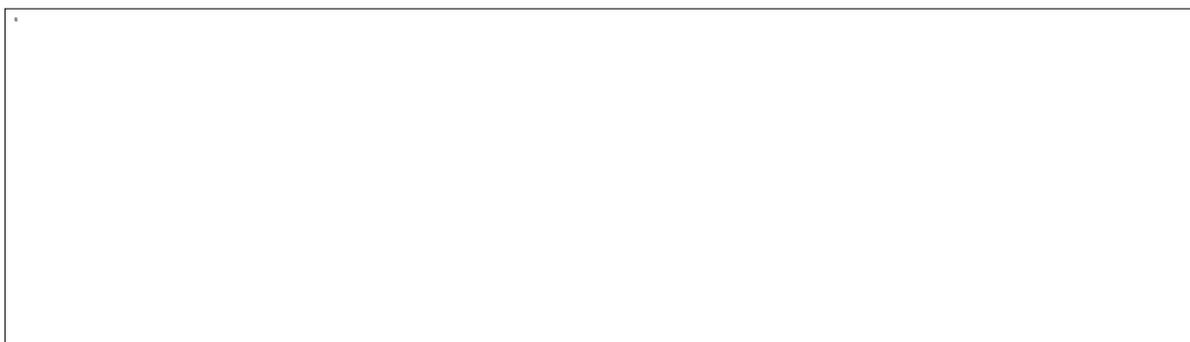


IEEE NEWSLETTER KITCHENER-WATERLOO SECTION

February 1999

TALK/SEMINAR



Mark this date on your calendar:

Grammar	. March 23:	Prof. En-Hui Yang on Data Compression based on Transforms University of Waterloo, Davis Centre Room 2577 (see page)
Room	. Dr. Safavi on antennas for wireless applications University of Waterloo, Davis Centre,	(see page)

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PROFESSOR EN-HUI YANG ON DATA COMPRESSION BASED ON GRAMMAR TRANSFORMS

The Signal Processing Chapter will present the following talk:

Date: Tuesday March 23, 1999

Time: 5.30 pm

Place: University of Waterloo Davis Centre, Room 2577

Subject: Data Compression Based on Grammar Transforms

Speaker: Professor En-Hui Yang

Subject: The presentation will provide an overview of some research work on data compression by the speaker's research group at the University of Waterloo. It will explain what grammar codes are, and how to use them to design new efficient data compression algorithms called grammar-based codes. These codes combine the power of arithmetic coding with that of string matching in a very elegant way and jointly optimize, in some sense, string matching and arithmetic coding capability. It is proved that if a grammar transform is irreducible, then the corresponding grammar-based code outperforms any finite state sequential compression algorithm, and hence achieves the ultimate compression rate for any stationary and ergodic source. Within the design framework of grammar-based codes, several efficient algorithms have been proposed recently. Simulation results show that they outperform the Unix Compress and Gzip algorithms, which are based on LZ78 and LZ77, respectively.

Speaker: En-hui Yang is currently an Assistant Professor in Electrical and Computer Engineering at the University of Waterloo. Previously, he was a Research Associate in the Department of Electrical and computer Engineering at the University of Minnesota, Minneapolis-St Paul, a visiting scientist at the University of Bielefeld, Germany, and a visiting scholar at the University of Southern California. Dr. Yang has published over 50 research papers in leading journals and conferences, and has lectured worldwide. His current research interests are: multimedia data compression, digital wired and wireless communications, information theory, source and channel coding, and applied probability theory and statistics.

PROF. SAFAVI-NAEINI ON INTEGRATED ANTENNA ELEMENTS

Date: _____ **Time:** _____ pm

Place: University of Waterloo, Davis Centre Room

Subject: Integrated Antenna Elements for Small Portable Wireless Terminals:
Performance and Design Issues, Some Novel Concepts.

Speaker: Professor Safieddin Safavi-Naeini

Subject: The small wireless computer/communicator represents the highest level of integration of electronic circuits. The antenna element is perhaps the only element which has not been fully integrated with the rest of the system. Planar and printed board (microstrip) antenna technology can achieve the final stage of integration. In this talk, first the system design and performance issues, along with the current stats of planar antennas, will be reviewed. Then, some new concepts and results of some experimental models will be discussed.

Speaker: Safieddin Safavi-Naeini was born in 1951 in Tehran, Iran. He received his BSc and MSc degrees in EE from the University of Tehran in 1973 and 1974, and the MSc and PhD in EE from the University of Illinois (Urbana-Champaign) in 1975 and 1979. He was an Associate Professor at the University of Tehran from 1980. He has been a frequent visitor to TUHH (Hamburg, Germany), U. of NSW (Australia), BVERI (China) and U. of Waterloo. Since 1997, he has been Associate Professor of Electrical and Computer Engineering at Waterloo.

Prof. Safavi's research interests include RF, microwave and millimetre wave integrated circuits and antenna elements, high-temperature superconducting thin film circuits and guided-wave optoelectronics.

CCECE98 - THE WHOLE PICTURE

As we reported in our last issue, the Canadian Conference on Electrical and Computer Engineering held in Waterloo in May 1998 was a great technical success. In other years, it has also been very profitable for the host section. However, this year, it did not bring in the expected revenue to completely cover costs. According to George Freeman, there were several reasons for this disappointing result:

1. Attendance was less than expected.
2. An expected large discount from the hotel, conditional on the block of rooms being taken up, did not materialise, partly due to unfavourable hotel practice.
3. Industrial support and participation was far below expectations.
4. Difficulty estimating attendance for meals and accommodation.

Out of a budget of nearly \$100,000, the deficit was about \$4000. This could be covered

out of the section's resources, but there may be contributions from the University of Waterloo, IEEE Canada and IEEE headquarters.

SECTION ENDORSES THE HKK CONFERENCE

The HKK Conference to be held June 13th has been endorsed by the Kitchener-Waterloo Section.

PROF. TOM LUO DESCRIBED INTERIOR POINT OPTIMISATION

On September 17th, Prof Tom Luo of the Communications Research Laboratory at McMaster University, Hamilton, described his work in Digital Signal Processing. He had changed the title of his talk to "Applications of Interior Point Optimization Methods in Digital Signal Processing. The heart of his method is an IPCG algorithm (for Interior Point Column Generation).

Picturing the optimum filter characteristic as a point on a multi dimensional field, the algorithm cuts the field in half and decides in which half the optimum lies: by repeating this process several times, the optimum filter is confined to a small area and a good approximation to it is easily defined. The classical DSP filter is successful, but converges slowly, is subject to local minima and requires an exact model and knowledge of the noise statistics.

Applications of the IPCG method include beamforming in wireless systems, high speed modems and signal compression. The objectives are robustness (such as noise immunity) and reduced cost.

The new method shows superior performance over Kalman Filtering in tracking targets, especially in conditions in which the Kalman filter performance is poor. As for future work, Prof Luo is looking at the problem of associating data with multiple targets.

Tom East.

CONFERENCES IN CANADA

1999

- Feb 21-24 1999 MTT-S International Topical Symposium on Technologies for
Wireless Applications. Vancouver. Bob Pinato (310)-813-5709
e-mail: bob.pinato@trw.com
- Apr 19-22 GaAs MANTECH - International Conference on Gallium Arsenide

Technology.
e-mail: dday@network-device.com

Vancouver. Ding Day (408)-734-9888

May 11-14 WWW8 - 8th International Conference on the World Wide Web.
Toronto

e-mail: into@www8.org <http://witanweb.iit.nrc.ca/www8>

May 12-14 1999 Canadian Conference on Electrical and Computer Engineering.
Edmonton. Terra Garneau 403-441-2640

E-mail: terra.garneau@telus.com
<http://www.ee.valberta.ca/ccece99>

May 25-28 ISPSD '99 International Symposium on Power Semiconductor Devices
and ICs.

Toronto. D.Kinzer (310)726-8561 E-mail: dkinzer1@inf.com
<http://www.utoronto.ca/ISPSD99>

Jun 1-3 IEEE BSS'99 - 3rd IEEE International Workshop on Broadband
Switching Systems

H. Mouftah (613)-545-2934 e-mail: mouftah@eleceng.ee.queensu.ca
<http://www.ece.queensu.ca/dept/bss.html>

Jun 6-10 ICC'99 IEEE International Conference on Communications. Vancouver.

P.Shepard (604)681-5226 E-mail:

congress@svenuewest.com

<http://www.icc99.com>

Jun 6-10 Quality of Service Miniconference. Vancouver. A. Mishra
(630)-979-8109

e-mail: mishra@lucent.com

Jun 6-10 IEEE Multimedia Miniconference. Vancouver. V.K. Bargavath
(732)-949-2837 e-mail: vkb@attmail.com

Jun 6-10 CTMC - Eighth Communication Theory Miniconference. Vancouver.
C. Naporano (973)-596-8474 e-mail: Clare@megahertz.njit.edu

<http://www.comsoc.org/confs/icc/99/ctmc/html>

Jun 7 MAST '99 - IEEE Multimedia Applications, Services & Technologies
Workshop. Vancouver. V.K. Bargavath. (732)-949-2837

e-mail: vkb@attmail.com

- Jun 10-11 IEEE International Symposium on Internet Telephony. Vancouver.
e-mail: isit99@comsoc.org
- Jun 21-24 1999 IEEE Digital Cross Connect Systems Workshop VIII. Whistler,
BC. R.Hamley (613)781-7969 E-mail: hamleyrd@stentor.ca
- Jun 21-24 4th International Airborne Remote Sensing Conference. Ottawa.
(734)994-5123x3234 e-mail wallman@erim-int.com
<http://www.erimin5.com/CONF/conf.html>
- Jul 18-22 1999 IEEE Power Engineering Society Summer Meeting. Edmonton.
Doug Topping (403)412-3191
- Aug 13-21 XXVI General Assembly of URSI. Toronto. K.G. Balmain
(416)978-3127
e-mail: balmain@waves.utoronto.ca
<http://www.nrc.ca/conserv/ursi99/welcome.html>

2000

- Sep 10-13 7th International Conference on Image Processing ICIP2000. Vancouver.
R.K.Ward (604)833-6894 E-mail: rababw@cicsr.ubc.ca

2001

- May 13-17 2001 URSI International Symposium on electromagnetic Theory.
Victoria BC. e-mail: cbutler@eng.clemson.edu

TRANSLATION PROJECT ON THE INTERNET

Marc Provencher of CEC has set up a discussion group on the internet for all members of the IEEE to use, but it is "mostly for Canada and mainly for Quebec". To subscribe to receive messages and to participate in the discussion, send a message to:

majordomo@majordomo.ieee.org

The message should be as follows:

Title: *no title required*

Text: subscribe r7-traduction *your e-mail address*

NEWS FROM ACADEMIA

Professor Mohamed Elmasry of the University of Waterloo has become a Fellow of the Royal Society of Canada, for his work in the Electrical and Computer Engineering Department. His research is in integrated circuits for telecommunications. He is author or co-author of 12 books, and more than 250 publications.

University of Waterloo Student Branch B organized a trip for students to attend the Career Fair held at the CCECE98 in the Waterloo Inn in May. They also hosted the Second Annual Graduate Studies Night, which was funded in full by the Department of Electrical and Computer Engineering: about 50 people were there to hear addresses by Dr. S.K. Chaudri, Dean of Engineering; Dr. David Wang, Associate Chair of Graduate Studies; and Dr. Vannelli, Chair of the E&CE Department.

NEWS FROM INDUSTRY

Com Dev International of Cambridge has won a contract with Hollandse Signaalapparaten worth \$7.1M to manufacture switch matrixes for radar phased arrays for the Netherlands Navy. Com Dev is also joining the international SkyBridge satellite consortium, whose prime contractor is Alcatel Space: SkyBridge is a proposed system of 80 LEO satellites. Com Dev has signed contracts with Nortel for base station infrastructure equipment worth \$49M: this work will be done in Moncton and in the UK. These contracts should help improve its financial performance, which has been disappointing of late.

Dalsa Inc. of Waterloo has announced plans to expand its operations and increase its staff from about 200 to 2000 by 2005.

EMJ Data Systems Ltd. of Guelph has sold off most of its interest in HookUp Communication Corp., an internet service provider, and will sell the remainder soon.

Hewlett Packard has vacated its new building on Phillip Street in Waterloo. Microage has moved in.

JPH International (formerly J.P.Haynes and Associates) has moved its headquarters from Orangeville to Waterloo. The company has increased its annual sales from \$295K to \$2.8M in five years, a compound annual growth rate of 57%.

MKS of Waterloo has recently acquired the SDM business unit of Silvon Software of Chicago.

Northern Digital of Waterloo has won a 1998 Canada Exports Award from the Ministry of Trade. The company develops and manufactures highly precise motion detection equipment. It is moving from Albert Street to Randall Street in the north end of Waterloo.

Open Text Corporation of Waterloo has acquired some of the assets of Lava Systems of Toronto, including technology used to integrate enterprise resource plannings with document management, a main Open Text product line. Lava was strong in Insurance.

RDM Corporation of Waterloo has received an order for \$0.9M from Liberty Check Printers of Minnesota for a system to inspect sheets of cheques as they are printed.

Research in Motion of Waterloo and Kitchener has signed several contracts for its two way Inter@ctive pager, including one for \$3M with Rogers Cantel, and another for \$50M with American Mobile Satellite Corporation. RIM has also formed a strategic alliance with Sybase and BellSouth Wireless Data, to use

Sybase technology developed in Waterloo.

COREL MAKES PEACE WITH HEDY LAMARR

As we reported in our May 1998 issue, filmstar Hedy Lamarre sued Corel Corp. for using her image without permission. They have recently signed a five-year agreement for Corel to use her image on a line of graphics tools.

SOLID STATE HYMNS

The Canadian Armed Forces has issued to its chaplains a music synthesizer in a suitcase which can provide music for church services. It contains about 2000 hymns which can be played on command, also songs and Christmas carols stored in solid state memory. It is supplied together with loudspeakers, which will serve hundreds of soldiers outdoors. This is very popular with chaplains, especially when their troops are away from home at Christmas and Easter. The devices have been used in Bosnia and the Golan Heights.

The synthesizers are manufactured by Gulbransen Inc. of California, weigh less than 7 kg and cost the armed forces \$850 US each.

According to Howard Dyck, choral conductor and CBC music host, the CBC is looking forward to the day when they will be able to record musical programs on computer chips instead of on tape or Compact Disks - no moving parts. (This would require a much longer bit stream for the same duration than instructions for a synthesizer, even with use of MPEG compression. - Ed)

LICENSED JAMMERS?

According to a report in the Microwave Journal, there are about 30 million cellphones in Japan, where they are called Handyphones. They have become such a nuisance in theatres, concert halls, restaurants and hospitals, that Nikkodo and SIC, two Japanese firms, are working on jammers to prevent their use in such locations. A system for licensing the jammers in some locations and forbidding them elsewhere is proposed. In a related story, the Japanese replace and discard their cellphones at such a rate, that a company is buying them up at 8 cents each, crushing them and extracting 0.014 grams of gold out of each, which is sold at a profit: 10,000,000 phones have been mined this way in 5 years, also PCB's from computers and other equipment

HARD DRIVE CRASHES

According to a CBC report, at 3.55 pm EDT on Friday September 25th, a hard drive which was perched on top of a minitower in Orangeville, Ontario, fell to the ground as a result of an earthquake (5.4 on the Richter scale, epicentre in Ohio). It is not known whether data was lost. The same earthquake was felt in Kitchener and Cambridge.

HELP WANTED

Companies looking for electrical, electronics and computer engineers can advertise in this space. E-mail your requirements to Tom East: 102432.2337@compuserve.com, and follow up with a certified cheque for \$50.00 made payable to _____. This will cover the fee for a quarter page in one issue of this newsletter.

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