Integration, The VLSI Journal

Special Issue on Thermal Modeling and Simulation, Thermal-Aware Design and Thermal Management for 2D/3D ICs

Call for Papers

One of the major challenges to the continuous improvement of the integration density of information processing and communication systems is heat removal in integrated circuits. This heat dissipation is caused by the increased power density every new technology generation, which is the consequence of have smaller transistors and faster clock speeds. Moreover, new design and architecture techniques, such as 3D stacked integration and multi-core processors, further exacerbate this problem. While high power densities are already a major concern in 2D systems as the excessive resulting temperature exacerbates thermal and reliability, they become even more severe in 3D systems because 3D integration introduces even higher power densities due to the placement of computational units on top of each other. Therefore, thermal management and effective cooling techniques have been identified by the Semiconductor Industries Association Roadmap as one of the five key challenges during the next decade for achieving the projected performance goals of the industry.

This journal special issue will cover recent progress on thermal related design techniques for 2D multi-core and emerging 3D systems, such as, thermal modeling, simulation, dynamic thermal management, thermal-aware physical design and optimization, and thermal related reliability modeling and optimization techniques. More specifically, papers with in-depth and extensive coverage of the following topics are welcome (topics of interest include, but are not limited to):

- Compact thermal/heat modeling for 3D integrated system-on-a-chips
- Compact thermal/heat modeling and characterization for multicore systems
- Fast thermal simulation and analysis for 3D and multicore systems
- Thermal/mechanical stress modeling and simulation
- Dynamic thermal management and regulation techniques for 3D and multicore systems
- Thermal modeling and on-chip managements considering active cooling techniques
- Thermal /power aware task scheduling and optimization
- Thermal aware physical design and optimization, (placement, floorplanning, logic synthesis)
- Active cooling techniques for 3D high-performance ICs
- Dynamic, leakage and total power estimation techniques
- NBTI/PBTI related reliability analysis and optimization techniques

Guest Editors

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Submission instructions

Manuscripts are subject to peer review and should be submitted online at
http://ees.elsevier.com/vlsij by June 30, 2011. When choosing Article Type, please select “Special Issue Thermal IC Design”. All manuscripts should conform to the standard formats as indicated in the “Guide for Authors” at
http://authors.elsevier.com/journal/vlsij.