Sensory Systems Technical Committee

IEEE Circuits and Systems Society
Activities for May 2002 through April 2003

Chair: Ralph Etienne-Cummings, Johns Hopkins University and University of Maryland, College Park, retienne@jhu.edu
Previous Chair: Geoffrey L. Barrows, Centeye, Inc., geof@centeye.com
Chair Elect: Orly Yadid-Pecht, Ben-Gurion University, Israel, oyp@ee.bgu.ac.il
Secretary: Andre van Schaik, University of Sydney, Australia, andre@ee.usyd.edu.au

Summary of Activities

The Sensory Systems (SS) committee of the IEEE Circuits and Systems Society focuses on the theory, analysis, design, and practical implementation of sensors, actuators, micro-electro-mechanical systems and processing electronics, and their applications.

Committee members are renowned experts, who are both committed to, and active within, the field. The committee membership currently stands at 32 members, up from last year by 15 new members. At ISCAS 2002, Orly Yadid-Pecht and Andre van Schaik were elected as the Chair Elect and Secretary, respectively, for the SSTC. This is the last year of Ralph Etienne-Cummings Chairmanship. He will assume the role of Past Chair after the SSTC meeting to be held at ISCAS 2003.

We were successful in electing our next Chair Elect, Prof. Yadid-Pecht, and Franco Maloberti to the Board of Governors. We, in conjunction with the Analog Signal Processing TC, have also published a Special Issue of *IEEE Sensors Journal* on Array Processing. We are currently finishing the review process for two additional Special Issues, in the Kluwer's *Analog Integrated Circuits and Signal Processing Journal* and the *EURASIP J. Applied Signal Processing,* which should appear later this year. We have also co-sponsored a workshop on Commercialization of Neuromorphic Systems, which was held at the Neural Information Processing Systems Conference in December 2002. We are part of the organization board of an "Institute Without Walls" on Neuromorphic Engineering, currently centered at the University of Maryland, College Park.

For ISCAS 2003, our TC increased the number of submitted papers from 29 to 64! We are also offering a tutorial on CMOS Imager Sensors, offering a Special Session on BioMEMS, and are participating in a Special Session on VLSI Chips for Navigation. We are currently negotiating a deal to convert the tutorial into a book. We have also established a Best Paper prize for our TC.

In conclusion, we are very happy to have surpassed all of the planned goals articulated in last year's report.

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

1. **Participation in ISCAS track paper reviews:** For the upcoming ISCAS conference, we have contributed six regular oral presentation sessions and two poster sessions. The three sessions cover the various topics in our TC, i.e. *Acoustic Sensors, MEMS, Networked Sensors, Neuromorphic Vision, Sensor Circuits, Smart Imagers, Neuromorphic Circuits and Systems*. We are also providing a full day tutorial titled *CMOS Imagers: From Phototransduction to Image Processing*. We are also offering a special session on *BioMEMS*, and participating in one, sponsored by the CNN TC, on VLSI Chips for Navigation and Tracking. We will have a total of 40 (30 oral presentations) papers in our track.

2. **Best Paper Award:** At our last TC meeting, we decided to award a best paper prize for our TC. We selected the top five scoring papers from all the submission in our Track and resubmitted them to the TC membership for ranking. The best paper prize will be awarded to Mathew Cheely and Timothy Horiuchi of the University of Maryland, College Park, for their paper titled "A VLSI Model of Range-Tuned Neurons in the Bat Echolocation System." A certificate will be presented to the authors at the TC meeting in Bangkok. Finalist certificates will also be presented to the finalists. We hope to have a photograph of the winner appear in the CAS Magazine.

3. **Journal Special Issues**: Together with the Analog TC, we published a Special Issue of *IEEE Sensors Journal* on Integrated Multisensor Systems and Signal Processing, Vol. 2, No. 6, December 2002. We are in the final review stage for a Special Issue of Kluwer's *Analog Integrated Circuits and Signal Processing Journal* on Smart Sensors. Most of the papers were presented in our two Special Sessions at ISCAS 2002 and have been extended for journal publication. The review process has been complete for a Special Issue of the *EURASIP J. Applied Signal Processing,* on Neuromorphic Systems. Both of these special issues should appear later this year.

4. **Panel Discussions:** Together with the Institute of Neuromorphic Engineering, we organized a workshop at the *Neural Information Processing Systems Conference 2002* on the Commercialization of Neuromorphic Systems. This workshop was held in Whistler, Canada, on December 13th, 2002. We invited speakers for industry, military and academic sectors to describe their experiences. In addition to the presentation of the technical details of their work, we also requested that they commented on the business potential of the field. We had a number of interesting discussions. The fully session was attended by 20 or so individuals, in addition to the presenters.

   In cooperation with the Cellular Nonlinear/Neural Networks Technical Committee, a panel session was organized at the 2002 Cellular Neural Networks and Applications (CNNA) conference in Frankfurt, Germany, in July of 2002. The purpose of the panel discussion was to address how smart sensors based on CNN techniques may be applicable to the growing field of uninhabited air vehicles (UAVs). This panel session brought together experts from these two greatly different communities (smart sensors and UAVs), and inspired subsequent activities.

5. **Outreach:** Various members of the TC are involved with the establishment of the Institute of Neuromorphic Engineering (INE), which is an "institute without walls" responsible for the promotion and education and research in the field of neuromorphic engineering. This Institute is located at the University of Maryland, College Park, but boasts membership and participants for all over the world. The Institute is also responsible for organizing a 3 week summer workshop in Telluride Colorado. We will encourage members of our community to participate in this workshop. Our current TC chair is also the Director of the INE. Lastly, members of our TC serve on program committees of various conferences such as NIPS, ISSCC, SPIE, BIS and many others.

6. **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 Sensors, TCAS and others.

   Current list of members:
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7. **Future Plans**: In the coming your, it is our goal to double the ISCAS contributions in the SSTC track. We have been actively encouraging researchers, starting with the TC members, in the field to send their work to the conference. This year, we have already seen more than doubling of the contribution, and we hope to continue. We will continue to offer tutorials or short courses in our track at the 2004 ISCAS. We hope to continue the best paper award and potentially provide a monetary award in addition to the certificates. We also plan to establish a relationship with either *IEEE TCAS-I & II* or *IEEE Sensors J.* to have the best papers in the Track appear as full papers in the Journals.