

KITCHENER-WATERLOO SECTION

June 2002

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LIFE MEMBERS ON THE MOVE

If you are over 65, and your age plus your number of years as a member of the IEEE total 100 or more, you are a life member automatically. Wally Read, a former president of the IEEE and a Life Fellow in Newfoundland, sent out a letter, condensed below.

Life Members on the Move in Canada

Ron Potts, Chair of the Life Members (LM) Committee of Region 7 (Canada), convened a meeting in Winnipeg to strategize how LMs might best organize and function across this country. What should be our role, what structure would best serve us, and what projects could be initiated immediately?

We LMs should offer ourselves to Sections to support them in their programming. Having enjoyed the benefits of IEEE membership over the years, it is “give back time” to repay with further service.

Recognition of our role: The best use of LM time and effort will be in close collaboration with the plans of the Sections and their committees. We need to know that a Section is receptive to this offer.

Action: Indicate to Section Chairs that a positive recognition of their support would be to have an LM sit as a non-voting member of the executive.

Life Member Chapter formation: There are 30,000 LMs in the world of which 849 are in Canada, 512 in four large sections, 337 in sixteen other sections. (KW has 31).

Action: Set up a LM chapter each in Toronto (211 LMs), Ottawa (151), Montreal (144) and Vancouver (106). [Does not add – ed.] For all other sections, set up a liaison contact to pursue programs beneficial to the section.

Potential Activity: Three areas of activity are suggested as a start:

1. Senior Member Campaign: Senior Members have dropped from 20% of total members to 10% in recent years. LMs, with Section Membership Chairs, could mount a proactive campaign to restore previous levels.
2. Critique and promote Virtual Museum: In January the History Committee mounted a virtual museum at www.ieee.org/museum, to create greater awareness of engineering as a career. Target audiences are students 10 to 18, educators and the public. LMs can (a) critique the presentation and (b) possibly visit local schools to promote its use in the classroom.
3. Identify Engineering Milestones: Since 1984, the History Committee has identified and marked forty events and sites which have significance for great

achievements in our technologies. For sure there are yet more worthy to be designated.

Action: Discuss these opportunities with the Section executive and offer LM resources.

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Joint meetings with the Engineering Institute of Canada are being discussed.

Ron Potts guides the program in Central Canada (including Ottawa and Montreal), Wally Read in the East and David Kemp in the West.

Wally Read, Life Fellow, Newfoundland

Dr. Peter Aiken on ``Advanced XML Topics``

XML-based technologies permit more extensive integration possibilities and can be implemented with little or no change to the existing application or data – the non-intrusive approach championed by industry experts. Those of us concerned with data challenges (such as delivery, integration, quality, interchange, etc.) are gaining access to advanced technologies allowing us to address these challenges in a programmatic manner using structured techniques. **Dr. Peter Aiken** of **Virginia Commonwealth University** presents a talk which overviews these possibilities including

- How XML-based metadata engineering is required as we consider our approaches to data quality engineering and enterprise integration
- How standardized delivery of organizational data via an XML-based portal provides a central point of integration
- How the data group can develop and deliver complete information delivery solutions to organizational clients – solving forever the “what have you done for me lately” problem.

DATE: Tuesday June 18, 2002

TIME: 4:30 p.m. – 6:30 p.m.

PLACE: MC2054, University of Waterloo

ALL ARE WELCOME
Refreshments will be served

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STUDENT PAPERS NIGHT 2002

The Kitchener-Waterloo Section of the IEEE held its Annual Student Papers Night on March 25th at the Davis Centre, University of Waterloo. About 50 people were there to hear excellent papers delivered by student members from Conestoga College and the Universities of Guelph and Waterloo. Scott Hafeman, University of Waterloo Student Branch Chair, was the Master of Ceremonies.

There were three presentations from the University of Guelph, three from Conestoga College and three from the University of Waterloo. The presentation of each paper, including question period, took 20 minutes.

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A panel of three judges evaluated the presentations. They were Tasreen Charania of Sirific, Guy Côté of VideoLocus and Mauro Rossi of Honeywell. When they had reached their conclusions, the results were announced by Slawo Wesolkowski, KW Section Chair.

For the **University of Guelph**, the first prize went to Rudi Meyenburg and Ben Millen for "Object tracking system through sensor fusion". They had used three pairs of ultrasound and RF transmitters to measure distance to an object by time of arrival, and software to calculate the best estimate of the object's position on a plane.

Second prize was awarded to Brendan Munn, Victor Sprenger and Andrew MacArthur for "Six-degree of freedom motion analysis system for tracking adjacent vertebrae of a porcine spine segment using three firewire cameras". They had constructed a Stewart platform robot on which the spine segment was subjected to loading: the three cameras pinpointed the positions of the vertebrae.

Third prize went to John Hayes and Jeff Bassett for “System for tactile feedback of visual information”. The tactile devices are pager type buzzers and were attached to various parts of the wearer’s hand: they were activated by the presence of objects in the wearer’s field of view.

For **Conestoga College**, the first prize was awarded to Brian Clinch and Sean Cooper for “LAN based universal motion controller”. At Virtek Vision, many laser projectors are used to cover a work area: by moving projectors by stepper motors controlled through 10baseT Ethernet, the number of projectors was greatly reduced.

Second prize went to Michael Carney, Chris Buckle and Michael Kraus for “DSSS transmitter and receiver”. Their system used Direct Sequence Spread Spectrum in which a pseudo-noise waveform is combined with the input bit stream to spread its bandwidth: this simulates CDMA used in many modern cellphones.

Third prize went to Mark Peeters and Scott Howes for “Wireless storage device”. This is a portable unit containing a 16 MB flash RAM: data can be transferred from a computer to it at 150 kb/s by an infrared link.

For the **University of Waterloo**, first prize went to Jason Grenier for “Laser machining”. He reviewed techniques used at Photonics Research Ontario for micromachining of a silicon substrate with a laser beam: the process tends to be destructive, spreading debris and causing cracks and heat stress: use of chlorine gas and femtosecond pulses solve these problems.

Second prize was awarded to Michael Jarrett for “Circumventing the wired equivalent privacy protocol” (WEP). IEEE802.11 covers transmission over the 2.4 GHz band at 11

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Mb/s: although WEP is supposed to be secure, it can be broken in a few hours, and should be combined with network-layer encryption and software-based authentication.

Third prize went to Ksenia Golod for “Comparative analysis of SONET and Gigabit Ethernet.” SONET is very robust and reliable, and is best suited to telephony: it will continue to cost (per Gb/s) several times as much as Gigabit Ethernet, which is more flexible and suited for the internet: achieving 40 Gb/s will be a challenge for either system.

Each first prize is worth \$100, second prize \$75 and third prize \$50. An additional prize was awarded to the best overall paper of the evening - \$100 to Brian Clinch and Sean Cooper of Conestoga College.

Slawo Wesolkowski, thanked Scott Hafeman for organizing the event and the three judges, and the students for their hard work in preparing their presentations. He also

thanked Microsoft for a donation of six packages of software which were given to the first and second winners from each institution, and for providing the pizza and pop.

The University of Waterloo Student Branch has purchased a trophy which will be engraved with the UW winners of the student papers night competition for several years.

PAUL WARD GAVE TALK ON MANAGEMENT OF DISTRIBUTED SYSTEMS

On 21st March, the Computer Chapter presented Dr. Paul Ward who gave an account of scalable distributed systems management.

One of the problems in large systems is to avoid a race condition. This may occur if two events can occur at the same time: to be sure this will not occur, a cause and effect chain from one to the other must be clear. In a system with thousands of events, comparing all possible pairs of events can be a prohibitive task, but the speaker showed that this task can be made manageable by defining clusters in which event pairs exist and confining the search within each cluster. He showed that Fidge/Mattern Timestamps can be replaced by cluster timestamps, because most processes only communicate with a small number of other processes.

RON POTTS TALKED ABOUT LIFE MEMBER CHAPTERS AND TOM EAST DESCRIBED THE EARLY DAYS OF WEATHER RADAR

All members of the Kitchener-Waterloo Section in the Life Fellow, Life Senior, Life Member and Life Associate categories (30 in all) had been invited to a meeting on March 28th to hear a presentation by Ronald Potts, to be followed by a talk by Tom East on the development of weather radar: however, there was a disappointing turnout. Ron Potts said IEEE Region 7 (IEEE Canada) is setting up a series of Life Member Chapters. Rather than one for each section, there would be three only, for the Eastern Council,

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Central Canada Council (in which we fall) and Western Council. The Central chapter was furthest advanced, with a representative from five of six sections appointed (including Tom East from KW). However, for developments since that meeting, see "Life Members on the Move" above.

During World War 2, microwave radars were being used for surveillance of the air and the sea. It had been noticed that sometimes, large diffuse echoes were seen on the screen, and Stewart Marshall of the Canadian Army Operational Research Group established by trials that they were caused by rain. After the war, he set up the Stormy Weather Research Group at McGill University, using a war surplus height finder radar, and later a purpose built weather radar, to gather data on rain clouds and snow for cloud physics studies. Tom East was recruited from England to maintain the radars and to do theoretical studies: he developed two novel displays – one a height/time display of a vertical pointing radar. The other was an electronic system to do in real time what the group had been doing by photography – Constant Altitude Plan Position Indicator to

show three dimensional data as two dimensional pictures at, say 10,000 feet height. The system used 86 vacuum tubes! CAPPI systems using solid state circuits and memories are now common place – see <http://weatheroffice.ec.gc.ca/radar>.

NEWS FROM ACADEMIA

Conestoga College has been declared the best community college of the 25 in Ontario. It was one of nine colleges which have been authorized by the Ontario government to provide degree courses. At our Student Papers night, the team which won the award for best overall presentation was from the college. Their project, for controlling a laser which marks material on the factory floor, was included in the Virtek Vision display at an international trade fair in Paris in April.

The University of Waterloo has set up a diploma program for photonics professionals. It has also set up an Institute for Quantum Computing, and has received federal funding for research chairs. The professors involved will be also associated with the **Perimeter Institute**. The National Research Council and the Business Development Bank have provided funds to UW Innovate Inc., which helps commercialize intellectual property. The Natural Sciences and Engineering Research Council has granted \$0.95M to Prof. Elmasry for five years for the development of optoelectronic chips.

NEWS FROM INDUSTRY

Arise Technologies Corporation of Kitchener has received a federal contract worth \$1M to supply solar energy equipment for houses to be built by Cook Homes. Solar panels will supply electricity for the homes: any surplus power can be sold to the local Hydro company.

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ComDev International of Cambridge is to supply beam select switch subsystems worth \$9.5M to TRW Inc. to be incorporated into US military satellites. The work will be done in Cambridge, and in Aylesbury, England. ComDev's Broadband Division is supplying its M/ERGY systems for field trials in Manhattan, Kansas: the system uses a new high speed standard called 1xEV-DO, a Code Division Multiple Access (CDMA) standard, and will have a range of about 5 km in an urban environment.

The silicon foundry of **Dalsa Corporation** of Waterloo has received the foundry gold performance award from Motorola Inc. The foundry, located in Bromont, Que., has 250 employees. Dalsa has recently received contracts worth \$1.7M for digital camera products.

Dspfactory Ltd. of Waterloo will supply digital sound ICs to Gennum Corp. of Burlington, Ont., for use in hearing aids. The company already supplies chips to other companies for headsets, PDAs and hearing aids.

Northern Digital of Waterloo has won an award from Ontario Exports, a government agency, for market expansion. The company has acquired Mednetix AG of Villigen, Switzerland, which makes magnetic sensors: the devices will be used in image guided surgery.

Research In Motion (RIM) has added voice capability to its Blackberry line of products: the 5810 will operate through Rogers AT&T Wireless: it is now available in Canada. RIM has introduced a new line of radio modems to be installed in other firm's products, operating with General Packet Radio Service (GPRS) networks. RIM has signed up two distributors of its GPRS capable Blackberry: Hutchinson in Hong Kong and Vodaphone in the UK. RIM plans to license its technology to other manufacturers. The Heritage Ministry gave blackberries to all athletes, officials and coaches on the Canadian Olympic and Paralympic teams at the 2002 Winter Olympic Games.

Sandvine Incorporated of Waterloo, founded by former employees of PixStream, will be showing its IP Services Platform at a trade show in Atlanta, Georgia. The device is to be used by internet service providers to minimize bandwidth, and add services such as content screening and virus protection. It is planned to move to a new building on Albert Street, and to start shipping products by December.

QUICK PUZZLE-2

The problem was: name three successive members of an arithmetical progression whose product is a prime number.

Think outside the box: a prime number has to be positive, but members of an arithmetical progression can be negative. Try $-3, -1, +1$.

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$$(-3)*(-1)*(+1) = 3, \text{ a prime.}$$

Also, $1, -1, -3$ of course.

Are there any other solutions? If you can think of any, send them in to tieast@ieee.org. Each member who sends in a solution will be in a draw for a prize.