

SEMINAR ANNOUNCEMENT

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
Faculty of Engineering
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Area: Integrated Circuits and Embedded Systems

Host: Prof. Massimo Alioto

TOPIC	Approximate Computing for Energy-efficient Error-resilient Multimedia Systems
SPEAKER	Prof. Kaushik Roy Purdue University
DATE	23 June 2015, Tuesday
TIME	2:00 pm to 3:30 pm
VENUE	E5-03-23 (Engineering Blk E5, Faculty of Engineering, NUS)

ABSTRACT

In today's world there is an explosive growth in digital information content. Moreover, there is also a rapid increase in the number of users of multimedia applications related to image and video processing, recognition, mining and synthesis. These facts pose an interesting design challenge to process digital data in an energy-efficient manner while catering to desired user quality requirements. Most of these multimedia applications possess an inherent quality of "error"-resilience. This means that there is considerable room for allowing approximations in intermediate computations, as long as the final output meets the user quality requirements. This relaxation in "accuracy" can be used to simplify the complexity of computations at different levels of design abstraction, which directly helps in reducing the power consumption. At the algorithm and architecture levels, the computations can be divided into significant and non-significant. Significant computations have a greater impact on the overall output quality, compared to non-significant ones. Thus the underlying architecture can be modified to promote faster computation of significant components, thereby enabling voltage-scaling (at the same operating frequency). At the logic and circuit levels, one can relax Boolean equivalence to reduce the number of transistors and decrease the overall switched capacitance. This can be done in a controlled manner to introduce limited approximations in common mathematical operations like addition and multiplication. All these techniques can be classified under the general topic of "Approximate Computing", which is the main focus of this talk.

BIOGRAPHY

Kaushik Roy received B.Tech. degree in electronics and electrical communications engineering from the Indian Institute of Technology, Kharagpur, India, and Ph.D. degree from the electrical and computer engineering department of the University of Illinois at Urbana-Champaign in 1990. He joined the electrical and computer engineering faculty at Purdue University, West Lafayette, IN, in 1993, where he is currently Edward G. Tiedemann Jr. Distinguished Professor. His research interests include spintronics, device-circuit co-design for nano-scale Silicon and non-Silicon technologies, low-power electronics for portable computing and wireless communications, and new computing models enabled by emerging technologies. Dr. Roy has published more than 600 papers in refereed journals and conferences, holds 15 patents, graduated 65 PhD students, and is co-author of two books on Low Power CMOS VLSI Design (John Wiley & McGraw Hill). He received several awards, and has been in the editorial board of several journals and Guest Editor of several Special Issues. Dr. Roy is a fellow of IEEE.

