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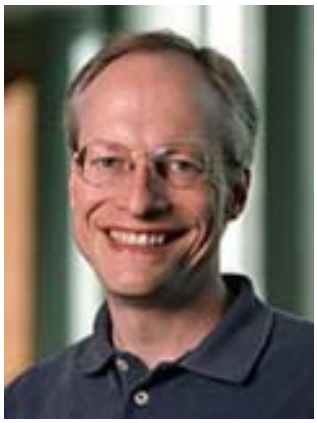
Convex methods for latent representation learning



Dale Schuurmans
University of Alberta

Friday 15 March
10:00 to 11:30am

Room 7-212 Agora bldg
University of Northern
British Columbia
3333 University Way
Prince George BC

Information
Jernej Polajnar
IEEE UNBC
Sub-section Chair
jernej.polajnar@gmail.com

Automated feature discovery is a fundamental problem in data analysis. Although classical feature learning methods fail to guarantee optimal solutions in general, convex reformulations have been developed for a number of such problems. Most of these reformulations are based on one of two key strategies: relaxing pairwise representations, or exploiting induced matrix norms. Despite their use of relaxation, convex reformulations can demonstrate significant improvements in solution quality by eliminating local minima.

I will discuss a few recent convex reformulations for representative learning problems, including robust regression, hidden-layer network training, and multi-view learning—demonstrating how latent representation discovery can co-occur with parameter optimization while admitting globally optimal relaxed solutions.

Speaker: Dale Schuurmans is a Professor of Computing Science and Canada Research Chair in Machine Learning at the University of Alberta. He received his PhD in Computer Science from the University of Toronto, and has been employed at the National Research Council Canada, University of Pennsylvania, NEC Research Institute and the University of Waterloo. He is an Associate Editor of JAIR and AIJ, and currently serves on the IMLS and NIPS Foundation boards. He has previously served as a Program Co-chair for NIPS-2008 and ICML-2004, and as an Associate Editor for IEEE TPAMI, JMLR and MLJ.

His research interests include machine learning, optimization, probability models, and search. He is author of more than 100 refereed publications in these areas and has received paper awards at IJCAI, AAAI, ICML, IEEE ICAL and IEEE ADPRL

UNBC UNIVERSITY OF NORTHERN BRITISH COLUMBIA

Co-sponsored by Computer Science Department, UNBC

* 5 page article

Kip Morison
BC Hydro

Thursday 21 March
Noon - 100pm

BC Hydro
Edmonds A01
Sky train auditorium

Information
Power and Energy chair
Rama Vinnakota
Rama.Vinnakota@bchydro.com

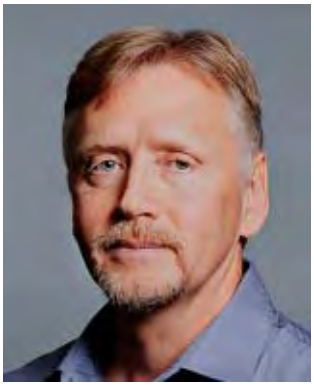
Technology preparedness: getting value and managing risk

The technology landscape is evolving rapidly in the electric utility space. In particular, the deployment of ubiquitous communication networks, the availability of sensors and intelligent end-point devices, and the development of advanced analytics have opened a new world of system intelligence, optimization, and automation. In addition, there are a plethora of other new technologies such as those associated with renewable generation, storage, asset management, load control, and transportation. Some new technologies may offer significant value to BC Hydro if deployed at scale, while others may be disruptive and pose risks if we are not prepared for their emergence into the mainstream.

This presentation will discuss technology preparedness; how do we ensure that we get value from new "enabling" technologies and how do we manage the risk of emerging "disruptive" technologies. The presentation will also highlight some of the major technology innovation activities under way at BC Hydro.

Speaker: Kip Morison has over 32 years of experience in the electric utility business and is currently the Chief Technology Officer for BC Hydro in Vancouver, Canada. Prior to his current role, he worked for 2 years for the BC Transmission Corporation, 15 years for Powertech Labs (the Technology Subsidiary of BC Hydro), and 14 years for Ontario Hydro. Kip hold a Master's degree in Electric Engineering from the University of Toronto and is a registered professional engineer in the provinces of British Columbia, Alberta, and Ontario and is a member of CIGRE and an IEEE Fellow.

IEEE PES Power & Energy Society®



Brian Gerson
PMC - Sierra

Tuesday 12 March
7:00pm

BCIT
Room SW1-2019
3700 Willingon Ave
Burnaby

Information
Joint Communications chair Vincent Wong
vincentw@ece.ubc.ca

Moore's Law – The beginning of the end of geometric scaling?

Electrical engineers have come to expect, and even rely upon, the ever increasing capabilities of silicon IC technology. In 2012 experts began to hypothesize that energy density and other issues will slow the growth of silicon technology. Brian Gerson, VP, Central Engineering at PMC-Sierra will discuss the technical hurdles the semiconductor industry is facing and how they are working to overcome them.

Speaker: Mr. Gerson is a veteran of the silicon industry and has led many of the key developments at PMC-Sierra related to the design of analog functions within the constraints of the digital CMOS process. He holds 10 US patents and is the current Vice President of Central Engineering at PMC-Sierra

IEEE COMMUNICATIONS SOCIETY · IEEE Information Theory Society · IEEE photonics SOCIETY · BTS IEEE Broadcast Technology Society · VTS · ITSS

Jt. Chapter BT-02/COM-19/IT-12/ITS-38/PHO-36/VT-06

A primer of cutting-edge telecommunication technologies – 5G, femtos, Machine-to-Machine

Mischa Dohler
CTTC

Distinguished Lecturer

Thursday 07 March
4:15 pm

Room 2020/2030
Kaiser Building
2332 Main Mall
UBC

This lecture will overview the really cutting-edge developments in the telecommunications industry. Without going into to many technical details, we will prime developments in M2M, Femtocells, and 5G design.

Machine-to-Machine: The unprecedented communication paradigm of machine-to-machine (M2M), facilitating 24/7 ultra-reliable connectivity between a prior unseen number of automated devices, is currently gripping both industrial as well as academic communities. Whilst applications are diverse, the in-home market is of particular interest since undergoing a fundamental shift of machine-to-human communications towards fully automatized M2M. The aim of this keynote is thus to provide academic, technical and industrial insights into latest key aspects of wireless M2M networks, with particular application to the emerging smart grid and smart home verticals. Notably, I will provide an introduction to the particularities of M2M systems, mainly in the context of smart homes. Architectural, technical and privacy requirements, and thus applicable technologies will be discussed. Notably, we will dwell briefly on the capillary and mainly cellular embodiments of M2M. The focus of capillary M2M, useful for real-time data gathering in homes, will be on IEEE (.15.4e) and IETF (6LoWPAN, ROLL, COAP) standards compliant low-power multihop networking designs; furthermore, for the first time, low power Wifi will be dealt with and positioned into the eco-system of capillary M2M. The focus of cellular M2M, useful for both data gathering and the increasing multimedia contents in smart homes, will be on latest activities, status and trends in leading M2M standardization bodies with technical focus on ETSI M2M and 3GPP LTE-MTC. Open technical challenges, along with the industry's vision on smart grid and smart home developments, will be discussed during the talk.

Femtocells: Femtocells, despite their name, pose a potentially large disruption to the carefully planned cellular networks that now connect a majority of the planet's citizens to the Internet and with each other. Femtocells – which by the end of 2010 already outnumbered traditional base stations and by March 2012 being deployed at a rate of about five million a year – both enhance and interfere with this network in ways that are not yet well understood. Will femtocells be crucial for offloading data and video from the creaking traditional network? Or will femtocells prove more trouble than they are worth, undermining decades of careful base station deployment with unpredictable interference while delivering only limited gains? Or possibly neither: are femtocells just a "flash in the pan"; an exciting but shortlived stage of network evolution that will be rendered obsolete by improved WiFi offloading, new backhaul regulations and/or pricing, or other unforeseen technological developments? This tutorial on femtocells overviews femtocells, demystifies their key aspects, and provides a preview of the next few years, by discussing in great depths the many aspects and facets of the femtocell eco system.

5G Cellular Design: Capacity projections from the International Mobile Telecommunications (IMT) have become outdated even before the next generation, i.e., the 4th generation (4G), wireless communications systems have been widely deployed. This is due to the fairly recent explosion and uptake of smart phones and smart services anytime/everywhere, and the thus associated data requirements. The trend is clearly towards splitting indoors and outdoors network designs, with focus on interoperation, support of mobility, high traffic levels and emerging bandwidth-intensive applications. Focusing e.g. on the market demand in dense urban areas during business hours, it has been calculated that about 1 Gbps/km2 are required. This is an order of magnitude higher than the current forward looking state of the art 4G networks. Whilst capacity is one of the main drivers, the cost of achieving said capacity is another. In other words, only cost efficient solutions to deliver the required capacity density are seen to be viable for 5G deployments. To this end, the talk will be divided into three topics: i) indoor design through femto cells; ii) outdoor design through innovative cellular design; and iii) management of said architectures through self-organizing networking (SON). Concerning the outdoors design, I will present a detailed architectural and functional approach to achieving 5G networking capacities – all corroborated by a fairly detailed cost and business case estimate. I introduce the concept of "architectural water-filling" with cheap below-rooftop access base stations and a unique feeding architecture using a combination of licensed in-band spectrum and out-of-band license exempt spectrum. Very high capacity feeding hubs with high-order spatial reuse are thus created using multi-beam antennas and advanced MIMO techniques, as well as use of millimeter wave radio links. Cognitive/docitive techniques are introduced to handle the increasingly complex system dynamics, making a viable step towards SON. Finally, I will dwell on latest trial and ETSI BRAN standardization activities towards the implementation of said 5G systems, as well as how current 3GPP LTE-A activities facilitate the design.

Speaker: Mischa Dohler is now Director of Research at CTTC, Barcelona. He is Distinguished Lecturer of IEEE ComSoc, Senior Member of the IEEE, and Editor-in-Chief of ETT. He frequently features as keynote speaker and panelist. He had press coverage by BBC and Wall Street Journal. He is a tech company investor and entrepreneur, being the co-founder, former CTO and now board member of Worldsensing – a M2M company with focus on the Smart City market. He loves his piano and is fluent in 6 languages.

In the framework of the Mobile VCE, he has pioneered research on distributed cooperative space-time encoded communication systems, dating back to December 1999 and holding some early key patents. He has published more than 150 technical journal and conference papers at a citation h-index of 32 and citation g-index of 65, holds a dozen patents, authored, co-edited and contributed to 19 books, has given more than 30 international short-courses, and participated in ETSI, IETF and other standardization activities. He has been TPC member and co-chair of various conferences, such as technical chair of IEEE PIMRC 2008 held in Cannes, France. He is/has been holding various editorial positions for numerous IEEE and non-IEEE journals and special issues.

Since 2008 he has been with CTTC and from 2010-2012 the CTO of Worldsensing. From June 2005 to February 2008, he has been Senior Research Expert in the R&D division of France Telecom, France. From September 2003 to June 2005, he has been lecturer at King's College London, UK. At that time, he has also been London Technology Network Business Fellow receiving Anglo-Saxon business training, as well as Student Representative of the IEEE UKRI Section and member of the Student Activity Committee of IEEE Region 8 (Europe, Africa, Middle-East and Russia).

He obtained his PhD in Telecommunications from King's College London, UK, in 2003, his Diploma in Electrical Engineering from Dresden University of Technology, Germany, in 2000, and his MSc degree in Telecommunications from King's College London, UK, in 1999. Prior to Telecommunications, he studied Physics in Moscow. He has won various competitions in Mathematics and Physics, and participated in the 3rd round of the International Physics Olympics for Germany

Information
Joint Communications chair Vincent Wong
vincentw@ece.ubc.ca

Biomedical Engineering

THE UNIVERSITY OF BRITISH COLUMBIA

2012/13 Grand Rounds Seminar Series

Date: Wednesday, March 6, 2013

Time: 7 - 8 AM

Location: Gordon & Leslie Diamond Lecture Theatre**, Room 1020, Gordon & Leslie Diamond Health Care Centre, 2775 Laurel Street, (VGH)**

Speaker: Dr. Mehdi Moradi, Assistant Professor, Department of Electrical and Computer Engineering, UBC

Title: Image analysis solutions to enhance prostate interventions

Abstract: In this talk, Dr. Moradi will present image analysis solutions that can improve the delivery of both diagnostic and therapeutic cancer interventions such as biopsy, brachytherapy and surgery. He argues that these technologies can provide exceptional opportunities for clinical translation in treatment and diagnosis of cancer. The central element of the proposed technologies is a radiological profile of different grades of the disease and relevant normal tissue, created by data driven machine learning on multiparametric and multimodality image data. Specific examples of technologies that use this framework will be presented. These include a tissue typing method based on support vector machine classification applied to the analysis of time series of RF ultrasound signals, and machine learning on multiparametric MRI data for target selection in MR-guided biopsy. He will also describe the engineering advances and challenges in the process of combining different imaging modalities for tissue typing.

Speaker's Bio: Dr. Moradi completed his B.Sc. in Biomedical Engineering at Tehran Polytechnic, M.Sc. in Biomedical Engineering at University of Tehran (2003), and Ph.D. in Biomedical Computing at Queen's University in Kingston, Ontario (2008). From 2009 to early 2012 he was an NSERC postdoctoral fellow in UBC, and then a research scientist at the National Center for Image Guided Therapy within Harvard Medical School in Boston, MA. In May of 2012 Dr. Moradi joined the Electrical and Computer Engineering Department at UBC as an Assistant Professor, with associate membership at Department of Urologic Sciences and at Vancouver Prostate Center. For the past decade, Dr. Moradi has focused on improving the detection and treatment of prostate cancer. His broad research interests are machine learning in medical image analysis, image-guided therapy and diagnosis, and multimodality and multiparametric imaging with emphasis on MRI and ultrasound. During his Ph.D., Dr. Moradi developed a novel technology for detection of cancer from ultrasound echo signals. His work was recognized by several national research awards for its potential to improve the accuracy of targeting of tumors during prostate biopsy. Staging of prostate cancer from multiparametric MRI and automatic dosimetry in prostate brachytherapy are among his recent research projects.

Please RSVP at http://bme-2012w-grand-round-5.eventbrite.com.

We encourage you to pass this invitation on to others in your network who might be interested in attending. Refreshments will be provided before the talk at 6:30 AM.

▶ DATE
MARCH 4, 2013

▶ TIME
4:30PM TO 6:00PM

▶ VENUE
CENTRE ROOM - BC HYDRO'S EDMONDS OFFICE,
6911 SOUTHPOINT DRIVE,
BURNABY, BC

"Meet and Learn"

Technical Society Reporting Out Session – IEEE/IEC

JOINT BC HYDRO/IEEE INDUSTRY APPLICATIONS CHAPTER EVENT

The IEEE Vancouver Section Industry Applications Society Chapter and BC Hydro are pleased to co-sponsor this technical society reporting out event. The purpose of this event is to share and transfer knowledge gained from attending technical society meetings, conferences, etc. with others in the profession. The presentations to be made at this event are from members of two IEEE working groups and one IEC technical committee based on recent meetings they have attended. All presenters will provide a summary of the topics presented at the events they attended, plus cover any highlights, share any new information learned and discuss issues that are currently of high interest to BC Hydro as well as the rest of the power industry. Each presentation will be 30 minutes long. Please come and meet with colleagues on topics relevant to the power industry. Food and refreshments will be provided. Registration is encouraged and the event is free-of-charge.

4:30 - 5:00 pm: "IEEE Machinery Committee - IEEE P1431" by Amir Khosravi

Amir Khosravi is a member of the Electrical Machinery Committee of IEEE and he will provide an update on the generator related standards this IEEE committee is working. Amir will also briefly talk about the important point of IEEE P1431 (Draft guide for measurement of partial discharge in AC electrical machinery).

Amir is a Specialist Engineer in Generation Engineering of BC Hydro with 28 years of industry experience in the Transmission, Distribution and Generation areas. He has a master's degree in electrical power and a PhD in system automation from Waseda University in Tokyo. He is a member of IEEE - Power and Energy Society (PES), and IEEE Standard Association. He is also BC Hydro's representative on the Electric Machinery Committee of IEEE and a paper reviewer for IEEE electrical machinery and electrical insulation. He is also registered as a Professional Engineer in the province of BC.

5:00 - 5:30 pm: "IEEE 693 Recommended Practice for the Seismic Design of Substations - 2013 Update" by Calvin Szeto

Calvin Szeto is a member of the Working Group Committee on the IEEE 693 document and he will provide some background on the document and update on what the Committee has been working on for the next version of the document.

Calvin is a Civil and Structural Engineer with BC Hydro T&D Stations Group. With over 20 years of engineering experience in both the public & private industry, he has been with BC Hydro for the past 8 years. He has practical experience in the substations design and provides technical expertise and oversight within BC Hydro and among external consultants. He has a master' degree in Structural Engineering and is registered as a Professional Engineer in the Province of BC.

5:30 - 6:00 pm: "IEC TC 62600-30: Power Quality Standards for Marine Energy Conversion Systems" by Jahangir Khan

Jahangir khan of Powertech Labs will report on his attendance of the 2012 IEC General Meeting held in Oslo Norway, and particularly on co-chairing the IEC TC 62600-30. This technical committee focuses on developing a power quality standard for marine energy conversion systems. Jahangir's presentation will include discussions on IEC standard development method, country participation, progress made to date, and challenges faced.

Jahangir Khan is a senior engineer at Powertech Labs, Smart Utilities (Power System Studies) Business Unit. He holds a PhD in Electrical Engineering. He is currently the Chair of IEEE Vancouver's Joint IAS/IES Chapter.

Please contact Bob Stewart at bob.stewart@bchydro.com or Jahangir Khan at jahangir.khan@powertechlabs.com if further information is required.

Vincent Yip
McCarthy Tetrault

BCIT Burnaby Campus
SW1-2019

Wednesday 13 March
6.00 - 8.00pm

Information
GOLD chair
Ophir Kendler
ophir2k@ieee.org

IP - Patent Law

Patent protection is one of the most important issues for large corporations, start-ups and inventors alike.

Patent attorney Vincent Yip will speak about the general principles of intellectual property law with a focus on patent law. He will be discussing the process of getting patents, the importance of patent rights, working with patent lawyers, as well as the commercialization and enforcement of patent rights.

Speaker: Vincent Kam-Sun Yip is an associate practicing in the Intellectual Property and Business Law groups of McCarthy Tetrault LLP in Vancouver and a registered Canadian patent agent. He also represents Canadian residents before the United States Patent and Trademark Office. He received his B.Sc. (Honours) in Microbiology and Immunology from the University of British Columbia in 2004 and his LLB from the University of British Columbia in 2007. He was called to the British Columbia bar in 2008.

GOLD
Graduates Of the Last Decade

Humanitarian Initiatives Committee - Student paper competition

IEEE-Canada HIC is organizing it´s first special student paper competition. Student papers will be accepted through the CCECE 2013 conference submission process. Best HIC paper will be awarded full sponsorship to attend the IEEE GHTC 2013 In Silicon Valley, San Francisco, October 2013. In order to give the chance to all students to participate, we therefore exceptionally accept late abstract submissions until Feb 28. The competition is open to undergraduate and graduate students enrolled in a Canadian College or university. Authors should clearly indicate that the papers are for the HIC Workshop. Papers will be reviewed and feedback will be provided to the authors.

For more information please contact, The Student Activities Committee Chair, Dr. Sawsan Abdul-Majid Email: smajid@site.uottawa.ca OR The IEEE-Canada HIC Chair, Dr. Ferial El-Hawary Email: F.El-Hawary@ieee.org

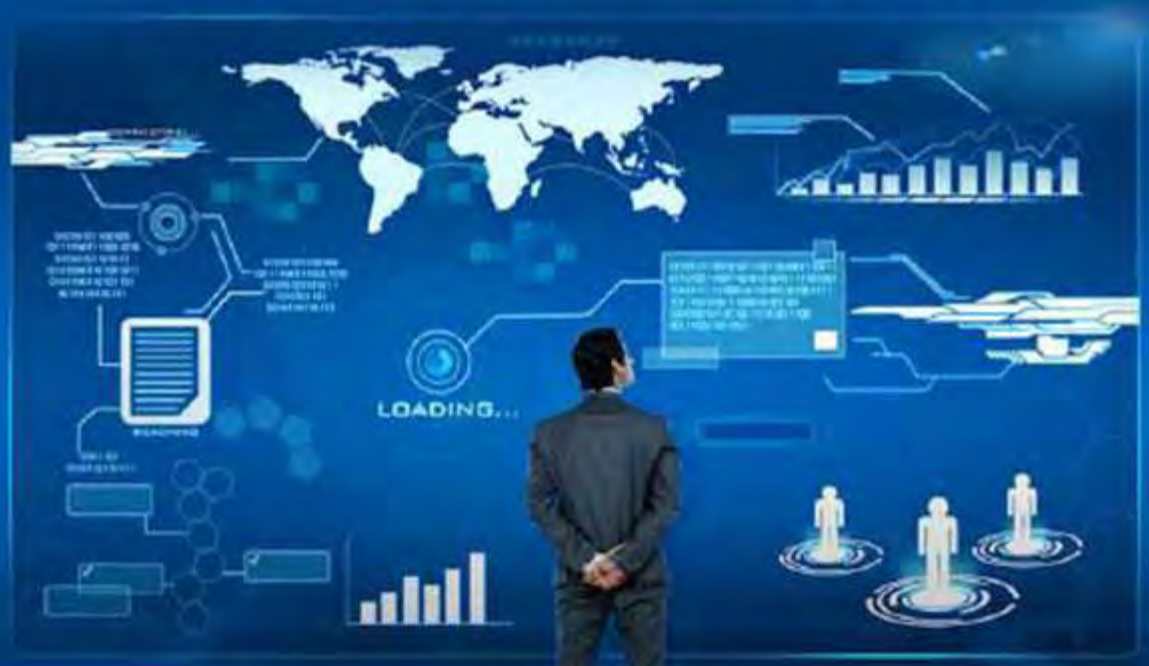
ICICS

Electrical and Computer Engineering

IEEE VANCOUVER SECTION

ICICS-ECE-IEEE Workshop on Future Communications and Multimedia Systems

CONNECTING PEOPLE AND MACHINES



Featuring

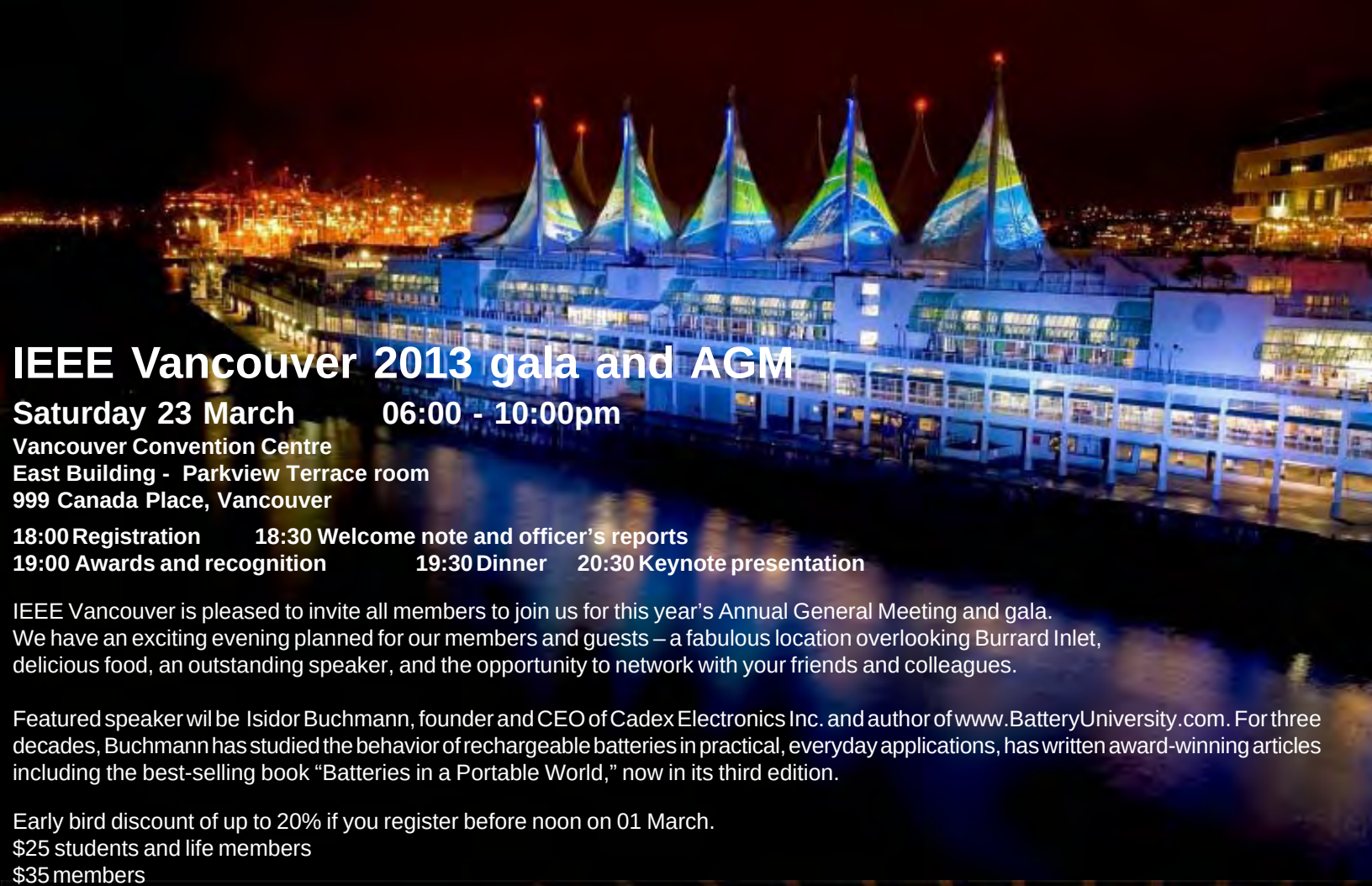
- Smart Cities – Technologies, Big Data and Citizens
- The Status of Digital Watermarking
- The Future of Internet TV

Friday, March 8, 2013
8:00 am – 4:30 pm
UBC Vancouver Campus
Kaiser Building
2020 – 2332 Main Mall

For free registration, technical program and other details, please see

www.icics.ubc.ca/workshops/comm2013

a place of mind
THE UNIVERSITY OF BRITISH COLUMBIA



IEEE Vancouver 2013 gala and AGM

Saturday 23 March 06:00 - 10:00pm

Vancouver Convention Centre
East Building - Parkview Terrace room
999 Canada Place, Vancouver

18:00 Registration 18:30 Welcome note and officer's reports
19:00 Awards and recognition 19:30 Dinner 20:30 Keynote presentation

IEEE Vancouver is pleased to invite all members to join us for this year's Annual General Meeting and gala. We have an exciting evening planned for our members and guests – a fabulous location overlooking Burrard Inlet, delicious food, an outstanding speaker, and the opportunity to network with your friends and colleagues.

Featured speaker wil be Isidor Buchmann, founder and CEO of Cadex Electronics Inc. and author of www.BatteryUniversity.com. For three decades, Buchmann has studied the behavior of rechargeable batteries in practical, everyday applications, has written award-winning articles including the best-selling book "Batteries in a Portable World," now in its third edition.

Early bird discount of up to 20% if you register before noon on 01 March.
$25 students and life members
$35 members
$45 non-members (1 guest per member).
You can register at https://meetings.vtools.ieee.org/meeting_registration/register/15965
Online payment is available and encouraged in the registration process. Guests should be registered separately using the same link. Please include your IEEE membership number and a contact email for yourself and your guest. For more information, or to arrange other means of payment, please email Steven McClain at stevenmcclain@ieee.org.

Hearts of Caesar Salad
Red Potatoes with Yoghurt and Dill
Du Puy Lentil and Banana Squash Salad
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 Cherry Bocconcini, Balsamico 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 Charlotte, Baked Cheesecake
Chocolate Eclairs, Fresh Fruit Flans, Gateau Basque
Assorted Fruit Creams and Tiramisu
House Made Biscotti
~
Freshly Brewed Moja Organic Coffee and Imported Teas

Eric Wohlstadter
UBC

Wednesday 17 April
3:30pm

KAIS 2020
2332 Main Mall
UBC Vancouver

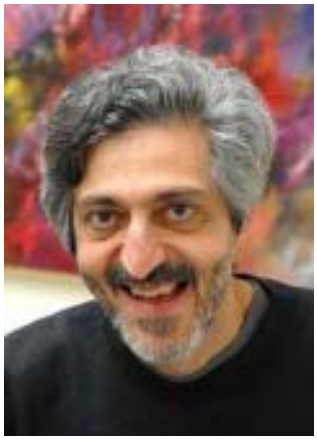
Information
Computer Society chair
Sathish Gopalakrishnan
sathish@ece.ubc.ca

Partitioning software services for hybrid cloud deployment

"Hybrid cloud" deployment can be an attractive option for companies wanting to deploy software services on scalable public cloud infrastructure, while still assuming local control over sensitive data resources. A hybrid deployment, despite providing better control, is dif?cult to design since code and data must be partitioned and distributed ef?ciently between a public cloud and private on-premise infrastructure.

In this talk, I will describe research into semi-automated partitioning of software services for hybrid clouds. The talk will address technical challenges relevant to: (i) modeling of software execution to abstract properties salient to the hybrid partitioning problem, (ii) combining code execution models and data storage models in order to support simultaneous optimization of execution data-flow and persistent data placement, (iii) formulation of the models to use integer programming for optimization. We implemented a new software pro?ling and partitioning framework (called Manticore) to evaluate our proposed solutions. Experiments on two open-source Web application show that Manticore can help developers to determine more optimal cost/performance tradeoffs for hybrid deployment than existing approaches.

This project is joint research with Nima Kaviani of the Computer Science Department and Rodger Lea of the Media and Graphics Interdisciplinary Centre (MAGIC).



Avi Wigderson
Princeton

Talk 1
Thursday 07 March
3:00 p.m

Room 2012 ESB
(Earth Sciences)
UBC

Talk2:
Friday 08 March
3:00 p.m

Room 1100 MATX
(Mathematics annex)
UBC

Cryptography: secrets and lies, knowledge and trust

Talk 1: PIMS Public Lecture

What protects your computer password when you log on, or your credit card number when you shop on-line, from hackers listening on the communication lines? Can two people who never met create a secret language in the presence of others, which no one but them can understand? Is it possible for a group of people to play a (card-less) game of Poker on the telephone, without anyone being able to cheat? Can you convince others that you can solve a tough math (or SudoKu) puzzle, without giving them the slightest hint of your solution? These questions (and their remarkable answers) are in the realm of modern cryptography. In this talk I plan to survey some of the mathematical and computational ideas, definitions and assumptions which underlie privacy and security of the Internet and electronic commerce. We shall see how these lead to solutions of the questions above and many others. I will also explain the fragility of the current foundations of modern cryptography, and the need for stronger ones. No special background will be assumed.

The power and weakness of randomness (when you are short on time)

Talk2: PIMS/UBC Distinguished Colloquium

Man has grappled with the meaning and utility of randomness for centuries. Research in the Theory of Computation in the last thirty years has enriched this study considerably. I'll describe two main aspects of this research on randomness, demonstrating respectively its power and weakness for making algorithms faster. I will also address the role of randomness in other computational settings, such as space bounded computation and probabilistic and zero-knowledge proofs.

Speaker: Avi Wigderson is a widely recognized authority in theoretical computer science. His main research area is computational complexity theory. This field studies the power and limits of efficient computation and is motivated by such fundamental scientific problems as: Does P=NP? Can every efficient process be efficiently reversed? Can randomness enhance efficient computation? Can quantum mechanics enhance efficient computation? He has received, among other awards, both the Nevanlinna Prize and the Gödel Prize.

These talks should be of broad interest to many of us although
they are not sponsored by the IEEE Computer Society but appear here courtesy of
IEEE Vancouver Joint Computer chapter chair Sathish Gopalakrishnan sathish@ece.ubc.ca

IEEE Joint Aerospace and Electromagnetics Chapter – Vancouver
Meeting Announcement

Wireless Device and EMC Trends: Implications for Aerospace and Industry

This is a free seminar, but you must register to assure your space.
Contact: Dave Michelson *davem@ece.ubc.ca* to save your seat!

Date: **Wednesday, March 27, 2013**

Time: 10:00 am: Registration
10:30 am - 5:00 pm: Presentations (with one hour lunch break)
5:00 pm – 6:00 pm: Reception with speakers in exhibit area

Speakers: Dave Michelson, University of British Columbia
Greg Kiemel, Northwest EMC
Garth D'Abreu, ETS-Lindgren
Kenneth Kirchoff, The Boeing Company
Mark Terrien, Agilent

Location: University of British Columbia
Department of Electrical and Computer Engineering
Kaiser Building, Rooms 2020/2030
2332 Main Mall
Vancouver, BC V6T 1Z4

Follow link for more details:
http://www.maps.ubc.ca/PROD/index_detail.php?locat1=313

We recommend that attendees park in the Health Sciences Parkade.

Register: Dave Michelson davem@ece.ubc.ca, phone: 604 822-3544
RESERVE YOUR SEAT BY MARCH 20 TO ENSURE SEATING AND CATERING

Several exhibitors will be available to discuss your needs – see below for more information.

TECHNICAL PROGRAM

"Educational Initiatives in Wireless Communications and EMC at UBC"
By *Prof. David G. Michelson, University of British Columbia*

Recent educational initiatives in wireless communications at UBC have dramatically improved our capacity for producing students who meet the needs of Canada's wireless industry. *EECE 380 – Electrical Engineering Design Studio* introduces students to the principles of wireless communications and RF/microwave test and measurement equipment through a set of three design projects that involve various aspects of the ORBCOMM satellite communications system and the NOAA weather satellite system. *EECE 483 – Antennas and Propagation and EECE 571A – Antennas and Propagation II* – introduce students to the principles of antenna design with emphasis on personal and satellite communications. *EECE 585 – Electromagnetic Compatibility* – introduces students to the principles of EMC through a combination of lectures and lab-based instruction. All of these courses involve significant design components and were developed in close cooperation with industry partners such as ORBCOMM, MDA, Sierra Wireless, Quake Global and BC's independent EMC labs.

"Wireless Trends and Compliance Considerations"
By Greg Kiemel, Director of Engineering, Northwest EMC

The proliferation of cell phones, wireless LAN, and other wireless devices mark a significant trend in the telecommunications industry. Not only has the number of dedicated radios grown, but convergent technologies have emerged where computing devices that historically contained no radios, now have 2, 3, and even 4 different radio modules. For example, many notebook PCs can be integrated with Wi-Fi®, Bluetooth®, and 4G radio modules. Optional features for a barcode scanner might include RFID, as well as Wi-Fi®, Bluetooth®, and 4G radio modules. Market forces dictate "cable replacement" strategies such as Bluetooth® and ZigBee™ on more and more products. The desire for internet connection "anytime – anywhere" has spurred cellular carriers to shift their services from voice-only networks to more data-centric services. Novel antenna technologies such as MIMO have increased data rates while improving coverage. It is clear that consumers want more convenient, and faster access to their data networks. This presentation will discuss some of the important trends in wireless, as well as provide product developers key strategies for successfully addressing the EMC regulatory requirements for their wireless devices.

"Over-The-Air Measurement with Reverberation Chambers"
By Garth D'Abreu, Technical Manager of the RF Engineering Group, ETS-Lindgren

Rooted in the simplicity of its hardware implementation and the elegance of its statistical behavior, the reverberation chamber (RC) has been found to be an economical and effective test environment for a great diversity of applications. Not only in EMC testing has the reverberation chamber been widely utilized, but also in various wireless test applications. Among the wireless test applications, Multiple Input, Multiple Output (MIMO) is undoubtedly one of the major applications that can make good use of RC test methodology due to the nature of MIMO multi-reflection coinciding with the RC core concept. Another interesting application arises from the increasing demand of in-flight wireless

access; in such a spacious environment as an airplane, the concept of frequency-stirred RC is implemented to evaluate RF propagation in an aircraft cabin. This presentation will cover the most updated developments in reverberation chamber wireless test applications.

"Allowance of Portable Electronic Devices on Aircraft: Interference Path Loss Testing Using Discrete Frequency Stirring"
By Kenneth Kirchoff, 787 Cabin Systems R&D Engineer, The Boeing Company

As more airlines around the world are installing passenger communication systems that enable the use of passenger-owned intentionally transmitting portable electronic devices (T-PEDs) there is a requirement from an airplane safety perspective to ensure electromagnetic compatibility between the T-PEDs and the airplane communication, navigation and surveillance (CNS) systems. An FAA advisory special committee, SC-202, was convened to produce an industry accepted method for measuring the interference path loss (IPL), which is the coupling between a transmitter onboard the airplane and the airplane CNS antennas. Full scale airplane testing was undertaken to compare traditional deterministic test methods to a new statistical test approach. This presentation outlines a new method for determining the IPL for each CNS system that utilizes a statistical approach to find the upper bound coupling with known confidence levels.

"Improving EMC Measurement Accuracy"
By Mark Terrien, EMC Business Development Manager for Agilent Technologies

This presentation addresses amplitude measurement accuracy near the system noise floor by first defining the maximum theoretical S/N available for measuring a signal at a regulatory limit, and then showing how this ratio is reduced by the physical limitations of the components of the measurement system. Shown next is a quantization of the magnitude of the errors when measuring CW signals in a background of broadband noise as a function of the type of detection used. Next, the presentation discusses and quantifies the relationship between the input S/N ratio and the detected S/N ratio that is seen on the measuring instrument. A discussion of a method by which a designer can determine the maximum cable loss allowable to guarantee a specific S/N ratio when using known antennas and measuring instruments follows. Finally, we show how all-digital receiver intermediate frequency (IF) architectures contribute to higher-efficiency EMC test facility operations by offering improved measurement accuracy, reduced overall measurement time, and reduced dependence on operator experience level.

SPEAKER BIOGRAPHIES

Prof. David G. Michelson is with the Department of Electrical and Computer Engineering at the University of British Columbia where he leads the Radio Science Lab. From 1996 to 2001, he served as a member of a joint team from AT&T Wireless Services, Redmond, WA, and AT&T Labs-Research, Red Bank, NJ, where he was concerned with the development of propagation and channel models for next-generation and fixed wireless systems. The results of this work formed the basis for the propagation and channel models later adopted by the IEEE 802.16 Working Group on Broadband Fixed Wireless Access Standards. Since then, he has led the Radio Science Laboratory at UBC, where

his current research interests include propagation and channel modeling for fixed wireless, smart grid, and satellite communications and low profile antenna design. He currently serves as the IEEE Communication Society's Director of Education, Chair of the IEEE Vehicular Technology Society's Propagation Committee, and Member of the Board of Directors of the Wavefront Wireless Commercialization Centre.

Greg Kiemel is the Director of Engineering at Northwest EMC. Greg has been instrumental in the development of wireless testing, product certification, and global approvals capabilities at Northwest EMC. With more than 26 years of EMC experience, Greg is an iNARTE-certified EMC and ESD engineer, as well as a certified Master EMC Design Engineer. Recognized as an expert in wireless approvals, he is active in ANSI ASC C63, and recently served as Chair of the TCB Council. Greg completed a two-year term as a Distinguished Lecturer for the IEEE EMC Society, and has been published in various technical journals. Prior to his 18 years with Northwest EMC, he worked as the lead regulatory engineer in the personal computer division at Epson Portland, Inc. and as an EMC engineer at Tektronix, Inc. Greg earned his BS in Engineering from Weber State University and is a Senior Member of the IEEE.

Garth D'Abreu is the Technical Manager of the RF Engineering Group at ETS-Lindgren in Cedar Park, Texas. He has primary responsibility for the design and development functions within the RF engineering group. The RF group provides technical support for ETS-Lindgren worldwide and is responsible for anechoic chambers, E Field generators, TEM cell device design and development, antenna design and absorber development. Mr. D'Abreu is the lead engineer for reverberation chamber design and testing and is responsible for the development of GTEM cells, products for EMP applications and wireless device test systems. He holds a BSc degree in Electronics & Communications Engineering, North London University, UK. He is a member of the IEEE EMC Society and has over 20 years experience in the RF industry.

Kenneth Kirchoff received his BS EE (Cum Laude) from Seattle University and has completed MS EE courses at Columbia University in New York and the University of Washington in Seattle. Kenneth has served on FAA advisory committees as a chairman of technical working groups, advised foreign regulatory bodies such as the MIC in Japan on safety aspects of wireless devices onboard airplanes and currently serves as a co-chair of the ARINC AEEC Cabin Systems Subcommittee technical working group for wireless systems onboard airplanes. Kenneth has worked at the Boeing Company for 22 years, spending time as an electromagnetic effects engineer on programs such as the 767 Tanker and Connexion by Boeing® and as a systems engineer in cabin systems working on onboard mobile telephony systems. Kenneth currently serves as the principle investigator in 787 Cabin Systems research and development working on such technologies as software defined radio, aircraft wireless infrastructure and synthetic aperture scanning. He also serves as the Boeing spokesman on the safe use of Portable Electronic Devices onboard airplanes.

Mark Terrien is the EMC Business Development Manager for Agilent Technologies. Mark has over 20 years of product development experience with Hewlett Packard and Agilent Technologies, with a focus on EMC receivers, spectrum analyzers and microwave test equipment. He holds an MBA from Golden Gate University in San Francisco and an MSEE in Electromagnetic Wave Theory from the University of Wisconsin-Madison.

See below for exhibitor information…..

Calling All EMC Exhibitors!

There will be a small tabletop exhibition during the March 27 meeting at the University of British Columbia. **Due to limited space, only 11 tables are available on a first come, first served basis.**

Details:

- Tables are each 30”W x 72”L and are available for **$250 USD per table.**
- **US based exhibitors, please contact Janet O'Neil** at j.n.oneil@ieee.org or phone 425-868-2558. Secure your space by issuing a check payable to "Seattle EMC Chapter" in $250 USD and sending to: Janet O’Neil, 22316 NE 19th Street, Sammamish, WA 98074. Contact
- **Canada based exhibitors, please contact Dave Michelson** at davem@ece.ubc.ca or phone 604-822-3544 to arrange payment and reserve your space.
- **Space will be confirmed in order of checks received until space is sold out.**
- Exhibitors are limited to what can be placed on the table only. No exceptions!
- Only one table is allowed per company.
- All exhibitors may set up starting at 9:00 am and must be torn down by 7:00 pm on March 27.
- Exhibit hours are 10:00 am to 6:00 pm.
- All exhibitors will receive an attendee list prior to the seminar and a final version following the seminar.