

Power and Energy

Cyber security in power system operation and control

Dr. Chen-Ching Liu
University College Dublin

Friday 11 September 11 1215 - 115pm
BC Hydro Dunsmuir Auditorium
2nd Floor, 333 Dunsmuir St, Vancouver

As the connectivity of power grid facilities increases with the adoption of new information and communications technologies, there is a growing concern over cyber security of the



Supervisory Control and Data Acquisition (SCADA) Systems. Although the importance of cyber security for IT is well recognized, research on the integrated cyber-power systems is just emerging. This seminar will provide the background and vulnerability issues of SCADA systems. Concepts and techniques for vulnerability assessment will be discussed with simulation cases.

Speaker: Dr. Liu received his BS and MS degrees from the National Taiwan University and his Ph.D from the University of California, Berkeley. He is currently a Professor and Deputy Principal of College of Engineering, Mathematical and Physical Sciences at the University College Dublin in Ireland. He has over 30 years of experience in the Electrical Power & Energy field and has previously been a member of the faculty and an Associate Dean of Engineering at the University of Washington and a member of the faculty at Iowa State University.

Dr. Liu is a Fellow of the IEEE and has chaired numerous PES technical and non-technical committees including the technical committee on Power System Analysis, Computing, and Economics. He received an IEEE Third Millennium Medal in 2000.

Info: For more information on upcoming chapter events, please contact the Chapter Chair, Glen Tang, at glen.tang@ieee.org

Computer

From augmented reality to augmented computing: cloud-mobile convergence paradigms

Xun Luo
Qualcomm Inc

Monday 21 September 700 - 900pm
BCIT Telus theatre SE6 - 233

Mobile devices have become indispensable elements of the pervasive computing environment during the recent years. However, due to their constrained processing power, user experience of mobile devices is often undermined. While getting the comparable hardware configuration as the desktop counterparts is impractical, it is possible to apply "augmented computing" techniques to provide the mobile device users with a similar



experience of using powerful computers. Augmented computing strives to integrate mobile devices with cloud-based resources as seamlessly as possible, making the underlying computing transparent to end users. In this talk I am going to discuss several paradigms to implement cloud-mobile convergence, the enabling technologies for these paradigms, and lastly, a couple of experimental augmented computing applications.

Speaker: Xun Luo is a researcher with the Mobile Connectivity Research Group at Qualcomm Inc's Office of the Chief Scientist. His research interests are networking, systems and applications in the pervasive and ubiquitous context. Before joining Qualcomm, he was a researcher with Motorola Labs, in the Cognitive Sensing Systems group from 2006 to 2008. He holds a Ph.D. in Computer Science from the University of Illinois at Chicago. Dr. Luo is a senior member of the IEEE.

Cosponsor: Joint Communications
Info: Sathish Gopalakrishnan
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Joint Communications

Security schemes for tactical mobile ad hoc networks

Dr. Helen Tang
Defence R&D Canada

Tuesday 01 September 1100am
Room # 418 - MACLEOD Building
2356 Main Mall University of BC

Mobile Ad-Hoc Networks (MANETs) are gaining importance with the increasing number of potential applications, such as military battlefield communications. However, MANETs are often vulnerable to security attacks due to their features of dynamic changing topology, cooperative algorithms, lack of centralized monitoring and management point, etc. All these have changed the landscape of network security. We need to search for new architecture and mechanisms to protect MANETs. In this talk, we will present several security schemes particularly designed for tactical MANETs, including Lightweight Integrated Authentication, Multi-modal biometric-based continuous authentication, ID-based distributed key management and Consensus-based cooperative spectrum sensing scheme.



Speaker: Dr. Helen Tang received her PhD degree in Electrical Engineering from Carleton University in 2005. From 1999 to 2005, she had worked in a few R&D organizations in Canada and USA including Alcatel-Lucent, Mentor Graphics and Communications Research Center Canada. In Oct. 2005, she joined Network Information Operations Section at Defence R&D Canada as a Defence Scientist.

She has published more than 20 research papers in international journals and conferences including IEEE Trans. on Wireless Communications, Journal of Security and Communication Networks, IEEE ICC, IEEE VTC, IEEE MILCOM, and IEEE GLOBECOM. She has served as session chair and technical committee member for various conferences. Her research interests include ad hoc and sensor networks, wireless network security, communication protocols and performance analysis.

Info: Alon Newton, anewton@ieee.org

Refreshments will be provided

Electron Devices

ESD protection design for analog/mixed-signal/RF ICs

Albert Wang
University of California

Friday 11 September 300 - 400pm
Room ASB 9705 Simon Fraser University

Distinguished Lecture

ESD (Electro-Static Discharge) failure emerges as one of the most devastating IC reliability problems as semiconductor technologies advance beyond the 100nm node. On-chip ESD protection design becomes a grand challenge to RF, analog and mixed-signal (AMS) IC designs as cited by the ITRS. This lecture discusses various issues associated with ESD protection design for RF/AMS ICs, including complex ESD-IC interactions, mixed-mode ESD simulation-design methodology, advanced RF ESD protection design, accurate RF ESD design characterization, ESD-RFIC co-design and whole-chip ESD design optimization, etc. Practical ESD design examples will be presented.



Speaker: Albert Wang received the BSEE degree from the Tsinghua University, China,

and the PhD EE degree from The State University of New York at Buffalo in 1985 and 1996, respectively. From 1995 to 1998, he was a Staff Engineer at National Semiconductor Corporation. From 1998 to 2007, He was a Professor of Electrical and Computer Engineering at the Illinois Institute of Technology, where he directed the Integrated Electronics Laboratory. He is currently a Professor of Electrical and Computer Engineering and Director for the Laboratory for Integrated Circuits and Systems at the University of California, Riverside, USA.

His research interests focus on Analog/Mixed-Signal/RF ICs, Advanced on-Chip ESD Protection, IC CAD and Modelling, SoC, Nano Devices and Circuits, etc. Wang received the CAREER Award from the National Science Foundation in 2002. He is the author for the book "On-Chip ESD Protection for Integrated Circuits" (Kluwer, 2002) and 150+ peer-re-

Signal Processing

Wireless sensors networks: a new life paradigm

Prof. Magdy Bayoumi
University of Louisiana

Friday 25 September 330 - 430pm
Room KAIS 2020, Fred Kaiser Building
2332 Main Mall, University of BC

Computers, communication, and sensing technologies are converging to change the way we live, interact, and conduct business. Wireless sensor networks reflect such convergence. These networks are based on collaborative efforts of a large number of sensor nodes. They should be low-cost, low-power, and multifunction. These nodes have the capabilities of sensing, data processing, and communicating. Sensor networks have a wide range of applications, from monitoring sensors in industrial facilities to control and management of energy applications to military and security fields. Because of the special features of these networks, new network technologies are needed for cost effective, low power, and reliable communication. These network protocols and architectures should take into consideration the special features of sensor networks such as: the large number of nodes, their failure rate, limited power, high density, etc. In this talk the impact of wireless sensor networks will be addressed, several of the design and communication issues will be discussed, and a case study of a current project of using such networks in drilling and management off-shore oil and natural gas in the gulf region will be given.

Speaker: Dr. Magdy A. Bayoumi is Director of The Center for Advanced Computer Studies (CACS), and Department Head of the Computer Science Department at the University of Louisiana at Lafayette (UL Lafayette). He is also the Z.L. Loflin Eminent Scholar Endowed Chair Professor in Computer Science. Dr. Bayoumi has been a faculty member in CACS

viewed papers in the field, and holds several U.S. patents. Wang is Editor for the IEEE Electron Device Letters and Guest Editor for IEEE Journal of Solid-State Circuits. He was Associate Editor for the IEEE Transactions on Circuits and Systems I, Associate Editor for the IEEE Transactions on Circuits and Systems II, Guest Editor for the IEEE Journal of Solid-State Circuits and Guest Editor-in-Chief for the IEEE Transactions on Electron Devices. He has been IEEE Distinguished Lecturer for the Electron Devices Society and the Solid-State Circuits Society. He currently serves as Vice President for IEEE Electron

since 1985. He received B.Sc. and M.Sc. degrees in Electrical Engineering from Cairo University, Egypt; M.Sc. degree in Computer Engineering from Washington University, St. Louis; and Ph.D. degree in Electrical Engineering from the University of Windsor, Canada. Dr. Bayoumi is the recipient of the 2009 IEEE Circuits and Systems Meritorius Service Award. He is also the recipient of the IEEE Circuits and Systems Society 2003 Education Award, and he is an IEEE Fellow.



Dr. Bayoumi has graduated more than 35 Ph.D. and about 175 Master's students. He has published over

300 papers in related journals and conferences. He edited, co-edited and coauthored 5 books in his research interests. He has been Guest Editor (or Co-Guest Editor) of eight Special Issues in VLSI Signal Processing, Learning on Silicon, Multimedia Architecture, Digital and Computational Video, and Perception-on-a-Chip. The latest Special Issue has been on "System-on-a-Chip," IEEE Proceedings, 2006. He has given numerous invited lectures and talks nationally and internationally, and has consulted in industry. Dr. Bayoumi has served in many editorial, administrative, and leadership capacities in IEEE Circuits and Systems (CAS) Society. Currently, he is the Vice President for Conferences. He was Vice President for Technical Activities, and a member of the Board of Governors of CAS Society. He has been involved in many conferences, serving in different capacities.

Devices Society. He is committee member for the SIA International Technology Roadmap for Semiconductor (ITRS), the IEEE EDS VLSI Technology and Circuits Committee and the IEEE CAS Analog Signal Processing Technical Committee (ASPTC). He has been serving various committees for numerous IEEE conferences. He speaks frequently at various international forums and is a frequent consultant to the IC industry. He is Fellow of IEEE.

Info: EDS Chair, Bonnie Gray bgray@sfu.ca

APEGBC 2009 Annual Conference & AGM

Charting the Course Ahead

October 15 - 17, 2009
Victoria Conference Centre, Victoria, BC



IEEE members are invited to APEGBC's 2009 Annual Conference.

This year's program features a number of electrical engineering sessions as part of our two-day professional development conference.

An extensive trade exhibition and numerous social events provide the perfect opportunity to network with colleagues and suppliers while enjoying the historical surroundings of Victoria, BC.

For full conference details, visit: www.apeg.bc.ca/ac2009

Electron Devices

Microflow phenomena and microflow control

Boris Stoeber
University of British Columbia
Thursday 27 August 300 - 400pm
ASB 9896, Simon Fraser University

Microfluidics deals with the behaviour, precise control and manipulation of minute amounts (nanolitres or picolitres) of fluid samples on-chip through typically sub-millimetre scale flow conduits. Applications of this emerging field are in the environmental and biomedical areas such as in biosensing, drug delivery and drug screening. Understanding the flow of non-Newtonian fluids in small-scale environments allows designing robust microfluidic systems as well as new flow control methods.



This talk will introduce three different microflow phenomena in the context of their applications:

1. Small particles are commonly used in biomedical microdevices as markers or drug carriers. However, small particles from suspensions tend to deposit in specific regions in microfluidic channels, where they build up over time and eventually block a flow passage. The effect of particle size and size distribution on channel clogging will be discussed.
2. In a solvent casting method for the fabrication of micromechanical parts the drying process of the solvent from a polymer solution needs to be well characterized to achieve the desired mechanical structures. We use confocal microscopy combined with particle image velocimetry to visualize the flow in a thin film of polymer solution during the drying process. This study reveals a fast flow inside the film as well as a surface counter flow that is driven by a surface tension gradient (Marangoni flow) caused by a concentration gradient along the film.
3. The small scale of microfluidic channels allows using thermally responsive polymer solutions that reversibly form a gel upon heating for active valving or for passive flow control. The characteristics of these fluids, their behaviour in microenvironments, as well as their application to flow control will be presented.

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IEEE Industry Workshop on UWB Wireless Technology

Wednesday 09 September 2009

Georgia Room, 2nd floor, Hyatt Regency Vancouver, 655 Burrard Street Vancouver

IEEE ICUWB 2009 is pleased to invite both conference attendees and members of the Engineering community in Western Canada and the Pacific Northwest to attend this four-hour industry workshop on UWB wireless technology.

Thanks to the generosity of our sponsors, admission to this four-hour industry workshop is free of charge. To register, please send a message with your contact information and affiliation to IEEE.UWB@gmail.com.

14:00 - 14:50 Deployment of UWB Wireless Technology in Industrial Environments

Prof. Dave Michelson
University of British Columbia, Vancouver, BC
UWB wireless technology holds great promise for enabling cable replacement, deployment of sensor networks, and physical measurement in real-world industrial environments. In this presentation, we review recent progress in this area and possible areas for future work.



14:50 - 15:40 Advances in UWB Measurement Technology

Mark Lombardi
Agilent Technologies, Colorado Springs
Designers and developers require effective methods to generate, capture and analyze UWB signals. This presentation will focus on the real world lessons that we have learned from working with multiple radio vendors on a variety of UWB technologies, including MB-OFDM.



15:40 - 16:10 Break, Technical Exhibits, Technical Book Sales

16:10 - 17:00 Miniaturization of Ultra-Wideband Antennas

Prof. Zhi-Ning Chen
Institute for Infocomm Research, Singapore
This talk briefly introduces design challenges of ultra-wideband (UWB) antennas. We begin by reviewing the special design considerations from a systems point of view. The talk focuses on real-world design examples including the design of a UWB antenna designed to fit into a USB dongle.



17:00 - 17:50 Introduction to Ground Penetrating Radar

Dr. Csaba Ekes
Terraprobe Geoscience Corp, Burnaby, BC
Ground Penetrating Radar (GPR) is a real-time, non-destructive testing (NDT) technique that can quickly and accurately locate the position and depth of post-tension cables, rebar, and electrical or fiber optic conduits embedded in concrete. This talk focus on our experience in applying GPR technology to the needs of our many clients in construction and geotechnical engineering.



Western Economic
Diversification Canada

Diversification de l'économie
de l'ouest Canada



IEEE Vancouver Section



Message from the Chair

IEEE Vancouver Section is looking forward to an exciting year. Here are some initiatives that are currently underway:

1. Zahra Ahmadian and Mazana Armstrong are leading the effort to form a Women in Engineering Affinity Group within Vancouver Section. If you're a WIE member and would like to sign the petition, or if you would simply like more information, please contact zahraa@ece.ubc.ca or mazana.armstrong@ieee.org.
2. Eugen Trandafir has been appointed as Vancouver Section's Conferences Chair. He lead the Section's efforts to attract new conferences to Vancouver, support conferences that have already been awarded to Vancouver, liaise with Tourism BC as required, and recruit and train other volunteers to assist in this effort. If you would like to help or would like more information, please contact eugen.trandafir@ieee.org.
3. Kouros Goodarzi is leading the effort to prepare a new set of Vancouver Section By-laws that are compliant with the new guidelines recently introduced by the Member and Geo-

graphic Activities (MGA) Board (formerly the Regional Activities Board (RAB)). If you would like to help or would like more information, please contact krs@ieee.org.

4. Glen Tang will represent Vancouver Section at the IEEE Canada GOLD Workshop to be held in late September in Mississauga. Glen's expenses will be jointly covered by Vancouver Section and IEEE Canada. If you would like to get involved with the GOLD affinity group in Vancouver, please contact glen.tang@bchydro.com.

5. The Section has approved Dave Michelson and Steven McClane's proposal to establish a Joint Aerospace and Electromagnetics Chapter comprising AESS, GRS, MTT-S, EMC-S, RE-S, PSE-S. The next step is to forward the proposal to Region 7 and the Member and Geographic Activities (MGA) Board for approval.

6. Pieter Botman and Meliha Selak are continuing the Section's efforts to encourage the establishment of student branches at UBC - Okanagan, Thompson Rivers University, the University of Northern BC and elsewhere in Mainland BC. If you would like to help or would like more information, please contact

p.botman@ieee.org or Meliha.Selak@bchydro.com.

7. Kouros Goodarzi is leading the effort to open an IEEE Concentration Banking account for Vancouver Section. This will simplify many important financial transactions.

8. Vancouver Section is actively supporting the IEEE International Conference on Ultrawideband to be held at the Hyatt-Regency in Vancouver from 9-11 Sep 2009. All members of the Section are invited to attend the industry workshop to be held in conjunction with the workshop on the afternoon of Wed, 9 Sep 2009. Registration is free of charge. Please see the announcement in this issue of Contact for further details!



Dave Michelson,
dmichelson@ieee.org

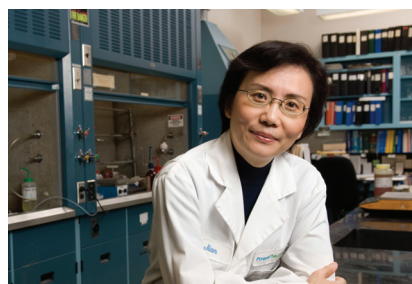
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A09-141

Institute for Computing, Information & Cognitive Systems Distinguished Lecture Series

Engineering Nanotechnology at UNC Charlotte: The Top-down Approach

Robert Hocken
 University of North Carolina at Charlotte
 Thursday 24 September 330-500pm
 Room 110 Hugh Dempster Pavilion
 6245 Agronomy Road UBC Vancouver, BC

which has been modified for picometer resolution (with MIT); the second is the Multi-Scale Alignment and Positioning System (MAPS) for nanoimprinting (with UCLA).

Speaker: Robert Hocken began his career at the National Bureau of Statistics, where he developed software correction of Coordinate Measuring Machines (CMMs) and the use of computer-assisted theodolites (with Bill Haight) for large-scale stereotriangulation. He played a lead role in the development of the Automated Manufacturing Research Facility, invented the laser tracker (with Kam Lau), and edited the first American measuring machine standard. In 1988, he came to UNC Charlotte as a chaired Professor, where he built the internationally recognized Center for Precision Metrology. The Center performs research and educates students in manufacturing metrology. Dr. Hocken has continued to perform research in areas ranging from large-scale metrology to nanotechnology. He is also active on the B89 Dimensional Metrology Committee, and is currently working with other universities on nanotechnology projects.

ICICS Distinguished Lectures are free

Continued from page 2 column 4

Speaker: Boris Stoeber is an Assistant Professor at the University of British Columbia in Vancouver, Canada, where he holds a joint position with the Department of Mechanical Engineering and with the Department of Electrical and Computer Engineering. He received the diploma degree in Electrical Engineering from the Technische Universität Darmstadt, Germany, and the diploma degree in General Engineering from the Ecole Centrale de Lyon, France, both in 1998, and the Ph.D. degree in Mechanical Engineering from the University of California at Berkeley, U.S.A., in 2002. Before joining the University of British Columbia he was a postdoctoral scientist with the Department of Chemical Engineering at the University of California at Berkeley. His research interests include microflow control strategies, flow physics of complex microflows, microflow imaging methods, microoptical devices, sensing technology, and fabrication techniques for micromechanical structures. His current work has applications in optical systems, environmental monitoring and in the biomedical area.

Info: EDS Chair, Bonnie Gray bgray@sfu.ca

Refreshments will be provided

Applications of Electromagnetic Transient Programs (PSCAD®/EMTDC™) for Power System Studies

Presented by
 Manitoba HVDC Research Centre
 To register for this event, please email
info@pscad.com, or call 1-204-989-1240

Wednesday 30 Sept 900a - 430p
 Hilton Vancouver Metrotown
 6083 McKay Avenue, Burnaby BC
There is no cost to attend

Lunch and refreshments will be served
 For further information, please contact
 IEEE PES Chapter Chair
 Glen Tang at glen.tang@ieee.org.

The Manitoba HVDC Research Centre, a subsidiary of Manitoba Hydro, performs innovative research and development into advanced power system technologies, developing and marketing an array of products and services worldwide including the renowned power system simulation software PSCAD®. PSCAD®, also known as PSCAD®/EMTDC™, is a powerful time domain electromagnetic transient simulation study tool which has limitless applications. PSCAD® can be used for transmission system design and performance, power quality studies, power electronic design, electric machine performance, distributed generation studies, control system and design optimization, protection system validation, among many others.

Download a free full-featured evaluation copy of PSCAD at: https://pscad.com/products/pscad/free_downloads

Who Should Attend

New and existing users of PSCAD®, Electrical Engineers & Engineers-in-training, power system analysts & technicians, and consultants. Previous PSCAD® experience is not necessary.

Participants will be provided a PSCAD® license for use during seminar, if they choose.

Various application areas will be presented and examples provided for participants' review and evaluation.

Seminar Outline

1. Introduction
 - Introduction to Electromagnetic transients in power networks
 - Introduction to Electromagnetic transient simulations programs—(PSCAD®/EMTDC™ in particular)
2. AC System Transient Studies
 - Transient/temporary over voltage studies (TOV)
 - Line energizing, capacitor bank back to back switching, inrush and out-rush reactors
 - Arrestor rating and the selection of arrestors
 - Transient recovery voltage across breakers (TRV)
3. Fast front studies—Insulation coordination
4. Transformers
 - Saturation and inrush current issues
 - Ferro resonance
5. Faults and detailed analysis of protection systems
 - DC offset in fault current, the rate of decay and its influence on CT saturation and relay

mal-operation

- Automated generation of a large number of fault waveforms in COMTRADE format for real time relay testing
- Detailed CT saturation models and their application

6. Induction Machines
 - Large induction motors starting issues including flicker and voltage dip problems

7. HVDC System Studies—AC/DC interaction, control methods, fault recovery and commutation failure

8. FACTS Devices—Applications in AC networks

- SVC, STATCOM, others
- 9. Wind Power—technology, role of simulation studies, examples

10. Power Quality—voltage dips, swells, harmonics and fluctuations

- Arc furnace loads
- 11. Synchronous machines / generators
- Controls including governors, exciters, PSS, ect.
- Sub-synchronous resonance issues and modeling

2009 IEEE International Conference on Ultra-Wideband 09 - 11 September 2009 Vancouver Canada Welcome and Call For Participation

<http://www.icuwb2009.org/>

ICUWB is the leading annual conference dedicated to the general topic of UWB communication in microwave and millimeter wave bands and over cable and power lines. It focuses on the latest advances in UWB technology, current and future applications ranging from UWB communication for personal area and sensor networks to UWB-based localization and positioning systems to UWB vehicular radar and imaging systems, and standardization and regulation for UWB transmission.

The main conference venue is the 34th floor of the Hyatt Regency Vancouver
 655 Burrard Street
 with a stunning 360 degree panorama view of the city and the nature surrounding it.
 For ways to participate in 2009 IEEE ICUWB please consult the website topics of Information for Sponsors & Exhibitors and Registration

Inquiries on any matters related to 2009 IEEE ICUWB should be directed to
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