

ENB Elite Master Program Neuroengineering (MSNE) Invited Presentation

Prof. Dr. Shih-Chii Liu

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Real-time Recognition with Neuromorphic Auditory Systems

Abstract: A fundamental organizing principle of brain computing enabling its amazing combination of intelligence, quick responsiveness, and low power consumption is its use of sparse spiking activity to drive computation. Recent progress in the development of higher-performance, more usable neuromorphic spike-event-based visual (DVS/ATIS/DAVIS) and auditory (AER-EAR/DAS) sensors along with versatile hardware such as FPGAs have stimulated exploration of real-time sensor processing for wearable and IoT platforms. These sensors enable "always-on" low-latency system-level response time at lower power than conventional sampled sensors. I will describe the circuits of a silicon cochlea auditory sensor that emulates the processing in biological cochleas, the event-driven deep networks that process the sensor data, and the real-time implementation of event-driven delta networks that emulate spiking networks on an FPGA platform with state-of-the-art power efficiency, latency, and throughput. I will demonstrate how we use these delta networks on a continuous spoken-digit speech recognition task.

Biography: Shih-Chii Liu received the B. S. degree in electrical engineering from Massachusetts Institute of Technology and the Ph.D. degree in the Computation and Neural Systems program from the California Institute of Technology in 1997. She worked at various companies including Gould American Microsystems, LSI Logic, and Rockwell International Research Labs before returning for her doctoral studies with Carver Mead. She is currently a Professor at the University of Zurich. Her research interests include low-power event-driven neuromorphic sensor and processor hardware design; and event-driven bio-inspired algorithms and deep neural networks, particularly for audio domains. 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 general co-chair of the 2020 IEEE Artificial Intelligence Circuits and Systems Conference (<https://ai-cas2020.eu>). She is also one of the lead organizers of the long-running Telluride Neuromorphic Cognition Engineering Workshop (<http://tellurideneuromorphic.org>). She co-directs the Sensors group (<http://sensors.ini.uzh.ch>) at the Institute of Neuroinformatics, University of Zurich and ETH Zurich.



The talk will be hosted by Prof. Werner Hemmert and Prof. Bernhard. U. Seeber.

Thursday, December 5th 2019, 17:00

Theresienstrasse 90, 80333 Munich (Room N1135)

Registration: <http://go.tum.de/669606> (or QR-Code)



All talks in the MSNE Invited Speaker Series are open to students, staff, and members of the public. Attendance is free.

Contact: msne@ei.tum.de / www.msne.ei.tum.de

MSNE is supported by the Elite Network of Bavaria.

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