From Approximate to Significance-Driven to Transprecision Computing: Opportunities and Challenges

Prof. Dr. Dmitrios Nikolopoulos, Queen's University Belfast
Director of The Institute of Electronics, Communication and Information Technology (ECIT) and Professor in the School of Electronics, Electrical Engineering and Computer Science (EEECS)

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Approximate computing has evolved over the years as a fundamental method to improve performance and energy-efficiency in embedded and high-end systems, using algorithmic techniques that sacrifice numerical precision without necessarily compromising the quality of the result. In this talk we will explore two approaches to approximate computing which my group and I have been exploring over the past five years: Significance-driven computation, an approach that aims at disciplined approximation of algorithms using a high-level, task-based programming model. And transprecision computing, a more recent approach that explores dynamic precision tuning to optimise performance and energy-efficiency in algorithms with input-dependent/data-dependent behaviour.

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