



ENERGY-EFFICIENT COMPUTING IN THE DARK SILICON ERA

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ABSTRACT: Transistor count continues to increase for silicon devices following Moore's Law. But the failure of Dennard scaling has brought the computing community to a crossroad where power has become the major limiting factor. Thus future chips can have many cores; but only a fraction of them can be switched on at any point in time. This dark silicon era is driving the emergence of heterogeneous multi-core architectures consisting of cores with diverse computational capabilities and power-performance characteristics enabling better match between the application requirements and the compute engine leading to substantially improved energy-efficiency. In this talk, I will introduce the technology trends driving heterogeneous multi-cores, provide an overview of computationally divergent and performance heterogeneous multi-cores, and present our effort in architecture, compiler, and runtime support to fully realize the potential of heterogeneity towards energy-efficient computing.

BIOGRAPHY: Tulika Mitra is a Professor of Computer Science at School of Computing, National University of Singapore (NUS). Her research interests span various aspects of the design automation of embedded real-time systems with particular emphasis on energy-efficient computing, heterogeneous computing, application-specific processors, and software timing analysis/optimizations. She has authored over hundred scientific publications in leading international journals and conferences in this domain. Prof. Mitra currently serves as Deputy Editor-in-Chief of IEEE Embedded Systems Letters, Associate Editor of the ACM Transactions on Embedded Computing Systems, IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems, IEEE Design & Test Magazine, EURASIP Journal on Embedded Systems, and IET Computers & Digital Techniques. She has served in the organizing and program committees of several major conferences in embedded systems, real-time systems, and electronic design automation.