



Hot Chips: The Annual Feast of Riches

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..... Welcome to the March/April issue of *IEEE Micro*, which is devoted to a set of articles summarizing some of the best presentations at the latest Hot Chips symposium. The Hot Chips special issue has been a tradition for several decades now and is an excellent opportunity to report on some of the cutting-edge microprocessor designs and projects in industry, research labs, and academia. Hot Chips continues to introduce many exciting and novel chips, making the task of selecting papers for this issue both challenging and a feast of riches. Guest Editors Rajeevan Amirtharajah (University of California, Davis) and Behnam Robotmili (AxStream), program co-chairs of the 2015 Hot Chips Symposium, have done an excellent job of recruiting and selecting papers for this special issue.

This issue includes Hot Chips articles about AMD's Carrizo accelerated processing unit, Intel's Xeon Phi Knights Landing product family, Xilinx's Zynq UltraScale+ multiprocessor system on chip, and UC Berkeley's agile approach for designing RISC-V microprocessors. These articles are briefly introduced in the Guest Editors' Introduction (see page 6). In addition, the guest editors highlight other Hot Chips presentations in the Expert Opinion column (see page 64). I

wholeheartedly thank Rajeevan and Behnam for their time and effort.

As in previous years, the 2015 Hot Chips conference included a good mix of multicore microprocessors; GPUs; field-programmable gate arrays (FPGAs); systems on chip; high-performance computing; and cloud, multimedia, and signal processing. An interesting emerging trend is the focus on the Internet of Things (IoT), a connected world of smart devices operating at extremely low power consumption. The IoT is likely to transform society and lead to a range of new applications and services. A big fraction of the IT industry considers the IoT as the next big wave in computing technology. (The Nov./Dec. 2016 issue of *IEEE Micro* will be dedicated to the IoT.)

Another hot topic is deep learning and social media, which recently emerged as we began to move away from the desktop and notebook to mobile devices and the datacenter (cloud). This trend not only pushes consumer demand for increased wireless bandwidth, it also leads to growing interest in image recognition, which has become essential for modern social media workloads. Convolutional neural networks (CNNs) are widely used in facial recognition and image analysis and tagging, and great efforts are being undertaken to accelerate CNN computa-

tion on both general-purpose and special-purpose hardware. Big companies as well as small start-ups are exploring the potential of hardware acceleration using GPUs, FPGAs, and even ASICs for speeding up neural network computation.

There clearly is no shortage of great ideas and chip designs at Hot Chips. Innovations were reported both in silicon technology (for example, die stacking, silicon-interposer-based multichip modules, and trigate field-effect transistors) and applications (for example, 5G mobile, deep learning, and the IoT). It is clear that with the end of Dennard scaling (slowed supply-voltage scaling) and continued integration following Moore's law, along with newly emerging consumer demands, the future of Hot Chips looks bright. I encourage you to read the articles included in this issue, as well as the Expert Opinion column for the guest editors' Hot Chips highlights.

Happy reading!

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