KEYNOTE – I

Workload Characterization in the Era of Specialization

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ABSTRACT
Traditional performance and energy scaling benefits based on technology improvements have slowed greatly. At the same time the demand for computing capability is unsatiated with new killer applications emerging in the domains of robotics, automotive, and machine-intelligence. Lack of progress in technology scaling will necessarily place more demands on the computer architecture and software layers to deliver capability. To overcome these challenges, hardware acceleration in the form of datapath and control circuitry customized to particular algorithms or applications has surfaced as a promising approach, as it delivers orders of magnitude performance and energy benefits compared to general-purpose solutions. Workload characterization is at the heart of this approach, as designers must determine both what workloads are important enough to justify specialization as well as their suitability for such techniques. This talk discusses recent efforts to develop new methodologies for workload characterization and pre-RTL simulation of accelerator-centric systems. Examples of workload characterization for specialization will be drawn from a project characterizing live applications from Google's production datacenter and the Harvard Robobee project.

BIO
David Brooks is the Haley Family Professor of Computer Science in the Paulson School of Engineering and Applied Sciences at Harvard University. Prior to joining Harvard, he was a research staff member at IBM T.J. Watson Research Center. Prof. Brooks received his BS in Electrical Engineering at the University of Southern California and MA and PhD degrees in Electrical Engineering at Princeton University. His research interests include resilient and power-efficient computer hardware and software design for high-performance and embedded systems.