

Seminario IMSE-Forum

Event-Based Auditory Processing with Spiking Silicon Cochleas and Deep Networks

Distinguished Lecture by Prof. Shih-Chii Liu, Institute of Neuroinformatics of Zürich

Audio processing based on conventional regular sampling, process audio frames unnecessarily even when the frames carry no information. They also require high sampling rates for auditory scene parsing where source localization and separation are essential. Event-based neuromorphic audio sensors and processing algorithms offer a potential solution to these applications for IoT, mobile, and always-on applications by asynchronously sampling and processing the audio input in a data driven way. This talk covers the latest audio sensing systems including a new sub milliwatt binaural silicon cochlea, event-based algorithms that process the outputs of these cochlea sensors, and example system applications such as auditory localization using a factor of 40 less computing power than conventional Nyquist-rate systems. The talk also covers event-driven deep networks that use the output of the cochleas and the impact of bit precision of such networks on their performance.

Biography:

Shih-Chii Liu co-leads the Sensors group at the Institute of Neuroinformatics, Univ of Zurich and ETH Zurich, Switzerland. She studied electrical engineering as an undergraduate and received the Ph.D. degree in the Computation and Neural Systems program from the California Institute of Technology. She worked at various companies including Gould American Microsystems, LSI Logic, and Rockwell International Research Labs. Her group has been working on the design of low-power neuromorphic event-based auditory and visual sensors, and research into neuromorphic algorithms and event-driven machine learning deep networks for processing inputs from these sensors. These algorithms and networks have been implemented on event-driven hardware systems that operate in natural environments. Dr. Liu is past Chair of the IEEE CAS Sensory Systems and Neural Systems and Applications Technical Committees. She is current Chair of the IEEE Swiss CAS/ED Society and an associate editor of the IEEE Transactions of Biomedical Circuits and Systems and Neural Networks journal.

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