Call for Papers

IEEE Design & Test Special Issue on Approximate Computing
Publication date: January/February 2016

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By relaxing the numerical equivalence between the specification and implementation of error-tolerant applications, *approximate computing* promises significant energy-efficiency gains by trading off computational effort with computation quality. The motivations of approximate computing are twofold. On the one hand, emerging applications such as cognitive computing, web mining and business analysis are rapidly gaining prominence, and they account for a significant portion of computational resources across the spectrum, from mobile and Internet of Things (IoT) devices to large-scale data center. They process noisy and redundant data sets obtained from non-traditional input sources such as various types of sensors (inexact inputs) and the associated algorithms are often stochastic in nature (e.g., iterative algorithms). Moreover, these applications usually do not require computing a unique or golden numerical result ("acceptable" instead of precise outputs). On the other hand, it is increasingly energy-inefficient to ensure fault-free computation as semiconductor technology advances to nanometer regime. This is because circuits are more prone to parameter variations and faults at advanced technology node with low supply voltage and ever-increasing integration density. Consequently, conventional fault-free computing requires adding redundancies at various levels of design hierarchy for variation tolerance and error correction, causing significant energy overhead. Consequently, leveraging the new source of energy-efficiency provided by approximate computing is increasingly important.

IEEE Design and Test seeks original manuscripts for a special issue on Approximate Computing scheduled for publication in January/February 2016. The topics of interest include, but are not limited to:

- Energy-efficient approximate hardware design
- EDA tools for approximate hardware design
- Neuromorphic circuits and systems
- Emerging technologies for approximate computing
- Architectural support for approximate computing
- Programming language and compiler support for approximate computing
- Analysis and characterization of error-resilient applications
- Runtime control and error compensation for approximate computing
- Application-specific designs using approximate hardware
- Sub- and near-threshold approximate computing
- Approximate computing for reliability enhancement

- Security issues in approximate computing
- Test and debug of approximate circuits

Submission and review procedures

Prospective authors should follow the submission guidelines for *IEEE Design & Test*. All manuscripts must be submitted electronically to the IEEE Manuscript Central Web site at http://www.manuscriptcentral.com/. Indicate that you are submitting your article to the special issue on "Approximate Computing". All papers will undergo the standard *IEEE Design & Test* review process.

Schedule

- Submission deadline: April 1, 2015
- First round of reviews completed: May 31, 2015
- Revised manuscript due: June 30, 2015
- Notification of final acceptance: July 31, 2015
- Submission of final version: August 15, 2015
- Publication date: January/February 2016

Questions

Please direct questions regarding the special issue to guest editors Qiang Xu (qxu@cse.cuhk.edu.hk), Nam Sung Kim (nskim3@wisc.edu), and Todd Mytkowicz (toddm@microsoft.com).