

Minutes of the Annual Meeting of the Sensory Systems Technical Committee of the IEEE Circuits and Systems Society

ISCAS 2018, Tuesday, May 29, 2018

13:15-14:15 @Room VV1.8, Firenze Fiera Congress & Exhibition Center

Florence, Italy

SSTC Officers

- **Chair:** Tim Constandinou t.constandinou@imperial.ac.uk
- **Chair Elect:** Amine Bermak eebermak@ee.ust.hk
- **Secretary:** Chen Shoushun eechenss@ntu.edu.sg
- **Secretary Elect:** Ricardo Carmona-Galán rcarmona@imse-cnm.csic.es
- **Past Chair:** Piotr Dudek pdudek@umist.ac.uk

Minutes prepared by the SSTC's secretary-elect Ricardo Carmona-Galán

List of attendees

Please refer to Annex I of these minutes

Agenda

1. New Members
2. Confirmation/Approval of Minutes from 2017 SSTC Meeting and 2017 SSTC Annual Report
3. Confirmation/Approval of 2018 Annual Report
4. Updates:
 - SSTC activity, ISCAS 2018
 - IEEE Sensors Council, IEEE BRAIN Initiative
 - IEEE CASS Technical Activities – New Initiatives for 2018/19
5. Upcoming events:
 - IEEE BioCAS 2018, IEEE ISCAS 2019, IEEE AICAS 2019
6. SSTC track best paper award 2018
7. AOB

Meeting minutes

1. New members

The Chair, Tim Constandinou, welcomed the participants, and explained that this point was moved up to the first place of the agenda, in order for the new members, if accepted, to participate in the discussions.

The potential new members whose proposition have been placed in due time are four:

- Kea-Tiong (Samuel) Tang – nominated by Pantelis Georgiou
- Hadi Heidari – nominated by Timothy Constandinou
- Ioulia Tzouvadaki – nominated by Themis Prodromakis
- Joseph (Gang) Wang – nominated by Orly Yadid-Pecht

Their CVs can be found in Annex II. They abandoned the room for the deliberations on their acceptance and several issues were risen. There was no doubt on the suitability of the proposals so they were all accepted by unanimous vote. However, concerns on the seniority criteria were pointed out. There is no reference to this in the SSTC Charter, however it is agreed that some seniority criteria should be incorporated in the form of different member categories (junior, senior, etc.).

It is also mentioned that prospective members from the industrial sector —whose incorporation is very much encouraged—, should not be examined under the same criteria as those with an academic track for obvious reasons.

2. Confirmation/Approval of Minutes from 2017 SSTC Meeting and 2017 SSTC Annual Report

Minutes from the 2017 Annual Meeting of the SSTC were prepared by Secretary Shoushun Chen. He also compiled the 2017 SSTC Annual Report. The Chair, Tim Constandinou, presented the documents to the members and they were approved with no objection.

3. Confirmation/Approval of 2018 Annual Report

This year, the Vice-Presidency of Technical Activities of CASS has asked to complete the Activity Report of the Technical Committees before ISCAS. For this reason, a 2-page executive summary has been set up by the Chair, Tim Constandinou, and the Secretary, Shoushun Chen. This Executive Summary was approved with no objection.

Also, the Activity Report was approved, compiled from the contributions of 37 members of the SSTC. The report has been already submitted, but there is time for updates before publication.

4. Updates

At this point, the Chair updates the SSTC on the most relevant activities that has been developed during the past year

4.1. Highlights of ISCAS 2018

This year, 22 members served as RCM's for the Sensory Circuits and Systems track. Tim Constandinou express his thanks to these members:

Jennifer Blain Christen, Víctor Brea, Ricardo Carmona Galán, Gert Cauwenberghs, Shoushun Chen, Jie Chen, Tobi Delbruck, Piotr Dudek, Jorge Fernández-Berni, Pantelis Georgiou, Tara Hamilton, Juan Antonio Leñero-Bardallo, Daniel Leon-Salas, Alejandro Linares-Barranco, Shih-Chii Liu, Paula López, Andrew Mason, Nicole McFarlane, Christos Papavassiliou, Christoph Posch, Milutin Stanacevic, Wei Tang.

This year there have been 10 more submissions to the Sensory Circuits and Systems track. The distribution of submissions and accepted papers for the different sub-tracks is depicted in this table:

Subtrack	2017	2018
7.1 Imagers and Vision Sensors	29	15/27
7.2 Acoustic Sensing	0	1/3
7.3 Chemical, Organic, and MEMS Sensing	6	5/11
7.4 Neuromorphic and Bioinspired Sensing	4	4/5
7.5 Autonomous and Self-powered Sensors	3	2/6
7.6 Other Areas in Sensory Circuits and Systems	13	6/13
Total (accepted/submitted and %)	25/55 (45%)	33/65 (51%)

The number of session organized in this year program were 4 oral sessions (2 on imagers, 1 on auditory and bio-sensors and 1 on sensory circuits and systems) and 2 poster sessions (1 on imagers and 1 on circuits and systems for sensors).

Pamela Abshire pointed out that this year there was not a sensor theme, and the explanations for this are found in that sensors are horizontal to all themes, so there was no need to segregate them in the vertical direction.

4.2. IEEE and Cross-society Updates

Concerning this point, the Chair wants the SSTC to congratulate one of our members that has become *IEEE Fellow* this year: Prof. Pamela Abshire.

4.3. IEEE Brain Initiative

IEEE Brain Initiative counts with the involvement of 12 IEEE societies/councils. Tim Constandinou is the CASS representative in IEEE Brain. The aim of this initiative is to:

- bring innovative technologies and tools to the field of neuroscience
- provide unbiased and vendor neutral technology directions that can help guide budget and funding decisions
- facilitate cross disciplinary collaboration and coordination bringing solutions that address the entire technology chain to accelerate commercialization

Amongst the activities organized within this initiative, there is an *Annual IEEE Brain Workshop*. Last year meeting was held in Washington DC, counted with more than 140 participants, 25% of them from industry, Facebook and Medtronic keynotes and invited speakers discussed neuroethics, brain research, and commercialization. 2018's meeting will be held in San Diego, Nov. 1-2, and will count on a poster session.

IEEE Brain initiative is also promoting keynotes, sessions and panels at a set of conferences: IEEE Sensors 2017, BioCAS 2018, IEEE SMC 2017, etc. As well as competitions, hackathons and hands-on events, focused on extraction of brain signals, demonstrated effective prototyping and application development using BCI tools, usability of brain signal databases, etc.

IEEE Brain Initiative also works for the development of standards for BMI, especially in the following areas:

- Sensors and interoperability
- Effectors
- Data representation, storing, and sharing
- Performance assessment and benchmarking
- User requirements – clinical and non-clinical BMIs

Standards roadmap to be delivered in mid-2018, in order to provide an integrated overview of all activity related to BMI neuro-technologies; and to identify gaps in existing standards and provide a plan to address these gaps.

IEEE Brain Initiative has created an online IEEE Brain Newsletter and has promoted special issues at the IEEE Institute (Nov 2016), Proceedings of the IEEE (Jan. 2017), IEEE Spectrum (June 2017), and Transactions on Neural Systems & Rehabilitation Engineering (Oct 2017).

In the educational field, *IEEE Brain Initiative* has produced a e-Learning module on Neuroethics and a Podcast Series with SMEs.

Upcoming activities in these lines were also announced.

4.4. IEEE Sensor Council

It is an IEEE entity devoted to sensors, more formally “the theory, design, fabrication, manufacturing, reliability and applications of devices for sensing and transducing physical, chemical, and biological phenomena”. Sensors are a cross-cutting subject among many IEEE disciplines. Hence a “Council” has been formed instead of a Technical Society. The *IEEE Sensors Council* covers Sensors in the field of 26 IEEE Technical Societies.

Amongst the activities promoted by the IEEE Sensor Council, there are conferences, publications, technical and industrial activities, summer schools, standards, etc.

The Chair of the SSTC announces that Pantelis Georgiou, active member of the SSTC, is the CASS representative at the *IEEE Sensor Council*, and that Sandro Carrara, also active member of the SSTC, has been nominated Editor-in-Chief of the *IEEE Sensors Journal*.

4.5. IEEE CASS Technical Activities – New Initiatives for 2018/19

The Chair then started reviewing the new initiatives promoted by the IEEE CASS Technical Activities Division, that were introduced to the TC Chairs earlier during ISCAS 2018.

One of the most relevant initiative is the update of IEEE CASS EDICS, that stands for Editors Information Classification Scheme. IEEE CASS TAD is asking contributions from TC Chairs, working together with EiC’s in order to update the EDICS corresponding to their area of expertise. Current EDICS relevant to SSTC are all within the label ACS (Analog and Mixed Mode Circuits and Systems):

- ACS210 - Signal conditioning and interfacing
- ACS210A0 - Conditioning and interfacing for sensors
- ACS210A5 - Conditioning and interfacing for actuators
- ACS250B0 - Interface circuits for MEMS
- ACS250B5 - Interface circuits for NEMS
- ACS250C0 - Optical devices and analog circuits

SSTC formed a sub-committee to review current EDICS and propose new classification/structure. This sub-committee is composed by Timothy Constandinou, Tor Sverre Lande, Christos Papavassiliou, Pantelis Georgiou, Konstantin Nikolic. Their current work is oriented to propose 2nd level themes for the new CASS EDICS:

- Sensor interface circuits (or “transducer interface circuits”)
 - Low frequency electromagnetic
 - Electromagnetic: optical, infrared, terahertz
 - Electrochemical: amperometric, potentiometric, conductimetric
 - Electromechanical: acoustic, inertial, pressure/flow

- Electrophysical: temperature, gas/humidity, radiation
- Sensor systems (or “transducer systems”)
 - Sensor arrays: either single mode, or multi-modal
 - Distributed sensors: combining power, communication, processing
 - Smart sensory systems: calibration, signal conditioning, processing, autonomous systems

Two additional initiatives were announced:

- IEEE AICAS 2019: A new CASS conference on circuits and systems for artificial intelligence. The SSTC agrees on looking for involvement in future editions. Perhaps developing a journal.
- Industry Workshop 2018 based on the concept developed at 2017 IBM Workshop. Core themes: IoT, quantum computing, machine learning/AI, HW security.

5. Upcoming events

IEEE ISCAS 2019, to be held in Sapporo, Japan, in May 26-29. The Chair wants to encourage SSTC members to propose special sessions and tutorials. There is also the intention to promote a “confession session” as the one held in ISCAS 2011 in Brazil.

Other upcoming events are:

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|----------------------------|--------------------|----------------------|
| ● <i>IEEE BioCAS 2018</i> | 17-19 October 2018 | Cleveland, Ohio, USA |
| ● <i>NeuroCAS 2018</i> | 10-21 October 2018 | Cleveland, Ohio, USA |
| ● <i>IEEE Sensors 2018</i> | 28-31 October 2018 | New Delhi, India |
| ● <i>IEEE AICAS 2019</i> | 18-20 March 2019 | Hsinchu, Taiwan |

6. SSTC track best paper award 2018

The top 6 papers in review has been ranked by a group of 10 volunteers: Jorge Fernández Berni, Shoushun Chen, Andrew Mason, Victor Brea, Paula López Martínez, Walter Daniel Leon-Salas, Tara Hamilton, Maurizio Valle, Iraklis Anagnostopoulos, Ricardo Carmona Galán. The Chair thanks their collaboration.

This year a paper with the best average rank (2.1) and a runner up (2.4) standout from others. The ISCAS 2018 SSTC Best Paper Award (Runner up) is:

"A 2.6GS/s Spectrometer System in 65nm CMOS for Spaceborne Telescopic Sensing" by Yan Zhang, Yanghyo Kim, Adrian Tang, Jon Kawamura, Theodore Reck, M.-C. Frank Chang

The ISCAS 2018 SSTC Best Paper Award (Winner) is:

"A 1280 by 720 by 3, 250 mW, 24 fps Hexachromatic Imager for Near-Infrared Fluorescence Image-Guided Surgery" by Missael Garcia, Kevin Kauffman, Tyler Davis, Radoslav Marinov, Viktor Gruev

7. AOB

There was no AOB discussed and the meeting concluded at 14:20pm.

Annex I: List of attendees

Members of SSTC who attended the 2018 Annual Meeting.

Name	Affiliation	Email
ABSHIRE, Pamela	Univ. of Maryland	pabshire@umd.edu
ANAGNOSTOPOULOS, Iraklis	Southern Illinois University	iraklis.anagno@siu.edu
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VALLE, Maurizio	Univ. of Genova	maurizio.valle@unige.it
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New Members of SSTC who attended the 2018 Annual Meeting.

Name	Affiliation	Email
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HEIDARI, Hadi	University of Glasgow	Hadi.Heidari@glasgow.ac.uk
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WANG, Joseph (Gang) Wang	University of Calgary	gawang@ucalgary.ca

Annex II: CVs of New Members