



PRESS RELEASE

EU PROJECT TO PRESENT LATEST ON TECHNOLOGY AND ARCHITECTURE DEVELOPMENT FOR BRAIN-INSPIRED ICs

NeuRAM3 Workshop Brings Together International Experts on Neuromorphic Electronics At ESSDERC/ESSCIRC 2016 on Sept. 12 in Lausanne, Switzerland

GRENOBLE, France – Sept. 6, 2016 – An international project to develop technology and architectures for mimicking neural behavior in integrated circuits will review the state of the art in creating neuromorphic circuits and bring together the device and design communities for this promising field on Sept. 12 in Lausanne, Switzerland.

The workshop during ESSDERC/ESSCIRC 2016 is organized by the NeuRAM3 project, which derives its name from “neural-computing architectures in advanced monolithic 3D VLSI technologies”. It will feature speakers from different EU and international programs and groups involved in development of neuromorphic electronics to present and discuss recent advances in the field.

NeuRAM3, a three-year EU project, includes teams from CEA Tech institutes Leti and List (F), STMicroelectronics (F), IBM Zurich (SUI), University of Zurich (SUI), CNR-IMM (I), imec (NL, B), Jacobs University (D), and IMSE-CISC (ESP). It was launched this year to realize a chip implementing a neuromorphic architecture that supports state-of-the-art machine-learning algorithms and spike-based learning mechanisms.

“Neuromorphic computing is based on mimicking the processes of the brain in a very simplified manner,” said Carlo Reita, director technical marketing and strategy, nanoelectronics at Leti, which is coordinating the NeuRAM3 project. “In the brain, connections between neurons get reinforced – meaning better synapse connections – when there is a temporal correlation between signals coming into the neurons.

“In this project, we are trying to mimic this behavior using not software programming in conventional computers, as in state-of-the-art deep-learning machines, but by using time-domain electrical spikes in a dedicated analog/digital circuit,” Reita said. “The circuits are designed to take advantage and ‘learn’ using the properties of some materials and components integrated in the circuit.”

Specific project goals are:

- Developing ultra-low power, scalable and highly reconfigurable neural architecture
- Delivering a 50x improvement in power consumption compared to conventional digital solutions
- Fabricating a monolithic 3D technology in FDSOI at 28nm with integrated RRAM synaptic elements

“With FDSOI, the project is aiming at ultra-low-power embedded circuits for distributed processing in the IoT and sensor systems,” Reita said.

Workshop presenters will offer a variety of approaches to implementing synaptic devices, neurons and different circuit architectures. Speakers and topics include:

- Carlo Reita, Leti, introduction
- Jean Fompeyrine, IBM – Zurich, chair Part 1
- Prof. Luping Shi, Tsinghua University, China, title to be confirmed
- Prof. Peter Bienstman, University of Ghent, Belgium, “Photonic Reservoir Computing Using Silicon Chips”
- Prof. Byoung Hun Lee, GIST, Korea, “Neuromorphic Hardware Development in Korea”

- Dominique Thomas, STMicroelectronics, France, chair Part 2
- Dr. Geoffrey Burr, IBM – Almaden, USA, “Neuromorphic Technologies for Next-Generation Cognitive Computing”
- Prof. Shimeng Yu, Arizona State University, USA, “Scaling-up Resistive Synaptic Arrays for Neuro-inspired Architecture: Challenges and Prospects”
- Dr. Julie Grolier, Thales-CNRS, France, “Brain-inspired Computing with Ferroic Nanodevices”
- Sabina Spiga, CNR-IMM, Italy, chair Part 3
- Prof. Yusuf Leblebici, EPFL, Switzerland, “Design and Co-integration of Memristive Crossbar Arrays with CMOS R/W Access”
- Dr. Barbara De Salvo, Leti, France, “Taking Inspiration from the Brain to Design Neuromorphic Circuits Based on Novel Technologies”
- Prof. Giacomo Indiveri, INI-UTH, Switzerland, “Distributed Heterogeneous Memory Structures in Multi-core Neuromorphic Computing Architectures”
- Dr. Soeren Steudel, imec-NL, Netherlands, “Reconfigurable Neuromorphic Synapse Interconnects with TFT”

Workshop Registration:

<http://esscirc-essderc2016.epfl.ch/registration>

About Leti (France)

As one of three advanced-research institutes within the CEA Technological Research Division, Leti serves as a bridge between basic research and production of micro- and nanotechnologies that improve the lives of people around the world. It is committed to creating innovation and transferring it to industry. Backed by its portfolio of 2,800 patents, Leti partners with large industrials, SMEs and startups to tailor advanced solutions that strengthen their competitive positions. It has launched 59 startups. Its 8,500m² of new-generation cleanroom space feature 200mm and 300mm wafer processing of micro and nano solutions for applications ranging from space to smart devices. With a staff of more than 1,900, Leti is based in Grenoble, France, and has offices in Silicon Valley, Calif., and Tokyo. Follow us on www.leti.fr and @CEA_Leti.

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