

Conference Reports

2019 International Symposium on Low Power Electronics and Design

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■ **THE 2019 EDITION OF** the International Symposium on Low Power Electronics and Design (ISLPED) was held at the Ecole Polytechnique Fédérale de Lausanne (EPFL) in Switzerland. The conference took place on July 29–31, 2019, well aligned with the celebration of the Swiss National Day on August 1st 2019.

This year's conference continued the tradition of being a premier forum for the presentation of innovative research in all aspects of low-power electronics and design. The two main tracks of the conference thereby cover various levels of abstraction in the design process, ranging from process technologies and analog/digital circuits, simulation and synthesis

tools, system-level design and optimization, to system software and applications. This broad reach is reflected by the joint sponsorship of the conference by the IEEE and ACM. This year, for the first time, the conference also included support from the IEEE Council on Electronic Design Automation (CEDA), in addition to the IEEE Circuits and Systems Society (CAS) and IEEE Solid-State Circuits Society (SSCS). Besides these institutional sponsors, the conference was also supported by EPFL's EcoCloud initiative, INTEL, and IBM.

To compile a very high-quality program for the 135 attendees, a technical committee of more than 80 experts provided at least five reviews per article and finally selected 39 articles and 19 posters from over 165 article submissions. Similar to other conferences, many of the submitted articles focused on machine learning applications. This trend resulted in three regular sessions specifically dedicated to this topic and various articles on machine learning embedded in other sessions. To further accommodate interests in the area of machine learning, a special session with three invited talks was added to the program to address in-memory computing as a promising research trend in this area. Among the submitted articles, one best article was selected for each of the two main tracks of the conference. The award for the Technologies, Circuits, and Architectures track was given to "A Low-Energy Inductive Transceiver Using Spike-Latency Encoding for Wireless 3-D Integration" by B. J. Fletcher, S. Das, and



Opening session.

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Design contest winners with the contest committee.



Gala dinner at the Olympic Museum.

T. Mak. The best paper award in the CAD, Systems, and Software track was given to “An Automated Approximation Methodology for Arithmetic Circuits” by S. De, J. Huisken, and H. Corporaal.

In addition to the regular and invited technical papers and presentations, the conference also included three keynote presentations. This year, the three keynotes were selected to provide a tour comprising the different scales of computing from cloud to the edge and the different technology aspects from CMOS to emerging technologies. In the first keynote, Hsien-Hsin (Sean) Lee, AI infrastructure research head at Facebook, provided insights into the hardware infrastructure and software tools in the datacenters of one of the largest cloud data center operators. In the second keynote, Prof. Luca Benini from ETH Zurich focused on the other extreme, discussing how advanced low-power architectures are key to ultralow-power computing at the edge. The third keynote, by Prof. Giovanni De Micheli, finally proceeded

beyond conventional CMOS, offering an insight into emerging technologies and corresponding tools.

FOLLOWING THE TRADITION of the ISLPED conference, the main technical program was accompanied by the ISLPED Low-Power Design Contest. This year, a record of 21 excellent applications were selected to present and demonstrate their research on site. A series of short pitches preceded the demo session during the industry reception of the conference. Many of these demos were again related to machine learning and the Internet of Things (IoT). Although many demos showed actual integrated circuit designs, others focused on system and design aspects with proof of concept FPGAs and software. Due to the many excellent applications, three awards were given for first, second, and third place. ■

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