Sensory Systems Technical Committee Annual Report

IEEE Circuits and Systems Society
Activities for May 2008 through April 2009

Chair : Shih-Chii Liu, Institut für Neuroinformatik, Switzerland, shih@ini.phys.ethz.ch
Chair-Elect: Bernabe Linares-Barranco, National Microelectronics Center, Spain, bernabe@imse.cnm.es
Secretary: Tobi Delbruck, Institut für Neuroinformatik, Switzerland, tobi@ini.phys.ethz.ch
Secretary Elect: Teresa Serrano-Gotarredona, National Microelectronics Center, Spain, terese@imse.cnm.es
Past Chair: Andre van Schaik, University of Sydney, Australia, andre@ee.usyd.edu.au

Annual Meeting: At ISCAS 2009, Taipei, Taiwan, Taipei Int. Convention Center, Room 203B, Monday, May 25th 2009 from 16.30 to 17.30.

Summary of Activities

The goal of the Sensory Systems (SS) Technical Committee is to foster research, development, education and industrial dissemination of knowledge relating to the emerging field of sensors, MEMS and associated processing systems. The activity is genuinely multidisciplinary, drawing upon knowledge and expertise from fields such as biology, physics, mechanics and chemistry, in addition to areas more traditionally associated with the IEEE such as electrical and computer engineering, computer science and information technology.

Committee members are renowned experts, who are both committed to, and active within, the field. The committee membership currently stands at 41 active members, 3 more than last year. The members voted during the annual meeting at ISCAS07 to modify the bylaws that govern the status of active members. This bylaw has been altered to "A member is removed from the committee if he/she does not attend three consecutive annual committee meetings or does not participate in the reviewing activities for three consecutive years".

At the last annual meeting, 30 TC members including new TC members were present (of a total of 46 members, representing an attendance rate of about 65%). The SSTC welcomed 3 new members last year (Dimitrios Loizos, Jacob Vogelstein, and Zeljko Ignjatovic).

The following details the CASS-related Sensory Systems activity by the committee and its members.

Participation in ISCAS track paper reviews:

The Sensory Systems Track received 66 submissions at ISCAS 2009. At least three reviews were arranged for each paper. With 6 Sensory System Sessions (4 oral, 2 posters), we had 29 accepted. There were no special sessions from SSTC this year.

This year, the demonstration track "Live demonstrations of Circuits and Systems" which was initiated from the SSTC and run as a special session for the previous 3 years was run for the first time as a regular ISCAS track, co-organized by SSTC member Philipp Hafliger.

Best Paper Award:

The 8 best papers in the Sensors track (according to the review scores) were selected by the TC 2008 Sensory Systems track chair (Dr. Liu) based on the feedback on all papers from the reviewers and Review Committee Members. These papers were then re-examined by the technical committee officers and members, Drs. Liu, Linares-Barranco, Delbruck, Serrano-Gotarredona, and in addition, 4 other committee members, each examining 6 papers, so that each paper would receive 6 reviews. Examining of a (co-)author's paper by the author was avoided. Each examiner ranked the 6 papers assigned with the best ranked paper receiving 6 points and the lowest ranked paper 1 point. The paper's points were tallied and the highest scoring paper has been selected as the best Sensory Systems track paper for 2009.

This year, the winning and honorary mention papers will be announced at the annual meeting instead of being reported here. The winning papers will then be reported in the SSTC meeting minutes.

3. Journal Special Issues:

4. Out Reach:

Members of our TC serve on program committees of various conferences such as SPIE, NIPS, ISSCC, ICECS, BICS and many others, and several members are active in organizing IEEE and other conferences and workshops.

5. Technical Committee Membership.

We have recruited a group of TC members that cover all the thrusts of our TC. The committee has members from academia, national labs and industry. We have also attempted to diversify the membership to include senior and junior scientists, as well as women and minorities. In addition, our members serve on the editorial boards of various Journals, such as IEEE TVLSI, TSensors, TCAS and AICSP journal.
(**Appendix A** contains a full list of current TC members)

6. Future Plans:

Extend visibility of TC via special issues, books, workshops, etc.

7. Committee member activities:

The activities by the various committee members are listed in **Appendix B**. 1 member (John Harris) is currently a IEEE CAS Distinguished Lecturer.

SSTC web site

The SSTC web pages are hosted by the IEEE at
http://www.ewh.ieee.org/soc/icss/committees/sensors/sensors-tc.php.
The officer and member lists are on the site, as well as reports and minutes. Suggestions for more dynamic content are welcome!

This meeting (2009) Teresa Serrano-Gotarredona (terese@imse.cnm.es) is taking over as secretary, and Bernabe Linares-Barranco as chair. Please inform Teresa and Bernabe of any needed changes to the site.

Editing the web site is possible by FTP download/upload. The current secretary (Tobi Delbruck) and chair (Shih-Chii Liu) currently have access to the site and will transfer this access to the new secretary and chair.

Appendix A: List of members

The following list of members does not include new members approved at the ISCAS 2009 meeting. The list is also maintained on the SSTC web site: http://ewh.ieee.org/soc/icss/committees/sensors/sensors-tc.php. (Linked from SSTCMemberList.xls.)

New committee members added at last annual meeting in 2008 in Seattle

Jacob Vogelstein

Johns Hopkins University
jacob.vogelstain@jhuapl.edu

Dimitrios Loizos

Design Engineer
NetLogic Microsystems, Inc.
1875 Charleston Rd.
Mountain View, CA, 94043
email: dloizos@netlogicmicro.com
Tel: +1 (650) 230-5642
Fax: +1 (650) 961-1092
and
Visiting Scholar
University of California, San Diego
Division of Biological Sciences
1500 Bonner Hall
9500 Gilman Dr.
La Jolla, CA, 92093
email: dloizos@ucsd.edu

Zeljko Ignjatovic

Univ of Rochester
ignjatoy@ecf.rochester.edu

Appendix B: member activities

Of the 46 members at the end of this period (including the 3 new members added at last annual meeting), 19 submitted activity reports.

Diego Barrettino (2008-2009)

Professional Activities:

Reviewer for Nature, IEEE Journal of Solid-State Circuits, IEEE Sensors Journal, IEEE Transactions on Biomedical Engineering, and IEEE Transactions on Circuits and Systems I.

Invited talks:

18.01.2008, CMOS-MEMS Sensors, Department of Materials, Microsystems and Nanotechnology Centre, Cranfield University, Bedfordshire, United Kingdom.

21.07.2008, CMOS-MEMS Sensors, Department of Electronic Engineering, University of Buenos Aires, Argentina.

30.04.2009, CMOS-MEMS Sensors, Tyndall National Institute, Cork, Republic of Ireland.

Journal Publications:

D. Jenkins, C. Song, S. Fares, H. Cheng, and D. Barrettino, Disposable Thermostated Electrode System for Temperature Dependent Electrochemical Measurements, Sensors & Actuators: B. Chemical, Vol. 137, pp. 222-229, 2009.

Amine Bermak (2008-2009)

IEEE Services

Invited talks

Wide Dynamic Range Compressive Sampling Smart CMOS Image Sensors" _Invited Seminar at Yonsei University, Electrical and Electronic Engineering Department_, Seoul, Korea, April 2009.

"Compressive Acquisition in CMOS Image Sensors -A New Design Paradigm" _Invited talk at the 214th Electrochemical Society's Fourth International Symposium on Integrated Optoelectronics_, Hawaii, Oct. 2008.

"A Low Power Digital Pixel Sensor with a dynamically biased ADC" Invited Talk at the International System on Chip Conference, ISOCC, 2008, Busan, South Korea.

Conference Organization

Symposium Chair at the "2008 Symposium on Emerging Low Power Sensor Technologies, Sydney, Australia.

Sensors and MEMS Track Chair at the "2008 IEEE Asia Pacific Conference on Circuits and Systems", Nov 2008, Macau.

General Chair at the "2008 IEEE International Conference on Electronic Design, Test and Applications", Hong Kong.

Editorial Services

Associate Editor IEEE Transactions on Very Large Scale Integration (VLSI) Systems.

Associate Editor IEEE Transactions on Biomedical Circuits and Systems.

Associate Editor Journal of Sensors.

Other Professional Activities

Member of the IEEE Circuit and Systems Society's Technical Achievement Award Subcommittee 2008 (the committee is responsible for selecting the recipient of the circuit and systems society's Technical Achievement award).

Session chairman at the "_2008 IEEE Asia Pacific Conference on Circuits and Systems_", "The Fourth International Conference on Intelligent Sensors, Sensor Networks and Information Processing," 2008,

Awards and Honors

Recipient of the _IEEE Service Award_ from IEEE Computer Society for Serving as a General Co-Chair at DELTA 2008.

Publications

Book Review

CMOS Mixed-Signal Circuit Design, R. Jacob Baker, IEEE Press, Wiley, Second Edition, 2009.

Journals

Xiaojin Zhao, Amine Bermak, Farid Boussaid, and Vladimir G. Chigrinov "Thin Photo-Patterned Micropolarizer Array for CMOS Image Sensors, IEEE Photonics Technology Letters, Accepted 2009.

A.B. Far, F. Flitti, B. Guo, and A. Bermak, "A Bio-inspired Pattern recognition System for tin oxide gas sensor applications, *IEEE Sensors Journal*, Accepted 2009.

Milin Zhang and A. Bermak, "Compressive Acquisition CMOS Image Sensor --From Algorithmic Solution to Hardware Implementation" *IEEE Transactions on Very Large Scale Integration Systems*, Accepted 2009.

F. Flitti, B. Guo, A.B. Far and A. Bermak, "A Robust and Low Complexity Gas recognition Technique for on-Chip Tin-Oxide Gas Sensor Array," *Journal of Sensors*, Volume 2008, pp. 1-6, 2008.

S. Chandrasekaran, A. Amira A. Bermak and *M. Shi* "An Efficient VLSI Architecture and FPGA Implementation of the Finite Ridgelet Transform" Journal of Real-Time Image Processing, Vol 3, No 3, pp 183-193, September 2008.

M. Shi, A. Bermak, *S. Chandrasekaran* and A. Amira, "A Committee Machine gas identification System Based on Dynamically Reconfigurable FPGA," *IEEE Sensors Journal*, Vol. 8, Issue 4, pp. 403 – 414, April 2008.

S. Chen, F. Boussaid[(*)] and A. Bermak, "Robust Intermediate Read-out for Deep Submicron CMOS Image Sensors," *IEEE Sensors Journal*, Vol. 8, pp. 286 – 294, March 2008.

B. Guo, A. Bermak, P.C.H. Chan and G. Yan, Characterization of Integrated Tin Oxide Gas Sensors with Metal Additives and Ion Implantations, *IEEE Sensors Journal*, Vol. 8, issue 8, pp. 1397-1398, Aug. 2008.

Conference Proceedings

Hung Tat Chen, Amine Bermak, Dominique Martinez, Smellphone: odour recognition with a cellular phone, ISOEN2009, International Symposium on Olfaction and Electronic Nose, Brescia/Italy 2009 (accepted).

Milin Zhang and Amine Bermak, "Architecture of a Digital Pixel Sensor Array Using 1-bit Hilbert Predictive Coding", ISCAS2009, IEEE International Symposium on Circuits and Systems, Taipai, Taiwan 2009 (accepted).

Faycal Benrekia, Mokhtar Attari and A. Bermak, "FPGA Implementation of a Neural Network Classifier for Gas Sensor Array Applications" Sixth IEEE International Multi-Conference on Systems, Signals and Devices" SSD 09, Djerba, Tunisia, 2009 (accepted).

Kwan Ting Ng, Hung Tat Chen, Farid Boussaid, A. Bermak, and Dominique Martinez A Robust Spike-Based Gas Identification Technique for SnO2 Gas Sensors ISCAS2009, IEEE International Symposium on Circuits and Systems, Taipai, Taiwan 2009 (accepted).

Zheng, I.; Zhang, X.; Flitti, F.; A. Bermak; "Cascaded classification for hardware face detection", IEEE International Conference on Electron Devices and Solid-State Circuits (EDSSC) 2008, Page(s):1–4, 8-10 Dec 2008.

Wu Xia Jun, Bermak Amine, "A Low Power Digital Pixel Sensor with a Dynamically Biased ADC", Internation SoC Design Conference (ISOCC) 2008, Nov 2008.

Zhang Milin, Bermak Amine, Li Xiaowen, Wang Zhihua, "A Low Power CMOS Image Sensor Design for Wireless Endoscopy Capsule", BioCAS 2008, Biomedical Circuits and Systems Conference, 2008. 20-22 Nov. 2008.

Xiaojin Zhao, Amine Bermak, Farid Boussaid, "A CMOS Digital Pixel Sensor with Photo-Patterned Micropolarizer Array for Real-Time Focal-Plane Polarization Imaging" BioCAS 2008, Biomedical Circuits and Systems Conference, 2008. 20-22 Nov. 2008.

Kwan Ting Ng; Guo Bin; Martinez Dominique; Boussaid Farid; Bermak Amine, "A 4×4 tin oxide gas sensor array based on spike sequence matching", Conf: 2nd International Conference on Signals, Circuits and Systems (SCS) 2008.

N.T. Ngo, T.T.T. Do, T.M. Le, Y.S. Kadam, and A. Bermak, "ASIP-controlled Inverse Integer Transform for H.264/AVC Coding," Proceedings of the 19th IEEE/IFIP International Symposium on Rapid System Prototyping, pp.158-164, 2008.

Amine BERMAK, Milin ZHANG, "Compressive acquisition in CMOS Image Sensors -A new design paradigm", invited paper at 214th Electrochemical Society's Fourth International Symposium on Integrated Optoelectronics, Hawaii Oct, 2008.

Milin ZHANG, Amine BERMAK, "A Compact Digital Pixel Sensor Architecture Using Predictive Coding Scheme", Accepted at the 7th IEEE Conference on Sensors, Page(s):961 – 964, Italy, Oct. 2008.

Milin ZHANG, Amine BERMAK, "Design of Digital Pixel Image Sensor with Adaptive Quantization and Pseudo Huffman Coding", Accepted at the 15th IEEE International Conference on Electronics, Circuits and Systems, Page(s):870 - 873. Malta, Sept 2008.

A. Far, F. Flitti, B. Guo and A. Bermak, "Gas Identification System based on Temperature Modulation tin-oxide sensors and bio-inspired processing", Accepted at the 15th IEEE International Conference on Electronics, Circuits and Systems, Malta, Sept 2008.

M. Law and A. Bermak, "A Time Domain Differential CMOS Temperature Sensor with Reduced Supply Sensitivity"" Accepted at the IEEE International Symposium on Circuits and Systems ISCAS2008, Seattle, USA, May 2008.

Aicha FAR, Bin GUO, Farid FLITTI, Amine BERMAK, "Temperature Modulation for Tin-Oxide Gas Sensors", 4th IEEE International Symposium on Electronic Design, Test & Applications, Jan. 2008.

Maxime AMBARD, Dominique MARTINEZ, Bin GUO, Amine BERMAK, "A Spiking Neural Network for Gas Discrimination using a Tin Oxide Sensor Array" 4th IEEE International Symposium on Electronic Design, Test & Applications, Jan. 2008.

Farid FLITTI, Aicha FAR, Bin GUO, Amine BERMAK, "Drift invariant Gas Recognition Technique For Tin Oxide Gas Sensor array," 4th IEEE International Symposium on Electronic Design, Test & Applications, Jan. 2008.

Oliver A. PFÄNDER, Reinhard NOPPER, Hans-Jörg PFLEIDERER, Shun ZHOU, Amine BERMAK, "Configurable Blocks for Multi-Precision Multiplication," 4th IEEE International Symposium on Electronic Design, Test & Applications, Jan. 2008.

Xiaoxiao ZHANG, S. Bouzerdoum, F. Boussaid and A. Bermak, "A compact CMOS Face Detection architecture based on Shunting Inhibitory Convolutional Neural Networks" 4th IEEE International Symposium on Electronic Design, Test & Applications, Jan. 2008

Yan Wang, Shoushun Chen and Amine Bermak, "Novel VLSI Implementation of Peano-Hilbert Curve Address Generator", IEEE International Symposium on Circuits and Systems, May 19-21, 2008, Seattle, USA.

Kwan Ting Ng, Chen Shoushun, Farid Boussaid, Amine Bermak, "Compact Gray-Code Counter/Memory Circuits for Spiking Pixels", 4th IEEE International Symposium on Electronic Design, Test & Applications, Page(s): 506-511, Jan. 2008, Hong Kong.

Y. Wang and A. Bermak, "FPGA Implementation of a Predictive Vector Quantization image compression algorithm for image sensor applications", IEEE International Symposium on Electronic Design, Test and Applications, Jan. 2008, Hong Kong.

Milin Zhang and A. Bermak, "Architecture of a Low Storage Digital Pixel Sensor Array with an On-line Block-Based Compression" IEEE International Symposium on Electronic Design, Test and Applications, Hong Kong, Jan. 2008, Hong Kong.

Shantanu Chakrabartty (2008-2009)

Professional Activities and Service

Associate Editor, Advances in artificial neural systems, Hindawi Publications.

Panelist, National Science Foundation

Member, IEEE

Member technical committee for IEEE Neural Network Society and Biomedical circuits and systems (BioCAS) society.

Technical Program Committee for 20th Symposium on Integrated Circuits and Systems Design, 2008, IEEE Biomedical Circuits and Systems Conference 2008.

Reviewer for IEEE transactions on Circuits and Systems, IEEE Int. Symp. On Circuits and systems, IEEE sensors journal, IEEE transactions on signal processing, IEEE transactions on Neural Networks, IEEE transactions on Biomedical engineering, Pattern Recognition Journal.

Publications

Journal Publications

N. Lajnef, N. Elvin, A. Elvin and S. Chakrabartty, ``**Piezo-Powered Floating Fate Injector for Self-Powered Fatigue Monitoring in Biomechanical Implants**", *IEEE Transactions of Biomedical Circuits and Systems*, pp.164-172, Vol. 2, Sept. 2008.

Y. Liu, A. Gore, S. Chakrabartty*, and E. C.Alocilja, "**Characterization of Sub-systems of a Molecular Bio-wire based Biosensor Device**," *Microchimica Acta* , 2008, DOI: 10.1007/s00604-008-0950-0.

Conference Publications:

C. Huang and S. Chakrabartty,`` **Low-threshold Voltage Multipliers based on Floating-gate Charge-pumps**", *IEEE Biomedical Circuits and Systems Conference*, Baltimore, USA, 2008.

C. Huang and S. Chakrabartty,`` **Self-powered CMOS Impact-rate Monitors for Biomechanical Implants**", *IEEE Biomedical Circuits and Systems Conference*, Baltimore, USA, 2008.

Y. Liu, E. C.Alocilja and S. Chakrabartty, "Forward Error Correcting Biosensors: Modeling, Algorithm, and Fabrication," *IEEE Biomedical Circuits and Systems Conference*, Baltimore, USA, 2008.

S. Chakrabartty and Y. Liu, ``**Towards Reliable Multi-pathogen Biosensors using High-dimensional Encoding and Decoding Techniques**", *SPIE Symposium on NanoScience+Engineering*, San Diego, CA, 2008.

A. Fazel , S. Chakrabartty, ``**Sigma-Delta Learning for Super-Resolution Independent Component Analysis"**, *IEEE International Symposium on Circuits and Systems (ISCAS),* Seattle, WA, 2008.

Y. Liu, S. Chakrabartty, E. C.Alocilja, **"A Multiplexed Biosensor based on Biomolecular Nanowires,"** *IEEE International Symposium on Circuits and Systems* , Seattle, USA, 2008.

Y. Liu, S. Chakrabartty, **"Computer Aided Simulation and Verification of Forward Error-Correcting Biosensors,"** *IEEE International Symposium on Circuits and Systems* , Seattle, USA, 2008.

N. Lajnef, S. Chakrabartty and N. Elvin, **"Calibration and Characterization of Self-powered Floating-gate Sensor Arrays for Long-term Fatigue Monitoring**", *IEEE Symposium on Circuits and Systems (ISCAS),* Seattle WA, May 2008.

A. Fazel , S. Chakrabartty, **Sigma-Delta Resolution Enhancement for Far-field Acoustic Source Separation**, *IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Las Vegas, NV, 2008..

Patents:

S. Chakrabartty, "Multiple-input Multiple-output Analog-to-digital Converter", US Patent no: 7,479,911, Issued January 20, 2009.

Workshops/Conferences/Panels/Invited Talks:

Operating below the sub-microwatt barrier – Explorations in Analog Computing, Invited Presentation, Wireless Integrated Microsystems (WIMS), University of Michigan, Ann Arbor, April 2009.

CMOS Circuits for Biomechanical Implants, Invited Presentation, CMOS Emerging Technologies Workshop, Vancouver, August 2008.

Sub-microwatt Sensors for Structural Health Monitoring of Biomechanical Implants, Invited Presentation, University of California, San Diego, August 2008.

Towards Reliable Multi-pathogen Biosensors using High-dimensional Encoding and Decoding Techniques, Invited Presentation, SPIE Symposium on NanoScience+Engineering, CA 2008.

High-dimensional Encoding-Decoding Techniques for Reliable Pathogen Detection, Invited Presentation, Hunter College, City University of New York, Feb 2008.

Mixed-signal data mining on microphone array hearing aids, Invited Presentation, Radio-Frequency Integrated Circuits Symposium, Atlanta Georgia, July, 2008.

Session Chair: IEEE BioCAS, Fall 2008.

Marc Cohen (2008-2009)

Journal Publications:

Y. L. Wong, M. H. Cohen, and P. A. Abshire, "A 750MHz 6b Adaptive Floating Gate Quantizer in 0.35µm CMOS." IEEE Transactions on Circuits and Systems I. In Press.

Y. L. Wong, Marc H. Cohen, and P. Abshire, "A 1.2GHz Comparator with Adaptable Offset in 0.35µm CMOS," IEEE Transactions on Circuits and Systems I, Vol. 55(9): 2584-2594, Oct. 2008.

Patents Issued:

7,400,253: "Harvesting Ambient Radio Frequency Electromagnetic Energy for Powering Wireless Electronic Devices, Sensors and Sensor Networks and Applications Thereof", Marc H. Cohen, July 2008.

7,461,972: "One Point Calibration Integrated Temperature Sensor for Wireless Radio Frequency Applications", Marc H. Cohen, September 14, 2006.

Invited Talks:

CSL/JIFSAN Symposium: "Tracking Technologies for Agri-Food", Marc H. Cohen, May 13-15, 2009.

Peer Reviewer:

Singapore National Science Foundation, 2009.
IEEE Transactions on Circuits and Systems I.
IEEE Sensors

Timothy G. Constandinou, (2008-2009)

Professional Activities and Service

Reviewer: IEEE JSSC, IEEE TBCAS, IEEE TNN, IET EL, IET CDS, IEEE ISCAS, IEEE BioCAS

Publications

Books

Timothy G. Constandinou, "Biologically Inspired Electronics for Micropower Vision Processing", VDM Verlag, ISBN: 978-3-639-13391-2, March 2009.

Journal Publications

Timothy G. Constandinou and Julius Georgiou, "A Micropower Arcsine Circuit for Tilt Processing", IET Electronics Letters, Vol. 44, No. 23, pp.1336-1338, 2008.

Timothy G. Constandinou, Julius Georgiou and C. Toumazou, "A Partial-Current-Steering Biphasic Stimulation Driver for Vestibular Prostheses", IEEE Transactions on Biomedical Circuits & Systems, Vol. 2, No. 2, pp. 106-113,

Timothy G. Constandinou and Julius Georgiou, "Micro-Optoelectromechanical Tilt Sensor", Journal of Sensors, ISSN: 1687-725X, pp. 1-7, 2008.

Timothy G. Constandinou, Julius Georgiou and Chris Toumazou, "Micropower front-end interface for differential-capacitive sensor systems", IET Electronics Letters, Vol. 44, No. 7, pp. 470-472, 2008.

Conference Publications:

Timothy G. Constandinou and Julius Georgiou, "A Micropower Tilt Processing Circuit", IEEE Biomedical Circuits and Systems Conference (BioCAS- Baltimore, USA), pp. 197-200, 2008.

Themis Prodromakis, Pantelis Georgiou, Timothy G. Constandinou, Kostis Michelakis and Chris Toumazou, "Batch Encapsulation Technique for CMOS based Chemical Sensors", IEEE Biomedical Circuits and Systems Conference (BioCAS- Baltimore, USA), pp. 321-324, 2008.

Timothy G. Constandinou, Julius Georgiou and Chris Toumazou, "A Fully-Integrated Semicircular Canal Processor for an Implantable Vestibular Prosthesis", IEEE International Conference on Electronics, Circuits and Systems (ICECS- Malta), pp. 81-84, 2008.

Timothy G. Constandinou, Julius Georgiou and Charalambos Andreou, "An Ultra-Low-Power Micro-Optoelectromechanical Tilt Sensor", IEEE International Symposium on Circuits and Systems (ISCAS- Seattle, USA), pp. 3158 – 3161, 2008.

Timothy G. Constandinou, Julius Georgiou and Chris Toumazou, "A Partial-Current-Steering Biphasic Stimulation Driver for Neural Prostheses", IEEE International Symposium on Circuits and Systems (ISCAS- Seattle, USA), pp. 2506 – 2509, 2008.

Timothy G. Constandinou, Julius Georgiou and Chris Toumazou, "A Micropower Front-end Interface for Differential-Capacitive Sensor Systems", IEEE International Symposium on Circuits and Systems (ISCAS- Seattle, USA), pp. 2474 – 2477, 2008.

Timothy G. Constandinou, Julius Georgiou and Chris Toumazou, "Towards an Integrated, Fully-Implantable Vestibular Prosthesis for Balance Restoration", TransTech International Conference on Smart Materials, Structures and Systems, Advances in Science and Technology (CIMTEC- Sicily), Vol. 78, pp. 210 – 215 2008.

Workshops/Invited Talks:

Invited Speaker: "Bio-Inspired Technology for Next Generation Healthcare", ETH/IBT seminar, Institute for Biomedical Engineering, ETH Zurich, Switzerland, 7th April 2009.

Invited Speaker: "Advances in Silicon-based Disposable Point of Care Applications", Advances in Biosensors for Point of Care Applications, National Physics Laboratory (NPL), Teddington, UK, 25th February 2009.

Invited Speaker: "Emerging Inner Ear Implant Technologies", Hallpike Symposia, British Association of Audiovestibular Physicians (BAAP), Sheffield, UK, 20th February 2009.

Invited Speaker: "Towards Totally Implantable Neural Prostheses for Inner Ear Rehabilitation", UK-Japan Brain Machine Interface Workshop, Tokyo, Japan, 12th February 2009.

Eugenio Culurciello (2008-2009)

IEEE services

Invited talks

Yonsei University, Seoul S. Korea, December 5th 2008, host: prof. Gunhee Han.

KAIST (Korean Advanced Institute of Science and Technology), Daejon S. Korea, December 9th 2008, host: prof. Hoi-Jun Yoo.

National Academies, NAFKI Complex Systems Conference, invited with full travel grant, November 13-15 2008.

Columbia University, "Silicon-on-sapphire: mixed-signal circuits and micro-systems design and opportunities", October 31st 2008. Host: prof. Yannis Tsividis.

IEEE International SOI conference, "Mixed Signal Microsystems in Emerging SOI ", invited talk, October 6-9 2008. Host: Mario Pelella, AMD.

University of Washington, "Integrated potentiostat for patch-clamp instrumentation", invited to weekly Electrical Engineering seminar series, Friday May 23rd 2008, Host: prof. Mani Soma.

Organizing: Conferences, Workshops, Panels, Special Sessions, Tutorials

IEEE BioCAS 2008: tutorials chair

IEEE Circuits and System for Medical and Environmental Applications Workshop 2009: invited talk chair

Editorial Services

Associate Editor for: IEEE Transaction on Biomedical Circuit and Systems (BioCAS) and PloS ONE Synthetic Vision Systems.

Awards and Honors

Best Paper Award, IEEE Circuit and System Society, for the IEEE ISCAS 2008 paper "Fall detection using an address-event temporal contrast vision sensor"

Publications

Invited papers

Mixed Signal Microsystems in Emerging SOI Technologies, E. Culurciello, IEEE SOI International Conference, October 2008, invited paper.

Books and Book Chapters

E. Culurciello, "Silicon-on-Sapphire, SOI circuits and systems", McGraw Hill publishing company, final version submitted, to be published in Fall 2009.
Journals
Ultra-low Current Measurements with Silicon-on-sapphire Integrator Circuits, E. Culurciello, H. Montanaro, D.S. Kim, IEEE Electron Device Letters, Vol. 30, Issue 3, March 2009, pp 258 – 260.
An Address-Event Fall Detector for Assisted Living Applications, Z. Fu, T. Delbruck, P. Lichsteiner, E. Culurciello, IEEE Transactions on Biomedical Circuits and Systems TBCAS, June 2008, Vol. 2, Issue 2, pp. 88-96.
An Integrated Patch-Clamp Potentiostat with Electrode Compensation, P. Weerakoon, K. Klemic, F.J. Sigworth, E. Culurciello, IEEE Transactions on Biomedical Circuits and Systems TBCAS, 2009, invited paper, in print.
Integrated patch-clamp biosensor for high-density screening of cell conductance, P. Weerakoon, K. Klemic, F.J. Sigworth, E. Culurciello, IET Electronics Letters, January 17th 2008, Vol. 44, Issue 2, pp. 81-82

Conference Proceedings

A Bio-Inspired Event-Based Size and Position Invariant Human Posture Recognition Algorithm, S.S. Chen, E. Culurciello, IEEE International Symposium on Circuits and Systems, 2009. ISCAS 2009, 24-27 May 2009, Taipei, Taiwan, to appear.
A Pulse-Based Amplifier and Data Converter for Bio-Potentials, W. Tang, E. Culurciello, IEEE International Symposium on Circuits and Systems, 2009. ISCAS 2009, 24-27 May 2009, Taipei, Taiwan, to appear.
High-Speed Fluorescence Imaging System for Freely Moving Animals, J.H. Park, V. Pieribone, J.V. Verhagen, C. von Hehn, E. Culurciello, IEEE International Symposium on Circuits and Systems, 2009. ISCAS 2009, 24-27 May 2009, Taipei, Taiwan, to appear.
Miniature Voltage Sensitive Dye Imaging System for In Vivo Experiments, Joon Hyuk Park, Vincent Pieribone, Dongsoo Kim, Justus Valentijn Verhagen, Shree Hari Gautam, Eugenio Culurciello, IEEE-NIH LIfe Science Systems and Applications Workshop LISSA 2009, NIH April9-10th 2009.
Voltage Sensitive Dye Imaging System for Awake and Freely Moving Animals, J.H. Park, E. Culurciello, D. Kim, J. V. Verhagen, S.H. Gautam, V. Pieribone, IEEE Biomedical Circuits and Systems Conference, November 2008.
A Size and Position Invariant Event-based Human Posture Recognition Algorithm, S. Chen, F. Folowosele, R. Etienne-Cummings, E. Culurciello, IEEE Biomedical Circuits and Systems Conference, November 2008.

Ralph Etienne-Cummings (2008-2009)

Educational Leadership

Co-Organizer of MRCIIS Winter School, *JHU*, January 12th – 16th, 2009
Member of Johns Hopkins University Strategic Planning Committee, Co-Chair of People Working Group, *JHU*, April 2008 – September, 2008
Associate Director for Education and Outreach, ERC on CISST, *JHU*, 2004 – Present
Co-Chair of Diversity Committee, ERC on CISST, *JHU*, 2004 – Present
Co-PI SITE REU Program & Supervised REU Students, ERC on CISST, *JHU*, 2000 – Present
Director, Research and Education Outreach, *Institute of Neuromorphic Engineering*, 2002 - 2008
Instructor, *NSF Sponsored Course on Telluride Neuromorphic Engineering*, 1996 - Present
Organization Committee, *NSF Sponsored Course on Telluride Neuromorphic Engineering*, 2002 –Present
Organized/Lead various tutorials, workshops and panels at international conferences, *ISCAS*, *BioCAS*, 1997 - Present

Awards and Honors

Promoted to full professor status Johns Hopkins University, Baltimore, MD, *Professor of ECE*, July 1st, 2008 – present

Achieved IEEE Senior Member Status, *IEEE*, December 2008
Best "Ph.D in a Nutshell," *IEEE BioCAS 2008 Conference*, Baltimore, MD, November 2008
Best Student Paper Finalist, *International Symposium of Circuits and Systems*, Seattle, WA, April 2008
Best Paper Honorable Mention, *North East BioEngineering Conference*, Providence, RI, April 2008

Professional Activities And Service

Appointed Conference General Chair, IEEE Biomedical Circuits and Systems 2008 Conference, 2007 – 2008
Elected to the Board of Governors, IEEE CAS Society, 2003-2005, 2005 – 2008
Appointed Assoc. Director for Education and Outreach, ERC on CISST at Johns Hopkins University, 2004 – Present
Appointed Organizing Committee of the NSF Telluride Neuromorphic Engineering Workshop, 2003 – Present
Appointed Director of the Institute of Neuromorphic Engineering, 2002 – 2008 (an Institute "with-out walls")
Appointed Senior Associated Editor, IEEE Sensors Journal, 2002 – July 2008
Appointed Associated Editor, IEEE Sensors Journal, July 2004 – 2008
Appointed Associated Editor, IEEE Trans. Biomedical Circuits and Systems, 2006 – Present
Appointed to the Strategic Committee: IEEE CASS Board of Governors, 2003 – 2008
Appointed to the Regional Activities Committee: IEEE CASS Board of Governors, 2003 – 2008
Appointed to the Technical Activities Committee: IEEE CASS Board of Governors, 2003 – 2008
Member of the Editorial Board: INE The Neuromorphic Engineer, 2002 – present
Guest Editor: IEEE Trans. Biomedical Circuits and Systems, Special Issue on BioCAS 2007, February 2008
Reviewer: IEEE SJ, IEEE TCAS II, IEEE TNN, IEEE TR, IEEE TBME, IEEE IJSSC, IJCV, NIPS, EWNS, ISCAS, Wiley, NSF, NIH

Publications

Journal Articles:

K. Murari, R. Etienne-Cummings, N. Thakor and G. Cauwenberghs, "Which Photodiode to Use: A Comparison of CMOS-Compatible Structures," to appear in *IEEE Sensors J.*, Summer 2009.

Y. M. Chi, R. Etienne-Cummings and G. Cauwenberghs, "Focal-Plane Change Triggered Video Compression for Low-Power Vision Sensor Systems," accepted to *Public Library of Science One*, January, 2009

J. Tapson, C. Jin, A. van Schaik and R. Etienne-Cummings, "A First-Order Non-Homogeneous Markov Model for Integrate-and-Fire Neurons Stimulated by Small Phase-Continuous Signals," to appear in *Neural Computation*, January, 2009.

F. Tenore, A. Ramos Murguialday, A. Fahmy, R. Etienne-Cummings, and N. V. Thakor, "Towards Real-Time Control of Individuated Finger Movements using Surface Myoelectric Signals," accepted *to IEEE T. Biomedical Engineering*, Spring 2008.

R. Jacob Vogelstein, Lisa Stirling, Francesco Tenore, Vivian K. Mushahwar, and Ralph Etienne-Cummings. "A Silicon Central Pattern Generator Controls Locomotion in vivo," *IEEE T. Biomedical Circuits and Systems*, Vol. 2, No. 3, pp 212 – 222, Sept. 2008.

A. Acharya, F. Tenore, V. Aggarwal, R. Etienne-Cummings, M. H. Schieber, and N. V. Thakor, "Decoding Finger Movements Using Volume-Constrained Neuronal Ensembles," *IEEE Trans. Neural Systems and Rehabilitation Engineering*, Vol. 16, No. 1, pp. 15-23, 2008.

V. Aggarwal, S. Acharya, F. Tenore, R. Etienne-Cummings, M. H. Schieber, and N. V. Thakor, "Asynchronous Decoding of Dexterous Finger Movements using M1 Neurons," *IEEE Trans. Neural Systems and Rehabilitation Engineering*, Vol. 16, No. 1, pp. 3-14, 2008.

N. Ekekwe, P. Kazanzides and R. Etienne-Cummings, "A Wide Speed Range and High Precision Position and Velocity Measurements Chip with Serial Peripheral Interface," *Elsevier Integration, The VLSI Journal*, Vol. 41, No. 2, pp. 297 – 305, Feb 2008.

Journal Articles (In Review):

V. Gruev, Z. Yang, R. Etienne-Cummings and J. Van der Spiegel, "Switchless Current Mode Active Pixel Sensor," submitted to *IEEE T. Circuits and Systems I*, November 2008.

N. Ekekwe, R. Etienne-Cummings, "On-Chip Bi-directional Resistance Trimming using Binary Weighted Currents," submitted *to IEE Electronics Letters*, Summer 2008.

C. Clark, C. White and R. Etienne-Cummings, "Design and Optimization of Tissue Specific Ultrasonic Systems," submitted to *IEEE T. Ultrasonics, Ferroelectrics and Frequency Control*, Fall 2008.

Invited Presentations:

R. Etienne-Cummings, "Current Mode Active Pixel Imagers Make Focal-Plane Processing Easier," *CMOS Emerging Technology*, Vancouver, Canada, Aug 2008.

Refereed Conference Presentations

S. Mitra, R. Zele and R. Etienne-Cummings, "Low-Voltage, High CMRR OTA For Electrophysiological Measurements," accepted for *ISCAS 2009*, Tiepei, Taiwan, May 2009.

F. Folowosele, A. Harrison, A. Cassidy, A. Andreou, R. Etienne-Cummings, S. Mihalas, E. Niebur, T. Hamilton, "A Switched Capacitor Implementation of the Generalized Linear Integrate-and-Fire Neuron," accepted for *ISCAS 2009*, Tiepei, Taiwan, May 2009.

J. Tapson, J. Diaz, D. Sander, N. Gurari, E. Chicca, P. Pouliquen and R. Etienne-Cummings, "The Feeling of Color: a Haptic Feedback Device for the Visually Disabled," *IEEE BioCAS 2008*, Baltimore, MD, November 2008.

P. Pouliquen, J. Vogelstein and R. Etienne-Cummings, "Considerations for the Use of a Howland Current Source for Neural Stimulation," *IEEE BioCAS 2008*, Baltimore, MD, November 2008.

S. Chen, F. Folowosele, D. Kim, R. J. Vogelstein, E. Culurcielle, and R. Etienne-Cummings, "A Size and Position Invariant Event-Based Human Posture Recognition," *IEEE BioCAS 2008*, Baltimore, MD, November 2008.

F. Tenore, and R. Etienne-Cummings, "Biomorphic Circuits and Systems: Control of Robotic and Prosthetic Systems," *IEEE BioCAS 2008*, Baltimore, MD, November 2008.

F. Folowosele, R. J. Vogelstein and R. Etienne-Cummings, "Real-Time Silicon Implementation of V1 in Hierarchical Visual Information Processing," *IEEE BioCAS 2008*, Baltimore, MD, November 2008.

R. Smith, F. Tenore, D. Huberdeau, R. Etienne-Cummings, N. Thakor, "Continuous Decoding of Finger Position from Surface EMG Signals for the Control of Powered Prostheses," *30th Annual International IEEE EMBS Conference*, Vancouver, Canada, August 2008.

A. Russell, F. Tenore, G. Singhal, N. Thakor, R. Etienne-Cummings, "Towards control of dexterous hand manipulations using a silicon Pattern Generator," *30th Annual International IEEE EMBS Conference*, Vancouver, Canada, August 2008.

N. Ekekwe, R. Etienne-Cummings, "Adaptive Hysteretic Comparator with Opamp Threshold Level Setting," *IEEE International Midwest Symposium on Circuits and Systems,* MWSCAS 2008, August 2008.

N. Ekekwe, R. Etienne-Cummings, "A 5-bits Precision CMOS Bandgap Reference with On-Chip Bi-directional Resistance Trimming," *IEEE International Midwest Symposium on Circuits and Systems,* MWSCAS 2008, August 2008.

F. Tenore, D. Huberdeau, N. Thakor and R. Etienne-Cummings, "Using Real-time Finger Tracking to Detect User Errors," *North East BioEngineering Conference*, Providence, RI, April 2008, **Honorable mention**.

Y. M. Chi, G. Cauwenberghs and R. Etienne-Cummings, "Image Sensor with Focal Plane Change Event Driven Video Compression," *IEEE ISCAS 2008*, Seattle, WA, May 2008.

C. Clarke, C. White and R. Etienne-Cummings, "Finite Element Modeling of Tissue for Optimal Ultrasonic Transducer Array Design," *IEEE ISCAS 2008*, Seattle, WA, May 2008.

G. Orchard, A. Russell, K. Mazurek, F. Tenore, R. Etienne-Cummings, "Configuring Silicon Neural Networks Using Genetic Algorithms" *IEEE ISCAS 2008*, Seattle, WA, May 2008.

F. Folowosele, F. Tenore, A. Russell, G. Orchard, M. Vismer, J. Tapson, and R. Etienne-Cummings, "Implementing a Neuromorphic Cross-Correlation Engine with Silicon Neurons," *IEEE ISCAS 2008*, Seattle, WA, May 2008.

J. Tapson, M.P. Vismer, C. Jin, A. van Schaik, F. Folowosele, R. Etienne-Cummings, "A Two-Neuron Cross-Correlation Circuit with a Wide and Continuous Range of Time Delay," *IEEE ISCAS 2008*, Seattle, WA, May 2008.

Patents:

N. Ekekwe, R. Etienne-Cummings, P. Kazanzides, "Adaptive and Reconfigurable Chip for DC Motor Control," Utility Patent Filed, USPTO Publication # 2008/0247735 A1, October 2008.

Workshops/Conferences/Panels/Invited Talks:

Participant: DARPA RP2009 Phase II Kick-Off Meeting, St. Michaels, MD, April 2008.
General Co-Chair and Organizer: IEEE BioCAS Conference, Baltimore, Fall 2008
Invited Speaker: DARPA DRSC Electronic StemCell Workshop, DC, Jan 2008.
Invited Speaker: University of Pennsylvania, Feb 2008.
Invited Speaker: Institute for Neuro Informatics, ETHZ, Zurich, Switzerland, October, 2008
Invited Speaker: Intelligent Sensors, Sensor Networks and Information Processing, Sydney, Australia, December, 2008 (Keynote Address)
Organizer: NSF Telluride Neuromorphic Engineering Workshop, Telluride, CO, 2003 – Present.
Organizer: IEEE BioCAS Conference, Baltimore, MD, November 2008 (General Chair).

Teaching

JHU:

CAD Digital VLSI Design, 520.491/391: Fall 1998-2008
Electronic Design Laboratory, 520.448/738: Spring 1999-2009
Senior Design Project, 520.498: 1998-2004
Independent Study/Research, 520.502/504: 1998-2009
Advanced Integrated Circuits, 520.671/672/771/772: 2007-2009
Product Design Laboratory, 520.427: 2008

Graduate Students (Graduated)

Masters

Andre Harrison, MSEE 2008 (JHU)

Ph.D.

Francesco Tenore, Ph.D. 2008 (ECE/JHU), "Biomorphic Robotic Systems: Silicon Spinal Networks for Robotic Limb Control,"
  Currently a Post Doctoral Fellow at The Johns Hopkins U. Applied Physics Lab
Clyde Clark, Ph.D. 2008 (MSU/EE), "Design and Optimization of Tissue Specific Ultrasonic Arrays," JHU/SOM Department of
  Radiology for a Post Doctoral Fellowship
Ralf Phillip, Ph.D. 2008 (ECE/JHU), "VLSI Systems for 3D Vision,"
Ndubuisi Ekekwe, Ph.D. 2009 (ECE/JHU), "Reconfigurable, Application-Specific Instrumentation and Control Integrated Circuits,"
  Analog Devices Inc, Boston, MA.
Fopefolu Folowosele, ECE Ph.D. Candidate, Graduation Expected, Fall 2009, JHU

CASS Conferences Organized

IEEE Biomedical Circuits and Systems 2008 Conference, Baltimore, MD

Dates: 11/20/2008 – 11/22/2008
General Co-Chairs: Ralph Etienne-Cummings and Andreas Andreou
Technical Co-Chairs: Shih-Chii Liu, Shuvra Bhattacharyya and Yong Lian
Special Session Co-Chairs: Amine Bermak and Julio Georgiou
Tutorial Co-Chairs: Khaled Salama and Euguenio Culurciello
Conference Organizer: Barbara Wehner
Local Admin: Ethel Paterson
Webmaster: Fope Folowosele
Number of Submitted Papers: 175
Number of Accepted Papers: 75 (43% acceptance rate)
Number of Invited Papers: 25
Number of Tutorials: 8 half-day tutorials
Number of Oral Sessions: 8 (single track)
Number of Poster Sessions: 3 (one per day, all encouraged to attend)
Number of Keynote Speakers: 3 (one per day)
Awards: Best Ph.D. in a Nutshell
Total Attendance: 140 (40% more than papers)

Tobi Delbruck (2008-2009)

Professional Activities & IEEE Services

IEEE CAS DLP: Lectured in Florida, Tokyo, Osaka, Burnaby Canada.
Member IEEE CASS Neural Systems and Applications technical committee (NSATC) and Sensory Systems technical committee
  (SSTC)
Secretary IEEE CASS Sensory Systems Technical Committee (SSTC)
Co-organizer of 2008 Telluride Neuromorphic Engineering Workshop.
Associate Editor of IEEE TBioCAS
Journal Reviews for Nature, PloS One, J. of Neuroscience Methods, Biological Cybernetics, IEEE Journals TCAS, JSSC, TNN,
  Industrial Electronics.
Conference Reviews for ISCAS and BioCAS.
Co-organizer of Dynamic Vision Forum, Zurich, 60 attendees to one day event with 4 live demonstrations.

Invited talks

31.01.08, Electrical and Computer Engineering Seminar Series, University of Florida, Dynamic silicon retina for event-based digital
  vision.
06.03.08, Secure Life Symposium, Univ. of Tokyo, Spike-based silicon vision.
10.03.08, Tetsua YAGI Lab, Osaka University, Dynamic digital vision with events.
29.05.08 Carl-von-Ossietzky-Universität Oldenburg, Spiking silicon retina for dynamic digital vision
02.06.08 BCCN Munich (Bernstein Center for Computational Neuroscience Munich), Dynamic vision with spike-based silicon retinas
28.07.08 Simon Fraser University, Burnaby, Building high performance neuromorphic and bioinspied systems (IEEE CAS DLP
  lecture)

21.08.08 [Autonomous Systems Lab (ASL)](#), Spike based digital vision.
16.10.08 [Sensors and Sensing in Biology and Engineering](#), Spike based digital vision.

Awards

01.05.08 Best paper award. Neural Systems and Applications Technical Committee of the IEEE Circuits and Systems Society **for ISCAS 2008 paper "Fall detection using an address-event temporal contrast vision sensor"**

Journal Publications

2008 [A 128×128 120dB 15us Latency Asynchronous Temporal Contrast Vision Sensor](#). (2008) Lichtsteiner, P., C. Posch and T. Delbruck . *IEEE Journal of Solid State Circuits*, Feb. 2008, 43(2) 566-576.

2008 *Fu, Z. and Delbruck, T. and Lichtsteiner, P. and Culurciello, E.*, **An address-event fall detector for assisted living applications**, IEEE Transactions on Biomedical Circuits and Systems | PDF |

Conferences Publications (peer reviewed)

[Self-timed vertacolor dichromatic vision sensor for low power face detection](#), R. Berner, P. Lichtsteiner, T. Delbruck, ISCAS 2008, accepted. In *Special Session on Live Demonstrations of Circuits and Systems.*

2008 *Conradt, J and Lichtsteiner, P and Berner, R and Delbruck, T and Douglas, RJ and Cook, M*, [A Pencil Balancing Robot Using Only Spike-based Visual Input.](#), Neural Information Processing Systems | PDF |5

2008 *Fu, Z. and Culurciello, E. and Lichtsteiner, P. and Delbruck, T.*, **Fall detection using an address-event temporal contrast vision sensor**, IEEE International Symposium on Circuits and Systems (ISCAS 2008) | PDF |5

2008 *Delbruck, T and Schrag, M and Boerlin, M and Eng, K*, **Real-time Topology Learning**, NIPS 2008 (Demonstration Track)

2008 *Berner, R and Lichtsteiner, P. and Delbruck, T.*, **Self-timed vertacolor dichromatic vision sensor for low power pattern detection**, IEEE International Symposium on Circuits and Systems (ISCAS 2008) | PDF |

Invited papers

[Frame-free dynamic digital vision](#) , T. Delbruck, Proceedings of Intl. Symposium on Secure-Life Electronics, Advanced Electronics for Quality Life and Society, University of Tokyo, Tokyo, Japan, Mar. 6-7, 2008, pp. 21-26.

Book chapter

2008 Indiveri, G. and Liu, S.-C. and Delbruck, T. and Douglas, R., **The New Encyclopedia of Neuroscience.**

Piotr Dudek

Professional Activities and Service

Member of Programme Committee: International Conference on Sensing Technology, ICST 2008

Member of Programme Committee: 4th International Congress on Electronics and Biomedical Engineering, Computer Science and Informatics, CONCIBE 2008

Reviewer - Journals: IEEE TCAS I, IEEE TCAS II, IEEE TBCAS, IEEE TNN, IEEE TC, IEEE SENSORS, IEEE TVLSI, JCA, JASP, IJCTA; Conferences: CNNA, IJCNN, ISCAS, APCCAS, ICST; Funding Agencies: EPSRC, British Council, SNSF

Awards

Best Student Paper, CNNA 2008: D.R.W.Barr and P.Dudek, "A Cellular Processor Array Simulation and Hardware Prototyping Tool", IEEE Workshop on Cellular Neural Networks and their Applications, CNNA 2008, pp.213-218, July 2008

Publications

Journal Publications

D.R.W.Barr and P.Dudek, "APRON: A Cellular Processor Array Simulation and Hardware Emulation Tool", Journal on Advances in Signal Processing, in Press

A.Lopich, P.Dudek, "Asynchronous Cellular Logic Network as a Co-Processor for a General-Purpose Massively Parallel Array", International Journal of Circuit Theory and Applications, in Press

A.Lopich, P.Dudek, "Hardware Implementation of Skeletonization Algorithm for Parallel Asynchronous Image Processing", Journal of Signal Processing Systems, [volume 56, number 1, pp.91-103, July 2009](#)

C.Alonso-Montes, D.L.Vilariño, P. Dudek and M.G.Penedo, "Fast Retinal Vessel Tree Extraction: A Pixel Parallel Approach", International Journal of Circuit Theory and Applications, vol 36, issue 5-6, pp.641-651, July-September 2008

Conference Publications:

J.Harkin, F.Morgan, S.Hall, P.Dudek, T.Dowrick and L.McDaid, "Reconfigurable Platforms and the Challenges for Large-Scale Implementations of Spiking Neural Networks", IEEE International Conference on Field Programmable Logic and Applications, FPL 2008, pp.483-486, September 2008

D.R.W.Barr and P.Dudek, "A Cellular Processor Array Simulation and Hardware Prototyping Tool", IEEE Workshop on Cellular Neural Networks and their Applications, CNNA 2008, pp.213-218, July 2008

D.Hillier and P.Dudek, "Implementing the Grayscale Wave Metric on a Cellular Array Processor Chip", IEEE Workshop on Cellular Neural Networks and their Applications, CNNA 2008, pp.120-124, July 2008

M.Huelse, D.R.W.Barr and P.Dudek, "Cellular Automata and Non-static Image Processing for Embodied Robot Systems on a Massively Parallel Processor Array", Automata-2008, Theory and Applications of Cellular Automata, pp.504-513, Luniver Press, 2008.

J.H.B.Wijekoon and P.Dudek, "Integrated Circuit Implementation of a Cortical Neuron", IEEE International Symposium on Circuits and Systems, ISCAS 2008, pp 1784-1788, May 2008

A.Lopich and P.Dudek, "ASPA: Focal Plane Digital Processor Array with Asynchronous Processing Capabilities", IEEE International Symposium on Circuits and Systems, ISCAS 2008, pp 1592-1596, May 2008

Workshops/Conferences/Panels/Invited Talks:

Invited Talk:, Brain-Inspired Electronic Systems Workshop, European Solid State Circuits Conference, ESSCIRC 2008, Edinburgh, September 2008

Invited Talk: "Grand Challenges in Microelectronic Design: Silicon meets Life", Electronics Knowledge Transfer Network, Manchester, September 2008

Invited Talk: Department of Information Technology, University of Lund, October 2008.

Invited Talk: Roska Lab, Friedrich Miescher Institute, Basel, November 2008.

Invited Talk: Institute of Neuroinformatics, University/ETH Zurich, November 2008.

Invited Talk: Department of ECE, Hong Kong University of Science and Technology, May 2009.

Alex Fish (2008-2009)

Professional Activities and Service

Reviewer: IEEE Sensors, IEEE TCAS II, IEEE TCAS1, IEEE TVLSI, ISCAS, ICECS, IEEE Sensors Conference

Publications

Journal Publications

A. Belenky, A. Fish, A. Spivak, O. Yadid-Pecht, "A snapshot CMOS Image Sensor with Extended Dynamic Range", IEEE Sensor Journal, vol. 9, issue 2, pp.103-111, Feb 2009.

X. Li, Y. Shoshan, A. Fish, G. A. Jullien and O. Yadid-Pecht, "Hardware Implementations of Video Watermarking, accepted to International Journal on Information Technologies and Knowledge, 2009.

M. Beiderman, T. Tam, A. Fish, G. A. Jullien and O. Yadid-Pecht, "A Low Light CMOS Contact Imager with an Emission Filter for Biosensing Applications, IEEE Transactions on Biomedical Circuits and Systems, vol 2, no. 3, pp. 193-203, September 2008.

Conference Publications:

S. Fisher, A. Teman, D. Vaysman, A. Gertsman, O. Yadid-Pecht and A. Fish, " Ultra-Low Power Subthreshold Flip Flop Design", accepted for presentation at ISCAS 2009, Taipei, May 2009.

S. Fisher, A. Teman, D. Vaysman, A. Gertsman, O. Yadid-Pecht and A. Fish, "Digital Subthreshold Logic Design – Motivation and Challenges", Proc 25th Convention of IEEE in Israel, pp. 702-706, Eilat, Israel, December 2008.

M. Beiderman, T. Tam, A. Fish, G. A. Jullien and O. Yadid-Pecht, "An advanced CMOS Imager Employing Modified AR and ACS methods", Proc. IEEE Sensors conference, pp. 1386-1389, Lecce, Italy, October, 2008.

X. Li, Y. Shoshan, A. Fish, G. A. Jullien and O. Yadid-Pecht, " Hardware Implementation of a DCT Watermark for CMOS Image Sensors", Proc. 15th IEEE International Conference on Electronics, Circuits and Systems, pp. 368-371, Malta, August 2008.

X. Li, Y. Shoshan, A. Fish, and G. A. Jullien, "A Simplified Approach for Designing Secure Random Number Generators in HW", Proc. 15th IEEE International Conference on Electronics, Circuits and Systems, Malta, August 2008.

A. Teman, S. Fisher, L. Sudakov, A. Fish and O. Yadid-Pecht, "Autonomous CMOS Image Sensor for Real Time Targets Detection and Tracking", Proc. IEEE International Symposium on Circuits and Systems, Seattle, USA, May 2008.

M. Beiderman, T. Tam, A. Fish, G. A. Jullien and O. Yadid-Pecht, "A Low Noise CMOS Image Sensor with an Emission Filter for Fluorescence Applications", Proc. IEEE International Symposium on Circuits and Systems, Seattle, USA, May 2008.

A. Fish and O. Yadid-Pecht, "Low Power "Smart" CMOS Image Sensors", Proc. IEEE International Symposium on Circuits and Systems, Seattle, USA, May 2008.

Workshops/Conferences/Panels/Invited Talks:

Invited Speaker: Technion, Israel, 2008
Co-Organizer: ISCAS 2008, Special Session on Sensory Low Power Smart CMOS Image Sensors and Beyond, Seattle, USA, May 2008.
Co-Organizer: IEEE Sensors 2009, Special Session on Design Methodologies for Advanced Ultra Low Power Sensor and Memory Arrays, Christchurch, New Zealand, October 2009.

Maysam Ghovanloo (2008-2009)

Assistant Professor of Electrical and Computer Engineering
Georgia Institute of Technology
85 Fifth St. NW, Room 419-TSRB   Phone/Fax/Mobile: (404) 385-7048 / (404) 849-4701 / (919) 744-9780
Atlanta, GA 30308   email: mgh@gatech.edu   http://www.gatech.edu/~mghovan

IEEE Services: Workshops/Conferences/Panels/Invited Talks/Review committees

Organizers: conferences, workshops

Special Session Co-Organizer: Advanced Neural Microsystems, IEEE Intl. Symp. on Circuits and Systems, Seattle, WA, May 2008 (with Dr. P. Mohseni).
Technical Review Committee, IEEE Engineering in Medicine and Biology Conference (EMBC'09), Minneapolis, MN, September 2009.
Technical Review Committee, IEEE Intl. Symp. on Circuits and Systems (ISCAS'09), Taipei, Taiwan, May 2009.
Technical Program Committee, IEEE Biomedical Circuits and Systems Conference (BioCAS'08), Baltimore, MD, November 2008.
Technical Review Committee, IEEE Engineering in Medicine and Biology Conference (EMBC'08), Vancouver, Canada, August 2008.
Technical Review Committee, Midwest Symp. on Circuits and Systems (MWSCAS'08), Knoxville, TN, August 2008.

Invited talks: plenary sessions, keynotes, invited lectures, ...

Invited talk on "Novel technologies for improving the quality of life for people with severe disabilities," School of Computer Science, *Florida International University*, Miami, FL, Mar. 2009.
Invited talk on "Novel technologies for improving the quality of life for people with severe disabilities," Department of Electrical and Computer Engineering, *Old Dominion University*, Norfolk, VA, Nov. 2008.
Invited talk on "Tongue motor output in human-system integration," *Army Research Office*, Workshop on Research Efforts and Future Directions in Neuroergonomics and Neuromorphics, College Park, MD, Oct. 2008.

Editorial services:

Associate Editor, Transactions on Circuits and Systems II, Dec. 2007 ~ Present

Publications

Book chapters:

M. Ghovanloo, (July, 2008) "Integrated circuits for neural interfacing: Neural stimulation," In *VLSI Circuits for Biomedical Applications* (K. Iniewski, ed.) Norwood, MA: Artech House, Inc.

Journal manuscripts:

X. Huo and M. Ghovanloo, "Using unconstrained tongue motion as an alternative control for wheeled mobility," Accepted for publication in the *IEEE Trans. on Biomedical. Eng.,* Feb. 2009.
X. Huo, J. Wang, and M. Ghovanloo, "Introduction and preliminary evaluation of tongue drive system: a wireless tongue-operated assistive technology for people with little or no upper extremity function," *Journal of Rehabilitation Research and Development,* vol. 45, no. 6, pp. 921-938, Nov. 2008.
M. Ghovanloo and S. Atluri, "An Integrated full-wave CMOS rectifier with built-in back telemetry for RFID and implantable biomedical applications," *IEEE Trans. on Circuits and Systems I*, vol. 55, no. 10, pp. 3328-3334, Nov. 2008.
X. Huo, J. Wang, and M. Ghovanloo, "A magneto-inductive sensor based wireless tongue-computer interface," *IEEE Trans. on Neural Sys. Rehab. Eng.,* vol. 16, no. 5, pp. 497-504, Oct. 2008.
G. Bawa and M. Ghovanloo, "An active high power conversion efficiency rectifier with built–in dual–mode back telemetry in standard CMOS technology," *IEEE Trans. on Biomed. Circuits and Systems*, vol. 2, no. 3, pp. 184-192, Sep. 2008.
G. Bawa and M. Ghovanloo, "Analysis, design and implementation of a high efficiency fullwave rectifier in standard CMOS technology," *Analog Integrated Circuits and Signal Processing*, Aug. 2008.

Conference proceedings:

M. Yin and M. Ghovanloo, "A flexible 32-channel simultaneous wireless neural recording system with adjustable resolution", Digest of technical papers *IEEE Intl. Solid State Cir. Conf.*, pp. 432-433, Feb. 2009.

U. Jow and M. Ghovanloo, "Optimization of a multiband wireless link for neuroprosthetic implantable devices," Proc. *IEEE Biomed. Circuits and Systems*, pp. 97-100, Nov. 2008.

X. Huo, J. Wang, and M. Ghovanloo, "Wireless control of powered wheelchairs with tongue motion using tongue drive assistive technology," Proc. *IEEE 30th Eng. in Med. and Biol. Conf.*, pp. 4199-4202, Aug. 2008.

M. Yin and M. Ghovanloo, "A low-noise receiver for multichannel wireless neural recording," Proc. *IEEE 30th Eng. in Med. and Biol. Conf.*, pp. 4222-4225, Aug. 2008.

J. Wang, X. Huo, and M. Ghovanloo, "A quadratic particle swarm optimization method for magnetic tracking of tongue motion in speech disorders," Proc. *IEEE 30th Eng. in Med. and Biol. Conf.*, pp. 4222-4225, Aug. 2008.

X. Huo, J. Wang, and M. Ghovanloo, *"*Using Tongue Drive system as a new interface to control powered wheelchairs," Proc. *RESNA Conference*, Washington, DC, June 2008.

J. Wang, X. Huo, and M. Ghovanloo, "Tracking tongue movements for environment control using particle swarm optimization," Proc. *IEEE Intl. Symp. on Circuits and Systems*, pp.1982-1985, May 2008.

M. Yin and M. Ghovanloo, "A wideband PWM-FSK receiver for wireless implantable neural recording applications," Proc. *IEEE Intl. Symp. on Circuits and Systems*, pp. 1556-1559, May 2008.

G. Bawa and M. Ghovanloo, "A back telemetry-capable active high efficiency rectifier in standard CMOS process," Proc. *IEEE Intl. Symp. on Circuits and Systems*, pp. 2514-2517, May 2008.

M. Yin and M. Ghovanloo, "A clockless ultra low-noise low-power wireless implantable neural recording system," Proc. *IEEE Intl. Symp. on Circuits and Systems*, pp. 1756-1759, May 2008.

Viktor Gruev 2008

Professional Activities and Service

Member of Program Committee: ISCAS, BioCAS
Reviewer: IEEE SJ, IEEE TCAS, IEEE TNN, IEEE IJSSC, NIPS, ISCAS

Publications

Journal Publications

R. Philipp, D. Orr, V. Gruev, J. Van der Spiegel and R. Etienne-Cummings, "Linear Current-Mode Active-Pixels-Sensor," *IEEE J. Solid-State Circuits,* Vol. 42, No. 11, pp. 2482-2491, November 2007.

Viktor Gruev, Alessandro Ortu, Nathan Lazarus, Jan Van der Spiegel, and Nader Engheta, "Fabrication of a dual-tier thin film micropolarization array," *Optics Express*, Vol. 15, Iss. 8, pp. 4994-5007, April 16, 2007.

Conference Publications:

V. Gruev, J. Van der Spiegel and N. Engheta, "Integrated Polarization Image Sensor for Cell Detection," *International Image Sensor Workshop*, Bergen, Norway, June 2009.

V. Gruev, J. Van der Spiegel and N. Engheta, "Nano-wire Dual Layer Polarization Filter," *Proc. IEEE ISCAS*, Taipei, Taiwan, May 2009.

V. Gruev, J. Van der Spiegel and N. Engheta, "Advances in Integrated Polarization Imaging Sensors," *IEEE/NIH LiSSA Workshop*, Bethesda, USA, March 2009.

V. Gruev, Z. Yang and J. Van der Spiegel, "Low Power Current Mode Imager with 1.5 Transistors per Pixel," *Proc. IEEE ISCAS*, Seattle, USA, May 2008.

V. Gruev, J. Van der Spiegel and N. Engheta, "Image Sensor with Focal Plane Polarization Sensitivity," *Proc. IEEE ISCAS*, Seattle, USA, May 2008.

Z. Yang, V. Gruev and J. Van der Spiegel, "Current-mode Image Sensor with 1.5 Transistors per Pixel and Improved Dynamic Range," *Proc. IEEE ISCAS*, Seattle, USA, May 2008.

V. Gruev, Van der Spiegel and N. Engheta, "Low Power Image Sensor With Polymer Polarization Filters," (*invited*) *Proc. IEEE ISCAS*, Seattle, USA, May 2008.

Philipp Hafliger (2008-2009)

Professional Activities and Service

P. Häfliger: member IEEE CASS Neural Systems and Applications technical committee (NSA TC) and Sensory Systems technical committee (SS TC)

P. Häfliger: secretary IEEE CASS Biomedical Circuits and Systems technical committee (BioCAS TC)

Publications

Journal Publications

"A gate leakage feedback element in an adaptive amplifier application", H. K. O. Berge and P. Häfliger, IEEE Transactions on Circuits and Systems II, 2008, vol. 55 (2), p 101-105

Conference Publications:

"Analog to Interval Encoder with Active Use of Gate Leakage for an Implanted Blood-Sugar Sensor", P. Häfliger and E. Johannessen, IEEE BioCAS conference 2008, Baltimore, USA, p 169-172

"Mismatch reduction with relative reset in integrate-and-fire photo-pixel array", J. M. A. Olsson and P. Häfliger, IEEE BioCAS conference 2008, Baltimore, USA, p. 277-280

"Two Color Asynchronous Event Photo Pixel", J. M. A. Olsson and P. Häfliger, IEEE ISCAS 2008, Seattle, USA, p. 2146-2150

Workshops/Conferences/Panels/Invited Talks:

P. Häfliger: IEEE ISCAS 2008, organizer Special Session on Live Demonstrations of Circuits and Systems

P. Häfliger: IEEE ISCAS 2009 Track, co-chair Live Demonstrations of Circuits and Systems

P. Häfliger: IEEE conference on Biomedical CAS 2008, member technical program committee

P. Häfliger: invited talk "Electronic Implants", That's IT, 150 years anniversary of the 'Realist Foreningen' and 40 years anniversary of the 'Cybernetisk Selskap' at the University of Oslo

Giacomo Indiveri (2008-2009)

Professional Activities and Services

Organizer of the 2009 CapoCaccia Workshop toward Cognitive Neuromorphic Engineering

Member of the Executive Board of the Institute of Neuromorphic Engineering, 2002-Present

Associate editor of the IEEE "Transactions on Neural Networks", since 2007.

Associate editor of "Cognitive Computation" (Springer), since 2008

Associate editor of "Advances in Artificial Neural Systems" (Hindawi), since 2007.

Review editor of "Frontiers in Neuro-engineering", since 2007.

Advisory Board member of the Telluride Neuromorphic Cognition Engineering Workshop since 2009.

Advisory Committee member of the Italian Society of Neural Networks SIREN, since 2009.

Scientific Advisory Board member of the Information Technologies Division of Austria Research Centers (ARC), Austria from 2005 to 2008.

Chair of the 2008 IEEE Technical Committee on Neural Systems and Applications

Chair of the 2008 Neural Information Processing Systems Demo Track.

Editorial Board member of The Neuromorphic Engineering newsletter.

Technical Committee member of the IEEE Biomedical Circuits and Systems Technical Committee, IEEE Neural Systems and Applications Technical Committee, and IEEE Sensory Systems Technical Committee

Reviewer: IEEE TCAS II, IEEE TNN, IEEE TBME, NIPS, ISCAS, etc.

Grants

IEEE CASS Major Projects/Initiatives Grant, for the 2009 CapoCaccia Workshop toward Cognitive Neuromorphic Engineering (one year workshop support, principal investigator).

EU ICT FP7 Grant ICT-231467-eMorph: "Event–Driven Morphological Computation for Embodied Systems" (3 year STREP project, coordinated by C. Bartolozzi, Italian Institute of Technology, Italy).

EU ICT Grant ICT-231168-SCANDLE "acoustic SCene ANalysis for Detecting Living Entities" (3 year STREP project, coordinated by S. Denham, University of Plymouth, UK), 2008.

European Space Agency (ESA) Ariadna study 08/6303 "Neuromorphic computation of optic flow data" (4 months project, principal investigator), 2008.

Swiss National Science Foundation Grant #121713: "Neuromorphic Attention" (3 year research project, principal investigator), awarded in 2008

Swiss National Science Foundation Grant #119973: "Real-time sound recognition using neuromorphic VLSI" (3 year research project, principal investigator), awarded in 2007

Publications

Chapters in books

G. Indiveri, S.-C. Liu, T. Delbrück, and R. Douglas. New Encyclopedia of Neuroscience, chapter Neuromorphyc Systems, pages 512–528. Elsevier, 2008.

G. Indiveri and R. Douglas. Handbook on "Nano- and Molecular Electronics", chapter Neuromorphic Networks of Spiking Neurons, pages 10–1–10–9. CRC Press, 2007.

Journal Publications

G. Indiveri, E. Chicca, and R. Douglas. Artificial cognitive systems: From VLSI networks of spiking neurons to neuromorphic cognition. Cognitive Computation, 1:119-127, 2009

S. Mitra, S. Fusi, and G. Indiveri. Real-time classification of complex patterns using spike-based learning in neuromorphic VLSI. IEEE Transactions on Biomedical Circuits and Systems, 3(1):32–42, Feb. 2009.

C. Bartolozzi and G. Indiveri. Global scaling of synaptic efficacy: Homeostasis in silicon synapses. Neurocomputing, 72(4–6):726–731, Jan 2009.

G. Indiveri. Neuromorphic VLSI models of selective attention: from single chip vision sensors to multi-chip systems. Sensors, 8(9):5352–5375, September 2008.

Conference Publications:

C. Bartolozzi, O. Nikolayeva, and G. Indiveri. Implementing homeostatic plasticity in VLSI networks of spiking neurons. In Proc. IEEE International Conference on Electronics, Circuits, and Systems, ICECS 2008, pages 682–685. IEEE, 2008.

M. Giulioni, P. Camilleri, V. Dante, D. Badoni, G. Indiveri, J. Braun, and P. Del Giudice. A VLSI network of spiking neurons with plastic fully configurable "stop-learning" synapses. In Proc. IEEE International Conference on Electronics, Circuits, and Systems, ICECS 2008, pages 678–681. IEEE, 2008.

D.B. Fasnacht, A. Whatley, and G Indiveri. A serial communication infrastructure for multi-chip address event system. In IEEE International Symposium on Circuits and Systems, ISCAS 2008, pages 648–651. IEEE, May 2008.

E. Neftci, E. Chicca, G. Indiveri, J.-J. Slotine, and R. J. Douglas. Contraction properties of VLSI cooperative competitive neural networks of spiking neurons. In J.C. Platt, D. Koller, Y. Singer, and S. Roweis, editors, Advances in Neural Information Processing Systems 20, pages 1073–1080, Cambridge (MA), 2008. MIT Press.

S. Mitra, G. Indiveri, and S. Fusi. Learning to classify complex patterns using a VLSI network of spiking neurons. In J.C. Platt, D. Koller, Y. Singer, and S. Roweis, editors, Advances in Neural Information Processing Systems 20, pages 1009–1016, Cambridge (MA), 2008. MIT Press.

Invited Talks:

Neural Computation and Synaptic Plasticity Using Neuromorphic VLSI, Institute of Informatics, University of Zurich, Switzerland, 2008.

2. An overview of neuromorphic circuit research at INI, BIES08 Workshop, Edinburgh, UK, 2008.

3. Neuromorphic computation and plasticity in VLSI, Italian Institute of Technology, Genoa, Italy, 2008.

4. Learning Machines (building them in VLSI), Future Challenges for the Science and Engineering of Learning, NSF Washington, USA, 2007.

Session Chairman: International Symposium on Circuits and Systems, 2001-2006

Workshops/Conferences/Panels:

2009 International Conference on Artificial Neural Networks (ICANN)
2009 IEEE International Symposium on Circuits and Systems (ISCAS)
2009 Neural Information Processing Systems (NIPS) conference
2009 International Conference on Artificial Neural Networks (ICANN)
2009 Bio-Sensing (OP207) Part of the SPIE International Symposium on NanoScience + Engineering
2008 SPIE Microtechnologies for the new Millennium conference.
2008 Computational Intelligence in Security for Information Systems CISIS'08
2008 International Federation of Automatic Control (IFAC) World Congress
2008 IEEE World Congress on Computational Intelligence (WCCI 2008)

Bernabé Linares-Barranco (2008-2009)

Professional Activities and Service

Chair-Elect of IEEE Sensory Systems Technical Committee
Associated Editor, IEEE Trans. Neural Networks, 1998 – Present
Member of Review Program Committee: ISCAS
Reviewer: IEEE TCAS I&II, IEEE TNN, NIPS, ISCAS

Publications

Journal Publications

G. Vicente-Sanchez, J. Velarde-Ramirez, T. Serrano-Gotarredona, and B. Linares-Barranco, "A Weak-to-Strong Mismatch Model for Analog Circuit Design," *Int. Journal of Analog Integrated Circuits and Signal Processing*, 59, pp. 325-340, 2009.

R. Serrano-Gotarredona, M. Oster, P. Lichtsteiner, A. Linares-Barranco, R. Paz-Vicente, F. Gómez-Rodríguez,L. Camuñas-Mesa, R. Berner, M. Rivas, T. Delbrück, S. C. Liu, R. Douglas, P. Häfliger, G. Jiménez-Moreno, A. Civit, T. Serrano-Gotarredona, A. Acosta-Jiménez, B. Linares-Barranco, "CAVIAR: A 45k-Neuron, 5M-Synapse, 12G-connects/sec AER Hardware Sensory-Processing-Learning-Actuating System for High Speed Visual Object Recognition and Tracking," *IEEE Trans. on Neural Networks,* in Press.

J. A. Leñero-Bardallo, T. Serrano-Gotarredona, and B. Linares-Barranco, "A Calibration Technique for Very Low Current and Compact Tunable Neuromorphic Cells. Application to 5-bit 20nA DACs," *IEEE Trans. Circuits and Systems, Part-II: Brief Papers,* vol. 55, No. 6, pp. 522-526, June 2008.

R. Serrano-Gotarredona, T. Serrano-Gotarredona, A. Acosta-Jimenez, C. Serrano-Gotarredona, J. A. Perez-Carrasco, A. Linares-Barranco, G. Jimenez-Moreno, A. Civit-Ballcels, and B. Linares-Barranco, "On Real-Time AER 2D Convolutions Hardware for Neuromorphic Spike Based Cortical Processing," *IEEE Trans. on Neural Networks,* vol. 19, No. 7, pp. 1196-1219, July 2008.

Shih-Chii Liu (2008-2009)

Professional Activities and Service

Chair of IEEE Sensory Systems Technical Committee
Chair-Elect of IEEE Neural Systems Technical Committee
Member of the Editorial Board: INE The Neuromorphic Engineer, 2002 – present
Member of Review Program Committee: ISCAS, BioCAS
Reviewer: ISCAS, BioCAS, NIPS, JSSCC

Journal Publications

Quantification of a spike-based winner-take-all VLSI network (2008). Oster, M., Wang, Y., Douglas, R., and Liu, S-C. IEEE Transactions on Circuits and Systems I 55(1): 3160--3169

Conference Publications:

Temporally learning floating-gate VLSI synapses (2008) Liu, S-C. and Moeckel, R.; , ISCAS 2008, 18-21 May 2008 Page(s): 2154-2157.

Steering with an a{VLSI} motion detection chip, (2008); Moeckel, R. and Jaeggi, R. and Liu, S-C. ISCAS 2008. 18-21 May 2008 Page(s): 1036-1039.

Workshops/Conferences/Panels/Invited Talks:

International Committee Member for Brain Inspired Cognitive Systems Conference, BICS (24 June--27 June, 2008).
Program Co-Chair: IEEE BioCAS Conference, 2008
Invited Speaker: Workshop on visual guidance systems for small autonomous aerial vehicles, IROS, 2008.
Invitee: NSF Telluride Neuromorphic Engineering Workshop, Telluride, CO, 2008.
Co-Chairman: IEEE ISCAS 2008, Sensory Systems Track.

Dimitrios Loizos (2008-2009)

Professional Activities and Service

Reviewer: IEEE Transactions on Circuits and Systems – I, IEEE Transactions on Circuits and Systems – II, International Symposium on Circuits and Systems, IET Circuits, Devices & Systems.

Publications

Invited papers

D. Loizos, P. Sotiriadis, G. Cauwenberghs, "A Translinear SiGe BiCMOS Current-Controlled Oscillator with 80Hz-800MHz Tuning Range," *J. of Analog Integrated Circuits and Signal Processing*, Vol. 57, No. 1-2, Nov. 2008, pp. 107-115.

Journal Publications

D.N. Loizos, P.P. Sotiriadis and G. Cauwenberghs, "A SiGe BiCMOS 8-Channel Multi-Dithering, Sub-Microsecond Adaptive Controller," *IEEE Trans. Circuits and Systems I: Regular Papers*, accepted/to appear.

Christoph Posch (2008-2009)

Professional Activities and Service

Reviewer: IEEE TVLSI, IEEE TNN, ISCAS

Awards

Sensory Systems TC Best Paper Award, 1st Honorary Mention: Matolin, D.; Posch, C.; Wohlgenannt, R.; Maier, T., "A 64×64 pixel temporal contrast microbolometer infrared sensor," *Circuits and Systems, 2008. ISCAS 2008. IEEE International Symposium on* , vol., no., pp.1644-1647, 18-21 May 2008

Publications

Journal Publications

Lichtsteiner, P.; Posch, C.; Delbruck, T., "A 128×128 120dB 15us Latency Asynchronous Temporal Contrast Vision Sensor", *Solid-State Circuits, IEEE Journal of* , vol. 43, no. 2, pp. 566-576, Feb. 2008

The CMS-HCAL Collaboration, S. Abdullin *et al.*, "Design, performance, and calibration of CMS hadron-barrel calorimeter wedges", Eur. Phys. J. C **55** 1 (2008) 159-171, doi: 10.1140/epjc/s10052-008-0573-y, May 2008

The CMS-HCAL Collaboration, S. Abdullin *et al.*, "Design, performance, and calibration of CMS forward calorimeter wedges", Eur. Phys. J. C **53** 1, (2008) 139-166, doi: 10.1140/epjc/s10052-007-0459-4, Jan 2008

Y Arai *et al.*, "ATLAS muon drift tube electronics", Institute of Physics, IOP Journal of Instrumentation, 2008 JINST **3** P09001, doi: 10.1088/1748-0221/3/09/P09001, Sep 2008

The ATLAS Collaboration, G Aad *et al.*, "The ATLAS Experiment at the CERN Large Hadron Collider", Institute of Physics, IOP Journal of Instrumentation, 2008 JINST **3** S08003, doi: 10.1088/1748-0221/3/08/ S08003, Aug 2008

Conference Publications:

Posch, C.; Matolin, D.; Wohlgenannt, R., "An asynchronous time-based image sensor," *Circuits and Systems, ISCAS 2008. IEEE International Symposium on*, pp. 2130-2133, 18-21 May 2008

Matolin, D.; Posch, C.; Wohlgenannt, R.; Maier, T., "A 64×64 pixel temporal contrast microbolometer infrared sensor," *Circuits and Systems, ISCAS 2008. IEEE International Symposium on*, pp.1644-1647, 18-21 May 08

Wohlgenannt, R., Matolin, D., Maier, T., Posch, C., "Characterization of a Temporal Contrast Microbolometer Infrared Sensor," *Electronics, Circuits and Systems, 2008. ICECS 2008. 15th IEEE International Conference on*, pp. 866-869, Aug 30 - Sep 3, 2008

Posch, C., Wohlgenannt, R., Matolin, D., et al., "A temporal contrast IR vision sensor" in *Optical Design and Engineering III*, Proceedings of SPIE Vol. 7100, 71002A (2008)

Patents:

(WO/2008/061268) METHOD FOR GENERATING AN IMAGE IN ELECTRONIC FORM, IMAGE ELEMENT FOR AN IMAGE SENSOR FOR GENERATING AN IMAGE, AND IMAGE SENSOR. AT 504.582, granted October 2008

Teresa Serrano-Gotarredona (2008-2009)

Professional Activities and Service

Secretary-Elect of IEEE Sensory Systems Technical Committee
Member of Review Program Committee: ISCAS
Academic Editor, PLOS-One, May 2008-Present
Reviewer: IEEE TCAS I&II, IEEE TNN, ISCAS, Midwest, PLOS one

Publications

Journal Publications

G. Vicente-Sanchez, J. Velarde-Ramirez, T. Serrano-Gotarredona, and B. Linares-Barranco, "A Weak-to-Strong Mismatch Model for Analog Circuit Design," *Int. Journal of Analog Integrated Circuits and Signal Processing*, 59, pp. 325-340, 2009.

R. Serrano-Gotarredona, M. Oster, P. Lichtsteiner, A. Linares-Barranco, R. Paz-Vicente, F. Gómez-Rodríguez, L. Camuñas-Mesa, R. Berner, M. Rivas, T. Delbrück, S. C. Liu, R. Douglas, P. Häfliger, G. Jiménez-Moreno, A. Civit, T. Serrano-Gotarredona, A. Acosta-Jiménez, B. Linares-Barranco, "CAVIAR: A 45k-Neuron, 5M-Synapse, 12G-connects/sec AER Hardware Sensory-Processing-Learning-Actuating System for High Speed Visual Object Recognition and Tracking," *IEEE Trans. on Neural Networks,* in Press.

J. A. Leñero-Bardallo, T. Serrano-Gotarredona, and B. Linares-Barranco, "A Calibration Technique for Very Low Current and Compact Tunable Neuromorphic Cells. Application to 5-bit 20nA DACs," *IEEE Trans. Circuits and Systems, Part-II: Brief Papers,* vol. 55, No. 6, pp. 522-526, June 2008.

R. Serrano-Gotarredona, T. Serrano-Gotarredona, A. Acosta-Jimenez, C. Serrano-Gotarredona, J. A. Perez-Carrasco, A. Linares-Barranco, G. Jimenez-Moreno, A. Civit-Ballcels, and B. Linares-Barranco, "On Real-Time AER 2D Convolutions Hardware for Neuromorphic Spike Based Cortical Processing," *IEEE Trans. on Neural Networks,* vol. 19, No. 7, pp. 1196-1219, July 2008.

Bert Shi (2008-2009)

Conferences or workshops actively involved in 2008-2009 include the following:

IEEE Symposium on Computational Intelligence for Multimedia Signal and Vision Processing (CIMSVP) (TC Member), 2009
Asia Pacific Conference on Circuits and Systems (APCCAS): (Track Chair for Neural Systems), 2008.
SPIE Intl. Symp. on Microtechnologies for the New Millenium: Bioengineered and Bioinspired Systems (TC Member), 2009.
IEEE International Workshop on Cellular Neural Networks and their Applications (CNNA) (PC Member) 2008
International Joint Conference on Neural Networks (IJCNN), (TC Member), 2008, 2009

Ongoing conferences or workshops actively involved in 2008-2009 include the following:

IEEE International Workshop on Cellular Neural Networks and their Applications (CNNA) 2010 (Publicity Chair)

Short Courses, Plenary Sessions, Keynote Speakers, Invited Lectures:

IEEE CAS Society Distinguished Lecture, "Bio-inspired CNN Visual Systems," Technische Universität Dresden, Dresden, Germany, Jul. 2008.

IEEE CAS Society Distinguished Lecture, "Bio-inspired CNN Visual Systems," Pázmány Péter Catholic University, Budapest, Hungary, Jul. 2008.

Publications (Journal Articles, Conference Papers, Books, Book Chapters):

Journal Articles

L. Y. Zhao and B. E. Shi, "Integrating Contrast Invariance into a Model for Cortical Orientation Map Formation," *Neurocomputing*, vol. 72, pp. 1887-1899, Mar. 2009.

B. E. Shi, "The Effect of Mismatch in Current- versus Voltage-mode Resistive Grids," *International Journal of Circuit Theory and its Applications*, vol. 37, no. 1, pp. 53-65, Feb. 2009.

E. K. C. Tsang and B. E. Shi, "Normalization enables robust validation of disparity estimates from neural populations," *Neural Computation*, vol. 20, no. 10, pp. 2464-2490, Oct. 2008.

Y. Meng and B. E. Shi, "Adaptive gain control for spike-based map communication in a neuromorphic vision system," *IEEE Transactions on Neural Networks*, vol. 19, no. 6, pp. 1010-1021, Jun. 2008.

Conference Papers

Y. Meng and B. E. Shi, "Normalized Phase Shift Motion Energy Neuron Populations for Image Velocity Estimation," to be presented at the *International Joint Conference on Neural Networks*, Atlanta, GA, USA, June. 2009.

Y. W. Wang and B. E. Shi, "Maximizing Neural Responses Leads to Sensori-Motor Coordination of Binocular Vergence," presented at the *IEEE Symposium on Computational Intelligence for Multimedia Signal and Vision Processing*, Nashville, TN, USA, Mar. 2009

X. J. Guo and B. E. Shi, "A Two Stage Energy Model Exhibiting Selectivity to Changing Disparity," presented at *International Symposium on Neural Networks*, Beijing, China Sep. 2008.

Y. N. Yang and B. E. Shi, "A V2 Neuron-Based Model for Salient Point Detection," presented at *International Workshop on Cellular Neural Networks and their Applications*, Santiago de Compostela, Spain, Jul. 2008.

Awards, Honors, and Patents:

IEEE CAS Society Distinguished Lecturer (term ended 2008)

Denise Wilson (2008-2009)

Other IEEE Service:

IEEE Circuits and Systems Society Fellow Committee Member, 2009
IEEE Circuits and Systems Society Representative to the IEEE Systems Council, 2007-2008.

IEEE Services:

Associate Editor, IEEE Sensors Journal

Journal Publications:

VaibhavVaidya and Denise Wilson, "SPICE Optimization of Organic FET model using charge transport elements," *IEEE Transactions Electron Devices*," vol. 56, no. 1, pp. 38-42, January 2009.

M.K. Boysworth, S. Banerji, D.M. Wilson, and Karl S. Booksh, "Generalization of multivariate optical computations as a method for improving the speed and precision of spectroscopic analyses," Journal of Chemometrics, vol. 22, no. 5-6, May-June 2008, pp. 355-365.

Conference Publications:

Denise Wilson, "Experiences of Engineering Students in post-Katrina Service Learning Programs," *Frontiers in Education 2008*: Saratoga Springs, New York.

Denise Wilson, "Does it Matter? Psychological Sense of Community & Belonging in Engineering Education," *Frontiers in Education 2008*: Saratoga Springs, New York.

Brian Ferguson, Jeff Kissinger, Karl Booksh, John Cranney, and Bill Largen, "A Novel Refractometer Architecture," *ISCAS 2008*: Seattle, Washington.

Denise Wilson and Leila Shepherd, "Chemical and Biological Sensors for Environmental Monitoring," *ISCAS 2008*: Seattle, Washington.

Rebecca Bates and Denise Wilson, "Confronted by Students: Dealing with Anger, Frustration and More Pleasant Emotions in Office Hours and Class" ASEE 2008: Washington D.C.

Orly Yadid-Pecht (2008-2009)

IEEE Services

Invited Lectures

"Imaging Challenges", invited for European Optical Society Conference, Munich, Germany, June 2009
"Power Reduction in "Smart" CMOS Image Sensors", ISCAS '08 Special session on Low Power, Seattle, May 2008

Other professional activities

Member of the IEEE CAS Neural Networks, Biocas and Sensors Technical Committees (1996 – present).
Member of the SPIE Solid State Sensor Arrays international conference program committee (1997-present).
Member of the Technical Committee for the IEEE BioCAS conference (2004-present).
Member of the Steering Committee for the IEEE ICECS (2003-present).
Member of the IEEE CAS Women in Engineering committee.
Special Session co-organizer, "Low Power Image Sensors", IEEE Circuits and Systems Conference, Seattle, May 2008.

Board Memberships:

2007 – 2009 IEEE Trans. on BioMedical Circuits and Systems Associate Editor
2006-present IEEE Sensors Council – Circuits and Systems Society Representative, Board Member (2006-present)

Awards and Honours

2009 iCORE Professorship in "Integrated Sensors and Intelligent Systems"

Publications

Peer Reviewed Papers:

M. Beiderman, T. Tam, A. Fish, G. Jullien, O. Yadid-Pecht, "A low light level image sensor for biomedical applications", IEEE Transactions on Biomedical Circuits and Systems, Vol. 2, No. 3, pp. 193-203, September 2008

X. Li, Y. Shoshan, A. Fish, G. A. Jullien, O. Yadid-Pecht, "Hardware Implementations of Video Watermarking", accepted to International Journal on Information Technologies and Knowledge, 2009.

A. Belenky, A. Fish, A. Spivak, O. Yadid-Pecht, "A snapshot CMOS Image Sensor with Extended Dynamic Range", IEEE Sensor Journal, Vol. 9, Issue 2, pp. 103-111, February 2009.

Y. Shoshan, A. Fish, X. Li, G. Jullien, O. Yadid-Pecht, "VLSI Watermark implementations and applications", International Journal on Information Theory and Applications, Vol. 2, No. 4, pp. 379-386, 2008.

Peer Reviewed Conference Papers:

S. Fisher, A. Teman, D. Vaysman, A. Gertsman, O. Yadid-Pecht, A. Fish, "Ultra-Low Power Subthreshold Flip Flop Design", accepted for presentation at IEEE ISCAS'09, Taipei, May 2009.

S. Fisher, A. Teman, D. Vaysman, A. Gertsman, O. Yadid-Pecht, A. Fish, "Digital Subthreshold Logic Design – Motivation and Challengest", Proc. 25th Convention of IEEE in Israel, pp. 702-706, Eilat, Israel, December 2008.

M. Beiderman, T. Tam, A. Fish, G.A. Jullien, O. Yadid-Pecht, "An Advanced CMOS Imager Employing Modified AR and ACS Methods", Proc. IEEE Sensors Conference, pp. 1386-1389, Lecce, Italy, October 2008.

Y. Shoshan, A. Fish, O. Yadid-Pecht, "Hardware Implementation of a DCT Watermark for CMOS Image Sensors, Proc. IEEE, ICECS, pp. 368-371, September 2008.

X. Li, Y. Shoshan, A. Fish, G.A. Jullien, O. Yadid-Pecht, "A simplified approach for designing secure random number generators in HW", Proc. IEEE, ICECS, pp. 372-375 September 2008.

M. Beiderman, T. Tam, A. Fish, G.A. Jullien, O. Yadid-Pecht, "Low Light CMOS Image Sensor with an Emission Filter for Fluorescence Applications", Proc. IEEE International Symposium on Circuits and Systems, ISCAS'08, Seattle, USA, pp. 1100-1103, May 2008.

A. Fish and O. Yadid-Pecht, "Power Reduction in "Smart" CMOS Image Sensors", Proc. IEEE International Symposium on Circuits and Systems, ISCAS'08, Seattle, USA, pp. 1408-1411.

Book Chapters

A. Fish and O. Yadid-Pecht, "Low Power Smart Image Sensors", in "CMOS Emerging Technologies", edited by Kris Iniewski, CRC Press, 2009.