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“Technology, Circuits & Systems for Smart Living” theme represents the ecosystem of technical building blocks and applications needed to realize a connected society

The 2018 Symposia on VLSI Technology & Circuits Covers the Unique Integration of Converging Trends in Machine Learning, Artificial Intelligence & the IoT

HONOLULU, HI (APRIL 5, 2018) – The 2018 Symposia on VLSI Technology & Circuits will deliver a unique perspective into the technological ecosystem of converging industry trends – machine learning, IoT, artificial intelligence, wearable/implantable biomedical applications, big data, and cloud computing – the emerging technologies needed for ‘smart living.’ In a weeklong conference packed with technical presentations, a demonstration session, panel discussions, focus sessions, short courses, and a new “Friday Forum” on machine learning, the microelectronics industry’s premiere international conference covers technology, circuits, and systems with a range and scope unlike any other conference.

Built around the theme of “**Technology, Circuits & Systems for Smart Living,**” the Symposia program integrates advanced technology developments, innovative circuit design, and the applications that they enable as part of our global society’s adoption of smart, connected devices and systems that change the way humans interact with each other.

Plenary Sessions (June 19):

The Symposia will open with two technology plenary sessions, including “*Memory Technology: The Core to Enable Future Computing Systems*” by Scott DeBoer, executive VP for technology development, Micron; and “*Revolutionizing Cancer Genomic Medicine by Artificial Intelligence & Supercomputing with Big Data*” by Satoru Miyano, director of the Human Genome Center, Institute of Medical Science at University of Tokyo.

The following Circuits plenary sessions include “*Hardware-Enabled Artificial Intelligence*” by Dr. Bill Dally, chief scientist & senior VP, Nvidia; and “*Semiconductor Technologies Accelerate Our Future Vision: ‘ANSHIN Platform’*” by Tsuneo Komatsuzaki, advisor, SECOM.

Focus Sessions (June 19, 20 & 21):

As part of the Symposia’s ongoing program integration, a series of joint focus sessions will be held to present contributed papers from the Technology and Circuits Symposia on June 20 and 21. Topics will include: “*Heterogeneous System Integration,*” “*Power Devices & Circuits,*” “*New Devices & Systems for AI,*” and “*Design & Technology Co-Optimization (DTCO) in Advanced CMOS Technology.*”

On June 19, the Technology focus sessions will include: “*Back-End Compatible Devices & Advanced Thermal Management*” and “*Sensors and Devices for IoT, Medicine, & Smart Living*.” The Circuits focus sessions, held on June 21, include “*Machine Learning Circuits & SoCs*,” and “*Advanced Wireline Techniques*.”

Evening Panel Sessions (June 18 & 19):

A joint panel discussion, bringing together leading experts from Technology & Circuits programs will be held June 18 to answer the question, “*Is the CPU Dying or Dead? Are Accelerators the Future of Computation?*”

As Moore’s Law slows down and processor architecture innovations move away from single thread performance, the future of computing seems to be moving away from the general purpose CPU. Is the era of the CPU over? Will future CPUs simply coordinate activity among accelerators and other specialized processing units? The panel will examine future computing workloads as well as the innovative technology and circuit solutions that enable them, from moving computation closer to memory, and developing bio-inspired systems.

The Technology evening panel session panel discussion, held on June 19 will examine “*Storage Class Memories: Who Cares? DRAM is Scaling Fine, NAND Stacking is Great*.”

Memory – DRAM and NAND scaling, though difficult, has persisted due to rapid innovations and continued engineering. Although there are new economic and fundamental challenges posed to continued memory scaling, a new class of memories – Storage Class memories, appears to bridge the latency gap that exists in the memory hierarchy and promises to improve system performance. Now the real question becomes – who really cares now? System architects, DRAM/NAND manufacturers? End users? The panel will discuss the challenges and opportunities of storage class memories in the environment where DRAM and NAND scaling continue.

The question to be addressed by the Circuits evening panel session, also held on June 19, is “*What’s The Next Big Thing After Smartphones?*”

Although smartphones have driven the industry for more than a decade, the pace of innovation is slowing, and market saturation is occurring. What will be the next big thing? The Internet of Things? Automotive electronics? Virtual reality? Something else? A set of panelists with diverse expertise will discuss the possibilities.

Thursday Luncheon (June 21):

Continuing the Symposia’s tradition of thought-provoking presentations centered around the conference theme is the Thursday luncheon talk, entitled “*The Hardware of The Mind, from Turing to Today*,” by Grady Booch, chief scientist for software engineering at IBM Research. As scientists continue to the computing power of the human mind, they strive to bridge the gap between the physicality of silicon and the exquisite wonder of the brain. This presentation examines the journey of the hardware of the mind – from the Iliad, to da Vinci, to Edison, to Turing, to today – including an examination of how the growing understanding of the brain transforms the engineering of silicon, and how the laws of physics as well as the laws of humanity constrain that journey.

Full Day Short Courses (June 18):

The Technology Short Course – “*Device & Integration Technologies for Sub-5nm CMOS & the Next Wave of Computing*” will cover a range of topics, including CMOS technology beyond the 5nm node, MOL/BEOL interconnects, atomic-level analysis for FinFET & Nanowire design, 3D integration for image sensors, neuromorphic AI hardware, memory technologies for AI/machine learning, and sensors & analog devices for next generation computing.

The first Circuits Short Course – “*Designing for the Next Wave of Cloud Computing*” will address advanced computer architectures, GPU applications and FPGA acceleration, the evolution of memory and in-memory computation, and advanced packaging, power delivery and cooling for cloud computing, as well as the impact of quantum computing.

The second Circuits Short Course – “*Bio-Sensors, Circuits & Systems for Wearable & Implantable Medical Devices*” will cover circuits and systems for mobile healthcare, analog front-ends for bio-sensors, digital phenotyping using wearable sensors, bi-directional neural interfacing, body-area networking and body-coupled communications, ultrasound-on-a-chip, as well as a CMOS-based implantable retinal prosthesis.

Demonstration Session (June 18):

Following a successful launch last year in Kyoto, the popular demonstration session will again be part of the Symposia program, providing participants an opportunity for in-depth interaction with authors of selected papers from both Technology and Circuits sessions. These demonstrations will illustrate technological concepts and analyses through table-top presentations that show device characterization, chip operational results, and potential applications for circuit-level innovations.

Friday Forum (June 22):

New to the Symposia program this year will be the Friday Forum – a full-day series of presentations focusing on how technology and circuit designers engage in and drive the future of AI/machine learning systems, a subject area that continues to evolve as an impactful driver of the integrated systems that are part of the Symposia’s “Smart Living” theme. “Machine Learning Today & Tomorrow: A Technology, Circuits & Systems View” will provide the foundations and performance metrics for machine learning systems, an examination of advanced and emerging circuit architectures for next-generation systems, as well as highlighting tools and datasets for benchmarking and evaluating service-oriented architecture (SoA) machine learning systems.

The annual Symposium on VLSI Technology & Circuits will be held at the Hilton Hawaiian Village in Honolulu, Hawaii from June 18-22, 2018, with Short Courses held on June 18 and a special Friday Forum dedicated to machine learning/AI topics on June 22. The two conferences have been held together since 1987, providing an opportunity for the world’s top device technologists, circuit and system designers to exchange leading edge research on microelectronics technology, with alternating venues between Hawaii and Japan. A single registration enables participants to attend both Symposia.

Sponsoring Organizations

The Symposium on VLSI Technology is sponsored by the IEEE Electron Devices Society and the Japan Society of Applied Physics, in cooperation with the IEEE Solid State Circuits Society.

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Further Information and Registration

Visit: <http://www.vlssymposium.org>.

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