

**Department of Electrical and Computer Engineering and
Department of Computer Science**

Title: «Variability in Deca-Nanometer Nodes: Opportunities for
Modeling and Mitigation»

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Room ΘΕΕ01/148, New Campus.

Abstract:

The downscaling trend is one of the greatest driving forces of the silicon industry. However, as transistors reach few tens of nanometers, a wide variety of semiconductor phenomena intensify. Design parameters and performance metrics that were considered (semi)constant in the past exhibit either systematic or fully random variability. This can be observed either right after the chip is manufactured (time-zero) or throughout the chip's lifetime (time-dependent). The complexity and significance of variability poses very interesting problems to the semiconductor community. Massively parallel simulations and smart signal representations are required to capture the impact of variability on processor components. Reliability and performance dependability become increasingly paramount design specifications for modern digital systems. As a result, techniques that mitigate variability effects at low cost are an immediate order of semiconductor business. We will use the phenomena of "Bias Temperature Instability" and "Random Telegraph Noise" as concept vehicles to illustrate the above challenges. We will inspect certain samples of prior art and will identify opportunities for the modeling and mitigation of time-zero and time-dependent variability.

Biography:

Dimitrios Rodopoulos was born in 1989 in Athens, Greece and graduated from the School of Electrical and Computer Engineering (ECE) of the National Technical University of Athens (NTUA) in 2012. He is a PhD Researcher in MicroLab-ECE-NTUA and serves as Research Associate for the Institute of Communication and Computer Systems (ICCS) of ECE-NTUA. He is a Graduate Student Member of the IEEE and the ACM and a member of the Technical Chamber of Greece. Dimitrios has co-authored eleven papers published in international peer reviewed conferences and journals and one EPO patent. He is also serving at ICCS as a Principle Investigator on the Intel Single-Chip Cloud Computer and as a Communications Contact for the ICCS membership to the Open Power Foundation. Dimitrios is currently involved in the FP7-612029-HARPA project of the European Commission and the Erasmus Brain Project. His research interests include circuit variability and aging, functional and parametric processor reliability and efficient simulation of olivocerebellar activity.