

# IEEE Circuits and Systems Society Biomedical Circuits and Systems

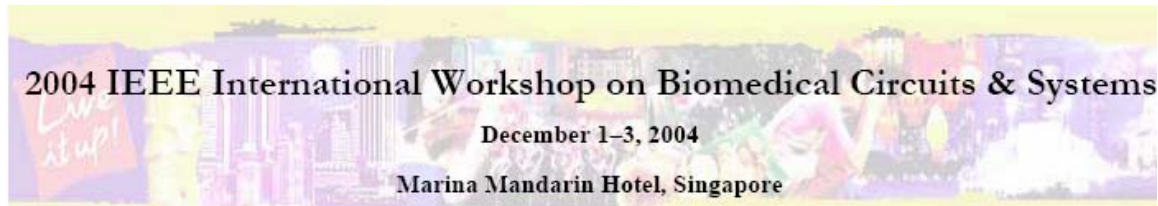
## Annual Activity Report 2004-2005

Chairman: Tor Sverre Lande  
Vice Chairman: Mohamad Sawan  
Secretary: Yong Lian  
Past Chairman: Chris Toumazou

The Biomedical Circuits and Systems technical committee focus on application of circuits in all sort of life sciences with a special emphasis on medical applications. Research areas covered are Biotechnology, Medical imaging, Bionics, Biomechanics, BioMEMS and derivatives thereof.

Our TC web-site: <http://ewh.ieee.org/soc/icss/committees/biocas/biocas.htm>  
where further information about BioCAS activities may be found.

The committee currently has 26 members all distinguished experts from the BioCAS field. In May 2004 TC meeting in Vancouver, Canada, Tor Sverre Lande continued his second year as chair elect. Our meeting was completely filled and people had to stand due to missing space.



The BioCAS workshop was successfully held in Singapore with approximately 140 attendees. On December 1 we had 4 tutorials organized. On December 2-3 we had two keynote speakers and a total of 110 papers presented in three parallel sessions. The workshop was organized by BioCAS TC Secretary Yong Lian and Past BioCAS TC Chair Chris Toumazou. Current BioCAS TC Chair, Tor Sverre Lande was Technical Program Chair and the BioCAS TC members were activated reviewing papers.

We are working on a special issue of TCAS-I with selected and extended papers from our workshop. In addition the special issue on Biomedical Circuits and Systems was opened for direct submissions. The response was significant. We have more than 65 submissions and have to select less than 20 for publication. This will hopefully result in a high quality exhibition of BioCAS research.

We have received and the BioCAS TC has approved a follow up of our workshop. The Director of Biomedical Institute in London, UK, Chris Toumazou, has offered to organized this event. Based on his plans we are scaling up the workshop to a full 3 days conference. As a multidisciplinary activity the conference will be a mix of short courses (morning) and technical sessions (afternoon). For practical reasons the conference is scheduled for November 29 to December 1, 2006.

As seen the BioCAS activity is picking up.

### ISCAS 2005

For ISCAS 2004 50 papers were submitted for the BioCAS track. We organized as three lectures with a total of 17 papers and 2 poster sessions containing 8 posters. Tor Sverre Lande was in charge of the review process as a member of the ISCAS 2004 TPC.

## TC member activities

Our committee members are all actively involved in a number of technical activities. Below is a list of those who has answered my request, but I am sure several more should have been included.

### 1. IEEE Services

- a) Peter Wu Board of Governors, *IEEE CAS Society*, VP conferences
- b) Chris Toumazou, Director of Biomedical Institute, Imperial College, UK.
- c) Orly Yadid-Pecht Board of Governors, *IEEE CAS Society*
- d) Ralph Etienne-Cummings Board of Governors, *IEEE CAS Society*
- e) Mohamad Sawan Elected Fellow of the IEEE
- f) Mohamad Sawan, CASS representative to the Steering Committee for C&D Magazine.
- g) André van Schaik Chair Elect of the Technical Committee on Sensors, *IEEE ISCAS, 2004*
- h) André van Schaik Secretary IEEE, Joint CASS and SSCC, NSW chapter, Australia
- i) André van Schaik *Distinguished Lecturer, INE 2004.*
- j) Orly Yadid-Pecht Chair of the Technical Committee on Sensors, *IEEE ISCAS, 2004*
- k) *IEEE Achievement Award, received for the ICECS2004.*
- l) Prof. Yong Lian served as General Co-Chair of the 2004 First IEEE International Workshop on Biomedical Circuits and Systems, 1-3 Dec. 2004, Singapore.
- m) Prof. Yong Lian served as Technical Committee Member, 2004 IEEE Asia Pacific Conference on Circuits and Systems, Taiwan, China, 2004.
- n) Prof. Yong Lian served as International Program Committee Member, 2004 IASTED Signal and Image Processing, Hawaii, USA, 2004.
- o) Prof. Yong Lian served as Invited Session Chair for Invited Session on Frequency-Response Masking Technique, 2004 IEEE International Symposium on Circuits and Systems, Vancouver, Canada, 2004.
- p) Prof. Yong Lian served as Session Chairs: FIR Digital Filters, 2004 IEEE International Symposium on Circuits and Systems, Vancouver, Canada, 2004.
- q) Prof. Yong Lian served as Session Chairs: Implantable Electronics, 2004 IEEE International Symposium on Circuits and Systems, Vancouver, Canada, 2004.
- r) Prof Lande served as Technical Program Chair for 2004 First IEEE International Workshop on Biomedical Circuits and Systems, 1-3 Dec. 2004, Singapore.
- s) Prof Lande served as Technical Program Chair for the 22<sup>nd</sup> NORCHIP conference sponsored by CAS, November 8-9, Oslo. Norway
- t) Prof Lande Member of ISCAS 2005 TC
- u) Ralph Etienne-Cummings and Philipp Häfliger organized the invited session on 'spiking neural networks' at ISCAS 2004.
- v) Wouter A. Serdijn ISCAS'2004 (TPC member and ASP Track Co-Chair)
- w) Wouter A. Serdijn ICECS'2004 (TPC member)
- x) Wouter A. Serdijn BioCAS'2004 (TPC/RC member)
- y) Wouter A. Serdijn Workshop on Advances in Analog Circuit Design (AACD'2005) (invited presentation)
- z) Wouter A. Serdijn ISCAS'2005 (TPC member and ASP Track Chair)
- aa) Wouter A. Serdijn Member CASS outstanding young author committee
- bb) Wouter A. Serdijn Tutorial organization for ISCAS'2005
- cc) Wouter A. Serdijn ProRISC workshop on Circuits Systems and Signal Processing (<http://www.stw.nl/prorisc/index.html>) Technical Program Committee: Wouter Serdijn and Georges Gielen
- dd) Mohamad SAWAN NEWCAS2004, Montreal
- ee) Erik Bruun management committee of the IEEE NORCHIP'2004 Conference, Oslo, Norway.
- ff) Tor Sverre Lande Technical Program Chair IEEE NORCHIP'2004 Conference, Oslo, Norway.
- gg) Erik Bruun Member of the program committee of the 30th European Solid-State Circuits Conference, Leuven, Belgium, 2004.
- hh) Tor Sverre Lande Technical Program Chair, the 2004 First IEEE International Workshop on Biomedical Circuits and Systems, 1-3 Dec. 2004, Singapore.

- ii) Erik Bruun Member of the Scientific Committee of the European Conference on Circuit Theory and Design, ECCTD 2005, Cork, Ireland.
- jj) Erik Bruun Member of the management committee of the IEEE NORCHIP'2005 Conference, Oulu, Finland.
- kk) Erik Bruun Member of the program committee of the Fifth Electronic Circuits and Systems Conference, Bratislava, Slovakia, 2005.
- ll) Erik Bruun Member of the conference committee of the IEEE PRIME 2005 conference (Ph.D.) Research in Microelectronics and Electronics), Lausanne, Switzerland, 2005
- mm) Erik Bruun Member of the program committee of the 31th European Solid-State Circuits Conference, Grenoble, France, 2005.

## 2. Editorial Services

- a) Orly Yadid-Pecht Deputy Editor in Chief: IEEE TCAS-I Journal
- b) Associate editor of IEEE TCAS-1 journal:
  - Yong Lian
  - Tor Sverre Lande
  - Gert Cauwenberghs
  - Wouter Serdijn
- c) Associate editors of IEEE Sensors journal
  - Gert Cauwenberghs
  - Ralph Etienne-Cummings
- d) Prof. Yong Lian is an Associate Editor, Circuits, Systems and Signal Processing.
- e) Prof. Yong Lian is a Guest Editor, IEEE Trans. on Circuits and Systems I.
- f) Prof. Yong Lian is a Guest Editor, Circuits, Systems and Signal Processing.
- g) Wouter A. Serdijn Analog Integrated Circuits and Signal Processing (Kluwer), member of the Editorial Board
- h) Tor Sverre Lande Analog Integrated Circuits and Signal Processing (Kluwer), member of the Editorial Board
- i) Wouter A. Serdijn International Journal of Low-Power Electronics, member of the Editorial Board
- j) Mohamad SAWAN Springer Mixed-Signal Letters
- k) Mohamad SAWAN Springer Alog special issue of IEEE ICECS2003
- l) Erik Bruun Analog Integrated Circuits and Signal Processing editorial board
- m) Erik Bruun Guest Editor of the January 2004 issue of Analog Integrated Circuits and Signal Processing (selected papers from NORCHIP'02).

## 3. IEEE distinguished lecturer program

- Prof. Yong Lian is a Distinguished Lecturer of IEEE Circuits and Systems Society.
- Prof. Yong Lian gave a Distinguished Lecturer talk in Shanghai, China, July 2004.
- Prof. Yong Lian gave a Distinguished Lecturer talk in Beijing, China, September 2004.
- Prof. Yong Lian gave a Distinguished Lecturer talk in Singapore, Oct. 2004. Conferences
- Orly Yadid-Pecht *Distinguished Lecturer, IEEE CASS, 2004-2005.*

## 5. Publications

- **Ralph Etienne-Cummings** 2003 Best Paper Award, *EURASIP Journal of Applied Signal Processing*, 2004
- Mohamad SAWAN 2005 Medal of honor from the President of Lebanon for outstanding achievements;
- Mohamad SAWAN 2004 Elected distinguished lecturer for the IEEE CAS Society;

- Mohamad SAWAN 2004 Co-recipient of Myril B. Reed Best Paper Award of the 46th IEEE-MWSCAS

### **Journal Publications:**

- d) van Schaik and S. Shamma, "A neuromorphic sound localizer for a smart MEMS system," *Analog Integrated Circuits & Signal Processing*, vol. 39, pp. 267-273, 2004.
- e) Jin, A. Corderoy, S. Carlile, and A. van Schaik, "Contrasting monaural and interaural spectral cues for human sound localization," *Journal of the Acoustical Society of America*, vol. 151, pp. 3124-3141, 2004.
- f) T. Delbruck and A. van Schaik, "Bias Current Generators with Wide Dynamic Range," *Analog Integrated Circuits and Signal Processing*, vol. 42, 2005.
- g) V. Best, A. van Schaik, and S. Carlile, "Separation of concurrent broadband sound sources by human listeners.," *Journal of the Acoustical Society of America*, vol. 151, pp. 324-336, 2004.
- h) V. Best, A. van Schaik, C. Jin, and S. Carlile, "Sharing auditory space: sound localization in the presence of a masker," *Acta Acustica, Special issue: Workshop on spatial and binaural hearing*, 2004.
- i) M. Clapp and R. Etienne-Cummings, "Sensing Signal Input Bearing to a Sensor Array Using Velocity-Sensitive Spatiotemporal Filters," *IEE Electronics Letters*, Vol. 40, No. 3, pp. 211-212, February 2004.
- j) V. Gruev and R. Etienne-Cummings, "A Pipelined Temporal Difference Imager," *IEEE J. Solid-State Circuits*, Vol. 39, No. 3, pp. 538 – 543, March 2004.
- k) R. Philipp and R. Etienne-Cummings, "A Single Chip Stereo Vision System," *Analog Integrated Circuits and Signal Processing Journal*, Vol. 7, pp. 703-712, July 2004.
- l) Fish and O. Yadid Pecht, "Adaptive thresholding for visual attention and tracking systems", *Optical Engineering*, Vol. 43, Issue 6, pp. 1278-1279, June 2004.
- m) A. Belenky, A. Fish, S. Hamami, V. Milrud and O. Yadid-Pecht, "Method for expanding the dynamic range of the readout integration circuits for uncooled microbolometer sensors", *Optical Engineering*, Vol. 43, Issue 06, pp. 1274-1275, June 2004.
- n) A. Fish, D. Akselrod, O. Yadid-Pecht, "A "Smart Sensor" for High Precision Image Centroid computation via a Low Resolution Winner-take-all Circuit in Conjunction with a Dynamic Element matching Algorithm", *Analog Integrated Circuits and Signal Processing journal*, Vol. 39, No. 3, pp. 251-266, June 2004.
- o) S. Diller, A. Fish, O. Yadid-Pecht, "Advanced Output Chains for CMOS Image Sensors Based on an Active Column Sensor Approach – A Detailed Comparison", *Sensors & Actuators: A. Physical*, Volume 116, Issue 2, pp. 304-311, October 2004.
- p) M. Herscovitz, O. Yadid-Pecht, "A modified Multi Scale Retinex Algorithm with an Improved Global Impression of Brightness for Wide Dynamic Range Pictures", *Machine Vision and Applications journal*, Volume 15, Number 4, pp. 220-228, October 2004.
- q) Shcherback, T. Danov, O. Yadid-Pecht, "A Comprehensive CMOS APS Crosstalk Study: Photoresponse Model, Technology and Design Trends", *IEEE Trans. on Elec. Dev.*, Volume 51, Number 12, pp. 2033-2041, December 2004.
- r) SAWAN, M., HU, Y., COULOMBE, J., "3Wireless Smart Implants Dedicated to Multichannel Monitoring and Microstimulation", *Invited paper in IEEE Circuits and Systems Magazine*, 2005, Vol. 5, pp. 21-39.
- s) COULOMBE, J., CARNIGUIAN, S., SAWAN, M., "3A Power Efficient Electronic Implant For A Visual Cortical Stimulator", *Artificial Organs J.*, Volume 29, Issue 3, pp. 233-238, March 2005.
- t) HARB, A., SAWAN, M., "3Low-Power CMOS Interface for Recording and Processing Very Low Amplitude Signal", *Springer Analog IC & Signal Proc. J.*, 2004, Vol. 39, pp.39-54.
- u) FAYOMI, C., SAWAN, M., ROBERTS, G., "3Reliable Circuit Techniques for LV Analog Design in Deep Submicron CMOS : A Tutorial", *Springer Analog IC & Signal Proc. J.*, 2004, Vol. 39, pp.21-38.
- v) A. Yurttas, E. Bruun, and R.G. Jensen, "Data Converter for Multistandard Mobile Phones," *Analog Integrated Circuits and Signal Processing*, vol. 38, pp. 53-61, January 2004.

- w) K.T. Christensen, T.H. Lee, and E. Bruun,  
 ``A High Dynamic Range Programmable CMOS Front-End Filter with a  
 Tuning Range from 1850 to 2400 MHz," *Analog Integrated  
 Circuits and Signal Processing*, vol. 42, pp. 55-64, January 2005.
- x) J.H. Nielsen and E. Bruun,  
 ``A CMOS Low-Noise Instrumentation Amplifier Using Chopper  
 Modulation," *Analog Integrated Circuits and Signal Processing*, vol. 42, pp. 65-76, January 2005.
- y) M. Cassia, P. Shah, and E. Bruun,  
 ``A Novel Calibration Method for Phase-Locked Loops," *Analog  
 Integrated Circuits and Signal Processing*, vol. 42, pp. 77-84, January 2005.

***Regular Refereed Conference Publications:***

- I. H. Shiraishi and A. van Schaik, "A 2-Dimensional Active Cochlear Model for Analog VLSI Implementation," presented at Proceedings of the IEEE International Symposium on Circuits and Systems, Vancouver Canada, 2004.
- II. Parthy, C. Jin, and A. van Schaik, "Reverberation for ambient data communication," presented at Proceedings of the 2004 International Conference on Auditory Display, Sydney, Australia, 2004.
- III. U. Mallik, E. Choi, M. Clapp, G. Cauwenberghs and R. Etienne-Cummings, "Temporal Change Threshold Detection Imager," accepted for *ISSCC'05 Digest of Technical Papers*, Vol. 48, Feb 2005.
- IV. R. J. Vogelstein, U. Mallik, G. Cauwenberghs, E. Culurciello and R. Etienne-Cummings, "Saliency-Driven Image Acuity Modulation on a Reconfigurable Silicon Array of Spiking Neurons," *accepted for Proc. of Neural Information Processing Systems*, Vancouver, Canada, December 2004.
- V. F. Tenore, R. Etienne-Cummings and M. A. Lewis, "Entrainment of Silicon Central Pattern Generators for Legged Locomotory Control," *Proc. of Neural Information Processing Systems 16*, S. Thrun, L. Saul and B. Scholkopf (Eds.), MIT Press, Cambridge, MA, 2004.
- VI. J. Vogelstein, U. Mallik, E. Culurciello, R. Etienne-Cummings and G. Cauwenberghs, "Spatial Acuity Modulation of an Address-Event Imager," *IEEE ICECS 2005*, Tel Aviv, Israel, December 2004.
- VII. Gruev and R. Etienne-Cummings, "Active Pixel Sensor with On-Chip Normal Flow Computation on the Read-Out," *IEEE ICECS 2005*, Tel Aviv, Israel, December 2004.
- VIII. V. Gruev, T. Horiuchi and R. Etienne-Cummings, "Linear Current Mode Imager with Low Fix Pattern Noise" *IEEE ISCAS'04*, May 2004.