



KITCHENER-WATERLOO SECTION

March 2005

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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 bi-monthly.

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Upcoming Events

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

FIRST Robotics Competition

UW Alumni

The University of Waterloo will be hosting the FIRST (For Inspiration and Recognition of Science and Technology) Robotics Waterloo Regional Competition from March 24 – 26, 2005 and invites you to watch robots face-off in thrilling competitions. Children are welcome to attend!

The FIRST Robotics Competition challenges teams of high-school students and their mentors to solve a common problem in a six-week timeframe using a standard "kit of parts" and a common set of rules. Teams build robots from the parts and enter them in a series of competitions designed by FIRST founders Dean Kamen and Woodie Flowers. The competition has grown to over 900 teams competing in 30 regional events and culminates in the championship event, which is held at the Georgia Dome in Atlanta with more than 7,000 student participants.

FIRST redefines winning for these students. Teams are rewarded for excellence in design, demonstrated team spirit, gracious professionalism and maturity, and the ability to overcome obstacles. Scoring the most points is a secondary goal. Winning means building partnerships that last.

There are a number of ways for you, our engineering alumni, to participate. While volunteer and mentor positions are full for the 2005 event, you can come as a spectator this year and be a part of the action in 2006! Come simply to watch - the event is free and children are welcome to attend!

For more information about the event, please visit <http://www.firstrobotics.uwaterloo.ca>.

International Engineering Management Conference

You are invited to St. John's, Newfoundland, Canada, for the 2005 International Engineering Management Conference (IEMC 2005). IEMC brings together engineering and management professionals, and academics from around the world. We encourage attendance from engineers, managers, business and management consultants, academics and researchers. IEMC is a forum for the exchange of ideas, experience, theories, and knowledge between all persons involved in engineering management. For more information on the conference, please visit the website: <http://www.iemc2005.org>.

Green Energy Conference

KW Record

UW will host the first International Green Energy Conference June 12 to 16. Leading topics include hydrogen energy, fuel cells, environmental protection, emission reduction and abatement, global warming and green buildings.

For more information see <http://www.igec.uwaterloo.ca>

Recent Events

Senior Member Upgrades

The following local member has earned the professional recognition of peers for technical and professional excellence.

Steven C. Rizzo

See <http://www.ieee.org/ra/md/smprogram.html> for more information on this program.

Canadian Engineering Competition

UW Daily Bulletin

UW engineering students Alice Malisia, Beth Vary, Matthew Millard and Melanie Stern were awarded first place in the "entrepreneurial design" category for their electronic piano tuning aid. They were one of several Waterloo teams who went to Calgary after victories in the Ontario Engineering Competition, held at UW in mid-February.

Student Papers Night Held 7th March

Tom East

A good crowd was on hand for the 2005 Student Papers Night at the University of Waterloo Davis Centre, so much so that after the first paper, we all moved from DC1304 to the larger DC1302.

There were three entries from the University: first prize went to Vikram Aggrawal for his paper on "Calculating the Logical Effort of CMOS Gates." Using SPICE simulation, he compared the performance of logic gates, taking into account delay, energy required and fanout. This calculation was performed for 90nm, 180nm and 350 technologies.

Second prize for a UW entry was awarded to Ammar Alzaydi for "Micro-Electro-Mechanical Systems Liquid Hydraulics Based Adaptive Mirror for Biomedical Applications." A laser beam is focused adaptively by a plexiglas mirror 500nm diameter and 13 nm thick. A deflection of up to 40nm is achieved by piezoelectric activator which applies pressure to a liquid and hence to the back of the mirror.

Third prize for UW went to Aakarsh Nair for "Health Human Resource Modeling." He tracked and forecast the "stock" of medical personnel such as family physicians, specialists and nurses, taking into account graduation from medical schools, immigration, dropouts, retirement and transfer from family physician to specialist, for example. His data comes from past studies and from the Canadian Medical Association, since there does not seem to be data available from the Ministry of Health. He predicts a growing difference between supply and demand.

The first prize for an entry from Conestoga College was awarded to Lauren Weber, Scott Charron and Matt Loschmann for the "SMLTECH Home Security Solution." Their system uses passive infrared motion detectors in the home. The status can be accessed from any remote computer via the internet. Security is achieved by the authentication system which uses a secret key and random signal generator. This presentation was also awarded the overall excellence prize for 2005.

Second prize went to Mark Jankowski, Mike Stratulat, Scott Laswick and Eric Steyn for their description of an “RFID Security System.” Radio Frequency IDentification is coming into frequent use at a rapid pace. Perhaps the most familiar system is the “Key Card” which, when placed next to a detector at an apartment building door, allows you to open the door. The card does not contain a transmitter nor batteries: the detector sends out a radio signal which activates the circuitry inside the card, and detects the reply coming back from the card. The “cards” have now been miniaturised to the point where they can be attached to merchandise in stores. Unlike the bar code which is the same for all identical items, the RFIDs can be unique for every piece. At the checkout, the reader, working at 13.56 MHz, can read all the contents of the cart.

Third prize for entries from Conestoga College went to Mike Jones for “A Video Based Mouse Control System Designed for Disabled People to Use to Control their PC.” A small bright icon on a headband worn by the user is detected by a “webcam”. Motion of the head is detected and instructs the mouse to move correspondingly. The system does not have to measure the position of the icon every 1/30 of a second, but looks for the new position in a restricted area near the previous one. “Mouse clicks” can be either by a foot pedal, or by blinking the eye.

Lab Fire at University of Waterloo

UW Bulletin

A recent fire in the High-Voltage lab destroyed millions of dollars of lab equipment and disrupted classes during the week of March 7. The cause has not been determined yet.

Semacode Expands Connections

Semacode

SS+K (Shepardson Stern + Kaminsky), a creatively-driven strategic communications firm based in New York, and Semacode Corporation, an ubiquitous computing technology company based near Toronto, announced an agreement that will have SS+K incorporate Semacode technology in selected 2005 marketing campaigns.

SS+K and Semacode collaborated last year on an ubiquitous urban game in which teams of teenagers hunted for treasure using mobile camera phones in Seattle, Minneapolis, Phoenix, Salt Lake City and Denver. The treasure came in the form of semacode URL barcodes, crossword-puzzle-shaped visual tags that were hidden in zones throughout an urban grid. Teams of 20 to 25 students from neighboring high schools in each city competed to find and “scan” the semacodes with their mobile camera phones. Semacode software then decoded the tags and fed them back into a game system that provided clues, points, and live updates to the players, displayed on their camera phone screens. Along the way, the software kept the players – who could not necessarily see or talk to many of the other players -- updated on what was happening in real time.

Putting the squeeze on big files

UW Bulletin

Waterloo professor En-Hui Yang's has his work cut out for him. As holder of the Canada Research Chair in Multimedia Compression and Information Theory, he works hard to make innovations in abstract theory and, at the same time, apply the theory into the real world to benefit society.

One of his challenges is to make the transfer of huge files easier. "There are two types of multimedia compression: lossless compression and lossy compression. Lossless compression sends everything but in a smaller size, while lossy compression gets rid of information that humans don't really need." But these two types of compression are traditional ones. They generally do not take digital rights management into consideration. When information can be widely distributed, you want to not only compress your data, but also protect your data from any possible infringement. So, Yang works on another kind of compression.

"It's called compression with watermarking. Take digital images, for example. Photographers wanted to protect their picture, so they put copyright information in the image. The image will be compressed, say by JPEG, and the copyright information will be embedded simultaneously in such a way so that the image looks fine, but you can't get rid of the embedded copyright information without rendering the compressed/watermarked image useless."

Compression with watermarking can also be used as a new way to carry information. While the image is being compressed, other actual information such as relevant text is embedded invisibly into the compressed image. Such a system is very robust because the image actually contains the carried information rather than with the carried information sent along separately.

http://ece.uwaterloo.ca/~www_info/people/faculty/yang.html

MileageTracker Pro wins international award

KW Record

MileageTracker Pro won the Java Challenge grand prize for the "business application" theme as announced at the 3GSM World Congress in Cannes, France today. The award is sponsored by mobile communications companies, Orange and Nokia.

Developed by J2X Technologies, MileageTracker Pro enables business people to easily track mileage and trip details on their cell phones and PDAs. MileageTracker Pro includes the synchronization of mileage data over wireless networks. It records car mileage, meeting and location information and generates accurate mileage claim reports. Java Challenge was a challenge to the top Java and Symbian developers worldwide to cook up cool mobile applications. MileageTracker Pro emerged the winner from the 30,000 developers in the Orange Partner Program.

<http://www.j2x.ca>

Engineers and the World

Internet's social effects 'unexpected'

UW Bulletin Jan 31

"Cyberspace and Social Life" is the title of a new course being offered this term as Sociology 345, taught by soc professor Lorne Dawson.

The course deals, its instructor says, "with the burgeoning research on the social implications of the media revolution introduced by the Internet. The rate of growth of the Internet is unprecedented, vastly out-stripping the speed and scope with which previous technologies, such as electricity, the telephone, and television, spread around the world. This month the number people online will surpass one billion. In just ten years of popular application the Internet has transformed how we 'do' almost every aspect of social life: from finding dates or jobs to stamp collecting and practicing religion.

"This course samples some of the findings of research into the impact of the Internet on such basic aspects of social life as the processes of identity formation and personal relationships, the existence and character of virtual communities, issues of deviance and social control, and forms of social protest and activism."

Engineering and Local Art

C.Hulls

The Region of Waterloo announced a public competition to commission a permanent active outdoor artwork incorporating solar power technology.

One of the short-listed designs is by Gorbet Design and has the working title of Solar Collector. The piece uses innovative technology from Spherical Solar Power, a division of ATS.

"Solar Collector is an interactive sculpture that gives form to the graceful angles of the sun and responds to the community and the seasons, coming to life at dusk with flowing waves of light."

See links below for more information:

[http://www.region.waterloo.on.ca/web/region.nsf/\\$All/1A756EBDC15FB49185256F9E004DE78E?OpenDocument](http://www.region.waterloo.on.ca/web/region.nsf/$All/1A756EBDC15FB49185256F9E004DE78E?OpenDocument)

<http://www.gorbetdesign.com/solar>

Volunteer For Course Development

UW Daily Bulletin

From third-year electrical engineering student Suresh Sriskandarajah: "We are a group of engineering students and alumni from Canada working together to develop engineering curriculum and programs for the disaster stricken coastal regions of Sri Lanka. There is a major shortage of engineering professionals in these regions . . . hampering all the efforts to rebuild the area. . . . We are looking for volunteers to help with developing curriculums, programs, courses, course materials, lab assignments, and to deliver. . . .

Professors and graduate students can assist with providing guidance and advice." The project proposal is on the web, and Sriskandarajah says there is involvement from a number of Canadian universities.

<http://www.eng.uwaterloo.ca/~ssriskan/engdev.pdf>

“Green” Roof to Top Waterloo City Hall

KW Record

Plant, soil and fabric layers will be used to replace the existing roof of the City Hall. With a donation from the vendor, the new roof will cost the same as replacing the roof with traditional materials. The roof will showcase the roofing technology in this area and is expected to last twice as long as a traditional roof.

Engineering Humour

IMS introduces ring tones for cars

Waterloo Tech Digest , January

In the "from the sublime to the ridiculous" file, Waterloo's IMS, which has developed some highly sophisticated technology for automobile sensors, unveiled a new product that it's marketing in collaboration with California's On The Edge Marketing. The product is called RideTones and essentially consists of ring tones for your car -
- MP3-quality sounds that you can blast out from your car when you lock or unlock the doors, open the trunk, or do various other things.

"Picture the fun of having AK-47s going off when you lock your car," says the company's sales materials. Yeah, now there's fun. Needless to say, the product is being targetted at a teenage/young male market. RideTones was unveiled at the 2005 Consumer Electronics Show in Las Vegas. IMS says the product will be available at the end of March.

Diagram Puzzle

Tom East

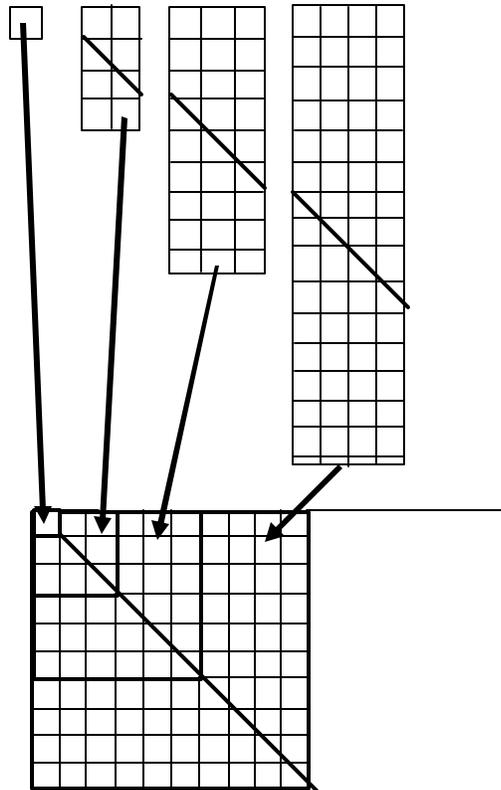
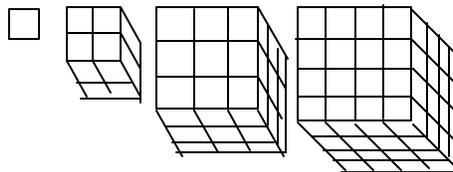
ANSWER TO DIAGRAM PUZZLE

The problem was to prove by diagrams that the sum $1^3 + 2^3 + 3^3 + \dots + n^3$ is always a perfect square. For example:

$$1 + 8 = 9, \quad 1 + 8 + 27 = 36, \quad 1 + 8 + 27 + 64 = 100$$

To construct the diagram:

- put a small square representing 1 in the top left corner of a working space
- for each number n^3 , dismantle the cube into a rectangle $n \times n^2$
- cut the rectangle in half using a diagonal cut
- fit the two pieces around the previous pieces.



Now it is easy to see why the square roots are made up of $1 + 2 + 3 + \dots + n$.

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