



IEEE NEWSLETTER KITCHENER - WATERLOO SECTION



April 1993

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Chair: Chandra Kudsia, (519)622-2300 ext. 276
Vice Chair: Rafaat Mansour, (519)622-2300 ext. 246
Secretary: Rosalind Hood-Morris, (519)570-0300
Treasurer: John Mowbray, (519)884-1710 ext. 371, 569

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Computers: Manh Le, (519)884-1710
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Microwave Theory and
Tech.:* Len Chow, (519)885-1211 ext. 2822
Circuits and Systems,
Electron Devices:* C.R. Selvakumar, (519)885-1211 ext. 3978
*Combined Chapter

Committee Chairs

Publicity: Ed Spike, (519)885-1211 x3716
e.spike@ieee.org FAX:888-6197
Education: Tim Williams, (519)748-5220
Program: Shesha Jayaram, (519)885-1211 ext. 5337
Arvind Vyas (519)884-1710 ext. 245
Membership and Trans-
fers: Keith Campbell, (519)884-1710 ext. 281
Publications
(News Letter): Tom East, (519)746-7809
Awards: C.R. Selvakumar (519)885-1211 ext. 3978
Nominations: Rosalind Hood-Morris, (519)570-0300
Herb Ratz (519)885-1211 ext. 2805

Student Activities Chairs

Conestoga College: Chuck Whitehead, (519)748-5220
Univ. Of Waterloo e-mail ieeesb@electrical.watstar.uwaterloo.ca
(519)885-1211 FAX: (519)746-3077
Stream A: Anton Cheng, askcheng@electrical.watstar.
Summer 1993 Daniel Miller, (519)885-1211 ext. 5215
Stream B: Mark Carrier, mcarrier@electrical.watstar.
Winter 1993 George Freeman, (519)885-1211 ext. 2876

Address

IEEE
K-W Section
c/o Elect. & Comp. Eng. DC2597
University of Waterloo
Waterloo, Ont., N2L 3G1
E-Mail: KWIEEE@sunee.uwaterloo.ca

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DAVID LOGE PARNAS ON FORMAL DOCUMENTATION OF WELL-STRUCTURED PROGRAMS

Presented by the Computer Chapter

Time: 5.30 p.m, Monday, May 10th 1993

Place: University of Waterloo Davis Centre, Room 1304

Speaker: Dr. David Loge Parnas, CRL McMaster University, Hamilton

Subject: Formal Documentation of Well-Structured Programs

Dinner: After the presentation. Phone Professor Jayaram at 885-1211x5337 for reservations.

Speaker: Dr. David Parnas is a Professor in the Department of Electrical and Computer Engineering at McMaster University in Hamilton. He is a member of the Communications Research Laboratory and Principal Investigator for both the Telecommunications Research Institute of Ontario, and the Canadian Institute for Telecommunications Research. He was Lansdowne Professor of Computer Science at the University of Victoria and has also been a member of the faculty at Carnegie-Mellon University, the University of Maryland, the Technische Hochschule Darmstadt, and the University of North Carolina. He has also worked at Philips Computer Industry and the United States Naval Research Laboratory in Washington, D.C.

His special interests include precise abstract specifications, real-time systems, safety-critical software, program semantics, language design, software structure, process structure, and process synchronization.

Professor Parnas received his Ph.D. from Carnegie-Mellon University, and an honorary doctorate from the ETH in Zurich. He has won several awards and was recently elected a Fellow of the Royal Society of Canada.

Subject: Professor Parnas introduces a method for making program documentation precise and readable when the program is lengthy. He proposes that the program documentation consist of a set of displays supplemented by a lexicon and an index. A display is a document, in which a program fragment is presented in such a way, that its correctness can be examined without looking at other displays. A display consists of three parts: (1) the specification of the program presented in the display, (2) the program itself, in which names of other programs (subprograms) may appear, and (3) the specifications of subprograms invoked by this program. His technique is a refinement of Mills' functional approach to program documentation and verification; programs are specified by LD-relations represented in tabular form. He illustrates his method with simple examples.

GEOFFREY HINTON ON GENERALIZING NEURAL NETWORKS

Presented by the Computer Chapter

Time: 5:30 p.m. Monday, May 17th 1993

Place: University of Waterloo Davis Centre, Room 1304

Speaker: Dr. Geoffrey Hinton

Subject: Making Neural Networks Generalize Better by Keeping the Weights Simple.

Dinner: After the presentation. Phone Professor Jayaram at 885-1211x5337, Mahn Le at 884-1710 or E-mail MANH.H.LE@WATERLOO.NCR.COM for reservations by May 10.

Speaker: Geoffrey Hinton is the Noranda Fellow of the Canadian Institute for Advanced Research, and professor of Computer Science and Psychology at the University of Toronto. He does research on ways of using neural networks for learning, memory, perception, symbol processing and motor control and has over 100 publications in these areas, including a 1992 Scientific American article on "How neural networks learn from experience". He was one of the researchers who introduced the back-propagation algorithm that is now widely used for practical applications. He won the 1992 ITAC/NSERC award for outstanding contributions to information technology.

Subject: For a supervised neural network to generalize well, there must be less information in the networks' weights than there is in the set of training cases. Professor Hinton will describe different ways of forcing the weights to be simple and show that this leads to much better generalization on a variety of tasks. It also makes it easier to interpret what the hidden units are doing.

ANNUAL GENERAL MEETING KITCHENER-WATERLOO SECTION IEEE

Time: 7:00 p.m.

Date: Tuesday, May 25th 1993

Place: Seagram Museum, Erb St. W. at Caroline St., Waterloo (Pay and Display parking on N side of Erb St.)

Spouses are invited to attend the short business meeting and the presentation afterwards.

1. ANNUAL GENERAL MEETING - K-W SECTION, IEEE

The Nominating Committee (chairman, Herb Ratz) has proposed a slate of names to serve on the K-W Section's Executive Committee from July 1, 1993 to June 30, 1994. The names of individuals are listed below. Members may nominate other members as alternative candidates under the following conditions:
For each nominee

- a) obtain agreement in writing to stand,
 - b) obtain supporting signatures of two percent of the voting members,
 - c) submit these documents to the Secretary, Rosalind Hood-Morris, 266 Whitmore Drive, Waterloo, Ontario by May 18th, 1993.
- If alternate nominations are received, elections will be held at the Annual General Meeting.

2. GUIDED TOUR OF SEAGRAM MUSEUM

3. REFRESHMENTS.

SLATE PROPOSED BY THE NOMINATING COMMITTEE FOR 1993-1994.

Section Officers:

Chair: Chandra Kudsia, ComDev
Vice Chair: Raafat Mansour, ComDev
Secretary: Rosalind Hood-Morris, Waterloo Board of Education
Treasurer: John Mowbray, NCR

Chapter Chairs:

Antennas and Propagation, Microwave Theory and Techniques: Len Chow, Univ. of Waterloo

Circuits and Systems, Electron

Devices: C.R. Selvakumar, Univ. of Waterloo
Computers: Manh Le, NCR

Committee

Chairs:

Awards: Shesha Jayaram, Univ. of Waterloo
Publications: Tom East, TEES
Program: Shesha Jayaram
Nominations: R.H. MacPhie, Univ. of Waterloo

Student Activities Chairs

University of Waterloo

Stream A: Daniel Miller

Stream B: George Freeman

Positions left: Conestoga College; Education;
vacant include: Membership

PROF. SHESHA JAYARAM ON HIGH FIELD STERILIZATION OF FOODS

Presented by the Microwave Chapter

Date: Tuesday, June 15, 1993

Time: 5:30 p.m. to 8:00 p.m.

Place: University of Waterloo, Chemistry 2, RM 079.
Also broadcast at the University of Guelph, MacNaughton Building, Rm. 101
Located off Gordon St., beside the "P2" Pay Parking Lot (Building easily recognized by the observatory dome on top).

Speaker: Professor Shesha Jayaram, University of Waterloo

Subject: Pulsed High Field Sterilisation of Liquid Foods

Dinner: After the presentation. Phone Professor Jayaram at 885-1211x5337; Mahn Le at 884-1710, or E-mail MANH.H.LE@WATERLOO.NCR.COM for reservation by June 8.

Speaker: Dr. Sheshakamal Jayaram obtained her Ph.D. in Electrical Engineering at the University of Waterloo, where she is an Assistant Professor. She spent two years as an Assistant Professor in the Faculty of Engineering at the University of Western Ontario, where she was the only female faculty member, and was secretary of a task force committee to encourage more women to enter and remain in the engineering field, ideally pursuing graduate studies.

Prof. Jayaram spent four years working in industry and for the Ministry of Energy in India as a research Engineer. She holds a BSc from University College and a MASc from the Indian Institute of Science, both in Bangalore, India.

Subject: Extending the shelf life of processed foods is an important aspect of post-harvest technology. Also, avoidance of microbial contamination is one of the most important requirements to ensure good quality and high yield of the manufactured products. Because of its reliability, steam sterilization is used traditionally to extend the shelf life of liquid foods despite its detrimental effects on the sterilizing media, particularly nutrient loss, besides being energy intensive. The requirement for a non thermal sterilization process has principally arisen from a need to overcome the disadvantages encountered with steam sterilization. With the rapid advances in electric pulse power technology, interest in the development of non thermal high field sterilization process has been increased in recent years. The method is environmentally compatible, also energy efficient, and could be of immense economic benefit to the food industry.

MERGER WITH CSECE?

by Tom East

The Canadian Society for Electrical and Computer Engineering (which is a constituent society of the Engineering Institute of Canada) is a separate body from the IEEE. The CSECE periodical, the Canadian Journal of Electrical and Computer Engineering, contains news of Society activities and technical papers, rather like the IEEE Canadian Review. According to a survey published in the October issue of the CSECE, 70% of CSECE members are also members of IEEE, and 65% would "favour association with the IEEE". A detailed proposal and business plan for the merger of IEEE Region 7 and CSECE is in preparation by a "Blue Ribbon Committee" containing past presidents of both bodies. The Fall issue of the IEEE Canadian Review will include an article about the proposed merger and you will be able to express your views and to vote on the merger.

CONFERENCES IN CANADA

1993

April 15 Forum: The Status of Women in Engineering and Technology: Is the Profession responsible? Toronto - Bob Osborn (416)783-3632.

- April 29 Fiber Optics Applications and Technology Symposium (FOATS '93) - Montreal - Pierre Allard (514)870-3265.
- April 30 NECEC '93 - St. John's Newfoundland - Paul Thorburn (709)772-4755.
- May 17-18 WESCANEX '93 Saskatoon - Ron Fleming (306)966-5299.
- May 19-21 Pacific Rim Conference on Communications, Computer and Signal Processing - Victoria - Nikitas Dimopoulos (604)721-8902.
- May 30 Canadian Workshop on Information Theory - Ottawa - Aaron Gulliver (613)788-5784.
- May 31-June 2 First Canadian Workshop on Field Programmable Gate Arrays - Winnipeg - R.D. McLeod (204)474-8891.
- June 7-9 20th International Conference on Plasma Sciences - Vancouver - Andrew Ng (604)822-3191.
- June 8-11 8th Conference on Real-Time Computer Applications in Nuclear, Particle and Plasma Physics - Vancouver - Ruth Risto (604)222-1047.
- June 19-23 8th IEEE Symposium on Logic in Computer Science - Montreal - IEEE ComSoc (202)371-1013.
- June 30-July 2 11th Symposium on Computer Arithmetic - Windsor - IEEE ComSoc (202)371-1013.
- July 18-22 Power Engineering Society (PES) Summer Meeting - Vancouver - Nick Chopra (604)663-4113 or B. Power (604)528-2736.
- Sept. 7-9 5th Workshop on Optical/Hybrid Access Networks - Montreal - R. Oliver (514)870-3060.
- Sept. 13-16 International Conference on Control and Applications - Vancouver - Guy Dumont (604)822-8564.
- Sept. 14-17 Canadian Conference on Electrical and Computer Engineering - Vancouver - A. Winter (604)293-5704 (Paper deadline April 9 - V.K. Bhargava (604)721-8617).
- Sept. 27-Oct. 1 ISSLS 93 - Vancouver - s. Hussain (604)432-3131.
- Oct. 3-8 Industry Application Society Annual Meeting - Toronto - Ajit Bapat (416)752-8020.
- Oct. 12-14 Vehicle Navigation and Information Systems 93 - Ottawa - H. Reekie (613)990-4099.
- Oct. 12-15 2nd International Conference on Universal Personal Communications (ICUPC 93) - Ottawa - Jim Scott (613)735-1440.
- Oct. 12-15 OCEANS 93 - Victoria - Mary O'Rourke (604)721-8470.
- Oct. 19-22 5th Alberta Exhibition and Conference on Power Quality - Calgary - Charanjit Singh (403)268-4028. Deadline for abstracts is April 30.

BEAM ROBOTICS

The BEAM Robot Olympics will be held at the Ontario Science Center in Toronto, April 22-25. Advanced registration is encouraged or you can register on the day of the competition up to noon Saturday, April 24th.

ENGINEERING SCIENCE QUEST '93

by Tom East

The Winter 1993 issue of the IEEE Canadian Review had an article by Dr. Osborn lamenting the lack of incentives for children to choose science and technology for their life's work. He suggested a number of ways in which we could turn this situation around. Here is one right on our doorstep:

Engineering Science Quest was started in 1991 by two UW undergraduate students one in Chemistry and one in Civil Engineering. It now has a staff of 9, who will hold classroom workshops in May and June, and summer day camps in July and August, for children who are entering grades 5 through 8.

If you have children or grandchildren in these grades, you could enrol them in a one week day camp on the UW campus from July 5 to August 16 1993 for \$115 each. Contact Sarah Boudreau or Clare Stewart at 885-1211 ext. 5239, and ask for a registration form.

You could also enquire about the classroom programs for next year. As well, for high school students, there is a CIT (counsellor in training) program.

STANDARDS

IEEE Canada (Region 7 Office) no longer sells standards. For all your Standards needs, contact Esaleta Corbin at IEEE headquarters, phone (908)562-3281, fax (908)562-1571.

STUDENT PAPERS NIGHT 1993

The University of Waterloo Davis Centre was the scene of the annual Student Papers night on March 17th.

The three judges were:

Edward Spike, University of Waterloo
Dr. Chandra, Raytheon Canada Limited
Professor R.H. MacPhie, University of Waterloo

Two teams from Conestoga College competed for the Ken McKenzie Award. The winning paper was presented by Don Clark, Gary Tickner, Kurt Batick and Nicholas Romany: they described "An Automatic Moisture Controller for Grain Dryers". The task was to redesign an existing controller, manufactured in Canada, to replace chips, some of which are obsolescent, by new ones of greater capabilities, but without rewriting code. The result was a new design, with reduced chip count, number of boards reduced from 7 to 3, reduced size and cost.

The other paper was presented by Louis Grubb, Brad Fiddler, Ron Vink and Ken Hilderley: their subject was "A 6802 Microprocessor Emulation using Discrete Logic and Horizontal Microcode". The emulator, which was on display in the lecture room, showed the various functions of the microprocessor in seven distinct parts: the objective was to provide a learning tool for microprocessor technologists.

The University of Waterloo contest was for the George Dufault Award. The judges reported that the results were extremely close, but awarded the first prize to Robert Wu for his presentation of "Mobile Cellular Systems: the Next Generation". The existing cellular telephone system uses FM but is to be converted to digital TDMA (Time Domain Multiple Access). Other schemes under consideration include Personal Communications (pocket sized cell phones), Intelligent Highways, Mobile Personal Computing and Wireless Regional Information Databases.

The other UW entry was delivered in French (the judges were all bilingual) by Slavo Wesolkowski on "Simulation of an Alternator". The fields in the stator and rotor were calculated by the finite element method, and the voltage/current relationships predicted with great accuracy, as confirmed by measurements.

Both the winners and the runners-up will receive cash prizes from the section: we are very grateful to ComDev Limited and to Raytheon Canada Limited for contributing to these prizes.

The papers by Clark, Tickner, Batick and Romany and by Wesolkowski will be entered in an IEEE Central Canada Council contest in May, the winning paper to be presented at an IEEE Canada conference in June.

Ken McKenzie, after whom the award for the College contest is named, gave technical direction of the TV and Broadcast studios at the college for many years.

George Dufault, in whose memory the award for the UW contest is named, set up the co-operative plan in 1957, and was the first head of the Department of Co-ordination at the Associate Faculties of Waterloo College, which became the University of Waterloo.

RAYTHEON WINS INDIAN CONTRACT FOR FOUR RADARS

Raytheon Canada of Waterloo has won a contract worth \$85 million US from the Government of India for two short-range (3GHz) airport surveillance radars and two long-range (1.3GHz) air route surveillance radars, all solid state, and for integration of a voice data communications system. This award was challenged by a French company, but was confirmed by the High Court in New Delhi.

NASA CONTRACT FOR COMDEV

ComDev Atlantic, ComDev's new subsidiary in Moncton, New Brunswick, has been awarded an \$8.5 million contract to design and build an instrument for a NASA satellite to measure atmospheric pollution. Some of the work will be done in the Cambridge company.

ComDev also has a plant in England.

AREA PEOPLE WIN AWARDS

PROF. CHAMBERLAIN RECEIVES ITAC/NSERC AWARD

The Information Technology Association of Canada, with the Natural Sciences and Engineering Research Council, has made an award to Prof. Savvas Chamberlain of UW Department of Electrical and Computer Engineering for his contributions to Information Technology. He is best known for his work on integrated circuits, especially charge-coupled devices.

Prof. Chamberlain's work resulted in the founding of Dalsa Inc. which has two plants in Waterloo. The company has developed an image sensor chip which has 26 million pixels, which would gather 26 MBs of data in a single look.

WLU AWARD FOR O'DONOVAN OF COMDEV

Val O'Donovan has received the Outstanding Business Leader Award from Wilfrid Laurier University. He is Chairman and Chief Executive Officer of ComDev Ltd of Cambridge.

He is a member of IEEE, and also of APEO and the American Institute of Aeronautics and Astronautics.

HUANG, DENG AND SALAMA OF UW RECEIVE ONTARIO INCENTIVE FUND AWARDS

The Ontario Ministry of Colleges and Universities "University Research Incentive Fund" has matched industry funds for six UW researchers. Three of them work in Electrical and Computer Engineering: Weiping Huang's and Li Deng's projects are with Bell Northern Research, and Magdy Salama's is with Ontario Hydro Research Division.

MICROSOFT SCHOLARSHIPS FOR TWO UW STUDENTS

The 1993 Microsoft Technical Scholarships have been awarded to James Fong and Chris Kaplan, who are both co-op students at the University of Waterloo. James Fong's work term was at Microsoft Canada, and Chris Kaplan's was at WATCOM Systems.

MODERN ELECTROSTATICS

Dr. Castle addressed the Section on this subject on January 27th 1993.

Electrostatics is defined by the ESA as "the branch of science that deals with electrical phenomena associated with charges at rest or in motion". In other words this refers to electrical phenomena in which electric field effects predominate over magnetic field effects.

Dr. Castle described electrophotography, which in the form of copiers is a 16 billion dollar industry in the US: Printers are catching up, at 11 billion dollars. There are six distinct steps in the copier: charge, expose, develop, transfer, fuse, clean. To perfect the technology has been a long process - the copier was invented by Chester Carlson in 1938, but the Xerox 914 only came on the market in 1959.

Other applications of electrostatics include precipitation of particles from flue gases, separation of ores and even biological cells, coating and painting, and generators and motors.

Electrostatic hazards range in scale from being struck by lightning, through ignition of vapours in supertankers or dust in silos, to zapping chips by ESD.

SELF-STUDY COURSES AND EDUCATIONAL VIDEOS

The Educational Activities department of the IEEE offers the following:

Video Tutorials: Phone (908) 562-5499 for information.

Engineering Economic analysis (sponsored by the Power Engineering Society)

Theory and Applications of Fuzzy Logic

Transient Voltage Surge Suppression

1992 International Conference on Acoustics, Speech and Signal Processing

1992 IEEE International Conference on Robotics and Automation

Self-Study Courses: Phone (908) 562-5498.

Applications of Mathematics in Electrical Engineering

Fault Calculations of Industrial/Commercial Power Systems

IEEE Engineers Guide to Business Series:

1. Presentations that work.
2. Writing for career growth.
3. "High Tech" creativity.

ALOUETTE/ISIS A MILESTONE OF ELECTRICAL ENGINEERING

The IEEE Center for the History of Electrical Engineering has designated the Alouette/ISIS Program as a Milestone of Electrical Engineering.

Alouette I was a satellite launched in 1962. One of its functions was to perform soundings of the ionosphere from the top side, to complement those from the ground. It was the subject of a meeting of the Kitchener-Waterloo Section before its launch. It was built in Canada - prior to that only the USSR and the US had built satellites. (Alouette is French for Lark, and is the title of a song popular in French Canada). It was followed by Alouette II, then by ISIS I (International Satellite for Ionospheric Studies) and by ISIS II in 1971.

With the launch of ANIK A1 in 1972, Canada became the first country to have a domestic geostationary communications satellite system (USSR satellites were on elliptic orbits, US satellites were for overseas communications).

Alouette/ISIS was nominated by the Ottawa Section for this designation, assisted by people from Communications Research Centre and Communications Canada. The IEEE Center for the History of Electrical Engineering is located in New Jersey.

The unveiling ceremony for the plaque will be held at the Communications Research Centre at Shirley's Bay near Ottawa on the afternoon of May 14th 1993. For details please contact John Palimaka at (613)748-8749 ext 2499.

WOMAN BUGGED BY EX

According to a story from San Francisco, a female author was having a problem with the computer which she used for preparing manuscripts. She asked her ex-husband for help, so he sent her a disk which he said contained instructions to fix the problem. However, it is alleged that it contained a bug which destroyed \$8,000 worth of manuscripts and software. The man has been charged by the authorities. We will keep you posted.



**1993 IEEE Workshop on
Charge-Coupled Devices and Advanced Image Sensors**

June 9-11, 1993

**William G. Davis Centre for Computer Research
University of Waterloo, Waterloo
Ontario, Canada N2L 3G1**



Sponsored by IEEE Electron Devices Society

In cooperation with:

**NASA Jet Propulsion Laboratory
Center for Space Microelectronics Technology**

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WORKSHOP REGISTRATION
(advanced registration only)

**1993 IEEE WORKSHOP ON CHARGE-COUPLED DEVICES
AND ADVANCED IMAGE SENSORS**

June 9-11, 1993

Last name/first name/initial _____

Company/University _____

Dept/Bldg/Mail Stop _____

Street address _____

City/state/postal code _____

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IEEE MEMBER Yes _____ No _____

IEEE MEMBERSHIP NO. _____

REGISTRATION FEES

Check the appropriate fees and enter amount in the remittance column.

All prices quoted are in US dollars. Please make cheque or money order (in USD only) payable to IEEE CCD Workshop and it is to reach Waterloo by May 31, 1993.

IEEE MEMBERS	NON MEMBERS	STUDENTS	REMITTANCE
US \$ 380 _____	US \$ 400 _____	US \$ 350 _____	_____

MAIL COMPLETED FORM AND PAYMENT TO:

**PROFESSOR SAVVAS G. CHAMBERLAIN
DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
UNIVERSITY OF WATERLOO
WATERLOO, ONTARIO N2L 3G1, CANADA**