Center of Excellence in Intelligent Engineering Systems

SEMINAR

Speaker: Prof. Mohamad Sawan

Professor and Canada Research Chair,
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Mohamad Sawan received the Ph.D. degree in 1990 in Electrical Engineering, from Sherbrooke University, Canada. He joined Polytechnique Montreal in 1991, where he is currently a Professor of microelectronics and biomedical engineering. His interests are the design and test of analog, digital, RF, and optic circuits and Microsystems. Dr. Sawan is a holder of a Canada Research Chair in Smart Medical Devices, he is leading the Microsystems Strategic Alliance of Quebec (ReSMiQ), and is founder of the Polystim Neurotechnologies Laboratory. Dr. Sawan is founder and cofounder of several international conferences such as the IEEE NEWCAS, ICECS, and BIOCAS. He is cofounder, and Editor in Chief of the IEEE Trans. on BIOCAS, Deputy Editor-in Chief of the IEEE TCAS-II (2009-2013), Associate Editor of the IEEE Trans. on Biomedical Engineering, and he is Editor and Associate Editor, and member of the board of several other international Journals. Dr. Sawan is founder and chair of the Eastern Canadian IEEE-Solid State Circuits Society Chapter. He published more than 700 peer reviewed papers, two books, 10 book chapters, and 12 patents. Dr. Sawan received several awards, among them the Shanghai Municipality International Collaboration award, the Queen Elizabeth II Golden Jubilee Medal, the Bombardier Medal for technology transfer, the Jacques-Rousseau Award for achieved results in multidisciplinary research activities, the medal of merit from the President of Lebanon for his outstanding contributions, and the Barbara Turnbull Award for spinal-cord research in Canada. He is Fellow of the IEEE, Fellow of the Canadian Academy of Engineering, Fellow of the Engineering Institute of Canada, and Officer of the Quebec's National Order.

Date: **Monday, March 21, 2016**

Time: **1:00 PM**

Venue: **Engineering Building, Second floor, Room 24C28 (ECE Seminar Room)**

Title

Toward Brain-Microsystem Interfaces for the Treatment of Neurodegenerative Diseases

Abstract

Implantable Brain-Microsystem Interfaces intended for the diagnostic and treatment of neurodegenerative diseases are promising alternative to study neural activities underlying cognitive functions and pathologies, and eventually to recover lost neural vital functions. This talk covers circuit techniques and Microsystems intended for intracortical neurorecording and neurostimulation. The implementation of custom SOC-based devices requires dealing with multidimensional design challenges such as power management, low-power circuit design, high-data rate communication, and reliable wireless energy recovery. Case studies of continuous neurorecording intended for learning about the intracortical vision mechanism, and for spike onset detection of epileptic seizure focus localization and treatment will be described. In addition, microstimulation in the primary visual cortex intended to recover vision for the blind through multisite large arrays of microelectrodes will be reported. Finally, Lab-on-chip (LoC) based neuro-transmitters detection, manipulation and characterization intended to locate dysfunctions at the level of neural cells interconnections will be summarized.

ALL ARE CORDIALLY INVITED