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• On the duality between Slepian-Wolf coding and channel coding



• Power management low power portable system architectures



“Good enough” computer systems*: reliability on the cheap



• IEEE Recognizes TRIUMF Milestone



• Multigigabit wireless multimedia communications



• EMC/EMI Issues in Biomedical Engineering

IEEE VANCOUVER SECTION

• **WE'RE NUMBER ONE !**

• IEEE mini-symposium on engineering for biomedical applications

• Dave Michelson elected to IEEE Canadian Foundation

• Special AGM 2010 set for 21 June

• **WELCOME Vancouver section newcomers**

Welcome..! recent newcomers to the **best** IEEE Section in Canada

A N K Zaman	GS	Edward Shantz	AM	Raymond Young	ST
Abouzar Tasouji Azar	GS	Gamini Siriwardana	M	Ron Newport	M
Ali Ostadfar	GS	Gerald Leung	ST	Rumiko Akai	ST
Allen Lee	ST	Gordon Wetzstein	ST	Samuel Frew	GS
Amir Siddiqui	ST	James Steele	M	Sher Chu	ST
Anton Khomutskiy	ST	Jeff Koftinoff	M	Somsubhra Sharangi	GS
Ashish Syal	M	Jeffrey Krahn	GS	Steve Makar	M
Bhushan Gopaluni	AM	Jonathan Fraser	GS	Susana Zoghbi	GS
Bilal Habib	ST	Juan Pablo Diaz Tellez	GS	Tareq Shahwan	ST
Boubacar Diallo	GS	Ka Hei Cheung	ST	Tessa Quinn	ST
Brandon Born	ST	Keith Beckett	M	Thomas Hazelton	GS
Caleb Simonyi-Gindele	M	Lan Phan	AM	Thomas Schmitz	M
Chao Yan	GS	Maryam Dehghani Estarki	GS	Tin Chi Yeung	ST
Chris Muller	ST	Matin Rahmatian	GS	Toufiqul Islam	GS
Christan Beharrell	ST	Michael Trinczek	M	Weijia Zhang	ST
Claudia Zuge	GS	Mohammad Beikahmadi	GS	Xiaochen Dai	GS
Cliff Edwards	M	Mohammad Jafar Taghiyar	GS	Xiaoyuan Guo	GS
Coco Qian Qian Sun	ST	Nicholas Erho	GS	Xu Han	ST
Collin Morrison	AM	Nicolas Veilleux	M	Yang Cao	M
Daniel Leon Rodriguez	M	Paulo da Graca	M	Yu Han	ST
Edward Liu	ST	Ravi Mutukutti	M		

AF Affiliate - AM Associate Member - F Fellow - GS Graduate Student Member - LF Life Fellow
LM Life Member - LS Life Senior - M Member - SM Senior Member - ST Student Member



Prof. Dave Michelson, Chair of IEEE Vancouver Section, has been elected as a member of the IEEE Canadian Foundation

The Foundation awards special grants to new and innovative projects within Canada that seek to apply technology for the benefit of humanity, awards grants to IEEE student branches in Canada to support IEEE McNaughton Learning Resource Centres and related scholarships, and serves as the fund administrator for IEEE peer recognition programs and scholarships within Canada.



Vijay K. Bhargava
UBC

Multigigabit wireless multimedia communications: future and core technologies

The millimeter wave technology has been known for several decades but was mainly used for military communications. In this presentation we specifically focus on 60 GHz band as recently a massive unlicensed spectrum up to 9GHz has been allocated worldwide in this band for civilian communication.

This spectrum is a very promising candidate for multigigabit wireless transmission systems including wireless personal area network (WPAN) as well as Wireless local area network (WLAN) usage. The effective interference level in this band is less severe than those WLAN systems deployed in the congested WiFi bands (2-2.5 GHz and 5-5.8 GHz). As a result, higher frequency reuse can be achieved, leading to a very high throughput network.

After summarizing the current status of standardization activities for 60 GHz band we will focus on a series of technical challenges that need to be resolved before the full deployment of multigigabit wireless multimedia communications. These include 60 GHz propagation and antennas, CMOS circuit design, modulation schemes, LDPC-based error correction schemes and MAC layer design.

Speaker: Vijay Bhargava, an IEEE volunteer for three decades, is Professor in the Department of

Electrical and Computer Engineering at the University of British Columbia in Vancouver, where he served as Department Head during 2003-2008. As a senior level IEEE volunteer, he has lectured in 66 countries and assisted IEEE Presidents in negotiating sister society agreements in India, Japan and Russia.

Vijay has served as the IEEE Vice President for Regional Activities Board, now known as Member and Geographic Activities (MGA) Board. During his tenure the program known as Graduates of the Last Decade (GOLD) was conceived and he developed a profound understanding of how IEEE Societies, Regions, Sections, Chapters and Student Branches work. He is the Founder of the IEEE Pacific Rim Conference on Communications, Computers and Signal Processing and of the Canadian Conference on Electrical and Computer Engineering

Vijay played major role in the creation of the IEEE Communications and Networking Conference (WCNC) and IEEE Transactions on Wireless Communications, for which he served as the Editor-in-Chief during 2007-2009. In 2010, he was appointed for a two year term as the IEEE Communications Society Director of Journals. He is a past President of the IEEE Information Theory Society.

Distinguished Lecture

Monday 17 May
7:00-9:00pm

BCIT Burnaby Campus
SW3-1710

Information

Joint Communications
Chair Alon Newton
alon.newton@gmail.com

Vijay Bhargava is a candidate for IEEE Communications Society President-Elect in the forthcoming election.

On the duality between Slepian-Wolf coding and channel coding



Jun Chen
McMaster University

Slepian-Wolf coding, also known as distributed lossless source coding, is of fundamental importance for many emerging applications. In this talk, we will discuss the intimate connections between Slepian-Wolf coding and channel coding. We show that there exist two different dualities between Slepian-Wolf coding and channel coding: type-level duality and linear codebook-level duality.

These two dualities together provide a comprehensive picture of Slepian-Wolf coding and clarify many subtle differences between linear block codes, fixed-rate nonlinear codes, and variable-rate codes. The implication of this work on Slepian-Wolf code design will also be discussed.

Speaker: Jun Chen received the B.E. degree with honors in Communication Engineering from Shanghai Jiao Tong University, Shanghai, China, in 2001, and the M.S. and Ph.D. degrees in Electrical and Computer Engineering from Cornell University, Ithaca, NY in 2004 and 2006, respectively. He was a Postdoctoral Research Associate in the Coordinated Science Laboratory at the University of Illinois at Urbana-Champaign, Urbana, IL from 2005 to 2006, and a Josef Raviv Memorial Postdoctoral Fellow at the IBM Thomas J. Watson Research Center, Yorktown Heights, NY from 2006 to 2007.

He is currently an Assistant Professor of Electrical and Computer Engineering at McMaster University, Hamilton, ON, Canada. He holds the Barber-Gennum Chair in Information Technology.

Cosponsors: Circuits and Systems Society, Victoria chapter and Systems, Man and Cybernetics Society, Vancouver chapter.

Tuesday 04 May 4
1030 - 1130am
Room 9705
Applied Science Building
(ASB), Simon Fraser Univ

Information

Circuits and Systems
chair Ljiljana Trajkovic
ljilja@cs.sfu.ca

EMC/EMI Issues in Biomedical Engineering

(15:30 - 16:30)

The potential for adverse interaction between electromagnetic signals and biomedical systems have raised safety concerns for patients undergoing medical examination by electromagnetic devices or patients with implanted medical devices in day-to-day situations. In this talk, we will present some recent investigations concerning EMC/EMI issues related to such scenarios. In particular, we will present:

(1) the results of a safety evaluation for a pregnant woman in close proximity to a walk-through metal detector, 2) thermal and temperature evaluation of a pregnant woman under an MRI RF coil, 3) the effects of implantable devices within human subject models under MRI coils, and 4) the interaction between vehicular mounted antenna and bystanders with implantable medical devices.

Speaker: Ji Chen received the Bachelor's degree from Huazhong University of Science and Technology, Wuhan, Hubei, China, the Master's degree from McMaster University, Hamilton, ON, Canada, in 1994, and the Ph.D. degree from the University of Illinois at Urbana-Champaign in 1998, all in electrical engineering. He is currently an Associate Professor with

Please join us for refreshments with the speaker from 16:30 - 17:00. To join us for a no-host dinner with the speakers afterwards, please contact Prof. Dave Michelson, dmichelson@ieee.org. Space is limited!

the Department of Electrical and Computer Engineering, University of Houston, Houston, TX. Prior to joining the University of Houston, from 1998 to 2001, he was a Staff Engineer with Motorola Personal Communication Research Laboratories, Chicago, IL. Dr. Chen has received outstanding teaching award and outstanding junior faculty research award from College of Engineering at University of Houston. He is also the recipient of ORISE fellowship in 2007. His research group also received the best student paper award at IEEE EMC Symposium 2005 and the best paper award from IEEE APMC conference in 2008.

The EMC community in British Columbia

Kavinder Dhillon
BC EMCA
(15:00 - 15:30)

In this short presentation, Kavinder Dhillon will survey the range of EMC activity in BC including EMC test labs, EMC consultants and the new EMC course and research facilities at UBC.

Speaker: Kavinder Dhillon is the president and founder of Richmond-based Lab Test Certification and the president of the BC EMC Association.



Prof. Ji Chen
University of Houston

Distinguished Lecturer

Friday 14 May
15:00 - 16:30
UBC Electrical and
Computer Engineering
MCLD 418

Info

Joint Aerospace chairs
Prof. Dave Michelson
dmichelson@ieee.org
Steven McClain
StevenMcClain@ieee.org



Wai Tung Ng
University of Toronto

Friday 21 May
1230 - 330pm.

Conference room at
Schneider Electric
(Xantrex Technology)
8999 Nelson Way,
Burnaby, BC

*Pizza lunch and pop
will be provided.*

Info and registration

Power Electronics Chair
Rasvan Mihai
Rasvan_Mihai@plugpower.com
604-233-7608
or Eugene Trandafir
eugent@analyticsystems.com

Power management low power portable system architectures

With the increasing needs to incorporate more complex mixed-signal controller for switched mode power supplies, CMOS compatibility becomes a very important consideration in monolithic Smart Power ICs. This presentation examines various design considerations for the implementation of integrated DC-DC converters.

The presentation will begin with an introduction to switched mode power supplies, digital vs. analog controller, power conversion efficiency, dead-times, choice of components, and power transistors for the output stages. In particular, EDMOS device structures, fabrication techniques and compatibility issues with CMOS process will be reviewed. Key device characteristics such as ruggedness, on-resistance, gate capacitance, switching speed and layout strategies required for optimum power conversion efficiencies will also be discussed.

This will be followed by examples of integrated DC-DC converters with novel features such as segment output stage, digital spread spectrum for EMI suppression, dead-time control will be covered in details. Finally, the benefit of the segmented output stage is demonstrated via a true power management system for portable audio applications.

Speaker: Wai Tung Ng is a professor and the associate chair, undergraduate studies, Electrical & Computer Engineering, University of Toronto. His current research work covers a wide spectrum, ranging from smart power integrated circuits and fabrication processes, power management circuit, integrated SMPS (Switched-Mode Power Supplies), integrated class D audio power amplifiers, advanced MOS and RF BJT/HBT device designs.

After he obtained his Ph.D. degree from the University of Toronto in 1990, Dr. Ng joined Texas Instruments, Dallas TX to work on LDMOS power transistors for automotive applications. In 1993, Dr. Ng joined the University of Toronto where he established the Smart Power Integration & Semiconductor Devices Research Group. He has extensive experience in working with the industry to modify standard CMOS technology for smart PIC and RF applications. Prof. Ng is the current chair of the IEEE Toronto Section. He is also an associate editor for IEEE Electronics Device Letters.

Contact Information: Prof. Wai Tung Ng
University of Toronto, Department of Electrical
and Computer Engineering, 10 King's College
Road, Toronto ON, Canada M5S 3G4
(416) 978-6249 ngwt@vrg.utoronto.ca



IEEE mini-symposium on engineering for biomedical applications

Friday 28 May 2010

13:00 - 16:30

Organized by
IEEE Vancouver Section Chapters of:
Joint Communications
Signal Processing Society
Engineering in Medicine and Biology Society



This event is free-of-charge and open to all members of the engineering community. However, pre-registration is required.

Please send your name and affiliation to
2010biomed@gmail.com

with the subject line
"Registration - 28 May 2010" and
indicate if you are an IEEE member.

Symposium chairs
Prof. Dave Michelson
and Prof. Rob Rohling, UBC

Hosted by
McKESSON
Empowering Healthcare

McKesson Medical Imaging Group
130-10711 Cambie Road
Richmond, BC V6X 3G5

This three-hour event will bring together academic researchers and industry experts to review recent progress and opportunities related to engineering for biomedical applications. A keynote presentation will be followed by several shorter presentations. The timing and location of the event is designed to facilitate participation by attendees from the BC Interior, Vancouver Island, Alberta and Washington State.

Technical Program

- 13:00 - 13:05 Welcome and introduction
Prof. Dave Michelson, UBC, chair, IEEE Vancouver section
- 13:05 - 13:55 The IEEE 802.15 task group 6 (TG6) on body area networks
Arthur Astrin, PhD, chair, IEEE 802.15 TG6, president, Astrin Radio
The IEEE 802.15 task group 6 (BAN) is developing a communication standard optimized for low power devices and operation on, in or around the human body (but not limited to humans) to serve a variety of applications including medical, consumer electronics / personal entertainment and other. This presentation will provide a summary of recent achievements and current challenges.
Speaker: Dr. Art Astrin currently serves as chair of IEEE 802.15 TG 6 and as president of Astrin Radio. He previously served as a professor at San Jose State University and held engineering positions with Apple, IBM, Memorex and Citibank. He earned his PhD in electrical engineering from UCLA and his MA in mathematics from UCSD.
- 13:55 - 14:20 The biomedical engineering sector in BC
Moderator: Brendan Payne, Life Sciences BC
- 14:20 - 14:45 Biomedical engineering education in BC
Moderator: Prof. Rob Rohling, UBC
- 14:45 - 15:15 Refreshment break and demonstrations
- 15:15 - 15:40 Past, present, and future of the Picture Archiving and Communications Systems (PACS)
Allan Noordvyk, McKesson MIG
- 15:40 - 16:05 Human interface technology for PACS
Cliff Edwards and Brian Stachniak, McKesson MIG
- 16:05 - 16:30 Signal processing for brain connectivity analysis
Prof. Z. Jane Wang and Prof. Martin McKeown

IEEE Vancouver Section 2010 Special AGM and Dinner

Monday 21 June 6 - 9 pm
Vancouver Convention Centre (East Building)
1055 Canada Place, Vancouver
Reception 6 pm
Meeting and dinner 7 pm

Please come and join us for this year's Special Annual General Meeting and Dinner! We have an exciting evening planned for our members and friends – a fabulous location overlooking the Burrard Inlet, delicious food, and the opportunity to network with your friends and colleagues.

We will be celebrating our successes over the past year including being recognized as the IEEE Canada Exemplary Section. The feature presentation by Frank Plumptre of BC Hydro will be an entertaining journey through the history of electrical engineering – not to be missed!

\$25 students and life members
\$30 members
\$35 non-members

For more information or to register please email Mazana Armstrong at events-vancouver@ieee.org.

Hearts of Caesar salad
Red potatoes with yogurt and dill
Tortellini in creamy pesto dressing
Greek style salad
Prawn, jicama, and orange salad
Fresh asparagus mimosa

West Coast smoked seafood platter with:
Lox style and hot smoked salmon, Indian candy, smoked tuna and trout
Black Forest turkey, pepper roast beef, capicollo and prosciutto salami
Grilled vegetable platter with handmade Bocconcini, balsamic glaze

Roasted pepper crust top sirloin of aged beef
Grilled piri piri chicken breast, fruit salsa
Wild mushroom ravioli alla panna
Roasted nugget potatoes
Bouquetiere of market fresh vegetables

Sliced seasonal fruits
Fine selection of cakes, tarts, french pastries including:
Black Forest torte, baked cheesecake, chocolate eclairs, fresh fruit flans,
Assorted mousses and tiramisu, house-made biscotti
Freshly brewed Café Rojas organic coffee and imported teas

We're Number One!

Vancouver is IEEE Canada's Outstanding Large Section for 2009

The results are in: IEEE Canada has named Vancouver as Canada's Outstanding Large Section based upon our operational record during 2009. During the past year, we:

- ▲ **recorded a 12% increase in our active higher grade and student membership**
 - our Power and Energy Society Chapter won the PES Membership Contest
 - our BCIT Student Branch Chapter Chair was recognized as Canada's top Member-Get-a-Member recruiter
- ▲ **saw our Power and Energy Society Chapter recognized as the PES High Performance Chapter**
- ▲ **saw our Section Chair receive the IEEE Canada E.F. Glass Western Canada Merit Award for his service to IEEE**
- ▲ **facilitated a Memorandum of Understanding between Japan's MCPC and IEEE ComSoc**
- ▲ **formed five new units**
 - a Women-in-Engineering Affinity Group;
 - IEEE Northern British Columbia Subsection;
 - IEEE Okanagan Subsection;
 - University of British Columbia - Okanagan IEEE Student Branch;
 - a Joint Aerospace and Electromagnetics Chapter incorporating the Aerospace and Electronic Systems Society, Electromagnetic Compatibility Society, Geoscience and Remote Sensing Society, Microwave Theory and Techniques Society, Product Safety Engineering Society and Reliability Society
- ▲ **added the IEEE Photonics Society to our Joint Communications Chapter increasing the society representation to AP03, VT06, COM19, PHO36.**
- ▲ **saw our Joint Communications Chapter hold a record number of technical meetings: 22!**
- ▲ **hosted 12 Distinguished Lecturers and Visitors**
- ▲ **established a Section History Committee**
- ▲ **received approval from the IEEE Global History Network to nominate three sites as IEEE Historical Milestones**
 - (1) CBUT Broadcast Transmitter Site (North Vancouver),
 - (2) the TRIUMF 520 MeV cyclotron (Vancouver)
 - (3) the DRAO Radio Astronomy Observatory (Penticton)
- ▲ **strengthened our industry connections by**
 - establishing a Section Industry Advisory Council
 - establishing a LinkedIn group
 - hosting three mini-symposia either on company premises or with local conferences
- ▲ **introduced a new Section website based upon Drupal web technology**
- ▲ **joined the IEEE Concentration Banking system**
- ▲ **sponsored IEEE ICUWB 2009 and hosted a joint Conference/Section event**
- ▲ **reactivated**
 - our Conferences Committee
 - our Continuing Education Committee
- ▲ **held our first Section Cultural Event**
 - a theatrical event at the Playhouse Theatre

1st

IEEE Recognizes TRIUMF's Main Cyclotron as an Engineering Milestone

A Prestigious Award for the World's Largest Cyclotron

(Vancouver, BC) — IEEE, the world's largest professional association for the advancement of technology, has recognized the extraction of the first high-energy proton beams from the TRIUMF main cyclotron on December 15, 1974 as an historic engineering milestone. The designation was approved by the IEEE Board of Directors following a rigorous review and evaluation by the IEEE History Committee. A dedication ceremony will be held at TRIUMF on the 36th anniversary of the event later this year.

The main cyclotron at TRIUMF is the world's largest such device; it measures 22 metres across and produces intense beams of protons at energies up to 500 Million electron-Volts (MeV). Since 1974, TRIUMF has used these proton beams (and secondary beams of pions, muons, neutrons, and and nuclear medicine.

Prof. David G. Michelson, chair of IEEE Vancouver Section and a member of the

Department of Electrical and Computer Engineering at the University of British Columbia, said, "The quality of the initial design and engineering of the TRIUMF 500 MeV cyclotron is underscored by the accelerator's longevity. Thirty-five years after the first full energy proton beam was extracted, the cyclotron is still the main engine of TRIUMF's world-leading research program."

According to Dr. Nigel S. Lockyer, Director of TRIUMF, "The vision of men like Professors Reg Richardson and Erich W. Vogt who led the effort to establish a major physics lab in British Columbia back in the 1960s has returned remarkable value to Canada in the years that have followed. We deeply appreciate the recognition by IEEE of the significant accomplishments of those early pioneers who laid the foundations for TRIUMF's string of science and technology successes." During the next five years, ongoing support from the Government of Canada will allow the 500 MeV cyclotron to

support a variety of continuing programs including proton-based therapies for selected eye cancers, pre-flight irradiation tests and studies of aerospace components, production of selected medical isotopes, and a broad program of research in nuclear physics and materials science using short-lived, exotic isotopes.

The TRIUMF lab also operates and maintains four smaller medical-isotope cyclotrons. Lockyer added, "The deep scientific and technical expertise at TRIUMF in cyclotron technology has positioned us as a leader in developing accelerator-based alternatives for the production of crucial medical isotopes such as molybdenum-99 and technetium-99m."



“Good enough” computer systems* : reliability on the cheap



Karthik Pattabiraman
University of BC

Thursday 20 May
15:00
KAIS 2020
2332 Main Mall, UBC

Info

Computer Society Chair
Sathish Gopalakrishnan
sathish@ece.ubc.ca

The complexity of computer systems has grown to a point where it is no longer feasible to make them perfectly reliable. In the past, computer systems used techniques such as triple-modular redundancy and type-safe languages to mask and avoid errors. Such techniques either incur high overheads or require intense effort from programmers, thereby driving up their costs. As errors become more and more prevalent in commodity systems, it is important to develop software that can anticipate and adapt to errors. In this talk, we propose to build software systems that can produce acceptable outputs in the face of hardware and software errors. The key insight is that many errors are not serious enough to warrant detection and recovery and therefore, it is sufficient to tolerate the few serious errors that do. Our goal is to provide “good enough” reliability, using low-cost techniques on commodity platforms.

I’ll present two systems that embody the above philosophy, Samurai: to tolerate software memory errors, and Flicker: to tolerate hardware memory errors. The systems focus on protecting a subset of the application’s data, called its critical data from errors. Samurai protects critical data from memory corruption errors in untrusted third-party code by replicating the data. Similarly, Flicker achieves sig-

nificant power-savings by exposing hardware errors to the application, and protecting critical data from such errors.

Finally, I will conclude by looking at the broader implications of the “good enough” approach and future directions.

* The title is based on an article in the Aug’09 issue of the Wired magazine titled “The Good Enough Revolution: When cheap and simple is just fine”.

Bio: is an assistant professor of computer engineering at the University of British Columbia (UBC), Vancouver. He received his MS and PhD degrees from the University of Illinois at Urbana-Champaign (UIUC) in 2004 and 2009 respectively. He then spent a post-doctoral year at Microsoft Research before joining UBC. Karthik’s research interests include fault-tolerant systems, programming languages and compilers and formal methods. Karthik was awarded the William C. Carter award in 2008 by the IEEE Technical Committee on Fault-tolerant Computing (TC-FTC) based on his dissertation research. Find out more at: <http://www.ece.ubc.ca/~karthikp>