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Tour of Ballard Power Systems' CLEARgen Powerbank fuel cells

Thursday 12 January
2:45pm - 4:15pm

Ballard Power Systems
9000 Glenlyon Parkway Burnaby

Fuel cell and hydrogen technology are important components of the evolving distributed power generation landscape. Fuel cells, combined with hydrogen storage, have the potential to save energy and reduce emissions when compared to other conventional systems. We will discuss the strategic and operational benefits of using fuel cells to generate clean and reliable electricity and review case studies detailing the successful application of Ballard's fuel cell system, powered by hydrogen generated as a by-product of chemical production, from the processing of municipal solid waste, renewable bio-gas generated at a landfill and other renewable sources.

Ballard's CLEARgen™ fuel cell system is a complete solution, designed to generate clean energy from hydrogen. Modular 500kW powerbanks are combined to produce multiple megawatts of zero-emission electricity, with heat created by the system providing hot water and space heating. The system can operate continuously to meet baseload power needs, or intermittently to provide peak power during times of high demand.

RSVP is required for this event.

Priority will be given to PES and IEEE members if the number of registrants exceeds spaces available.

Ballard Power Systems Inc. is a world leader in the development, manufacture, sale and servicing of clean energy hydrogen fuel cells. Our products and services are delivering economic and environmental benefits today across a wide range of applications, including motive power, backup power and distributed generation. Headquartered in Burnaby, British Columbia, we are working to accelerate fuel cell product adoption, by putting fuel cells to work through smarter, cleaner and reliable power solutions.

Hosts

Terry Howe P.Eng. is the Manager, Solutions Engineering. A graduate of Queen's University in Mechanical Engineering, Terry has worked at Ballard Power Systems Inc. since 1994.

Buz McCain, PhD, is Platform Manager for Distributed Generation. His Mechanical Engineering education includes degrees from UCLA, UC Berkeley, and the University of Michigan. Buz has been on the Ballard Power Systems' team since 2008



Power & Energy Society®

Information

Power and Energy Chair

Glen Tang

Glen.Tang@powerex.com



1MW CLEARgen™ fuel cell system



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Light refreshments served



**UNBC
DEPARTMENT
OF COMPUTER
SCIENCE AND
IEEE NBC**

Invite Faculty, Students, Staff and the Public to attend the following presentation:

“DWT-SVD IMAGE WATERMARKING USING SELECTED SUBBANDS”

Dr. Saif Zahir

**Computer
Science
Department
UNBC**

**Friday
January 20, 2012**

1:00 pm – 2:30 pm

**Room: ADM 1079
(Senate Chambers)**

This talk presents an image-watermarking scheme based on discrete wavelet transformation (DWT) and singular value decomposition (SVD). In this scheme, the host image is decomposed in to four DWT levels. SVD is applied on the HL1-4 and LH1-4 sub-bands of each level and pseudo number sequence is added to the singular values of their coefficients to produce what we call modified singular values. To obtain the modified HL and LH coefficients, we take the inverse of the SVD of the modified SVs. Finally, we perform the IDWT on the modified HL & LH coefficients as well as HH and LL coefficients to produce the watermarked image. Simulation results show that our watermark is robust against high JPEG compression, Gaussian-noise, resizing and other image processing attacks. In addition, this watermark is not susceptible to any false positive or negative as well as to detection of false reference watermark.

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**In memory of Hugh Goldie
IEEE Life Senior Member**

Hugh retired in 1987 after 30 years of service in the power utility business with B. C. Hydro and Power Authority, Vancouver, British Columbia, Canada. He was a registered professional engineer in B. C and a Senior Member of IEEE and was active in various administrative roles in IEEE for over 20 years. He held various offices in the Vancouver Section of IEEE from 1967 through to 1973, culminating in the Chairmanship in 1972-73. Hugh Goldie was one of five recipients from the Vancouver Section of IEEE to be awarded the 1984 IEEE Centennial Medal.



He was born November 9, 1929 in Vanderhoof, British Columbia and received his BA Se in Electrical Engineering from the University of British Columbia in 1953 and his Masters from McGill University in 1956. He was presented the Gold Medal from the Association of Professional Engineers for the Province of British Columbia for the highest standing for the four years leading to the BAsC degree.

In 1953 he joined the Northern Electric Company in Montreal as a development engineer and left in 1956 to take a position as Assistant Communications and Testing Supervisor in the Electrical Operating Division of British Columbia Electric. Hugh joined the British Columbia Hydro and Power Authority in 1962 as Communications Engineer in the Engineering Division. In 1966 he moved to Senior Control and Communications Engineer and in 1968 he became Assistant Manager, Systems Planning and Development Engineering Division, moving to Manager of that Division in 1970. Hugh moved to Vice President Electrical Operations in 1981 and then on to Vice President, Corporate Planning in 1984. Hugh Goldie was active in Industry affairs and was a member of the Professional Engineers of British Columbia, Senior Member of the IEEE and Honorary Lecturer, Department of Electrical Engineering at the University of British Columbia.

Hugh Goldie passed away on November 20, 2011.

Editor's note..

The IEEE Vancouver 2012 roster on the following page needs to be updated. If you know of changes which should be made kindly inform secretary B. Gill at bgill@ieee.org. The current roster is always available www.ieeecontact.org via the **Contact Us** tab.

The collection, review and verification of the IEEE Vancouver's archival records is continuing. The section History committee provides data records and summaries as available at the time of publication. Inaccuracies, corrections, and addendums to historical data will be published on an ongoing basis on IEEE Vancouver's history web site, located in the IEEE Global History Network http://www.ieeeahn.org/wiki/index.php/IEEE_Vancouver_Section_History.

The reader should refer to this web site for the most complete and accurate Vancouver Section historical data.

For example: the printed Centennial booklet shows

Publicity 2005 Gruja Blagojevic

and should show

Publicity 1989 Nick Keenan

2005 Gruja Blagojevic

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Jt. Chapter AES-10/AP-03/GRS-29/EMC-27/IMTT-17/PSE-43/RL-07
• Aerospace and Electronic Systems • Antennas and Propagation
• Geoscience & Remote Sensing • Electromagnetic Compatibility • Micro-wave Theory & Techniques • Product Safety Engineering • Reliability Society

Joint Applied Physics Chapter

Jt. Chapter IM-09/MAG-33/NPS-05/UFFC-20
• Instrumentation and Measurement • Magnetics • Nuclear and Plasma Sciences • Ultrasonics, Ferroelectrics and Frequency Control

Joint Communications Chapter

Jt. Chapter BT-02/COM-19/IT-12/ITS-38/PHO-36/VT-06
• Broadcast Technologies • Communications • Information Theory • Intelligent Transportation • Photonics • Vehicular Technology

Joint Computing Chapter

Jt. Chapter C-16/CIS-11
• Computer • Computational Intelligence

Joint Chapter CS-23/RA-24/SMC-28

Jt. Chapter CS-23/RA-24/SMC-28
• Control System • Robotics and Automation • Systems, Man and Cybernetics

Joint Industry Applications and Electronics Chapter

Jt. Chapter IAS-34/IE-13
• Industry Applications • Industrial Electronics

Joint Management Chapter

Jt. Chapter TMC-14/E-25/PC-26/SIT-30
• Technology Management Council • Education • Professional Communication
• Society on Social Implications of Technology

Joint Power and Energy Chapter

Jt. Chapter PE-31/DEI-32
• Power and Energy • Dielectric and Insulation

Joint Solid-State Circuits & Technologies Chapter

Jt. Chapter SSC-37/CPMT-21/CE-08
• Solid-State Circuits • Components, Packaging and Manufacturing Technology
• Consumer Electronics