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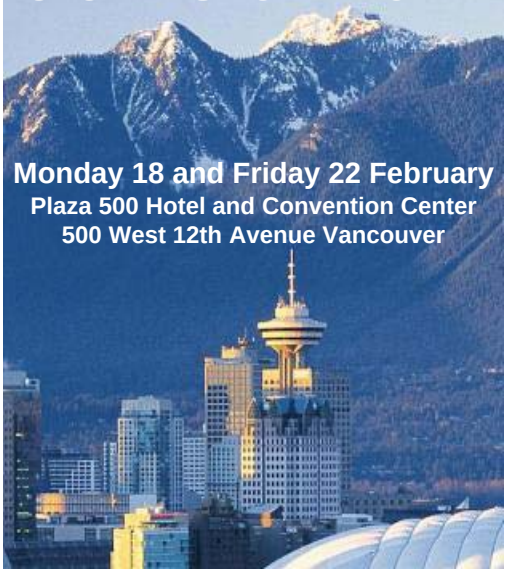
CONTACT

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS

Working IEEE/IFIP Conference on Software Architecture (WICSA)

TUTORIALS - OPEN TO ALL!



Monday 18 and Friday 22 February
Plaza 500 Hotel and Convention Center
500 West 12th Avenue Vancouver

The WICSA 2008 organizing committee is pleased to offer nine leading-edge tutorials covering various aspects of software architecture. These tutorials are chosen specifically for their relevance, timeliness, and the qualifications of the presenters. These tutorials will be of interest to industry practitioners, students, and researchers. Registration for the main WICSA conference is ***not*** required in order to register for the tutorials held on 18 and 22 February 2008.

Tutorials - Monday 18 February

- Architecting SOA Services with Rational Software Architect [TSOA] (Full day)
- Evaluating a Service-oriented Architecture [TESO] (Morning)
- Software Architecture for Safety-Critical Systems [TSFY] (Morning)
- Architecture and Agile Methodologies—How to Get Along [TAGL] (Afternoon)
- Security Patterns and the Design of Secure Architectures [TSEC] (Afternoon)

Tutorials - Friday 22 February

- Economics-Driven Architecting [TEDA] (All day)
- Introduction to SysML and Object Oriented Systems Engineering Methodology [TSML] (All day)
- Representing Application Architectures in Software Factories [TAAF] (Morning)
- An Introduction to Architecture-level Reliability Analysis [TREL] (Afternoon)

Further tutorial details and registration at
http://www.wicsa.net/registration.html
Register soon - insufficient enrollment may lead to cancellation

Circuits and Systems

Variation Robustness for Analog/Mixed-Signal, Custom Digital and Memory Design

Patrick G. Drennan
Solido Design Automation

Tuesday 26 February - 600pm
Room SW3-1750 BCIT

As process technologies and supply voltages shrink, designers are faced with a pressing need to address systematic and random sources of variation in a more deliberate and thorough way. Accounting for variation within the flow of design has not progressed commensurate with the process technologies. We still rely on best-, worst-case corners, mismatch plots and maybe a Monte Carlo verification if there is enough time. It is time for a new approach. This talk will begin with a brief review of the physical phenomena and industry standard device models for variation sources, including random local and global variations and systematic proximity effects. New techniques to accelerate, increase accuracy and derive more information from statistical variation analysis will be presented. About the presenter:
Speaker: Patrick Drennan is Chief Technology Officer of Solido Design Automation, Inc. Prior to joining Solido, Patrick was a Distinguished Member of the Technical Staff at Freescale Semiconductor (formerly Motorola, Inc.). Patrick was one of the creators of the backwards propagation of variance (BPV) method for statistical characterization. This model guarantees consistency between simulation and silicon measurement and it is valid for all biases and geometries, which are significant attributes for design. His mismatch (local variation) model earned the Best Regular paper at the 2002 IEEE Custom Integrated Circuit Conference. He was the first to describe the impact of shallow trench isolation (STI) and well proximity effect (WPE) on design, demonstrating that the WPE produces a graded channel MOSFET. More importantly, he showed the catastrophic impact these unforeseen phenomena can have on circuit design. For this work, he received the Best Invited Paper at the 2006 IEEE Custom Integrated Circuit Conference. Patrick has extensive experience in measurement, modeling, characterization, test structure generation and design application of systematic and stochastic semiconductor variations. Patrick received the B.S. degree in microelectronic engineering and M.S. degree in electrical engineering from Rochester Institute of Technology and the Ph.D. degree in electrical engineering from Arizona State University.
Info: Ljiljana Trajkovic - ljilja@cs.sfu.ca

Electron Devices

Pneumatic and Hydraulic Microactuators: A new approach for achieving high force and power densities at microscale

Dr. Michael De Volder
Katholieke Universiteit Leuven,Belgium

Friday 08 February 200pm
Room ASB9896
Simon Fraser University

Recent research reveals that hydraulic and pneumatic microactuators can develop higher force and power densities at the microscale compared to other methods. Despite these promising characteristics, hydraulic actuators are rare in microsystem technology due to the lack of low friction microseals and difficult fabrication.

This research provides a first in-depth investigation of seal technologies for piston-cylinder hydraulic microactuators. A number of classic seal technologies such as lipseals and hermetic seals have been applied for the first time on microsystems. Innovative seals for microactuators based on surface tension and ferrofluids have been developed. The latter seals are leak-tight, low friction and allow to seal pressures of more than 8 bar. These developments result in piston-cylinder actuators with an outside diameter of 1.3 mm and a length of 13 mm, that are able achieve actuation forces of 1 N, strokes of 10 mm, and speeds of 1 m/s.
During this research, an inductive position sensor was developed that can be integrated efficiently in piston-cylinder microactuators. Using PI and sliding mode control systems, this sensor allows to position with an accuracy up to 30 µm. This is a significant improvement in comparison to similar systems described in literature. Therefore, the developed actuator-sensor combination can be considered as one of the most powerful existing miniature mechatronic drives.
Speaker: Michael De Volder received his undergraduate and Ph.D. degrees from the Katholieke Universiteit Leuven in Belgium in 2002 and 2007, respectively, the latter in the Division of Production Engineering, Machine Design and Automation (PMA) with Dr. Jan Piers. In 2003 he obtained a scholarship from the Institute for the Promotion of Innovation through Science and Technology, Flanders (IWT) to support his doctoral research. In 2004 he obtained a scholarship for research abroad from the Fund for Scientific Research, Flanders (FWO). In 2005 he was a visiting researcher at the Precision & Intelligence Laboratory of the Tokyo Institute of Technology (Japan). He is currently a postdoctoral researcher at the Katholieke Universiteit Leuven, with research interests in the design of micro-actuators, hydraulic microdevices, and microsystem technology.
Info: EDS Chair, Bonnie Gray bgray@sfu.ca

Power Engineering

Automated Fault Analysis: intelligent techniques for detection, classification and location of disturbances

IEEE PES Distinguished Lecturer
Mladen Kezunovic
Texas A&M University

Friday 08 February 8 Noon-100pm
Skytrain Room of BC Hydro Edmonds Auditorium, 6911 Southpoint Drive, Burnaby

A visible trend in the industry is a large scale deployment of Intelligent Electronic Devices (IEDs) in substations at various voltage levels.

Due to a large amount of data collected by such devices, automation of the data processing and analysis is highly desirable. The outcome of the analysis may be of interest to many different utility groups such as protection, maintenance and operations.

This lecture surveys the issues associated with implementation of automated analysis systems and offers some novel approaches as a solution to the problem. The discussion includes variety of intelligent systems approaches using expert systems, neural networks, fuzzy logic, genetic algorithms and decision trees. As an example, an optimal fault location as an important function that informs operators, relay engineers and maintenance crews where the fault is so that adequate actions may be performed to analyze the consequences of the fault clearing action and to restore the system is described. The lecture also focuses on some recent development projects where the advantage of synchronized sampling is recognized. This technique is considered crucial for future development of automated analysis systems. The lecture ends with a projection of future development trends and related standardization.

Speaker: Mladen Kezunovic received the Dipl. Ing. , M.S. and Ph.D. degrees in electrical engineering in 1974, 1977 and 1980, respectively. Currently, he is the Eugene E. Webb Professor and Site Director of the Power Engineering Research Center (PSerc), an NSF Industry/ University Cooperative Research Center at Texas A&M University. He worked for Westinghouse Electric Corporation, Pittsburgh, PA, 1979-1980 and Energoinvest Company, in Europe 1980-1986. He was a Visiting Associate Professor at Washington State University, Pullman, 1986-1987. He spent his sabbaticals at EDF Research Center in Clamart during 1999-2000 and at the University of Hong Kong during fall 2007.

His main research interests are monitoring, control, and protection of power systems and the 21st century grid developments with related innovation in engineering, technology, policy, economic, societal and environmental issues. He has published over 350 papers, given over 100 seminars, invited lectures and short courses, and consulted for over 20 major companies in the utility business worldwide. Dr. Kezunovic is a Fellow of the IEEE, a member of CIGRE and Registered Professional Engineer in Texas.

Info: For more information on upcoming events for the Vancouver Chapter of the IEEE PES, please visit our web page http://ewh.ieee.org/reg/7/vancouver/powereng/ or contact the Chapter Chair, Meliha Selak, by e-mail at meliha.selak@bchydro.com

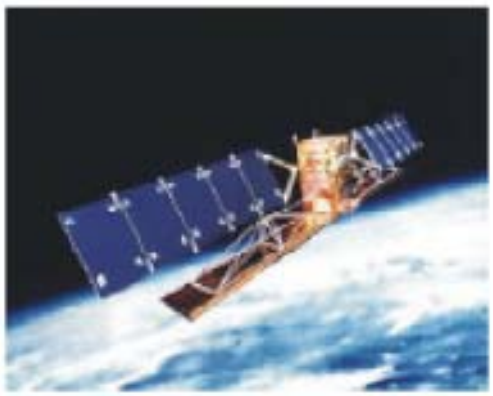
Aerospace,Geoscience & Remote Sensing

Canada and Radar Satellites

Ed Shaw
CASI President

Friday 01 February - Noon to 1pm
MDA,13800 Commerce Parkway, Richmond
A joint event with the Canadian Aeronautics and Space Institute (CASI), and part of their 2008 President's Tour.

Remote Sensing satellites provide repetitive images of the earth using optical or microwave imagers. Canada chose to exploit radar satellites



RADARSAT 1

because they can reliably take images in darkness or through cloud. They are ideal for monitoring sea ice conditions and larger shipping in the Canadian Arctic and east and west coasts. RADARSAT 1 launched in Nov 1998 was developed using innovative technology to produce an image swath 500km wide to track through the North West passage on a daily

RADARSAT 2

basis.
RADARSAT 2 launched in Dec 2007 has even more capability with higher resolution and dual polarization. These satellites have worldwide coverage and have many applications ranging from disaster assessment to rice crop monitoring. MDA sells the images to many countries through a network of over 40 ground stations.

Speaker: Ed Shaw CASI President for the 2007-08 term, Edryd Shaw has a Ph.D in Radar Signal Processing. He worked on radar multi-beam antennas in the U.K. before emigrating to Canada in 1966. Ed spent a number of years at Computing Devices of Canada where he helped develop passive sonar systems.

Ed joined the Canada Centre for Remote Sensing to lead the ground system development for LANDSAT1, a US optical satellite launched in 1972. He was the director for the RADARSAT 1 satellite program during the design and program approval stages. Ed retired as the Director General of CCRS in 2001 and now runs a consultantcy.

Registration: Registration ***IS REQUIRED*** for this event. Members and non-members are welcome to attend.

Info: Chapter Chair Rob Leitch at rleitch@ieee.org or 604.231.2184

Computer

18 – 22 February
Plaza 500 Hotel and Convention Center
500 West 12th Avenue Vancouver

WICSA is the premier gathering of practitioners and researchers interested in finding out about and improving on the state of practice of Software Architecture. WICSA is a working conference, where researchers meet practitioners and where practicing software architects can explain the problems that they face in their day-to-day work and so influence the future of the field.

In addition to traditional conference keynotes and paper sessions WICSA includes interactive working sessions where practitioners and researchers discuss their experiences in order to understand the current state of the field, and identify opportunities to make a difference in the future.

For more visit http://www.wicsa.net

Info: Philippe Kruchten, kruchten@ieee.org

Networked Multiple Description Estimation and Compression with Resource Scalability

Dr. Xiaolin Wu
McMaster University

Friday 01 February - 300 to 400pm
ASB 9896 Simon Fraser University, Bby

We present a joint source-channel multiple description (JSC-MD) framework for resource-constrained network communications (e.g., sensor networks), in which one or many deprived encoders communicate a Markov source against bit errors and erasure errors to many heterogeneous decoders, some powerful and some deprived. To keep the encoder complexity at minimum, the source is coded into K descriptions by a simple multiple description quantizer (MDQ) with neither entropy nor channel coding. The code diversity of MDQ and the path diversity of the network are exploited by decoders to correct transmission errors and improve coding efficiency. A key design objective is resource scalability: powerful nodes in the network can perform JSC-MD distributed estimation/decoding under the criteria of maximum a posteriori probability (MAP) or minimum mean-square error (MMSE), while primitive nodes resort to simpler MD decoding, all working with the same MDQ code. The application of JSC-MD to distributed estimation of hidden Markov models in a sensor network is demonstrated.

The proposed JSC-MD MAP estimator is an algorithm of the longest path in a weighted directed acyclic graph, while the JSC-MD MMSE decoder is an extension of the well-known forward-backward algorithm to multiple descriptions. Both algorithms simultaneously exploit the source memory, the redundancy of the fixed-rate MDQ, and the inter-description correlations. They outperform the existing hard-decision MDQ decoders by large margins (up to 8dB). For Gaussian Markov sources, the complexity of JSC-MD distributed MAP sequence estimation can be made as low as that of typical single description Viterbi-type algorithms.

Speaker: Xiaolin Wu received his B.Sc. from Wuhan University, China in 1982, and Ph.D. from University of Calgary, Canada in 1988. He is currently a professor at the Department of Electrical & Computer Engineering, McMaster University, Canada, and holds the NSERC-DALSA research chair in Digital Cinema. His research interests include multimedia coding and communications, image processing, signal quantization and compression, and joint source-channel coding. He has published over one hundred sixty research papers and holds two patents in these fields. He is the principal inventor of CALIC, the benchmark algorithm for lossless image coding. His awards include 2003 Nokia Research Fellowship, 2000 Monsteds Fellowship, and 1998 UWO Distinguished Research Professorship. He is an associated editor of IEEE Transactions on Multimedia, and served on program committees of numerous IEEE conferences/workshops on multimedia, data compression, and information theory.

Webcast: The talk will be webcasted using WebEx. Please check the web page below for webcast link and password.
http://www.ensc.sfu.ca/~jiel/ieee/2008_wu.html
Info: Jie Liang - jiel@sfu.ca

CONGRATULATIONS!!

Section secretary and Contact reporter Mazana Armstrong's new son, Evan John, arrived on January 11 2008 five weeks early. Evan weighed 2.8 kg and was 51 cm long. Mazana tells us "We are all doing well, he is a very calm little baby"

CZT Detectors and CMOS Circuits For Medical Imaging

Dr. Kris Iniewski
Redlen Technologies

Friday 25 January 300pm - 400pm
IRMACS Presentation Studio, ASB 10900
Simon Fraser University

CZT is currently the only semiconductor material that is capable of room temperature operation for X-ray and â-ray radiation detector application. In this talk we will briefly review basic principles of medical imaging modality that is called single photon emission computer tomography (SPECT). We will discuss operation of CZT detectors and associated CMOS signal processing. We will describe various circuit techniques used for signal amplification, filtering, multiplexing, and analog to digital conversion. The talk will conclude with comparison of images taken by â-ray camera to those obtained using ultra-sound, X-ray and magnetic resonance imaging (MRI).

Speaker: Krzysztof (Kris) Iniewski is managing R&D chip development activities at Redlen Technologies Inc., a start-up company in British Columbia. His research interests are in VLSI circuits for medical imaging and security applications. From 2004 to 2006 he was an Associate Professor at the Electrical Engineering and Computer Engineering Department of University of Alberta where he conducted research on low power wireless circuits and systems. During his tenure in Edmonton he put together a book for CRC Press "Wireless Technologies: Circuits, Systems and Devices".
From 1995 to 2003, he was with PMC-Sierra and held various technical and management positions in Research & Development and Strategic Marketing. Prior to joining PMC-Sierra, from 1990 to 1994 he was an Assistant Professor at the University of Toronto's Electrical Engineering and Computer Engineering department researching high-speed semiconductor devices and circuits. Dr. Iniewski has published over 100 research papers in international journals and conferences. He holds 18 international patents granted in USA, Canada, France, Germany, and Japan. He is a frequently invited speaker and has consulted for multiple organizations internationally. He received his Ph.D. degree in electronics (honors) from the Warsaw University of Technology (Warsaw, Poland) in 1988. Together with Carl McCrosky and Dan Minoli he is an author of "Data Networks – VLSI and Optical Fibre", Wiley, 2007.

Registration:
http://www.ensc.sfu.ca/~jiel/ieee/2008_Kris.html
Info: Ljiljana Trajkovic - ljilja@cs.sfu.ca

Institute for Computing, Information & Cognitive Systems
Distinguished Lecture Series

Engineering in Medicine and Biology

Digital Humans: From Biomechanical Models to Simulated Surgery

Scott L. Delp, Stanford University
Thursday 31 January 330-450pm
Room 310 Hugh Dempster Pavilion, UBC

The outcomes of surgeries performed to improve musculoskeletal function are unpredictable. This problem exists, in part, because the development and testing of new surgical techniques rely almost entirely on clinical trials (i.e., trying surgeries on patients), in which the means to quantify surgical changes or predict postoperative results do not exist. I believe that the design and analysis of surgeries will proceed more effectively if computer models are developed that predict the functional consequences of surgical interventions.

My students and I have developed computer graphics models to simulate the biomechanical consequences of bone reconstructions, muscle-tendon surgeries, and joint replacements. This presentation will review our dynamic simulations of movement used to design surgical procedures for the management of cerebral palsy and osteoarthritis. I also will outline some of the major challenges that arise in development of biomechanical simulations of individual subjects.

Speaker: Scott L. Delp received the M.S. and Ph.D. degrees in mechanical engineering from Stanford University in 1986 and 1990. He joined Northwestern University with a joint appointment in the departments of biomedical engineering, and physical medicine and rehabilitation. He returned to Stanford in 1999. He is Co-Director of Stanford's Center for Biomedical Computation. In 2002, Delp became the founding Chairman of Stanford's Bioengineering Department. Delp's work draws on computational mechanics, biomedical imaging, and neuromuscular biology to improve treatments for individuals with physical disabilities. He led the development of a widely-used software system that enables modeling and simulation of complex human and animal movements. These computer models help to provide a scientific basis to better treat movement disorders resulting from osteoarthritis, cerebral palsy and stroke.
Info: 604.822.6894 or info@icics.ubc.ca

Single-chip Multiprocessors: A New Landscape for Computer Architecture and Beyond

Gurindar S. Sohi, University of Wisconsin
Thursday 28 February 330-450pm
Room 310 Hugh Dempster Pavilion, UBC

Advances in semiconductor technology over the past 25 years have made for a very exciting time in the field of computer architecture. Once basic uniprocessor functionality could be implemented on a chip, additional transistor resources could be used for innovative uniprocessor microarchitectures. As a result, today's high-performance uniprocessor microarchitecture barely resembles that of two decades ago, and the computing community has been able to transparently enjoy continuous performance increases. Multiple processing cores can now be put on a single chip, which resembles a traditional small-scale multiprocessor.

We anticipate a further revolution in the architecture and microarchitecture of multicore chips as technological advances provide us with more transistors with which to innovate. Unlike in the past, however, software and applications will not be able to transparently reap the benefits of these innovations, and we will need to be more proactive in accessing the new hardware capabilities. This talk will present some initial results on innovations in the microarchitecture of multicore processors and memory hierarchies, and their likely impact on software and applications.

Speaker: Guri Sohi received his PhD in Electrical and Computer Engineering from the University of Illinois. He is currently the John P. Morgridge Professor and E. David Cronon Professor of Computer Sciences at the University of Wisconsin-Madison, and the Chair of the Computer Sciences Department. The results of Sohi's research in the design of high-performance microprocessors and computer systems can be found in almost every high-end microprocessor on the market today. 2007–2008 ICICS Distinguished Lecture Series ICICS hosts the 19th annual Distinguished Lecture Series, bringing in academic & industrial leaders in the forefront of their fields.
Info: 604.822.6894 or info@icics.ubc.ca

The da Vinci Robot: Taking Surgery Beyond the Limits of the Human Hand

Chris Hasser
Applied Research Intuitive Surgical, Inc
Tuesday 12 February 400 - 500pm
CHBE Room 101, 2360 East Mall, UBC

The da Vinci® Surgical system includes six manipulator arms with a total of 41 degrees of freedom, along with a stereo endoscope and 3D video display, with over 700 installations worldwide. Surgeons use it to perform tens of thousands of minimally invasive surgeries per year. Just twelve years ago, the technology was a demo in a government-funded research laboratory.

This talk will cover the evolution of the da Vinci system as well as Intuitive Surgical. Key topics will include successfully mapping the technology to clinical needs, evolution of contributing technologies, and engineering skill sets required to build the technology. Further discussion will include the challenges for researchers and designers to continue to advance the technology.

Speaker: Dr. Hasser graduated from Cornell University with a B.S. in Electrical Engineering. He received a commission in the U.S. Air Force, and served at the Armstrong Laboratory in Dayton, Ohio, as a researcher and research manager in the area of telerobotics and haptic feedback. While at the Armstrong Laboratory, he received an M.S. in Electrical Engineering from the University of Dayton, with an emphasis in controls.

He continued his education at Stanford University, receiving a Ph.D. in Mechanical Engineering. From 1996-2002, he worked for Immersion Corporation as Chief Research Engineer, responsible for internal and collaborative haptics research projects. He joined Intuitive Surgical in 2002 to found the Applied Research Group, which focuses on the development of technologies 2-7 years from market introduction.

LIGHT REFRESHMENTS SERVED

Info: Ezra Kwok - ezra@chml.ubc.ca

BCIT Industrial Research Facilities Tour: Internet Engineering Lab (IEL) and Industrial Instrumentation Process Lab (IIPL)

Friday 29 February 2008 200 - 400pm
BCIT Burnaby Campus - Bldg NE25, Ground Floor
3700 Willingdon Avenue, Burnaby, BC

200pm - Welcome - Room 113
215pm - Introduction of the Technology Centre and Group for Advanced Information Technology by Dr. Hassan Farhangi, Director, GAIT
230pm - Internet Engineering Lab Presentation by John Karsch, IEL Lab Manager, GAIT Hydraulics Lab Remote Demonstration by Joel Carter, Research Analyst, GAIT
245pm - IEL and IIPL Tours
345pm - Closing Remarks - Room 113
400pm - Tour Ends

The Internet Engineering Laboratory (IEL) located on the campus of the British Columbia Institute of Technology (BCIT) is a leading edge network test and measurement facility open to both corporate and academic researchers worldwide. One of only five research centers of its kind in North America, the lab focuses on the design and management of advanced networks involving a wide range of layer 4/3 (TCP/IP) issues such as network performance evaluation, application level traffic, network security and conformance to standards.

The IEL is jointly funded by Canada Foundation for Innovation (CFI) and BC Knowledge Development Fund (BCKDF), and it is supported by in-kind donation from various companies. Spirent Communications, a major UK test equipment manufacturer and Empowered Networks, a leading Canadian provider of network management and performance solutions are the main sponsors of the lab. The lab is a part of BCIT's research and development centre's information technology research group which actively assists organizations in developing advanced software products in the Information Technology sector.

The IEL contains $2.2 million dollars of network hardware and test equipment including network routers and switches, traffic generators, impairment emulators and network analysis tools capable of emulating and testing both small and large-scale network configurations. The architecture of the lab allows for a range of traffic levels and interconnection types so users can test their equipment in a realistic yet totally controlled environment. It is also possible to segment the routers into discrete networks or sub networks as needed; generate and replay loads based on actual or simulated traffic; and collect statistical data on network and routing performance.

The IEL currently has three core router/switches (link): a Black Diamond 6806 and two Cisco 6506 routers. Each can support well-known network interfaces such as Fast Ethernet and Gigabit Ethernet. The IEL also contains 10 edge routers and switches typically found in the networks of midsize companies or institutions; three Cisco 2600 and 7500 series routers and three Summit 48i L-3 switches. To imitate real world conditions two IPWave traffic impairment units allow deliberate delays, errors or packet drop conditions to be imposed on the traffic. By combining core routers, edge switches and traffic impairment emulators, researchers can recreate any network configuration from a nationwide Internet surrounded by edge "client" VPN networks, to a small plant floor network.

Meaningful research requires not only the right equipment, but the ability to generate the volumes of traffic found on the Internet. To meet these needs, the IEL contains three traffic generation units that create tightly controlled traffic patterns of numerous common protocols including TCP/IP, HTTP, FTP, and many others. These include two Smart Bits 6000B and 600B load generators that can generate and measure over 100,000 streams — enough network traffic to represent a small city on the Internet. More sophisticated traffic simulation and measurement is provided by an Adtech AX4000.

All equipment is housed in a state-of-the-art facility fitted with UPS, air conditioning, and adequate rack space. Other amenities include a kitchen/meeting area and an adjoining console workspace for test planning and development. Most equipment and tools are also available via a secure link to the Internet to allow for remote testing and analysis.
For more information on the IEL, please visit: http://www.bcit.ca/appliedresearch/tc/facilities/iel/

Info: Bryan Bell, Chair: IEEE CSS Vancouver Chapter; bbell@ieee.org, 604 528-1562 (w) 604 931-0727 (h)