

# IEEE Circuits and Systems Society Sensory Systems Technical Committee

## Annual Report 2019

(Activities for May 2018 through May 2019)

### Officers

**Chair:** Timothy Constandinou, Imperial College London, [t.constandinou@imperial.ac.uk](mailto:t.constandinou@imperial.ac.uk)  
**Chair-Elect:** Amine Bermak, HKUST, Hong Kong, [eebermak@ece.ust.hk](mailto:eebermak@ece.ust.hk)  
**Secretary:** Shoushun Chen, Nanyang Technological University, Singapore, [eechenss@ntu.edu.sg](mailto:eechenss@ntu.edu.sg)  
**Secretary Elect:** Ricardo Carmona-Galán, Sevilla Microelectronics Institute, [rcarmona@imse-cnm.csic.es](mailto:rcarmona@imse-cnm.csic.es)  
**Past Chair:** Piotr Dudek, University of Manchester, UK, [p.dudek@manchester.ac.uk](mailto:p.dudek@manchester.ac.uk)

### Website

<http://iee-cas.org/community/technical-committees/sensory-systems-technical-committee-sstc>

### Annual Meeting

**2018 Meeting:** Was at ISCAS 2018, Florence, Italy  
VV1.8, Firenze Fiera Congress and Exhibition Center, Tuesday 29th May, 13:15 – 14:15

**2019 Meeting:** Will be at ISCAS 2019, Sapporo, Japan  
Seminar Room 2 (Sapporo City Industrial Promotion Center, 3F), Wednesday 29 May 11:30-12:45

## 1. INTRODUCTION

The goal of the IEEE Circuits and Systems Society (CASS) Sensory Systems Technical Committee (SSTC) is to foster research, development, education and industrial dissemination of knowledge relating to the emerging field of sensors and associated processing systems. The activity is 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.

## 2. TECHNICAL COMMITTEE MEMBERSHIP

Committee members are experts, who are active within the field and who contribute to the committee activities. We have recruited a group of TC members that cover all aspects of our TC. The committee has members from academia, national/international labs and industry.

The SSTC presently has 75 active members (see Appendix A). Four new members joined the committee in 2018. 42 people attended the 2018 annual meeting including 38 current members and 4 new members.

## 3. PARTICIPATION IN ISCAS

### ISCAS 2019, SS Track – Best Paper Award

- The top 6 ranked papers in review (minus conflict-of-interest) were ranked by 6 volunteer best paper judges: Jorge Fernández Berni, Tobi Delbruck, Paula López Martínez, Ibrahim (Abe) Elfadel, Shih-Chii Liu, Ricardo Carmona Galán. Each volunteer ranked the papers and the paper with the highest average score was selected.
- Best Paper Award 2019 of the IEEE CAS Society - Sensory Systems Technical Committee (SSTC)
  - "A Compact 4-Decade Dynamic Range Readout Module for Gamma Spectroscopy and Imaging"
  - Giovanni L. Montagnani, Luca Buonanno, Davide Di Vita, Carlo Fiorini, Marco Carminati
- Best Paper Runner Up 2019 of the IEEE CAS Society - Sensory Systems Technical Committee (SSTC)
  - "Temperature sensors incorporated into a CMOS image sensor with column zoom ADCs"
  - Shuang Xie, Xiaoliang Ge, Albert Theuwissen

### ISCAS 2019, SS Track – Review Committee and Participation

- SS Track received 43 submissions for ISCAS 2019 (compared to 65 in 2018), 20 papers accepted (46%).
- 2 track chairs and 22 RCMs participated in the review process. Thanks to all RCM members for their great effort and help with review assignment, namely: Tim Constandinou, Themis Prodromakis, Paula Lopez, Pantelis Georgiou, Gert Cauwenberghs, Venkat Rangan, Nicole McFarlane, Milutin Stanecevic, Juan Leñero-Bardallo, Maurizio Valle, Ibrahim Elfadel, Ricardo Carmona, Shoushun Chen, Matthew Law, Nicola Massari, Christoph Posch, Christos Papavassiliou, Timir Datta-Chaudhuri, Iraklis Anagno, Victor Brea, Shii-Chii Liu, Piotr Dudek, Alex Serb
- SSTC organized a total of 4 sessions at ISCAS 2019 (3 oral, 1 poster).
  - *Oral sessions:* Image Sensors, Sensory Systems, Chemical & Mechanical Sensors
  - *Poster sessions:* Sensory Circuits & Systems

#### 4. DISTINGUISHED LECTURER PROGRAM

SSTC currently has four Distinguished Lecturers:

- Pantelis Georgiou (2018-19 roster)
- Andrew Mason (2019-20 roster)
- Man-Kay (Matthew) Law (2019-20 roster)
- Andreas Andreou (2019-20 roster)

#### 5. NEW IEEE FELLOWS

One committee member was elevated to IEEE Fellow status in 2019:

- Maysam Ghovanloo

#### 6. COMMITTEE MEMBER ACTIVITIES

In addition to their research and scientific activities, the Committee members are contributing to the development of the field of Sensory Systems through of the organisation of many conferences & workshops, and other dissemination activities, including delivering numerous invited lectures and seminars. They are serving on Editorial Boards of many journals and are active in a number of committees within IEEE and beyond.

Many are also active in knowledge transfer and commercialisation activities, including publication of patents. Their work has been recognised by various awards.

Below is a summary of individual member activities (24 members responded to requests for this information).

##### *SHORT COURSES, PLENARY SESSIONS, KEYNOTE SPEAKERS, INVITED LECTURES*

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##### **Alejandro Linares-Barranco**

- A. Linares-Barranco, "Spike-based Building Blocks for Neuromorphic Robotic", Invited Talk, Sept-2018. NBS CIT-EC. Universität Bielefeld.

##### **Alexander Serb**

- Invited lecture: Huawei professors' day, Moscow, Nov. 2018.

##### **Sandro Carrara**

- "Memory-Efficient Neuromorphic Learning and Inference," Forum on Alternative Computing Models using Analog/MS Computational Substrates, IEEE Custom Integrated Circuits Conf. (CICC'2019), Austin TX, Apr. 17, 2019.
- "Neuromorphic Silicon Learning Machines," Colloquium, Naval Research Laboratory, Washington DC, April 1, 2019.
- "Silicon Integrated High-Density Neural Interfaces," Lawrence Livermore National Laboratory, Livermore CA, Febr. 25, 2019.
- "Memory-Efficient Neuromorphic Learning and Inference," 2018 Workshop on Hardware and Algorithms for Learning On-a-chip (HALO), IEEE Int. Conf. Computer Aided Design (ICCAD'2018), San Diego CA, Nov. 8, 2018.
- "Energy Efficient Neuromorphic Learning and Inference at Nanoscale," IEEE CEDA Distinguished Speaker Luncheon at 2018 IEEE/ACM Design Automation Conference (DAC 2018), San Francisco CA, June 26, 2018.

### **Gert Cauwenberghs**

- “Memory-Efficient Neuromorphic Learning and Inference,” Forum on Alternative Computing Models using Analog/MS Computational Substrates, IEEE Custom Integrated Circuits Conf. (CICC’2019), Austin TX, Apr. 17, 2019.
- “Neuromorphic Silicon Learning Machines,” Colloquium, Naval Research Laboratory, Washington DC, April 1, 2019.
- “Silicon Integrated High-Density Neural Interfaces,” Lawrence Livermore National Laboratory, Livermore CA, Febr. 25, 2019.
- “Memory-Efficient Neuromorphic Learning and Inference,” 2018 Workshop on Hardware and Algorithms for Learning On-a-chip (HALO), IEEE Int. Conf. Computer Aided Design (ICCAD’2018), San Diego CA, Nov. 8, 2018.
- “Energy Efficient Neuromorphic Learning and Inference at Nanoscale,” IEEE CEDA Distinguished Speaker Luncheon at 2018 IEEE/ACM Design Automation Conference (DAC 2018), San Francisco CA, June 26, 2018.

### **Ibrahim (Abe) M. Elfadel**

- Invited: “CAD for ML/ML for CAD: A Virtuous Cycle?” SRC/Mubadala Forum on Future AI Hardware Systems, Khalifa University, Abu Dhabi, UAE, Apr 16, 2019.
- • Invited: "Domain-Specific Architectures and their Fast Prototyping," IBM T. J. Watson Research Center, Yorktown Heights, NY, Oct 26, 2018.
- • Invited: "A Taxonomy for Machine Learning in VLSI Computer-Aided Design," IBM, Poughkeepsie, NY, IBM EDA Education Series. Invited Seminar, Aug 22, 2018.
- • Half-day tutorial: "Piezoelectric Energy Harvesting: Modeling, Design, Fabrication, and Testing," 61st Midwest Symposium on Circuits and Systems, Windsor, ON, Canada, Aug 5 - 8, 2018.

### **Man-Kay Law**

- “Ultra-low Power/Energy Harvesting CMOS Sensing Circuits and Systems”, Nova University of Lisbon, Lisbon, Portugal, Feb. 2019.
- “Ultra-low Power/Energy Harvesting CMOS Sensing Circuits and Systems”, International Iberian Nanotechnology Laboratory, Braga, Portugal, Mar. 2019.

### **Pantelis Georgiou**

- Keynote - Bio-inspired microelectronics for improving human health, IEEE International Symposium on Medical Measurements and Applications 2018, Rome, Italy, June 11th, 2018.
- Invited Talk – Bio-inspired AI Improving Human Health, The Economist event on the Artificially Intelligent Healthcare Sector, Athens Greece, September 24th, 2018.

### **Ricardo Carmona-Galán**

- "Feature extraction at sensor level in CMOS vision chips", ACM International Conference on Distributed Smart Cameras (ICDSC'18), Eindhoven (Netherlands), Sept. 3-4, 2018.
- "Efficient low-level feature extraction in smart CMOS image sensors", Third Barcelona Technoweeek: Course on Semiconductor Detectors. Institut de Ciències del Cosmos, Universitat de Barcelona, Spain, July 2-6, 2018.
- "CMOS Image Sensors for Time-of-Flight Estimation", Course on CMOS Image Sensors @WASC 2018. Instituto de Sistemas e Robótica, Universidade de Coimbra, Portugal, June 27-28, 2018.

### **Shih-Chii Liu**

- “Classification using event-driven sensors and machine learning deep neural networks”, Dept of Electrical Engineering, University of Gainesville, Florida, Dec 12, 2018.
- “Exploiting timing sparsity with event-driven sensors and deep neural networks”, DCC Lecture, Donders Institute of Cognitive Neuroscience, Nijmegen, Netherlands, Oct 30, 2018.
- “Exploiting input timing information and sparsity in deep neural networks”, Department of Electrical and Computer Engineering, National University of Singapore, Singapore, Feb 21, 2018.
- CapoCaccia Neuromorphic Cognition Workshop, Sardinia, Italy, Apr 28, 2018.

#### **Timir Datta-Chaudhuri**

- “Pulsed Electromagnetic Field [PEMF] Effects on Orthopedic Soft Tissue: Screening of New Signal Types”, invited seminar at The Orthofix Symposium December 2018.

#### **Timothy Constandinou**

- “Towards a distributed mm-scale chronically-implantable neural interface”, IEEE Brain Initiative Workshop on Advanced NeuroTechnologies (San Diego, USA), 2 November 2018.

#### **Tobi Delbruck**

- Why we stopped working on hardware SNNs (for now), CapoCaccia Neuromorphic Cognition Workshop, Sardinia, May 2018.
- Sensing and processing with events, 26th edition of the European Signal Processing Conference, Rome, Italy Sept. 2018.
- Using spatio-temporal sparsity in CNN and RNN accelerators, Samsung Deep Learning Forum, Suwon, S. Korea, Sept. 2018.
- Neuromorphic AI Tutorial, BioCAS, Cleveland, USA, Oct. 2018.
- Quick visual robotics with event cameras, 32nd International Congress on High-Speed Imaging and Photonics (ICHSIP-32), Twente, Netherlands, Oct. 2018.
- Neuromorphic AI Tutorial, AICAS, Hsinshu, Taiwan, Mar. 2019.

### **CONFERENCES**

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#### **Alejandro Linares-Barranco**

- RCM ISCAS 2019.

#### **Sandro Carrara**

- IEEE BioCAS 2019 (Publicity Co-Chair).
- IEEE ISCAS2019 (Tutorial Chair).
- PRIME 2019 (General Chair).
- IEEE MeMeA (General Co-Chair).

#### **Gert Cauwenberghs**

- Organizational Committee (Special Sessions), IEEE BioCAS'2019.
- Technical Program Committee, IMMD, IEEE ISSCC, 2018-2020.
- Co-organizer, and co-chair, invited session on “Industrial-strength Accelerators for Machine Learning and Artificial Intelligence,” DAC Designer Track, IEEE/ACM DAC2018, San Francisco CA, 2018.

#### **Ibrahim (Abe) M. Elfadel**

- CAD Track Co-chair, Technical Program Committee, 26th IEEE/IFIP International Conference on Very Large Scale Integration (VLSI-SoC 2018), Verona, Italy, Oct 8-10, 2018.
- Co-organizer, 11th IEEE/ACM Workshop on Variability Modeling and Characterization, co-located with the 37th International Conference on Computer Aided Design (ICCAD 2018), Irvine, CA, Nov 5-8, 2018.
- Review Committee Member, 52nd International Symposium on Circuits and Systems (ISCAS 2019), Sapporo, Japan, May 26-29, 2018.
- Member of Organizing Committee, SRC/Mubadala Forum on Future AI Hardware Systems, Khalifa University, Abu Dhabi, UAE, April 15 – 16. 2019.

#### **Kea-Tiong (Samuel) Tang**

- Technical Program Committee, IEEE ISCAS conference (2011-present).

- Technical Program Committee, IEEE BioCAS conference (2012-present).
- Technical Program Committee, IEEE Life Sciences Conference (LSC), Tutorial co-Chair (2018).
- Technical Program Committee, IEEE NEWCAS 2018~2019.
- General Vice Co-Chair, Taiwan and Japan Conference on Circuits and Systems (TJCAS), 2018.
- Local Arrangement Co-Chair (2019), IEEE International Conference on Artificial Intelligence Circuits and Systems (AICAS).
- Technical Program Committee, the 18th International Symposium on Olfaction and Electronic Nose (ISOEN 2019).

#### **Man-Kay Law**

- ITPC, International Solid-State Circuits Conference (ISSCC), 2017-present).
- RCM, IEEE Symposium on Circuits and Systems, 2012-present.
- RCM, IEEE Biomedical Circuits and Systems Conference, 2012-present.

#### **Nicola Massari**

- TPC of PRIME conference.
- TPC of ICECS conference: organized special session for ICECS 2018.

#### **Nicole McFarlane**

- Member of the Technical sub-Committee ICECS 2018.

#### **Orly Yadid-Pecht**

- Member of the Technical Committee for the IEEE Workshop on CCDs and Advanced Image Sensors (2016-).
- Member of the IEEE CAS Analog Signal Processing, Neural Networks and Sensors Technical Committees (1996-Present).
- Member of the Steering Committee for the IEEE ICECS (2003-present).

#### **Pantelis Georgiou**

- IEEE BioCAS 2018 Conference, Special Sessions Chair (Cleveland, US).
- IEEE Sensors 2018 Conference, Live Demo Chair (New Delhi, India).

#### **Paula López Martínez**

- Co-Chair of the Women in CAS Committee of the ISCAS 2020.

#### **Shih-Chii Liu**

- Review member of IEEE ISCAS 2018.
- Co-organizer of Telluride Neuromorphic Cognition Engineering Workshop 2015, Telluride, Colorado.

#### **Timir Datta-Chaudhuri**

- Member of the CAS BIOCAS TC.
- Member of the CAS SS TC.

#### **Timothy Constandinou**

- IEEE BioCAS 2018 Conference, Technical Program Co-Chair.
- IEEE NeuroCAS 2018 Workshop, General Chair.

#### **Tobi Delbruck**

- Co-organizer AICAS 2019 (Demos and Jeopardy Event), Hsinshu City, Taiwan.
- Co-organizer of Telluride Neuromorphic Cognition Engineering Workshop 2017, Telluride, Colorado.

**Víctor Manuel Brea**

- Program Chair of 12th International Conference on Distributed Smart Cameras (ICDSC 2018), Eindhoven, Netherlands, Sept. 3rd-4th 2018 (ACM).

**EDITORIAL BOARDS**

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**Alejandro Linares-Barranco**

- AE – IEEE TCAS II – Express Briefs.
- AE – Frontiers on Neuromorphic Engineering.
- Review Editor – Frontiers on Neurorobotics. Review Editor, Frontiers in Neurorobotics.

**Amine Bermak**

- IEEE transactions on Electron Devices.
- Nature Scientific Reports.

**Sandro Carrara**

- ExCom of the IEEE Sensors Council.
- AdCom of the IEEE Sensors Council.
- Scientific Board of the Swiss Integrative Center for Human Health (2019-).

**Gert Cauwenberghs**

- IEEE Transactions on Biomedical Circuits and Systems.
- IEEE Transactions on Biomedical Engineering.
- Frontiers in Neuroscience (Frontiers in Neuromorphic Engineering)

**Ibrahim (Abe) M. Elfadel**

- Associate Editor: IEEE Transactions on VLSI.
- Guest Editor: Micromachines, Special Issue on MEMS Accelerometers, April 2019.
- Editor Board: Microelectronics Journal (Elsevier).

**Iraklis Anagnostopoulos**

- Reviewer IEEE Transactions on Computers, IEEE Transactions on Very Large Scale Integration Systems, IEEE Embedded System Letters

**Kea-Tiong (Samuel) Tang**

- Associate Editor of IEEE Transactions on Biomedical Circuits and Systems (2014 – present).

**Nicole McFarlane**

- Associate Editor TBioCAS (2019-present).

**Orly Yadid-Pecht**

- Member of the Editorship Board, International Journal Information Models and Analysis, 2013 – present.
- Associate Editor, Journal for Low Power Engineering Applications January 2011 – Present .

**Pantelis Georgiou**

- IEEE Transactions on Biomedical Circuits and Systems, Associate Editor.
- IEEE Sensors, Associate Editor.

**Ricardo Carmona-Galán**

- Associate Editor, Journal of Real-Time Image Processing, Springer (ISSN 1861-8200).

**Shih-Chii Liu**

- IEEE Trans. on Biomedical Circuits and Systems, Associate Editor.
- Frontiers in Neuromorphic Engineering, Associate Editor.
- Neural Networks Journal, Associate Editor.

**Shoushun Chen**

- Associate Editor, IEEE Sensors Journal.

**Timir Datta-Chaudhuri**

- Associate Editor – Bioelectronic Medicine (Springer Nature).

**Timothy Constandinou**

- IEEE Transactions on Biomedical Circuits and Systems.

**Tobi Delbruck**

- Frontiers in Neuromorphic Engineering, Associate Editor.

**Víctor Brea**

- Víctor Brea, Dominique Ginhac, François Berry, Richard Kleihorst, “Special issue on advances on smart camera architectures for real-time image processing”, Journal of Real-Time Image Processing, vol. 14, no. 3, pp. 635-636, Springer Heidelberg, DOI: 10.1007/s11554-018-0764-1.
- Associate editor of Journal of Real-Time Image Processing since Jan. 1st 2019.
- Advisory board of Workshop of Architecture of Smart Cameras (WASC).

**AWARDS, HONORS**

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**Amine Bermak**

- Best Researcher Award at HBKU, College of Science and Engineering, for 2018.

**Ibrahim (Abe) M. Elfadel**

- Board of Directors Award from the Semiconductor Research Corporation, USA, for “Pinoneering Semiconductor Research in Abu Dhabi.” Jointly with Prof. Mohammad Ismail, September 2018.
- Best Paper Award with my student Rupesh Karn at the 2019 UAE Graduate Student Research Conference, Abu Dhabi, April 16, 2019. Paper entitled: "Cryptomining Detection in Container Clouds Using System Calls and Explainable Machine Learning."
- A. Richard Newton Young Student Fellow Award from the Design Automation Conference, San Francisco, CA, June 2018, for my Research Engineer and former MSc student Hector Gonzalez Diaz.

**Kea-Tiong (Samuel) Tang**

- Bronze Award, the 18th Golden Silicon Award, 2018.
- Outstanding Electrical Engineering Professor Award, the Chinese Institute of Electrical Engineering, 2018.

**Orly Yadid-Pecht**

- 2018 ASTech Technology Leadership Award.
- 2018 AIMBE Fellowship.

**Pantelis Georgiou**

- The Rosetrees Trust Interdisciplinary Award 2018.

**Wei Tang**



- Teaching-Research-Service Synergy Award, College of Engineering, New Mexico State University 2019.

## PATENTS

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### Alexander Serb

- Patent on neural preamplifier, submitted, May 2018.

### Amine Bermak

- US Patent Application - "Monolithic Integrated Gas-sensitive FETs in Standard CMOS Process" 2018.

### Gert Cauwenberghs

- "Capacitive Passive Mixer Baseband Receiver with Broadband Harmonic Rejection," C. Kim, C.M. Thomas, G. Cauwenberghs, L.E. Larson, S. Joshi, and S. Ha, United States Patent 9,876,518, Jan. 23, 2018.

### Ibrahim (Abe) M. Elfadel

- "System and Method for Low-Power, Single-Wire Communication," Co-inventors: Shahzad Muzaffar and Jerald Yoo. US Patent 10,263,765B2. Issued on April 16, 2019.
- "System and Method for Self-Synchronized Communications," Co-inventor: Shahzad Muzaffar. US Patent Application Number: 16/023,356. Filed Jun 29, 2018
- "Sensor Array for Consolidated Force Measurement," Co-inventor: Shahzad Muzaffar. US Patent Application Number: 16/023,335. Filed Jun 29, 2018.
- "Apparatus and Method for Weight Measurement During Motion Using Force Waveforms," Co-inventor: Shahzad Muzaffar. US Patent Application Number: 16/023,287. Filed June 29, 2018.
- "Method for Secure Device-to-Device Communication using Multilayered Cyphers, Co-inventor: Shahzad Muzaffar. US Patent Application Number: 16/047,375. Filed July 27, 2018.

### Orly Yadid-Pecht

- O. Yadid-Pecht, N Vastarey, R. Turner, V. Vij "Sensor for detecting food-borne gastrointestinal irritants, contaminants, allergens, and pathogens", Patent pending, Application no: 62/669758.

### Paula López Martínez

- Title: Energy harvesting System with integrated Power Management Unit and solar cell in the same silicon substrate. Inventors: Esteban Ferro Santiago, Paula López Martínez, Víctor M. Brea Sánchez, Diego Cabello Ferrer. Nº: T201730001 (Spanish Office of Patents and Marks).

### Ricardo Carmona-Galán

- I. Vornicu, R. Carmona Galán, Á. Rodríguez Vázquez, "Método y dispositivo de detección de pico del histograma comprimido de los valores de píxel en sensores de tiempo de vuelo de alta resolución". CSIC-Universidad de Sevilla. Núm. P201830870, 05-SEP-2018. OEPM (España).

### Shih-Chii Liu

- Patent No. 15/347,501 "Memory cell unit and recurrent neural network including multiple memory cell units".

### Shoushun Chen

- Shoushun Chen, "Pixel acquisition circuit, image sensor and image acquisition system," US CN US10212380B2.
- Shoushun Chen, "Pixel acquisition circuit, optical flow sensor, and image acquisition system," US CN SG US10181194B2.

### Wei Tang

- Joerg Kliewer, Wei Tang "Asynchronous Wireless Sensing". Dec. 2018, United States Patent US 10,153,892.

## 8. SELECTED REPRESENTATIVE PUBLICATIONS

In order to provide a “curated” list of publications, the members were asked to highlight their three most important publications of the past year (31 members responded to requests for this information).

### Alejandro Linares-Barranco

- Ricardo Tapiador-Morales, Alejandro Linares-Barranco, Angel Jimenez-Fernandez, Gabriel Jimenez-Moreno. Neuromorphic LIF Row-by-Row Multiconvolution Processor for FPGA. IEEE transactions on biomedical circuits and systems. Feb-2019.
- Alessandro Aimar, Hesham Mostafa, Enrico Calabrese, Antonio Rios-Navarro, Ricardo Tapiador-Morales, Iulia-Alexandra Lungu, Moritz B Milde, Federico Corradi, Alejandro Linares-Barranco, Shih-Chii Liu, Tobi Delbruck. Nullhop: A flexible convolutional neural network accelerator based on sparse representations of feature maps. IEEE transactions on neural networks and learning systems. July-2018.
- Alejandro Linares-Barranco, Hongjie Liu, Antonio Rios-Navarro, Francisco Gomez-Rodriguez, Diederik Moeys, Tobi Delbruck. Approaching Retinal Ganglion Cell Modeling and FPGA Implementation for Robotics. Entropy MDPI. June-2018.

### Alexander Serb

- Seamlessly fused digital-analogue reconfigurable computing using memristors, Nature Communications.
- Practical Implementation of Memristor-Based Threshold Logic Gates, IEEE TCAS I.

### Amine Bermak

- Wei Xu; Bo Wang; Mingzheng Duan; Moaaz Ahmed; Amine Bermak; Yi-Kuen Lee, “A Three-Dimensional Integrated Micro Calorimetric Flow Sensor in CMOS MEMS Technology”, IEEE Sensors Letters, Vol 3, Issue 2, 2019.
- Fang Tang ; Zhou Shu ; Mingdong Li ; Yi Hu ; Xichuan Zhou ; Shengdong Hu ; Zhi Lin ; Ping Gan ; Tiancong Huang ; Amine Bermak, “A Low Power and Fast Tracking Light-to-Frequency Converter With Adaptive Power Scaling for Blood SpO2 Sensing” IEEE Transactions on Biomedical Circuits and Systems, Volume: 13 , Issue: 1, 2019.
- Bo Wang ; Man-Kay Law ; Jun Yi ; Chi-Ying Tsui ; Amine Bermak, “A -12.3 dBm UHF Passive RFID Sense Tag for Grid Thermal Monitoring”, IEEE Transactions on Industrial Electronics, 2019.

### Fernando Perez-Peña

- Escudero, Elena Cerezuela, Fernando Pérez Peña, Rafael Paz Vicente, Angel Jimenez-Fernandez, Gabriel Jimenez Moreno, and Arturo Morgado-Estevez. "Real-time neuro-inspired sound source localization and tracking architecture applied to a robotic platform." Neurocomputing 283 (2018): 129-139.
- Donati, Elisa, Fernando Perez-Pefia, Chiara Bartolozzi, Giacomo Indiveri, and Elisabetta Chicca. "Open-Loop Neuromorphic Controller Implemented on VLSI Devices." In 2018 7th IEEE International Conference on Biomedical Robotics and Biomechanics (Biorob), pp. 827-832. IEEE, 2018.
- Cifredo-Chacón, María-Ángeles, Fernando Perez-Peña, Ángel Quirós-Olozábal, and Juan-José González-de-la-Rosa. "Implementation of Processing Functions for Autonomous Power Quality Measurement Equipment: A Performance Evaluation of CPU and FPGA-Based Embedded System." Energies 12, no. 5 (2019): 914.

### Gert Cauwenberghs

- “A Fully Integrated RF-Powered Energy-Replenishing Current-Controlled Stimulator,” S. Ha, C. Kim, J. Park, G. Cauwenberghs and P. Mercier, IEEE Transactions on Biomedical Circuits and Systems, vol. 13 (1), pp.191-202, 2019.
- “Sub- $\mu$ Vrms-Noise Sub- $\mu$ W/Channel ADC-Direct Neural Recording With 200-mV/ms Transient Recovery Through Predictive Digital Autoranging,” C. Kim, S. Joshi, H. Courellis, J. Wang, C. Miller and G. Cauwenberghs, IEEE Journal of Solid-State Circuits, vol. 53 (11), pp. 3101-3110, 2018.

- “Deep Supervised Learning Using Local Errors,” H. Mostafa, V. Ramesh, and G. Cauwenberghs, *Frontiers in Neuroscience*, vol. 12, pp. 608:1-16, 10.3389/fnins.2018.00608, 2018.

#### **Ibrahim (Abe) M. Elfadel**

- Syed, W., and Elfadel, I .M., "Vibrational Model of a Prismatic Multilayered Tapered Cantilever Using Perturbation Analysis, *Journal of Sound and Vibration*, Elsevier, Vol. 441, pp. 1 25, Feb 2019.
- Mohammed, Z., Elfadel, I .M., and Rasras, M., "Monolithic Multi Degree of Freedom (MDoF) Capacitive MEMS Accelerometers," *Micromachines*, Vol. 9, No. 11, Nov. 2018.
- Syed, W. U., Bojesomo, A., and Elfadel, I .M., "Electromechanical Model of a Tapered Piezoelectric Energy Harvester," in *IEEE Sensors Journal*, Vol. 18, No. 14, pp. 5853-5862, July 15, 2018.

#### **Iraklis Anagnostopoulos**

- Zois-Gerasimos Tasoulas and Iraklis Anagnostopoulos. Optimizing Performance of GPU Applications with SM Activity Divergence Minimization. In *Proceedings of International Conference on Electronics Circuits and Systems (ICECS)*. IEEE, 2018.
- Zois-Gerasimos Tasoulas, Ryan Guss, and Iraklis Anagnostopoulos. Performance-based and Aging-aware Resource Allocation for Concurrent GPU Applications. In *Proceedings of International Symposium on Defect and Fault Tolerance in VLSI and Nanotechnology Systems (DFT)*. IEEE 2018.
- Ioannis Galanis, Theodoros Marinakis, and Iraklis Anagnostopoulos. Workload-aware Management Targetting Multi-Gateway Internet-of-Things Accepted in *IEEE International Conference on Omni-layer Intelligent systems (COINS)*, 2019.

#### **Jorge Fernández-Berni**

- D. Velasco-Montero, J. Fernández-Berni, R. Carmona-Galán and Á. Rodríguez-Vázquez, “Optimum Selection of DNN Model and Framework for Edge Inference,” *IEEE Access*, vol. 6, no. 1, pp. 51680-51692, 2018. DOI 10.1109/ACCESS.2018.2869929, ISSN: 2169-3536.
- D. Velasco-Montero, J. Fernández-Berni, R. Carmona-Galán and Á. Rodríguez-Vázquez, “Optimum Network/Framework Selection from High-Level Specifications in Embedded Deep Learning Vision Applications,” in *Advanced Concepts for Intelligent Vision Systems (ACIVS)*, Poitiers, France, September 2018, ISBN 978-3-030-01448-3, *Lecture Notes on Computer Science 11182 (Springer)*, pp. 369–379, 2018.
- D. Velasco-Montero, J. Fernández-Berni, R. Carmona-Galán and Á. Rodríguez-Vázquez, “Demo: Deployment of DNNs on Heterogeneous Hardware in a Low-Cost Smart Camera,” in *ACM Int. Conf. on Distributed Smart Cameras (ICDSC)*, Eindhoven, Netherlands, September 2018.

#### **Kea-Tiong (Samuel) Tang**

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