

FROM THE EXECUTIVE COMMITTEE

It is with great pleasure that we bring you this new edition of Signal with a new format. In a second page we will regularly present the scientific contributions of our member. We will introduce articles published by ReSMiQ members in prestigious journals with high impact factors. As always your comments and suggestions are welcome. We are also very proud to announce that Professor Sylvain Martel, Director of Polytechnique Montréal's Nanorobotics Laboratory received a grant from the Québec Consortium for Drug Discovery (CQDM) for his research in controlling bacteria coated with anti-cancer drug that can be directed toward cancerous organs. The executive committee congratulates Professor Martel and all other ReSMiQ members for their achievements. Right now our priority, as many of you know, is to actively work to prepare the mid-term evaluation of our center by the FQRNT this coming October. Also our center will be sponsoring CMC's TEXPO 2011 to be held at Gatineau, Québec, on Octobre 19th.

Best regards,
M. Sawan, director

RESMIQ'S ACTIVITIES

Financial support competition for graduate students.
APPLICATION DEADLINE – October 15, 2011, 5:00pm
[Eligibility and Application](#)

GET READY! NEWCAS 2012

10th IEEE International NEWCAS Conference
June 17 - 20, 2012, Montréal, Canada

www.newcas2012.org

Message to members: we will be pleased to publish your news in forthcoming issues, let us know.

NEWS FROM OUR MEMBERS

EXPOSURE

Dr. Boukadoum from UQAM gave an invited talk at the Nanoelectronics and Advanced Design Seminar held at the INAOE in Puebla, Mexico.

[More details](#)

INVOLVEMENT

Dr. Thibeault from ETS is the Program Chair for the IEEE VLSI Test Symposium 2012, to be held in Hawaiï, USA.

[More details](#)

ACHIEVEMENT

Dr. Martel from Polytechnique received a 1,9M\$ grant from the CQDM for the battle against colorectal cancer.

[More details](#)

Dr. Boland from ETS is the recipient of the Excellence in Teaching award for 2011.

Dr. Izquierdo supervised the projects of Florent Lefèvre and Yu-Mo Chien, PhD students at UQAM, recipients of a 30K\$ Pierre-Péladeau Scholarship for their project in nanotechnologies.

[More details](#)

Dr. Thibeault from ETS received research chair entitled "Méthodologie de conception de systèmes hybrides, fortement intégrés, et hautement fiables".

SPOTLIGHT ON OTHER CONFERENCES

IEEE Biomedical Circuits and System Conference (BIO-CAS 2011), November 10 - 12, 2011, San Diego, USA.

[More details](#)

2011 International Conference on Electronics, Circuits and Systems (ICECS), December 7 - 9, 2011, Beirut, Lebanon.

[More details](#)

23rd International Conference on Microelectronics (ICM), December 19 - 22, 2011, Hammamet, Tunisia.

[More details](#)

RESEARCH CONTRIBUTIONS

Some of the research achievements of our members.
This month, three major contributions are presented.

1. E. Lareau, F. Lesage, P. Pouliot, D. Nguyen, J.L. Lan, **M. Sawan**, *Multichannel wearable system dedicated for simultaneous electroencephalography/near-infrared spectroscopy real-time data acquisitions*, Journal of Biomedical Optics 16(9), Sept. 2011.



Abstract- Functional neuroimaging is becoming a valuable tool in cognitive research and clinical applications. The clinical context brings specific constraints that include the requirement of a high channel count to cover the whole head, high sensitivity for single event detection, and portability for long-term bedside monitoring. For epilepsy and stroke monitoring, the combination of electroencephalography (EEG) and functional near-infrared spectroscopy (NIRS) is expected to provide useful clinical information, and efforts have been deployed to create prototypes able to simultaneously acquire both measurement modalities. However, to the best of

our knowledge, existing systems lack portability, NIRS sensitivity, or have low channel count. We present a battery-powered, portable system with potentially up to 32 EEG channels, 32 NIRS light sources, and 32 detectors. Avalanche photodiodes allow for high NIRS sensitivity and the autonomy of the system is over 24 h. A reduced channel count prototype with 8 EEG channels, 8 sources, and 8 detectors was tested on phantoms. Further validation was done on five healthy adults using a visual stimulation protocol to detect local hemodynamic changes and visually evoked potentials. Results show good concordance with literature regarding functional activations and suggest sufficient performance for clinical use, provided some minor adjustments were made.

2. O. El-Bakry, M. Ahmad, **M. Swamy**, *Identification of Differentially-Expressed Genes for Time-Course Microarray Data Based on Modified RM ANOVA*, IEEE/ACM Transactions on Computational Biology and Bioinformatics. Online.

The regulation of gene expression is a dynamic process, hence it is of vital interest to identify and characterize changes in gene expression over time. We present here a general statistical method for detecting changes in microarray expression over time within a single biological group and is based on repeated measures (RM) ANOVA. In this method, unlike the classical F-statistic, statistical significance is determined taking into account the time dependency of the microarray data. A correction factor for this RM F-statistic is introduced leading to a higher sensitivity as well as high specificity. We investigate the two approaches that exist in the literature for calculating the p-values using resembling techniques of gene-wise p-values and pooled p-values. It is shown that the pooled p-values method compared to the method of the gene-wise p-values is more powerful, and computationally less expensive, and hence is applied along with the introduced correction factor to various synthetic data sets and a real data set. These results show that the proposed technique outperforms the current methods. The real data set results are consistent with the existing knowledge concerning the presence of the genes. The algorithms presented are implemented in R and are freely available upon request.

3. Y. Fan, **Z. Zilic**, *Accelerating Test, Validation and Debug of High Speed Serial Interfaces*, Springer, 1st Edition., 2011, XII, 250 p.

Accelerating Test, Validation and Debug of High Speed Serial Interfaces provides innovative test, debug approaches and instructions on how to arrive to practical test of modern high-speed interfaces.

