courts. Carlson, Gaskey & Olds was recently recognized as one of the top patent firms in the U.S. protecting "IP America" in "Who Protects IP America?" in IP Law & Business, July 2003.

### **Biomedical circuits and systems to recuperate neuromuscular functions**

IEEE Seminar

Monday September 29, 2003, 5:00 - 7:00 p.m., DC 1304, University of Waterloo

This talk covers the techniques and methods employed to build high reliability Biocircuits and Biosystems dedicated to design and implement advanced implantable and wirelessly controlled devices such as sensors and microstimulators. A global view of

typical micro-device will be given. In addition, case studies related to peripheral and cortical neural systems will be presented. Special attention will be paid to low-power management and corresponding circuit techniques of such typical implantable multi-disciplinary systems.

Mohamad Sawan received the B. Eng., M.Sc. and Ph.D. degrees, as well as a post-graduate training, all in Electrical Engineering. He is currently a Professor at the Ecole Polytechnique de Montréal. His scientific interests are the design and test of mixed-signal (analog, digital and RF) circuits and systems, the digital and analog signal and image processing. His interests deal also with modeling, design, integration, assembly and validation of remotely powered and controlled medical devices. Dr. Sawan is a holder of a Canadian Research Chair in Smart Medical Devices and Fellow of the Canadian Academy of Engineering. He is leading a research center known by ReSMiQ (Microelectronics Strategic Alliance of Quebec) and the Eastern Canadian IEEE-Solid State Circuits Society Chapter. He is co-founder of the Int. Functional Electrical Stimulation Society and member of its Board of Directors. Also, he is the founder of PolySTIM neurotechnology research laboratory at the Ecole Polytechnique.

### **Lifetime in electronics**

IEEE Seminar

October 8, 2:30 UW DC1304

The lecture will summarize lifetime experiences of a person who lived, as an adult, through the second world war, studied engineering in free Czechoslovakia and after the 1948 coup d'etat by the communists and worked in a communist country until 1968. Another occupation, this time by the Soviet Red Army, led to a permanent exile to Canada.

The lecture will cover some interesting and probably forgotten facts about the war time electronics. Afterwards it will describe work experiences in communist Czechoslovakia and finally the much more fruitful years in North America. All will be presented from the point of view of a professional who specialized in electronics.

Jiri Vlach was born in Czechoslovakia in 1922. During the Second World War and occupation by Germany, the universities were closed for the Czechs and the only possibility to continue some studies was in special courses. This is how I got to electrical engineering in 1941. After the war I studied electrical engineering at the Technical University of Prague and my first employment was with the nationalized enterprise Tesla. Over the years, the organization changed its name several times and also changed the direction of work. In 1967 I was invited as a Visiting Professor to the University of Illinois. In 1969, I received the offer to join the Department of Electrical Engineering of the University of Waterloo, where I still work as a retiree. I was elected IEEE Fellow in 1982 and presently I am an IEEE Life Fellow.

### **The Decew Falls Milestone History Project**

Ron Potts

Date: October 15, 12noon

This lunch meeting, arranged by the Hamilton Life members, will discuss the history of engineering in the Niagara area. The meeting will be held at the Plainsman Restaurant, Hwy5&8 (Peter's Corners). Those planning to attend should email either [r.potts@ieee.org](mailto:r.potts@ieee.org) or [BDekat@sentex.net](mailto:BDekat@sentex.net). Lunch is \$10.

## **Canadian Reliability and Maintainability Symposium**

IEEE Conference

New technologies for engineering design, manufacturing and test are rapidly developing, changing and expanding. The manufactured product must meet all the customer's expectations if the product's maker and distributor are to penetrate the market and retain or increase their share of the market. The need for cost-effective innovations and techniques to assure a high quality product that is reliable and maintainable has never before been so essential. Just meeting standard engineering and manufacturing requirements will not provide the competitive edge needed today. Quality managers and engineers can sharpen their competitive edge by properly applying cost-effective Reliability & Maintainability techniques.

The Canadian Reliability and Maintainability Symposium provides a forum to share your experiences and to network with leading R&M professionals, your colleagues, industry and government leaders, and academia.

The IEEE Reliability Society Ottawa Chapter is organizing the Canadian Reliability and Maintainability Symposium (CRMS2003) to be held in Ottawa (October 16-17, 2003).

For more information, please visit <http://www.crms2003.ca/>

## **Workshop on Image Processing**

IEEE Workshop

The UW/IEEE Computer Society Chapter is working to organize a workshop on Image Processing: Methodologies and Applications tentatively set for late October or early November. Check the website [http://www.ece.uwaterloo.ca/~ieee\\_kw](http://www.ece.uwaterloo.ca/~ieee_kw) for more information.

## **A Stream Cipher Based on a Cascade of Small S-Boxes**

UW Seminar

Presenter: Stafford Tavares, Queen's University

In this paper, we describe and analyze a stream cipher based on a cascade of small S-boxes. Each stage of the cascade is a small version of the RC4 cipher designed by Ron Rivest. The output of each stage drives the left pointer of the next stage. We call the cascade that uses 2-bit versions of RC4 the GST cipher. The cipher appears most suitable for hardware implementation in wireless handsets.

## **Executable Software Specifications: The ASM Approach**

UW seminar

Date Sept 25, 2:30-3:30, MC 5158

Some people think that executable specification is a contradiction in terms. We think that executable specifications will change the way software is designed, developed, tested and documented. Our opinion is based on the theory of abstract state machines, extensive international experimentation with ASMs, and the applied ASM work of our own group, the group on Foundations of Software Engineering. Contrary to natural sciences, computer science is about artificial reality, about computer systems. Mathematically

speaking, what is a computer system? A computer system may have many meaningful levels of abstraction. Fix such a level. The ASM theory tells us that there is an abstract state machine that, behaviorally, is identical to our system on the chosen abstraction level. The specification language AsmL, developed by the FSE group, makes writing ASM models practical. Our tools allow the developers (more and more) to experiment with their design, validate it and enforce it. The tools allow testers to be involved earlier in the software development cycle and empower them to test the intended functionality of software (and not only its robustness).

Biography: Yuri Gurevich is Sr. Researcher at Microsoft Research in Redmond, WA. He is also Professor Emeritus at the University of Michigan, ACM Fellow, Guggenheim Fellow, and Dr. Honoris Causa of Limburg University in Belgium. In Microsoft, he heads the group on Foundations of Software Engineering.

## **Congratulations**

### **Third-place finish for Midnight Sun**

UW Daily Bulletin, selected by C. Hulls

The University of Waterloo's Midnight Sun VII was the top Canadian team and finished in third place overall in the American Solar Challenge event in Claremont, California. Team member Calli Citron says the team had "a flawless last run, with no glitches... our overall time was less than it was two years ago and it was a good race." University of Missouri - Rolla was the winner of the race, followed by the University of Minnesota.

The team had to replace a motor midway through the 11-day race and is now raising funds to transport the car and team to the World Solar Car Challenge in Australia.

### **UW profs named to Royal Society of Canada**

UW Daily Bulletin

Ian Munro of the school of computer science, and Adel Sedra, UW's new dean of engineering, will be formally inducted into the Canadian Academy of the Sciences and Humanities of the Royal Society of Canada in a ceremony set to take place on November 24, 2003.

### **Creative Encounters celebrates 10th anniversary**

Guelph Web site

Creative Encounters, the University of Guelph's award-winning science, technology and engineering camp, is celebrated its 10-year anniversary August 15 with activities for parents and students.

Over the past decade, Creative Encounters has introduced thousands of young people to the worlds of science, engineering and technology in a fun, hands-on and interactive manner.

Creative Encounters affects the lives of close to 10,000 children ages 9 to 16 annually through summer camp and community programs. The programs include a one-week science and engineering camps for grades 4 to 8; PAGES, an overnight science camp for girls entering grades 7 and 8; and TechQuest, a camp that teaches the fundamentals of the

Internet, Web site design, graphic manipulations, programming, electronics and robotics. The curriculum changes each year to attract and maintain interest.

In addition to the summer camps, Creative Encounters holds more than 200 workshops in public schools in May and June on science and engineering and runs the All-Girls Science and Engineering Club, an extension of PAGES for girls aged 12 to 15 that meets once a month to participate in the common pursuit of scientific discovery and social camaraderie.

Creative Encounters is an entirely student run, not-for-profit organization, affiliated with U of G's school of engineering and a member of Actua, a national, not-for-profit organization that provides training, resources and support to 28 organizations offering science and technology education programs to over 240,000 youth annually. As a member of Actua, Creative Encounters receives support through many leading national and international companies such as Merck Frosst, the Government of Ontario, Hewlett-Packard, NSERC, RBC Royal Bank, Shell (Canada), the Canadian Engineering Memorial Foundation, and L'Oréal Canada.

For more information, visit the Web site, <http://www.thinkbig.at/creativeencounters>.

## **UW robots fly in international contest**

UW Daily Bulletin

Members of the Waterloo Aerial Robotics Group (WARG) competed in the International Aerial Robots Competition -- a "multi-year competition to push the envelope of technology by challenging students to accomplish near-impossible mission objectives."

"The goal," explains UW team member Brent Tweddle, "is to build a fleet of air vehicles capable of flying three kilometres, identifying target buildings, entering the structures and navigating inside to obtain visual reconnaissance information. This must be done within a period of 15 minutes and without the help of any crew."

The Waterloo Aerial Robotics Group came fourth in this year's International Aerial Robotics Competition, held at Fort Benning, Georgia.

A six-member team from WARG went to Georgia to compete -- "demonstrating partial autonomous flight with its fixed wing aircraft", says Brent Tweddle, head of public relations for the team. He writes: "WARG is extremely proud of the achieved results, since the technology was developed in an extremely short time frame and with more than their fair share of technical problems.

"The team only began development three months prior to the competition, when we received our new aircraft from the manufacturer. The onboard computer system was finished only 24 hours before WARG was scheduled to leave for Georgia; as a result, some of the testing was done in the van on the way.

"Almost miraculously, sometime around 5 a.m. on the morning of the competition, the autopilot system was finalized and showed promising results during tests done in the parking lot. At the competition, WARG switched on its autopilot system for the first

time. WARG used its first attempts to tune the control system. This process thrilled the judges, crowds and media, as WARG's aircraft banked hard and descended rapidly right in front of the audience. With only one attempt left to complete the mission of flying the 3 km around a course of GPS waypoints, WARG made an executive decision to ground the aircraft due to safety concerns. Since the airplane travels at a cruising airspeed of 100 kph, a crash would be exceptionally dangerous."

He goes on: "WARG is looking to recruit a large group of new members this September. We encourage students from all faculties to come out to our meetings and get involved.

"WARG also plans to focus on public relations and sponsorship. As a volunteer group funded only through donations, WARG is feeling the effects of the poor economy and must compete on a much lower budget than its American competitors." Anybody interested in sponsorship or other involvement can get in touch with Tweddle at pr@warg.uwaterloo.ca.

<http://www.ece.uwaterloo.ca/~warg/index.html>

## **Engineering students win award for dog-cooling device**

Guelph Web Site

Two University of Guelph biological engineering students have received national recognition for designing a tool to aid dogs that are searching for lost land mines in regions with hot climates.

Jason Pearman and Dan McEwen developed the mine detection dog cooling assist device, which is worn like a collar and a vest and dissipates heat from two critical areas of a dog's body. The invention recently won second place in the Canadian Appropriate Mine Action Technologies Competition. "It's pretty exciting," said Pearman, who will share in the \$2,500 cash prize. "It feels good to be successful in a competition where you are up against schools with much larger programs." Sponsored by Mines Action Canada and Engineers Without Borders, the annual contest gives engineering students an opportunity to make a difference to people working in land mine-affected communities.

Pearman, who will begin his final year at U of G in the fall, said he and McEwen chose their project because "dogs have proven invaluable in demining operations. They are the first tool for detection because their sense of smell for explosives is so sensitive.

Operations can clear mines three to four times faster when they are working with dogs." But, he added, the animals are often working in very hot and humid regions of the world. "The heat starts to get to them after only a few hours."

The device created by Pearman and McEwen, who graduated in June, relies on polyacrylamide crystals, which retain several times their own mass in water. The crystals are placed in pouches inside a collar and a vest, which are then soaked in water. The heat generated by the dog warms the absorbed water in the crystals and causes it to evaporate, acting like an external sweating device. The vest is made of breathable material and allows the dog to move shoulders and front legs. "It is a very subtle design," Pearman said. "The whole point of the competition is to come up with technology that is low-tech and simple and can be implemented by people working in faraway countries with relative ease."

Indeed, the competition's judges commended the pair for the project's sensible and rational design. They also called the invention "extremely interesting" and an "insightful and unique approach to a problem that few even considered."

Pearman said he and McEwen did not set out to "do anything revolutionary" when they entered the competition. "We just wanted to provide the mining detection dogs with a little assistance. We figured if we can prolong the amount of time a dog can work by even 15 to 20 minutes a day, it will really add up in the long run."

## **UW IEEE Students have Mini-Solar Car Race**

IEEE Student Branch A

Congratulations to all participants in the mini solar car contest on July 18th! Students were given access to a solar panel, wheels, and other parts and built small vehicles powered only from the solar panel. There were 7 entries and 6 cars made it to the track. The team captains of the winning teams are listed below.

1st Richard Li

2nd Alan McLaughlin

3rd Kuo-Feng Tong

## **Recent Events**

### **Gift encourages young women to study computer science**

UW Daily Bulletin

UW's Centre for Education in Mathematics and Computing now can encourage more school-age women to study computer science thanks to a \$1 million gift from Imperial Oil Ltd.

The Imperial Oil seminar seeks to address the steep decline in the number of women entering the field by introducing Grade 9 and 10 female students to computer science. At that age, students begin making choices about their future areas of study. Launched last year, the week-long seminar enrolled 40 female students and introduced them to programming and digital hardware. With the new funding, the seminar accommodated a total of 96 students this year at seminars held in May and during this week.

### **Automatic Registration of Spatial Datasets**

IEEE Seminar 21July

Recent technical advances have produced a variety of sensors such as digital frame cameras, line cameras (linear array scanners), ranging sensors (e.g. LIDAR systems) and navigation units (e.g. GPS/INS). The integration of these datasets is essential since each data set provides unique information about the area of interest. However, successful integration is contingent on the alignment of these datasets relative to a common reference frame, which is known as the registration problem.

The presentation will start by outlining the essential four components of an effective registration paradigm. First, a decision has to be made regarding the choice of primitives for the registration procedure. Then, a similarity measure should be devised to ensure the correspondence of conjugate primitives. The third issue is concerned with establishing

the registration transformation function that mathematically relates geometric attributes of corresponding primitives. Finally, a matching strategy has to be designed and implemented as a controlling framework that utilizes the primitives, the similarity measure, and the transformation function to solve the registration problem.

### **Leading the way in miniaturization**

Faculty of Engineering

Electrical and computer engineering professors Rob Gorbet and Dan Davison, along with professor Eric Kubica of systems design, are taking the lead in the world of mechanical miniaturization. The team has started the new facility for Theoretical and Applied Research in Smart Actuators and Sensors (TARSAS). They received funding from the Canada Foundation for Innovation and the Ontario Innovation Trust to work with the variety of materials that can simultaneously be an actuator and a sensor.

TARSAS has begun using the unique characteristics of Shape Memory Alloys (SMA), "smart materials," so named because they remember their initial crystal form. Even after plastic deformation, they can be prodded to return to their original shape.

Gorbet, Raafat Mansour (also of E&CE), and master's student Brian Keats are currently involved in a development project using SMAs to produce inexpensive, self-tuning, cavity wave-guides for satellite receivers. Temperature swings in space greatly affect the performance of satellite systems. Historically these devices have used expensive non-thermal reacting alloys. Using SMAs, wave-guides made of more practical and inexpensive materials can sense temperature swings and adapt to maintain their original properties. (Gorbet already has an SMA test specimen slated to go on the next Mars lander.)

SMAs can potentially be scaled down to a few crystals in size, opening the way for the development of surgical instruments small enough to autonomously travel through the body to the site of injury.

### **Space Time Codes: Theory and Heuristics**

IEEE Seminar July 23

Space-time codes has become an area of intense research in the area of information theory due to their promise for improved error performance and increased capacity. These codes are composed of matrices, which are transmitted over multiple antennas and timeslots. The inclusion of the spatial dimension has resulted in several new design criteria, which are different than those for classical channel codes.

In this presentation, the space-time design criteria from literature are presented, and the associated assumptions and terminology. A link is then made between the classical code design criteria and those for space-time codes. It is seen that the new criteria may be seen as an extension of the classical coding theory. Using this view, several new space-time code designs are presented and compared.

### **Elliptic Curve Cryptography Workshop**

UW Daily Bulletin

The seventh in a series of "annual workshops dedicated to the study of elliptic curve cryptography and related areas" was held at UW. The three-day event is sponsored by the

Centre for Applied Cryptographic Research in the faculty of math. "It is hoped," organizers say, "that the meeting will continue to encourage and stimulate further research on the security and implementation of \_elliptic curve cryptosystems and related areas\_, and encourage collaboration between mathematicians, computer scientists and engineers in the academic, industry and government sectors."

## **Prof rethinks the workplace**

UW Daily Bulletin

It's Monday, a quarter after eight in the morning. You finish your breakfast and prepare to leave for work. Instead of negotiating congested roadways in your car or jockeying for space on a crowded bus, you walk a few blocks to your workspace.

Neither home nor office, this workspace was created for and by the people in your neighbourhood. You sit down at a workstation. You have all that you need to work comfortably -- office equipment, meeting rooms, kitchen facilities, perhaps even a pool table. This is your "co-workplace".

In her innovative new book, \_The Co-Workplace: Teleworking in the Neighbourhood\_, Laura C. Johnson, a professor in the school of planning, explores an alternative to both the traditional and the home-based office -- the "co-workplace". A new type of neighbourhood-based facility, it offers the benefits of remote work while maintaining boundaries between workplace and home. With access to such amenities as meeting rooms, childcare, food services and recreation facilities, the co-workplace combines the infrastructure of a good corporate office with the convenience of a neighbourhood location.

The book is published by University of British Columbia Press, and the first chapter is available for view on its web site.

## **Developing smart technologies**

The Engineering Faculty

Mechanical engineering professor Farid Golnaraghi is keeping a close eye on the construction taking place just outside his office window. When the addition to Engineering III is completed, the faculty's newest Canada Research Chair will be moving into one of the new labs in the mechatronics wing.

Golnaraghi points to project after project in the existing lab that seamlessly integrates mechanical elements with electrical and electronic elements. He stops at a cantilevered mechanism attached to a model of a human arm.

"This is a feedback system that is designed to counter the adverse effects of Parkinson's disease," he explains. "Smart sensors analyze the shaking motions of the patient's arm, feed them to an actuator no bigger than a wrist watch. The actuator provides a force that is equal and opposite to the shaking motion and the patient's hand appears to move steadily."

## **Health research gets a bionic boost**

Barbara Elve, Gazette

A proposed new option in biomechanics will give UW engineering students an edge in what some researchers are calling "the new glamour field".

Using the principles of mechanics to explore biological problems, biomechanics researchers are applying their engineering talents to everything from hip joint replacements to laparoscopic surgery, from heart valves to medical imaging equipment -- "areas that have major impact for people," says Brodland, "and areas of significant growth as the population ages."

[http://www.civil.uwaterloo.ca/brodland/bioengineering/Biomechanics\\_option.pdf](http://www.civil.uwaterloo.ca/brodland/bioengineering/Biomechanics_option.pdf)

## **Prof's satellite goes up**

UW Daily Bulletin

Chemistry professor Peter Bernath will lead a team of international scientists studying depletion of the ozone layer with information gathered from a satellite.

Bernath is mission scientist and principal investigator for the SCISAT satellite. The satellite, built by Bristol Aerospace of Winnipeg, weighs about 150 kilograms and is powered by a single solar panel. It will circle the earth 15 times a day, some 650 km above the surface.

The mission's goal is to take a variety of measurements in the stratosphere and troposphere, sending back information that will advance scientists' understanding of ozone depletion, particularly above the Arctic.

Bernath has been preparing for today's launch since February 1999, when the Canadian government announced the selection of the Atmospheric Chemistry Experiment (ACE) as the scientific mission of SCISAT. With the title of "Mission Scientist", he heads a team that includes scientists from Canada, the United States, Belgium, Japan, France and Sweden.

<http://www.nasa.gov/multimedia/nasatv/>

## **With Com Dev Battery**

KW Record

The SCISAT satellite also contained a Lithium-ion battery built by Com Dev International. The 28 volt battery can deliver 240 watts when the satellite is in the dark.

## **Antenna research in Communications Research Centre Canada**

IEEE Seminar

Dr. Jafar Shake of Communications Research Centre Canada (CRC) described the structure of RAATLab (Research Advanced Antenna Technology). The group has been active in the research and development of the state of the art antenna technologies for various applications.

<http://www.crc.ca>

## **Applications of Mechatronics in today's Automotive Industry**

IEEE seminar, reported by Tom East

On July 15th, Yarko Mathiwsky, acting for Thomas Frommer, made a presentation to about 12 people on the way electronic/mechanical devices are being used in automobiles. Solectron, a multinational company (with 6 locations in Canada), supplies many products and services to all major manufacturers for their cars, SUVs and trucks.

The speaker stated that there are four major trends in the auto industry: cost pressures, alternate fuels, outsourcing and "electronification". Issues to be faced are packaging, high temperatures, internal communication and power consumption. Systems such as ABS and power train controllers are well established, but new devices are coming along, first introduced in high end vehicles, eventually to be more widely adopted. Examples are navigation systems, power running boards, tire pressure sensors (including possibly pressure correction by a built in pump), and even a beverage holder located behind the PRNDL switch (gear shift) which heats a warm drink or cools a cold drink using a Peltier junction device.

The speaker is looking for partnership with schools, such as joint development projects.

## **Introduction to the Model Checking of Software**

IEEE, NCR, ICR course

Verifying that a piece of software is doing what it is supposed to do is a multi-faceted, non-trivial problem. Prof. Dr. Stefan Leue introduced an automated software analysis method that is capable of automatically locating errors in software models by exhaustively exploring their state space.

Model Checking addresses the problem of determining whether a model (which, in our terms, corresponds to a software system) is satisfying a set of specified properties (for instance, its requirements specification). In this course I will breathe some practical meaning into this rather dry definition, and give an overview of existing model checking techniques and tools.

The development of the foundations of model checking started in the early 1980s when there was much interest in defining mathematical semantics for programs in order to prove them correct. Within the past two decades, model checking has evolved into a mature software analysis technology. The models to be analyzed are often obtained from UML models, and there is an increasing trend to extract the models automatically from the software code.

## **Essential Skills Validation Project**

IEEE

The Essential Skills project is a project which looks at nine skills that are found in every occupation, they are reading, writing, document use, thinking skills, numeracy, oral communication, working with others, continuous learning and computer use. The essential Skills project is currently measuring these skills and examining how they are used in every occupation in Canada. From our research career and skill assessment tools and work based training tools have been created. For more information please see the Essential Skills website, [www.hrdc-drhc.gc.ca/essentialskills](http://www.hrdc-drhc.gc.ca/essentialskills).

The Essential Skills website has only a few professional occupations because we have only started to collect data on professional occupations. In the past we focused on the non-professional occupations and the technical trades. In the next phase of research starting in August we will focus on professional occupations.

## **Virtual Museum and Global Technological Literacy Programs**

IEEE Newsletter

The IEEE Foundation approved US\$200 000 in grants at its June Board of Directors meeting. Two grants went to the IEEE History Center in New Brunswick, N.J., USA. One, for \$130 000, is to support the operation of the IEEE Virtual Museum for the next two years. The second, for \$25 000, is to cover costs for sponsoring the 2004 IEEE Student Branch History Paper Contest. This worldwide competition solicits papers on a historical subject from IEEE Student Members and offers the winners an honorarium and a travel grant to present their paper at the 2004 IEEE History Conference, to be held next June at Bletchely Park, United Kingdom. Ten winners, one from each of the 10 IEEE Regions, will be selected.

## **Canadian Virtual Museum to include local Quilts**

KW Record

Local curator, Tracy Loch, has worked with Synthescape to develop a web site describing the quilts of local farm women. The site will be incorporated into the <http://www.virtualmuseum.ca/> site. The quilts had been displayed at Castle Kilbride until recently.

## **Robotics Students Showcase Projects**

Conestoga Web Site

On Wednesday, August 13, Conestoga students presented three completed robotics projects as part of their final year course. The first is a system to write and package CDs; the second assembles prefabricated yo-yo parts into a finished product, then packages and seals the product; the third packages film, placing film into a casing, sealing the casing, then boxing and labeling it. In some instances, these projects use an automated conveyor-type production system, in others a rotary-type system. More than 30 students were involved. They have worked on all aspects of their projects, from the idea phase, through project proposals and costing, feasibility studies, design, installation and assembly, troubleshooting, and complete documentation.

## **Sandvine Business Case exercises WLU Students**

WLU web site

An Internet start-up company is asking 229 business students at Wilfrid Laurier University to recommend ways of commercializing its products and services in a shrinking telecom market. <http://www.sandvine.com/>, which develops and delivers Internet traffic-management solutions and value-added services, is the subject of the school of business and economics' latest integrated case exercise (ICE).

“The Sandvine case asks our students to apply all they’ve learned in a growing, dynamic and fluid industry – the high-tech sector.”

Specific challenges the recommendations must address include:

How the growth of legalized downloads for nominal fees and the increased threat of litigation against illegal file sharing will affect the popularity of peer-to-peer (P2P) sharing and the need for Sandvine's P2P traffic-management solutions.  
Why Sandvine's products work better and are more cost effective than existing software.  
What organizational changes, if any, need be made to deal with these issues.

## **Mennonites Online**

Global and Mail

Local Mennonites are accepting more technology as a way of maintaining their independence. They are using robots to build car parts and laser-guided machinery in a sheet-metal business. The traditionally large families are finding it difficult to buy enough land for farming.

## **Investigating Voltage Collapse and Subsequent Transient Instability in a Large Power System**

IEEE Seminar July 18

This presentation provided an overview of a dynamic analysis carried out on the large-scale Queensland transmission system. Contingencies are highlighted and discussed, which show how decaying voltage s and the subsequent hyper-excitation of generators can lead to transient oscillatory instability because of insufficient damping torque. Different levels of voltage compensation have been implemented at critical generators in the model to determine the impact these different control levels may have on the time to voltage collapse and instability following a system contingency.

## **Guelph Initiates RoboSoccer project**

IEEE

Starting in May 2003, the University of Guelph IEEE Branch has embarked on an initiative to develop a RoboSoccer project. RoboSoccer is an intercollegiate competition where teams of students build autonomous and semi-autonomous robots, which are used to play soccer against each other. Teams, using their engineering and design knowledge, build the robots using concepts and theory they learn in their studies in addition to the research they do on their own. At present the program is in its infancy and needs funding in order to grow and involve more students.

## **The evolution of the Ontario electricity market**

UW seminar July 10th, 2003.

The seminar presented a brief overview of the IMO's role and the design of the Ontario electricity market. The focus of the presentation will be on future market evolution and how the electricity markets can promote/accommodate environmental issues.

## **Waterloo Region Portal Initiated**

KW Record

A local team has arranged funding to build and support a web site collecting information on local companies, facilities and events.

<http://www.techtriangle.com/english/news.cfm?newsid=258>

## **On Some Algebraic Properties of the AES-like S-boxes**

UW Seminar

Several recently proposed block ciphers such as the AES, Camellia, Shark, and Square use s-boxes. This talk discussed the S-Boxes properties.

## **Alternative Energy**

### **Electric Cars: Goalposts Moved**

Tom East

The state of California passed a law in 1990 requiring that eventually 10% of all cars sold in the state must have zero emissions. The only technology available would be battery driven electric or fuel cell cars. Based on this requirement, General Motors developed a practical electric car powered by batteries only, and put it into limited production: they would not have been competitive price-wise with conventional cars, so GM leased them.

Under pressure from the big three auto manufacturers, the requirements were relaxed in several stages. In 2002, GM, DaimlerChrysler and Isuzu claimed that the latest California regulations usurped Federal regulations for fuel efficiency, and asked that they be further watered down. GM saw no point in continuing with all-electric vehicles, and ceased production: the leases are expiring - some cars go to museums and research groups and the rest are scrapped. A mock funeral was held in Hollywood by aficionados.

Fuel cell vehicles are still in evidence (the Bush administration supports this technology, but it will be many years before it takes over), and there are several models of hybrid electric/gasoline cars. Oh well, two steps forward, one step back.

### **Waterloo House adds Power to Grid**

KW Record

A model solar house in Waterloo generated more power than it used and fed the excess into the grid. Arise Technologies hopes to install solar power roofs on as many as 15 houses in the Eastbridge area. The federal government is helping to support the installations financially.

## **Engineering Humor**

### **More On Cheating**

By Tom East

In the 1930s, I attended a boys' boarding school in England. We started each day with a short prayer service before classes. This gave some of us a chance to finish off homework that should have been done the night before: it helped if the boy in the next seat would lend you his. I was in a senior class when the teacher showed us what he had received from a junior class - two identical essays, in different handwriting, but they had the same name at the top! Evidently one boy had been in a tremendous hurry, and copied the other boy's name.