

EDS DL Mini Symposium

Keynote Talk; SCS Distinguished Lecture

Fine-Grain Power Management in Many-Core System-On-Chip (SoC)

Dr. Vivek De

IEEE Fellow, Intel Fellow
Director, Circuit Technology Research Group, Intel, USA
Email: vivek.de@intel.com



Abstract:

Many-core SoC spanning clients to servers to high-performance computing systems in scaled CMOS process are discussed. Key circuits and design techniques that enable a wide dynamic voltage-frequency operating range, spanning multi-threaded high-throughput near-threshold voltage (NTV) to single-threaded burst performance modes, are elucidated. Fine-grain multi-voltage design and spatio-temporal power management schemes to achieve maximum performance under stringent thermal and energy constraints are presented, along with integrated voltage regulator technologies. Real chip design examples are used to illustrate basic design principles and practical considerations.

Speaker's Biography:

Vivek De is an Intel Fellow and Director of Circuit Technology Research in Intel Labs. He is responsible for providing strategic technical directions for long term research in future circuit technologies and leading energy efficiency research across the hardware stack. He has 249 publications in refereed international conferences and journals and 209 patents issued, with 26 more patents filed (pending). He received an Intel Achievement Award for his contributions to an integrated voltage regulator technology. He received a Best Paper Award at the 1996 IEEE International ASIC Conference, and nominations for Best Paper Awards at the 2007 IEEE/ACM Design Automation Conference (DAC) and 2008 IEEE/ACM International Conference on Computer-Aided Design (ICCAD). One of his publications was recognized in the 2013 IEEE/ACM Design Automation Conference (DAC) as one of the "Top 10 Cited Papers in 50 Years of DAC". He received a PhD in Electrical Engineering from Rensselaer Polytechnic Institute, Troy, New York. He is a Fellow of the IEEE.