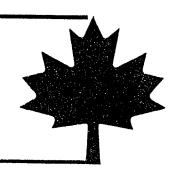# IEEE NEWSLETTER
KITCHENER - WATERLOO SECTION

January 1995

MEETINGS

Mark these dates on your calendar:

January 24th, 5.30 pm, University of Waterloo Davis Centre Room 2577: Dr. Bradley Fox of ComDev on Experimental Design and Practices in Microgravity Material.

February 7th, 5:30 pm, University of Waterloo Davis Center Room 1302: Terry Wilkinson of CSDesign Inc. on Object-Oriented Programming.

For details see page 2

A HAPPY AND PROSPEROUS NEW-YEAR TO ALL OUR READERS

Feature Articles

The Kitchener-Waterloo Section of the Institute of Electrical and Electronics Engineers serves all members whose mailing address is in Bruce, Grey, Perth, Waterloo or Wellington Counties.

DR. BRADLEY FOX ON EXPERIMENTAL DESIGN AND PRACTICES IN MICROGRAVITY MATERIAL PROCESSING

Presented by the K-W Section.

Time: Tuesday January 24th, 5.30 p.m.

Place: University of Waterloo Davis Centre, Room DC 2577.

Speaker: Dr. Bradley Fox, COMDEV Cambridge.

Subject: Experimental Design and Practices in Microgravity Material Processing.

Dinner: Meet the speaker for dinner after the seminar. Please contact Shesha Jayaram for details (519-885-1211 ext 5337).

Refreshments will be served at 5:15 p.m.

Speaker: Dr. Bradley Fox is a materials scientist/engineer with 15 years experience in materials R&D. Dr. Fox has degrees in Physics and Ceramic Sciences. He was a Research Fellow at Pennsylvania State University, working on development of electronic materials. At the Ontario Research Foundation (now Ortech) he did contract R&D for many industrial and government programs, including several projects for the user development program of the Canadian Space Agency, gaining experience in microgravity experimentation. He is now in the Corporate R&D division of COMDEV, and is involved in the technology and management of their materials related research programs.

Subject: Testing and experimentation of materials and devices in a microgravity environment while still on earth is not a trivial task. The principal method to simulate a low gravity field is to place the experiment (and sometimes the experimenter) in a "free fall" frame of reference. The design and the procedures needed to carry out free fall experimentation requires a knowledge of the effects of the low gravity state and the "quirks" of the method used to put the experiment into free fall. NASA has been conducting low G training and testing in a KC-135 aircraft for the last 35 years (affectionally known as the "vomit comet"). This talk will touch on some of the design criteria and scientific consequences of experimentation in material processing in low G.

TERRY WILKINSON ON OBJECT-ORIENTED PROGRAMMING

Presented by the K-W Section.

Time: Tuesday February 7th, 5.30 p.m.

Place: University of Waterloo Davis Centre, Room DC 1302.

Speaker: Terry Wilkinson, CSDesign Inc.

Subject: Object-Oriented Programming.

Dinner: Meet the speaker for dinner after the seminar. Please contact Shesha Jayaram for details (519-885-1211 ext 5337).

Refreshments will be served at 5:15 p.m.

Speaker: Terry Wilkinson is a computer consultant, teacher, author, contractor and president of CSDesign Inc. Since 1981 he has also been a senior consultant to Watcom International Corp., a subsidiary of Powersoft Corp. and Sybase Corp. Terry has a strong technical background, having been the principle designer and developer for a number of C and C++ projects. He has also lectured extensively in North America and Asia on subjects that include programming methodology, database

design and object-oriented programming. Terry holds B.Math and M.Math degrees in Computer Science from the University of Waterloo.

Subject: Object-oriented technologies have been with us for some time now, yet many of us are not very familiar with the basic concepts. This talk will describe object-oriented programming from an historical perspective, focusing on the evolution of the paradigm from conventional language constructs.

WALLACE READ IS NEW PRESIDENT-ELECT

by Tom East

Wallace Read, of Newfoundland, Canada won the election for President-Elect of the IEEE. He will take up his position on January 1st 1995, and automatically become President of the IEEE one year later. He is a member of the Board of Directors, and is Vice-president Standards Activities. He was Director of Region 7 (Canada) 1984-1985. This is the second time that a Canadian has been elected president - the first was Robert H. Tanner of Ottawa, who was president in 1972. The vote was fairly close (but not as close as the race for mayor in Waterloo!):

Wally Read	19,398
Donald Bolle	18,785
Charles Alexander	18,716
Write-in	198
Total votes	57,097
Total valid ballot forms	46,136
Forms mailed out	234,445

In case you are wondering how 46,000 odd forms could contain over 57,000 votes, let me remind you that the IEEE uses Approval Voting, in which the voter can vote for as many candidates as s/he wishes. This makes it easier to vote against someone, without expressing a preference among the others.

SECTION PRESIDENT'S REPORT

by Rafaat Mansour

This is my first report in the Section's Newsletter since assuming the Chair office this past June. I would like to take this opportunity to express my appreciation to the former Chair Chandra Kudsia, both on behalf of the section and personally, for his dedicated and energetic leadership during his tenure as the Section Chair.

With enthusiasm, I am looking forward to working with the old and new members of the K-W Section. David Wang has joined the Section Executive Committee as Vice Chair, Arokia Nathan has joined as a Chair of the C&S Chapter and Ed Spike has rejoined as a Chair of the Publicity Committee. The Section is quite fortunate to have these talented volunteers as members of the Executive Committee.

The IEEE Region 7 fall meeting was held this year in Halifax on the weekend of September 24-25. I represented our Section in this meeting. Some of the important issues discussed are:

- **Review of the major Region Goals for the 1994.**

   i) Develop programs to increase the retention rate from student to member.

   ii) Establish a mechanism to allow Canadian members to pay registration fees for IEEE conferences in Canadian dollars. (Note that IEEE membership fee can now be paid directly in Canadian dollars).

   iii) Increase the visibility of IEEE to industry with the objective of illustrating the advantages of employees involvement in IEEE.

- **Section Election Date**

The director of IEEE Region 7 (Canada), Ray Findlay urged all Sections to consider having January 1 as the change-over date for the incoming Section officers. The reason is to have the change-over date coincide with Region's fiscal year end. The issue was left for the Sections to decide.

- **IEEE and CSECE Merger**

The status of the proposed merger between the Canadian Society of Electrical and Computer Engineers (CSECE) and IEEE-Canada was presented by Tony Eastham Vice Chairman of Regional committee. CSECE will be dissolved and assets will be transferred to IEEE Canada if :

   i) Merger be accepted by the CSECE members. Only 2 % responded to a ballot held through the CSECE Journal. A new ballot was sent this fall. The hope is to get a 20 % return.

   ii) IEEE Canada to have a unincorporated status.

   iii) Merger be approved by IEEE board of directors.

   iv) Merger be recognized by Engineering Institute of Canada (EIC).

The target date for this merger is January 1, 1995.

- **CANARIE**

IEEE Canada has been awarded a grant of $85,000 from the Canadian Network for the Advancement of Research Industry and Education (CANARIE) to develop advanced Electronic services for IEEE members in Canada. A pentium server was purchased under this project. It is presently connected to the internet through the cooperation of the Multimedia communication at the University of Ottawa.

The funds from CANARIE will allow the purchase of Fax/modem and ethernet cards for all sections that require them. There are also funds to purchase up to eight complete systems with a 486 8 Mbytes RAM, 320 Mbytes hard disk, fax/modem, ethernet card and a 14" monitor.

The possibility that our Section gets one of these systems will be discussed with the Section Executive Committee.

- **CCECE Conference**

The effectiveness of the Canadian Conference on Electrical and Computer Engineering (CCECE) was discussed. A number of issues were raised by some members of the Regional committee:

- September is not generally seen as a good month for the conference.

- Short of funding from Universities.

- Too broadly based. Needs to be more focused.

- Fee structure is not adequate.

- The current technical Chair has resigned. A new technical Chair needs to be found.

The next CCECE conference is scheduled for September 5-7, 1995 in Montreal.

- Office for IEEE Canada

At the present time, the region has an administrative assistant to help with the organization and the paper work of the Region. She has a mail drop, fax number and an email address (c.lowell@ieee.org). She is currently working from home. The goal is to open an office dedicated to the needs of Canadian members as well as to look after the regional activities. The director of Region 7 would like to establish it early next year possibly in Toronto or in Ottawa. The issue will be addressed in detail in the next Executive Regional Committee meeting.

Finally, I had the chance to talk to other Section Chairs of our Region learning about the activities of their Sections. Overall the meeting was productive and very well organized.

IEEE STRATEGIES FOR THE FUTURE: MEETING MEMBER NEEDS IN THE 21ST CENTURY - PART 2

Goals

1. Career enhancement
2. Globalization
3. Organizational improvement
4. Products and services - including electronic dissemination of existing IEEE products and services
5. Public responsibility

The responsibility for reaching these goals, and the schedule, will rest with the leadership of each IEEE entity. Goals and strategies must be periodically re-examined. Feedback from the global membership will be vital.

Career Enhancement

The goal is to empower IEEE members to realise lifelong careers in electrotechnology by providing a broad range of resources that will enable them to prosper and to develop and update their technical and professional competencies. The following objectives will allow the goal to be reached:

1. Assure that all IEEE members have access to an appropriate range of cost beneficial intellectual resources that will enable them to develop and continually update their technical and professional competencies throughout their careers.

2. Increase the conviction of IEEE members and industrial leaders of the value of investing in continual improvement and revitalization of technical and professional competencies.

3. Become a leading influence in improving the quality of electrotechnology education at colleges and universities worldwide.

4. Develop career resources in the form of programs and benefit packages that will achieve their goals for financial security and quality of life in their retirement years.

Globalization

The goal is to transform the IEEE into a truly global organization, characterized by decentralized volunteer and staff leadership working cooperatively around the world, by collaborative relationships with national societies, and by active involvement of members in all areas of the world. The following objectives will allow the goal to be reached:

1. Achieve worldwide acceptance of the IEEE as a global organization, complementary to the recognized national technical, educational, and professional societies.

2. Substantially increase IEEE membership in all countries of the world where potential new members live and work.

3. Transform the IEEE into a distributed, networked, global organization sensitive to multicultural issues; take full advantage of available technology to overcome geographic and economic constraints in conducting the Institute's global operations.

Organizational Improvement

The goal is to improve the IEEE's organizational structure and business practices to take greatest advantage of available resources, encourage innovation, and ensure cost-effective responsiveness to member and customer needs; maintain a sound financial position that reduces the degree of reliance on member dues, ensures efficient management and use of financial resources, and supports the Institute's mission and strategic goals. The following objectives will allow the goal to be reached:

1. Enhance IEEE's commitment to excellence of service for members and customers in all technical and geographic areas, taking full advantage of opportunities for interactive electronic access to services.

2. Minimize barriers between the IEEE's many organizational units and increase productivity by fostering innovation, promoting interunit cooperation, and using current electronic systems to enhance communications among members, volunteer leaders, and staff members around the world.

3. Optimize use of the expertise, energy and dedication of the IEEE staff and volunteer leaders by creating an energizing, supportive work environment.

4. Develop a long-term financial management strategy for the Institute.

Products and Services

The goal is to move expeditiously to the electronic dissemination of existing IEEE products and services; systematically identify opportunities for expanding the product line to take full advantage of the electronic media, and broaden the markets for the Institute's products and services; achieve and maintain recognition of the IEEE as a leader in the timely generation and dissemination of global electrotechnology standards. The following objectives will allow the goal to be reached:

1. Make all IEEE information products and databases of value to members available in electronic form as quickly as possible.

2. More closely match IEEE products and services to the needs of members and nonmember customers worldwide, with special emphasis on the practical applications of electrotechnology and environmental concerns.

3. Make the IEEE a major force in the development and dissemination of standards and related information that serve the needs of the global electrotechnology community.

4. Position the IEEE as a premier publisher of books on electrotechnology and as the publisher of choice for member-authors.

Public Responsibility

The goal is to align IEEE initiatives with the public interest by advocating the application of electrotechnology to promote economic development and by increasing public awareness, acceptance, and appreciation of the contributions to society made by electrotechnology and the profession. The following objectives will allow the goal to be reached:

1. Foster economic development by promoting the advancement of electrotechnology.

2. Improve the public's image of electrotechnology professions and the role of engineers and scientists in society.

3. Enhance the quality of instruction and foster student interest in mathematics and the sciences in their early educational years; enhance public understanding of technology.

CONFERENCES IN CANADA 1995

Feb 20-22 IEEE MTT-S International Topical Symposium on Technologies for Wireless Applications. Vancouver. George Heiter, 508-960-6136.

Feb 20-23 INTERCOMM95 Congress and Exhibition. Vancouver. 604-669-1090.

May 9-11 IEEE Intelligent Networks Workshop - IN95. Ottawa. J. Erfanian, 905-615-6486.

May 17-19 IEEE Pacific Rim conference on Communications, Computer, Visualization and Signal Processing. Victoria. D.G.Goodenough, 604-721-7209, e-mail: pacrim@csr.uvic.ca

Jun 4-11 IEEE Holm Conference on Electrical Contacts CPMT. Montreal.

Jun 12-16 IEEE Pulp and Paper Industry Conference. Vancouver.

Jul 9-14 CASE95: 8th International Workshop on Computer-aided Software Engineering. Toronto. H.A. Muller, 604-721-7630, email: hausi@csr.uvic.ca.

Jul 10-12 Wireless 95: 7th Annual International Conference on Wireless Communications. Calgary. L. Southwood, 403-289-3140. (Deadline for abstract Feb 28).

Sep 17-22 IEEE International Symposium on Information Theory. Whistler, BC.

Sep 20-23 17th International Conference - IEEE Engineering in Medicine and Biology Society. Montreal.

Sep 24 IEEE International Workshop on Software Evolution Processes and Measurement. Victoria.

SLAWO WESOLKOWSKI WINS IEEE AWARD

The Region 7 Office has announced that Slawo Wesolkowski, a student at the University of Waterloo, was awarded the Central Canada Council Life Member Award in the 1994 IEEE Canada Student Paper Competition. Slawo presented his paper to our section during our Student Papers Night last May. It was sent to the Region where it won him this latest honour. Congratulations Slawo!

LJ RISTIC DESCRIBED MICROMACHINING

by Tom East

On September 9th, Dr. Ristic gave a talk on the use of lithographic techniques, commonly used to fabricate integrated circuits, for making tiny electromechanical devices. A layered structure is built up, and then, by etching away one or more intermediate (sacrificial) layers, other layers are left suspended with an air gap or gaps. An electrode can be anchored on straps at the four corners, or even cantilevered.

Such a device can act as an accelerometer. There is a great demand for accelerometers to fire airbags in cars: a micromachined device would cost $5, compared to about $50 for a present-day conventional device. Dr. Ristic foresees a world market for all kinds of sensors of 12 billion dollars in the year 2000.

Other applications for micromachining include spiral inductors in microwave chips. Conventional inductors lie directly on a thin insulating layer on the substrate: by digging a deep well beneath the inductor, the impedance of the component is increased by a large factor, and a typical amplifier stage gain increased by 10 db.

INTELLECTUAL PROPERTY EXPLAINED BY GEOFFREY IMAI

by Tom East

On September 28th, at a well-attended meeting of the KW section, Geoffrey Imai of Gowling, Strathy and Henderson described five ways that the results of one's work can be retained under one's own control.

Patent: can be a simple invention, even using two well-known devices together if it has not been done before. It must be useful, novel and not obvious to someone skilled in the science. It must be registered before it is published (even submitted as a thesis) (with some leeway under some circumstances), on a country by country basis. In all countries, the patent goes to the "first to file", except in the USA, where the rule is "first to invent" (keep those witnessed notebooks), and Taiwan, which is in a class on its own. Patents last about 20 years.

Trade-Mark: for example label, logo or the pattern of stripes on a running shoe. Must not be confusing with other trade-marks, and must not be descriptive. If registered, lasts 15 years.

Copyright: for example literary works, paintings, brochures, cartoons and software. Whether registered or not, it is recognized by most countries. Lasts for the lifetime of the creator plus 50 years. If the creator of software (programmer) cannot be identified, copyright lasts 50 years from the time it was written.

Industrial design: typically, ornamentation rather than function. Register country by country: lasts 5 years, renewable for five more.

Cartography: the configuration of integrated circuit chips is now protectable.

LEN CHOW ON A PROGRAM FOR GROUNDING

On December 9th, Prof. Len Chow described to the Section, a computer program developed by M. Elsherbiny, M.M.A. Salama and himself for predicting the performance of a grounding system for electrical substations. Such a system consists of a rectangular grid of metal rods, on or just below the surface of the ground: it may also have metal stakes driven vertically into the ground and attached to the crossings of the grid, to improve the connection to the ground. The important performance figures of such a system are the resistance, the "touch potential" (the voltage difference between a point on the surface of the ground and the main connection), and the "step voltage" (the voltage difference between two points one pace apart). The program uses the method of moments - in particular Galerkin's variational method, which is economical in the size of matrices required. The language used is C: several thousand lines of it. Use of the program was demonstrated on the large screen. It is menu driven: parameters such as dielectric properties of one or two layers, mesh size, rod diameters, stake length and others are entered in a table, and outputs appear as

three dimensional graphs. For further details, a mouse driven pointer is moved over the ground to a point of interest, and the potentials at that point appear.

BULLETIN BOARD SOFTWARE COPIERS FINED

Last summer, Michael Solomon was fined $20,000 for sending copyrighted software on the 90 North bulletin board from Montreal. As well, Sergio Arana was fined $2,500 for sending copyrighted software from Toronto on his Legion of Death bulletin board. These convictions were obtained under the Canadian Copyright Act.

CENTER FOR THE HISTORY OF ELECTRICAL ENGINEERING

The IEEE and Rutgers University (which houses the Center) have forged a partnership for research and education into the history of electrical engineering. They also give guidance to individuals and organisations in our profession who want to find a permanent repository for their records. Recently, computer history has become one of their most active areas. The Center is appealing for funds: the IEEE Foundation will match donations $1 for every $2 donated by February 21 1995. Phone 908-932-1066 or Internet history@ieee.org.

ELECTRIC CAR FROM QUEBEC?

The Couture Power Train is a system developed at Hydro Quebec for passenger cars by Pierre Couture. It consists of a battery which can be charged from a normal electric outlet, and four motors, one in each wheel of the car, which run under computer control. Although the car would only have a range of 65 km on the battery alone, the battery can be charged en route by a small gasoline motor which is much more efficient than a regular drive train, and less polluting. Hydro Quebec intends to license the system to car manufacturers, and hopes to see such cars on the road by the year 2000.

FOCUS AUTOMATION SYSTEMS SELLING TO JAPAN

Focus Automation Systems Inc. of Waterloo has signed an agreement with Itochu Techno-Science Corporation of Japan. The Japanese trading company will market and distribute a machine vision processor which Focus calls Cyberscan. This product uses line scan video cameras to inspect paper on a production line, for example, and to flag defects. Focus already distributes throughout North America.

HEWLETT-PACKARD SYSTEM ON WALL STREET

Hewlett-Packard Canada has sold computer terminals worth $25 million to the New York Stock Exchange. These Entria X terminals are made in HP's Waterloo plant at King and Weber Streets.

COMDEV AND RIM IN THE NEWS

ComDev of Cambridge and Research In Motion of Waterloo have continued to make news headlines since they joined in a partnership in 1994. ComDev leads a NASA project to test high-temperature superconductors in space. The company also settled an international trade dispute with Space Systems Loral of California. A satellite partly owned by ComDev was launched in November. Research in Motion, a University of Waterloo spin-off, has won an Emmy award at the Creative Arts Awards ceremony in Pasadena for a film editing product, the Digisync Film Barcode Reader, which was used in well-known TV shows.

MAGNETIC FIELDS - A HOME HAZARD?

This letter is being sent to the editor, IEEE Spectrum.

The article by Tekla Perry - "Today's view of magnetic fields" in the December 1994 issue of Spectrum concerns me, especially the box "Two house calls" on page 20. The field from an electric stove, 18 inches from the burner, was 10 times what epidemiologists judged to be "high", though "nobody knows for sure what levels, if any, are dangerous ...".

Could there be a connection here with the increasing incidence of breast cancer in women, since they do much of the cooking in most homes. Would a statistically significant difference in incidence of breast cancer be found in women who have been cooking with electricity versus those who have used gas or other fuels?

Yours sincerely,

T.W.R. East, Ph.D., P Eng.

FORMER WATERLOO MICROSYSTEMS FOR SALE

American modem company Hayes Microcomputer Products is in Chapter 11 bankruptcy protection, but it is claimed that this will not impact the Waterloo operation on Phillip Street. Waterloo Microsystems was founded in 1982 as a spin-off from the University. Hayes Microcomputer Products bought it in 1990, and operated it as an R&D facility, but has recently put it up for sale.

RAYTHEON CANADA TO SUPPLY RADARS TO FAR EAST

Raytheon Canada Limited of Waterloo has signed contracts for five air traffic control radars for China, two for India and one for Hong Kong. The company is already supplying radars to the Sultanate of Oman and to Iran. Raytheon Canada's radar product line is the next generation after the RAMP radars which were installed throughout Canada in the 1980s. One model operates in L band (1250-1350 MHz or 23 cm wavelength) and another in S band (2700-2900 MHz or 11 cm). They are all solid state - no vacuum tubes except the CRTs - and use sophisticated signal processing to eliminate ground and weather clutter without impairing detection of aircraft.

ELECTROHOME PROJECTS ITS IMAGE

About half of Electrohome Limited's activity is now in its broadcast stations, and the other half in projection systems. They are no longer making radios, TVs and air conditioners. But their projectors are used in places around the world: among them the Barcelona stock exchange, the nerve center of AT&T in New Jersey, CN rail, Ronald McDonald House in New York City and the court room at the O.J. Simpson trial.

CHIPS TO BE INSTALLED IN DANGEROUS DOGS

Kitchener City Council has passed a bylaw which will allow the Humane Society to have any dog which is running at large three times in a year, or which menaces a passer-by, installed with a microchip behind its ear, so that it can be permanently identified. It will cost the owner about $40 for this operation. This move comes after several incidents in which vicious dogs have scared or wounded members of the public.