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- From single media to multimedia - perception, coding, and quality



- Combined feedforward and feedback control of flexible structures: from atomic force microscopes to megawatt wind turbines
- Tour of BC Hydro's Burrard Thermal Generating Station  
*(date updated)*



- Advanced on-chip electrostatic discharge (ESD) protection solutions in CMOS/BiCMOS technologies



- MATLAB workshop review



- New product development



- Medical devices rocky road – knowing when to switch gears



- Special AGM 2010 will be in June
- IEEE mini-symposium on engineering for biomedical applications

[Message from the Chair](#)



Sheila S. Hemami  
Cornell University

**Distinguished Lecture**

Friday 26 March 2010  
1530 - 1630  
Room KAIS 2020  
Fred Kaiser Building  
2332 Main Mall, UBC

**Information**

Signal Processing Chair  
Z. Jane Wang  
zjanew@ece.ubc.ca

**Website**

<http://www.ece.ubc.ca/~zjanew/IEEESPvc.html>

## From single media to multimedia - perception, coding, and quality

Humans are the ultimate consumers of multimedia information, and effective system design requires a performance metric. While such metrics have been extensively studied for single-media perception for one or more decades, those for multimedia perception and use are still in their relative infancy.

In this talk, I will focus on the development of single-media quality metrics for audio and visual information, and contrast it with the development of appropriate metrics for multimedia information. I will describe how humans perceive single-media information, how an understanding of perception has been incorporated into single-media coding and then quality measurement, and I will discuss the current state of understanding of multimedia perception as it has been applied to coding and quality measurement problems

**Speaker**

Sheila S. Hemami (F) received the B.S.E.E. degree from the University of Michigan in 1990, and the M.S.E.E. and Ph.D. degrees from Stanford University in 1992 and 1994, respectively. Her Ph.D. thesis was entitled "Reconstruction of Compressed Images and Video for Lossy Packet Networks" and she was one of the first researchers

to work on what we now call "error concealment." She was with Hewlett-Packard Laboratories in Palo Alto, California in 1994 and worked on video-on-demand. She joined the School of Electrical Engineering at Cornell University in 1995, where she holds the title of Professor and directs the Visual Communications Laboratory.

Dr. Hemami's research interests broadly concern communication of visual information, both from a signal processing perspective (signal representation, source coding, and related issues) and from a psychophysical perspective.

Dr. Hemami is an IEEE Fellow and has held various visiting positions, most recently at the University of Nantes, France and at Ecole Polytechnique Federale de Lausanne, Switzerland. She has received numerous college and national teaching awards, including Eta Kappa Nu's C. Holmes MacDonald Award. She is currently Editor-in-Chief, IEEE Transactions on Multimedia (2008-10); Member-at-Large of the IEEE Signal Processing Society Board of Governors (2009-11), and an SPS Distinguished Lecturer (2010-11). She has Chaired the IEEE Image and Multidimensional Signal Processing Technical Committee (2006-07); and served as Associate Editor, IEEE Transactions on Signal Processing (2000-06).

## Advanced on-chip electrostatic discharge (ESD) protection solutions in CMOS/BiCMOS technologies



Juin J. Liou  
University of Central  
Florida

### Distinguished Lecture

Monday 12 April 100pm  
Simon Fraser University  
Applied Sciences Building  
(ASB) Room 9896

Light refreshments  
will be provided

#### Information

Electron Devices Chair  
Bonnie Gray  
bgray@sfu.ca

Electrostatic discharge (ESD) is a process in which a finite amount of charge is transferred from one object (i.e., human body) to the other (i.e., microchip). This process can result in a very high current passing through the microchip within a very short period of time, and more than 35% of chip damages can be attributed to such an event. As such, designing on-chip ESD structures to protect microchips against the ESD stress is a high priority in the semiconductor industry.

The continuing scaling of CMOS technology makes the ESD-induced failures even more prominent, and one can predict with certainty that the availability of effective and robust ESD protection solutions will be a critical component to the success of the deep sub-micron technology advancement. An overview on the ESD sources, models, protection schemes, and testing will first be given in this talk. This is followed by examples of designs of robust ESD protection solutions for CMOS/BiCMOS-based integrated circuits in digital and analog applications.

**Speaker:** Juin J. Liou received the B.S. (honors), M.S., and Ph.D. degrees in electrical engineering from the University of Florida, Gainesville, in 1982, 1983, and 1987, respectively. In 1987, he joined the Department of Electrical and Computer Engineering at the University of Central Florida (UCF), Orlando,

Florida where he is now the Pegasus Distinguished Professor and UCF-Analog Devices Fellow. His current research interests are Micro/nanoelectronics computer-aided design, RF device modeling and simulation, and electrostatic discharge (ESD) protection design and simulation.

Dr. Liou holds 5 U.S. patents (2 more filed and pending), and has published 8 books, more than 230 journal papers (including 14 invited articles), and more than 180 papers (including 69 keynote or invited papers) in international and national conference proceedings. He has been awarded more than \$9.0 million of research contracts and grants from federal agencies (i.e., NSF, DARPA, Navy, Air Force, NASA, NIST), state government, and industry (i.e., Semiconductor Research Corp., Intel Corp., Intersil Corp., Lucent Technologies, Alcatel Space, Conexant Systems, Texas Instruments, Fairchild Semiconductor, National Semiconductor, Analog Devices, RF Micro Device, Lockheed Martin), and has held consulting positions with research laboratories and companies in the United States, China, Japan, Taiwan, and Singapore. In addition, Dr. Liou serves as a technical reviewer for various journals and publishers, general chair or technical program chair for a large number of international conferences, and regional editor

(in USA, Canada and South America) for the Microelectronics Reliability journal.

Dr. Liou received ten different awards on excellence in teaching and research from the University of Central Florida (UCF) and six different awards from the IEEE Electron Device Society. Among them, he was awarded the UCF Pegasus Distinguished Professor (2009) – the highest honor bestowed to a faculty member at UCF, UCF Distinguished Researcher Award (four times: 1992, 1998, 2002, 2009), UCF Research Incentive Award (two times: 2000, 2005), UCF Trustee Chair Professor (2002), and IEEE Joseph M. Biedenbach Outstanding Engineering Educator Award in 2004 for his exemplary teaching, research, and international collaboration.

His other honors are Fellow of Institute of Engineering and Technology, Fellow of Singapore Institute of Manufacturing Technology, Fellow of UCF-Analog Devices, Distinguished Lecturer of IEEE Electron Device Society (EDS), and Distinguished Lecturer of National Science Council. He holds several honorary professorships, including Chang Jiang Scholar Endowed Professor of Ministry of Education, China – the highest honorary professorship in China, NSVL Distinguished Professor of National Semiconductor Corp., USA, Chang Gung Endowed Professor of Chang Gung University, Taiwan, Fang Chia Endowed Professor, Fang Chia University, Taiwan, Chunhui Eminent Scholar of Peking University, China, Cao Guang-Biao Endowed Professor of Zhejiang University, China, Honorary Professor of Xidian University, China, Consultant Professor of Huazhong University of Science and Technology, China, and Courtesy Professor of Shanghai Jiao Tong University, China.

Dr. Liou was a recipient of U.S. Air Force Fellowship Award and National University Singapore Fellowship Award. Dr. Liou served as the IEEE EDS Vice-President for Regions/Chapters, IEEE EDS Treasurer, IEEE EDS Finance Committee Chair, IEEE EDS Administrative Committee Elected Member, and IEEE EDS Educational Activities Committee Member.

## Special AGM 2010 to be held in June

Vancouver Section Executive Committee would like to announce that this year's Annual General Meeting will be held in June. Starting this year, our operational year has been aligned with the calendar year to be in compliance with IEEE bylaws. Elections for Vancouver Section officers will be announced at a later date this year, therefore there will be no transitioning to new officers at this special AGM. The business part of the meeting will include reports on Section operations and finances for 2009. More details coming soon!

## Combined feedforward and feedback control of flexible structures: from atomic force microscopes to megawatt wind turbines



Lucy Y. Pao  
University of Colorado

### Distinguished Lecture

Friday 26 March 2010  
14:00-15:00

Electrical & Computer  
Engineering  
2332 Main Mall  
Kaiser 2020, UBC

### Information

Control Systems chair  
Ryozo Nagamune  
nagamune@mech.ubc.ca

In the past, manipulators, machine tools, measurement and many other systems were designed with rigid structures and operated at relatively low speeds. With an increasing demand for fuel efficiency, smaller actuators, and speed, lighter weight materials are now often used in the construction of systems, making them more flexible. Flexible structures are also prevalent in space systems where lightweight materials are necessitated for fuel efficiency when carrying the structures into space. Achieving high-performance control of flexible structures is a difficult task, but one that is now critical to the success of many important applications, ranging from the shuttle remote manipulator system, satellites, megawatt wind turbines, robotic manipulators, gantry cranes, disk drives, tape systems, to atomic force microscopes. The unwanted vibration that results from maneuvering a flexible structure often dictates limiting factors in the performance of the system.

We will discuss a general combined feedforward and feedback control architecture and how it can be applied for controlling flexible structures. Depending upon the particular performance goals, such as tracking accuracy in a trajectory following task or rapid settle time for a point-to-point motion, there are different requirements for the controller. In many applications, the actuators and sensors are separated by the flexible structure, leading to nonminimum phase characteristics that are challenging for control. Over the last few decades, many feedback and feedforward control methods have been developed for flexible structures. We will overview and compare several of these control methods, and we will outline our recent and on-going investigations and applications in a few areas ranging from atomic force microscopes to megawatt wind turbines. Finally,

we shall close by discussing a number of future challenges.

**Speaker:** Lucy Y. Pao received the B.S., M.S., and Ph.D. degrees in Electrical Engineering from Stanford University, and she is currently the Richard and Joy Dorf Professor of Electrical, Computer, and Energy Engineering at the University of Colorado at Boulder. She was a Visiting Scholar at Harvard University during 2001-2002 and a Visiting Miller Professor at the University of California at Berkeley in Fall 2008, and she has recently completed a term as a Visiting Scholar at the National Renewable Energy Laboratory during January to August 2009. She has interests in the areas of control systems (with applications to flexible structures, atomic force microscopes, disk drives, tape systems, power converters, and wind turbines), multisensor data fusion (with applications to unmanned autonomous vehicles, satellites, and automotive active safety systems), and haptic and multimodal visual/haptic/audio interfaces (with applications to scientific visualization and spatial communication).

Professor Pao has received a number of awards and has been active in many professional society committees and positions. Selected current activities include being an IEEE Control Systems Society (CSS) Distinguished Lecturer (2008-2011), Chair of the 2008-2011 International Federation of Automatic Control (IFAC) Triennial World Congress Young Author Prize (YAP) Selection Committee, and General Chair for the 2013 American Control Conference. She is also the Scientific Director for the Center for Research and Education in Wind (CREW), a multi-institutional wind energy center involving the University of Colorado at Boulder, the National Renewable Energy Laboratory, Colorado School of Mines, and Colorado State University, in partnership with the National Center for Atmospheric Research and the National Oceanic and Atmospheric Administration.



Thursday 22 April 1pm  
Burrard Thermal  
(Port Moody)

### Information

Control Systems chair  
Ryozo Nagamune  
nagamune@mech.ubc.ca  
Registration by email is  
required for this event

## Tour of BC Hydro's Burrard Thermal Generating Station

The Burrard Generating Station is a 950 MW conventional natural gas-fired generating station. The largest thermal facility in BC Hydro's fleet, it is possibly the utility's most technically complex operation. It plays an important role to provide back-up for the hydroelectric system during low water years, and also to provide transmission support and electrical supply security for the Lower Mainland.

Burrard has been upgraded and modernized. Improvements have been made to reduce the emission of smog-forming pollutants, to eliminate

chlorine from the cooling water, to use a modern Digital Control System, to improve thermal efficiency, to reduce greenhouse gases, to provide oil spill containment, and to reduce noise at the facility. In 2009, the Provincial Government instructed BC Hydro to remove Burrard Thermal from its baseline supply of power.

This tour is an opportunity for engineers to learn what this means operationally, and to view the many recent modernizations at the plant.

**Cosponsors:** Joint presentation of Power & Energy Society and Control Systems Society.





## New product development

The presentation is intended for engineers that work on developing and producing products in large volume, yet want to optimize the product development cycle and avoid costly mistakes. The Presentation covers the Product Development (PD) phases and the roles of the different functions throughout the PD phases.

The purpose of this Presentation is to help engineers understand how the product development pieces fit together, and how to get the most out of their product development efforts. This will be done by going over the product development (PD) process, detailing the roles of each function, highlighting critical dependencies, and passing on best practices.

**Speaker:** Eric worked has 12 years experience in wireless product development and 7 years experience leading product development teams, and he was product development manager for the Nokia N91 and N96 smartphones.

He holds a US patent in cell phone antenna design, and has B.Eng. from the Royal Military College of Canada and a M.Eng. from Carleton University, both in electrical engineering. He is currently the Director of Global Project Management at Heli-One.

Eric Guetre  
Heli-One  
Monday 12 April  
700 - 900pm  
BCIT SW3 - 1750  
**Information**  
Joint Communications  
Chair Alon Newton  
alon.newton@gmail.com



## Medical devices rocky road – knowing when to switch gears

LightIntegra has developed the ThromboLux technology which is used as a point of care device to determine platelet quality for blood transfusions. Mr. Geyer is also Chairman of Neovasc Inc. (formerly Medical Ventures Corp.), a new specialty vascular device company that develops medical devices for the rapidly growing vascular and surgical marketplace.

He has served on the Board of Directors of British Columbia Science World since 2003 and currently holds the position of Chairman.

Mr. Paul Geyer graduated with a B.A.Sc. in Electrical Engineering from the University of British

Columbia in 1988. A Professional Engineer, he has taken numerous postgraduate courses in Bio-medical Engineering and medical technology and has completed the Canadian Securities Course.

He has been actively involved in the Cardiac Surgery and Interventional Cardiology markets for the past 18 years. Besides being an active angel investor in technology and life science companies, Mr. Geyer has established a private foundation, the PNG Enterprise foundation, which is actively involved in projects supporting a number of different Charitable organizations including World Vision, Red Cross and others.

Paul Geyer  
LightIntegra Technology  
Tuesday 30 March 2010  
400 – 500pm  
CHBE Room 101  
2360 East Mall, UBC  
**Information**  
EMBS Chair Ezra Kwok  
ezra@chml.ubc.ca

## Message from the Chair

### Section History Committee

IEEE Vancouver Section's new History Committee has achieved remarkable success during the past few months.

### IEEE Milestones Program

A few months ago, we proposed three electrical and computer engineering accomplishments for consideration for recognition by the IEEE History Committee as IEEE Milestones:

- First Television Broadcast in Western Canada, 1953. (CBUT, Mount Seymour)
- First Radio Astronomical Observations Using VLBI, 1967. (DRAO, Penticton)
- First 500 MeV Proton Beam from the TRIUMF cyclotron, 1974. (TRIUMF, Vancouver)

All three have been examined and approved by both the IEEE Milestones Coordinator

and an advocate appointed by the IEEE History Committee. If the nominations are approved by the full Committee, the final step will be approval by the IEEE Board of Directors. Dedication of a bronze plaque at a public ceremony at the site of each accomplishment will follow later this fall.

### Section History

Our next major activity is to prepare a short Section History in preparation for the Section Centennial in 2011. Several resources are available, including staff at IEEE History Centre, our Life Members, and six boxes of IEEE Vancouver Section Records that are held in the Special Collections Division at UBC Library. The collection "consists of records generated in the course of the merger and in the first months of the IEEE (1962-1963), as well as of the documentation of the two previous societies which constitute two sub-fonds: IRE (1950-1963) and AIEE (1911

- 1963). The fonds consists of minutes of meetings, as well as of annual report and publications and is arranged in three series : series one dealing with minutes of meetings (1963), series two consisting of annual report (1062-1963) and series three being a miscellanea of publications and leaflets (1960-1963). The sub-fonds IRE and AIEE are subdivided in numerous series."

If you're interested in joining the Section's History Committee and contributing to this effort, please contact me at your earliest convenience.

Dave Michelson, dmichelson@ieee.org





Command Window

File Edit Debug Desktop Window Help

Help to MATLAB? Watch this video, see Demos, or read Getting Started.

**MATLAB** **WORKSHOP**

SFU  
SIMON FRASER UNIVERSITY  
THINKING OF THE WORLD

IEEE  
Always one step ahead...

9 February 2010 ASB 9896 3:00PM to 4:30PM  
SFU IEEE Student Branch

SFU Presented by: Amir H. Khoshaman

On Tuesday February 9, 2010, the SFU IEEE student branch, led by Mohammad Akhlaghi, a 3rd-year undergraduate student and his team, organized our branch's first technical workshop, and the topic was Matlab. With over 50 undergraduate students and graduate students signed up, the workshop was over demand. Even Professor Glenn Chapman, our branch counselor, showed up to support the event.

Our presenter, Amir H. Khoshaman, a Masters student at SFU, volunteered to give the talk and carefully planned a presentation around topics that are most useful to students with their engineering courses this semester. Our aim is to assist students with their course work. Therefore, the topics that were chosen specifically targeting courses such as Ensc 320 (Electric Circuits 2) and Ensc 380 (Linear Systems). Topics include examples of using fourier transform, convolution, plotting functions in both time/freq domain, and plotting zeros and poles on real/imag axes.

Overall, the workshop was a great success, and students really liked the timeliness and the content of the presentation. We hope to continue this trend by providing more workshops in the near future for our students. We also asked students to provide feedback and suggest topics that they would like to see in the future, and our student executive team are using that to plan our next workshop topic.

Duncan Chan, SFU IEEE Student Branch Chair  
Mohammad Akhlaghi, Vice-Chair

(Photo note - Photos shot with Olympus 590 UZ (Ultra Zoom).  
[http://www.photographyblog.com/reviews/olympus\\_sp\\_590uz\\_review/](http://www.photographyblog.com/reviews/olympus_sp_590uz_review/)  
Camera's embedded software option stitched individual views together to produce the panoramic views shown here.)





# IEEE mini-symposium on engineering for biomedical applications

Friday 28 May 2010 1300 - 1630

Chair: Prof. Dave Michelson, UBC

Hosted by:

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



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 [davem@ece.ubc.ca](mailto:davem@ece.ubc.ca) with the subject line "Registration - 28 May 2010". Please indicate if you are an IEEE member.



*Keynote presentation*  
**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.



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

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