



IEEE NEWSLETTER KITCHENER-WATERLOO SECTION



September 1998

TALKS/SEMINARS

Mark these dates on your calendar:

Thursday, September 17th:	Dr. Luo on Robust Filtering University of Waterloo, Davis Centre, Room 2577 5.30 pm (See page 2)
Tuesday, September 29th:	Dr. Agnew on Cryptography and Applications, University of Waterloo, Davis Centre, Room 1304 5.30 pm (See page 3)
Tuesday, October 27th:	Dr. Preiss on C++ and Java, University of Waterloo, Davis Centre Room 1304 5.30 pm (See page 3)

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PROF. LUO ON ROBUST FILTERING

Date: Thursday September 17, 1998

Time: 5.30 pm

Place: University of Waterloo,
Davis Centre, Room 2577

Subject: Robust Filtering using
Semidefinite Programming Approach

Speaker: Professor Zhi-Quan (Tom)Luo

Subject: A novel, finite-horizon, discrete-time time-varying state estimation method is proposed based on the recent robust semidefinite programming. The proposed method is robust to the norm bounded parameter uncertainties in the noise statistics. The robust performance is achieved by minimizing an upper bound on the worst case variance of the estimation error for all admissible systems. The method is recursive in the sense that each subproblem has a fixed size, and guarantees robust performance with respect to the uncertainties that are known to lie within certain a priori bounds. The latter is in contrast to the earlier robust designs which accommodate all conceivable uncertainties and therefore often lead to conservative solutions. Our new method has compared favorably in computer simulations with some of the existing robust filtering approaches. Also, when applied to the problem of multi-target tracking, the new method has led to a significant improvement in tracking performance.

The Speaker: Zhi-Quan (Tom) Luo was born in Nanchang, Jiangxi province, china in 1963. He received the B.Sc. degree in applied mathematics in 1984 from Peking University, Beijing. In 1984/1985, he studied at the Nanking Institute of Mathematics, Tianjin. and from 1985 to 1989 at the Department of Electrical Engineering and Computer Science, MIT, where he received a Ph.D. In 1989, he joined the Department of Electrical and Computer Engineering, McMaster University, Hamilton, where he is now a full professor. His research interests lie in the union of large-scale optimization, parallel and distributed computation, data communication and signal processing. Dr. Luo is a member of SIAM and IEEE and is an associate editor for the Journal of Optimization Theory and Applications.

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

GORDON AGNEW ON CRYPTOGRAPHY AND APPLICATIONS

Date: Tuesday, September 29, 1998
Time: 5.30 pm.
Place: University of Waterloo,
Davis Centre room 1304
Subject: Cryptography and Applications
Speaker: Dr. G. Agnew
Subject: Dr. Agnew will examine various aspects of information and network security as well as emerging applications such as electronic commerce. The talk will include a brief introduction to privacy, authentication and digital signatures as well as to conventional and public-key cryptographic systems. He will then examine issues relating to the implementation of security functions such as certification and public key infrastructure. The widespread deployment and acceptance of electronic commerce is dependent on suitable security functions. He will examine the issues and some proposed solutions to these problems (such as electronic wallets, electronic coins, Secure Electronic Transactions).

The presentation is intended for an audience with little or no previous experience in cryptography.

DR. PREISS ON C++ AND JAVA: COMPARING APPLES AND ORANGES

Date: Tuesday, October 27, 1998
Time: 5.30 pm.
Place: University of Waterloo, Davis
Centre, room 1304
Subject: C++ and Java: Comparing Apples
with Oranges
Speaker: Dr. B. Priess, Dept. of
Elec. and Computer
Engineering,
University of Waterloo.
Subject: On the surface, C++ and Java programs look quite similar. However, the syntactic similarity between the two languages can be misleading - C++ and Java were each designed for a specific application domain. It is because it is possible to compile almost identical programs in C++ and Java, that the two languages invite comparison. However, comparing C++ with Java is like comparing apples with oranges.

An oft quoted statistic is that a C++ program can run as much as ten or twenty times faster than the same program in Java. While this may, indeed be the case for a given program, such a comparison is flawed because it does not account for the different target application domains of the two languages. In fact, it can be argued that in its target domain, a one-hundred line Java program can perform a task that might require several thousand lines of C++ code, thus making the relative performance of Java competitive.

In this talk Dr. Preiss will compare programming in C++ and Java and discuss how the goals of the designers have influenced the feature-sets provided in the two languages. In particular, he will discuss the characteristics of each language vis-a-vis its target domain, and give a brief overview of some of the exciting recent developments in Java, such as object serialization, persistence, and remote method invocation.

OBITUARY: KEITH CAMPBELL

We are saddened to report that Keith Campbell passed away August 4th after a long illness. Keith was Chair of the KW Section of the IEEE in 1973/4, and continued on the executive until 1993. He was employed at NCR Canada for many years, and at his invitation, executive meetings were held at NCR. He was a keen radio amateur (call sign VE3IZW) and was a long time member and past president of the Kitchener-Waterloo Amateur Radio Club.

CCECE '98 A GREAT SUCCESS

Our Section of the IEEE hosted the Canadian Conference on Electrical and Computer Engineering from May 24 to 28. It was held at the Waterloo Inn in the north end of Waterloo. By all reckoning it must be counted as a great success, thanks to the hard work by Conference Chair George Freeman and his committee.

Four plenary sessions were held at which renowned speakers gave fascinating talks to large audiences, then attendees split up into seven parallel sessions, for a total of 65 sessions - about 230 papers. In 55 of the papers, one or more of the authors was from the area covered by the K-W Section: several were from local industry (Com Dev, DALSA, NCR) and many from the University of Waterloo. There were papers from Japan, Spain and the Persian Gulf, as well as Canada and the USA.

A banquet was held at the Concordia Club in Kitchener in which awards were presented; a German dance club entertained the guests.

The plenary sessions dealt with several important subjects:

Dr David Parnas: "Computer Science is not Software Engineering". Dr. Parnas quoted this definition: "Engineers are professionals whose education prepares them to use math, science and technology to build products that are important to the safety and well-being of the public". Dr. Parnas wants to see courses do just that, not teach skills in UNIX and Java. Engineers must learn scientific knowledge which has been found to be reliable and relevant, how to apply that knowledge, and the discipline of design and analysis. Software Engineering needs a system of accreditation. A software engineer should apply an engineer's seal to his work. Like all engineers, software engineers should take responsibility for usability, safety and reliability.

Dr. Vijay Bhargava: "Recent Advances in Cellular Wireless Communication". The first generation of analog cellphones are well established - there are 45 million in N America. The second generation, digital, is being implemented: compression of the 64 kb/s phone signal to 8 kb/s is the key to accepting digital. TDMA (time division multiple access) was the obvious approach, but Bell Mobility has chosen CDMA (code division multiple access). Third generation, ITU standard IN2000, integrates voice and data. Fourth generation aims for telepresence and education. Wireless links are tending to replace local wiring to the home, especially in areas of low telephone density which want to catch up.

Dr Savvas Chamberlain: "University NSERC Research and Technology Transfer - the DALSA Corporation Case". Dalsa's high resolution sensor chips and electronic cameras are used in postal and manufacturing inspection. The company has 200 employees of whom 57 are UW graduates. Dr Chamberlain's view is that after 15 years, an assistant/associate professor has generated enough technology that it should be harvested and not stay in filing cabinets and refereed journals: it is time to found a spin-off company. But this runs counter to the University culture: "publish or perish" - founding a company is "not academic". Dr. Chamberlain agrees with the statement that "Enterprise is legitimate, honorable and important". Ontario Centres of Excellence are to be encouraged.

Dr. Bruce Francis "From Digital Control to Digital Signal Processing". Dr. Francis outlined the math, and gave some examples, especially applied to coding and compressing high quality audio signals.

Dr. James Cross: "A Compact One Million Volt Power Supply" While searching for a high voltage supply for a physics experiment, Dr. Cross found none suitable, so he decided to

develop one himself. It consists of a ferrite core transformer with many secondaries. Several secondaries, each containing its own rectifiers, are printed on a printed circuit board which delivers 12.5 kV DC.: these secondaries are connected in series. The size of a power supply is reduced from something near the size of a bus, to less than a filing cabinet, with corresponding reduction in cost. It is now feasible to use it as a component in systems for detecting explosives or drugs.

CONFERENCES IN CANADA

1998

Sep 23-25 IEEE International Professional Communication Conference (IPCC'98). Quebec.
Cheryl Reimold (914)725-1024; E-mail: c.reimold@ieece.org

Oct 8-11 3rd International Symposium on Planning and Design of Broadband Networks. Montebello, Que.
Ibrahim Gideon (613)723-4928;
E-mail: Ibgedeon@nortel.com

Oct 12-16 1998 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS'98). Victoria.
A.K.C.Wong (519)885-1211 x 5775
E-mail: akcwang@watfast.uwaterloo.ca
<http://www.cs.umn.edu/iros98>

Oct 19 Workshop on Objects, Components and the Virtual Enterprise. Vancouver. Dr. P. Nixon +353-1-608-2666;
E-mail: paddy.nixon@cs.tcd.ie
<http://www.cs.tcd.ie/Virtues/ocve98/>

Nov 8-14 NSS'98 IEEE Nuclear Science Symposium. Toronto.
C.L. Woody (516)344-2752 E-mail: woody@bnl.gov
<http://www.nss98.bnl.gov>

1999

Feb 21-24 1999 MTT-S International Topical Symposium on Technologies for Wireless Applications. Vancouver.
R.A.Sparks (978)897-2601; E-mail: r.sparks@ieece.org

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 5-11 ICC'99 IEEE International Conference on Communications. Vancouver. P.Shepard (604)681-5226
E-mail: congress@venue.west.com <http://www.icc99.com>

Jun 21-24 1999 IEEE Digital Cross Connect Systems Workshop VIII. Whistler, BC. R.Hamley (613)781-7969
E-mail: hamleyrd@stentor.ca

Jul 18-22 1999 IEEE Power Engineering Society Summer Meeting.
Edmonton. Doug Topping (403)412-3191

2000

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

NEWS FROM INDUSTRY

Com Dev International of Cambridge plans to purchase 3dbm, a California company, which makes expanders and receivers which extend the range of cellular phone systems into inaccessible areas.

Control Advancements of Kitchener is marketing a Virtual Reality Mouse, a device originally developed at the University of Waterloo. It assists a visually impaired user to find their way around the screen - whenever the cursor touches an icon or the edge of the screen, the user feels the mouse resisting motion. It was on display at CCECE'98 in Waterloo in May. Ontario's Assistive Devices Program can cover up to 75% of the cost for a user to buy one.

Descartes Systems Group of Waterloo has purchased the Lightstone Group of Mineola, USA, and Calixon, NV of the Netherlands. The company's software is used to track shipments.

Electrohome Limited of Kitchener has bought into Fakespace, a California company which makes Virtual Reality systems for corporations such as Boeing and Ford.

Labtronics Inc. of Guelph has formed a partnership with Beckman Instruments of New Jersey, a supplier of medical and clinical instruments.

Mortice Kern Systems (MKS) of Waterloo has licensed Microsoft to use MKS software which makes UNIX software compatible with Windows NT. MKS has also purchased the software configuration management business of Silvon Software Inc. of Chicago. MKS profits continue to increase.

NCR Canada Ltd of Waterloo is expanding rapidly to fill the need for automatic banking machines. Their use is spreading outside banks to large stores and other places. The company expects to have more than 600 employees eventually.

Northern Digital of Waterloo supplied the infrared marker systems which were used in making the horror movie Godzilla. An actor, wearing markers, went through the motions required of the monster: the positions of the markers were captured by Northern Digital

cameras which provided the inputs for computers to generate the monster.

Open Text of Waterloo has purchased Information Dimensions Inc. of Ohio. The company now claims to be the world leader in business electronic document management, and has been named by Profit Magazine as one of the 100 fastest growing companies in Canada.

Research In Motion (RIM) of Waterloo and Kitchener has received a loan of over \$5M from Industry Canada to develop its line of two way pagers. Orders for its inter@active pager are requiring the company to hire more staff.

St. Mary's Hospital of Kitchener has won an award at the Medical User's Software Exchange conference in Dallas, for its paperless, electronic health records system, beating out 700 other hospitals. Its Meditech system is used in 800 hospitals world-wide.

Sybase Waterloo (formerly WatCom) supplied the technology for the World Cup of Soccer web site. Officials at ten sites used a Sybase SQL Anywhere database to exchange data.

Vital Innovations of Waterloo has developed GlassNet, which connects insurance companies with auto glass companies. Pictures of a damaged car will be sent to the insurance company for appraisal and approval of work.

Waterloo Maple has moved into the former Seagram Museum at the corner of Erb and Caroline Streets in Uptown Waterloo.

Web Pearls of Waterloo offers maths in a web browser using Java beans software. One of the products, Pearl Author, is being used by a German publisher. The company hopes to interest universities, colleges and even high schools in their products.

Zakutin Technologies of Waterloo has had its main product, the Radar Ball, adopted by Rawlings of St Louis, Missouri, the world's largest supplier of baseballs. The Radar Ball, being manufactured in Taiwan, measures the speed at which a pitcher throws the ball.

IT'S BEEN CLIMBING EVER SINCE

Do you know where the world's first escalator was installed? 100 years ago, it started operating in Harrod's department store in London, England (built in 1884). Since 1985, the store has been owned by Mohamed Al-Fayed.

WISDOM FROM BEN

He that waits upon fortune is never sure of a dinner.

- Benjamin Franklin.