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EDITORIAL

Guest Editorial: Special Issue on 2011 International Conference on Embedded Computer Systems: Architectures, Modeling and Simulation (SAMOS XI)

John McAllister · Luigi Carro · Skevos Evripidou

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This special edition of IJPP includes extended versions of the six best papers from the 2011 IEEE International Conference on Embedded Computer Systems: Architectures, Modeling and Simulation (SAMOS XI). The six papers were selected from 37 high quality papers presented at the conference, which had an overall acceptance rate of 41 %.

Held in Agios Konstantinos, Samos, Greece from 18th to 21st July 2011, SAMOS (http://www..samos-conference.com) is a unique annual event on embedded computing systems, bringing together researchers from industry and academic in a uniquely relaxing atmosphere which combines dissemination of state-of-the-art research with afternoon beach and boat trips and day-long hikes in the mountains, all bathed in the glorious sunshine of Samos in July. In every sense of the word, SAMOS is a unique event.

The first article included, '*ADL-Based Specification of Implementation Styles for Functional Simulators*' by David Penry, and Kurtis Cahill describes a novel orthogonal-specification design principle for use in the development of microarchitectural functional simulators. This approach, which specifies how a simulator is implemented separately from what it is implementing, enables different styles of simulator to be automatically synthesized.

J. McAllister (✉)
Queen's University Belfast, Belfast, UK
e-mail: j.Mcallister@ecit.qub.ac.uk

L. Carro
Universidade Referal Do Rio Grande Do Sul, Porto Alegre, Brazil

S. Evripidou
University of Cyprus, Nicosia, Cyprus

In '*A Parallel Dynamic Binary Translator for Efficient Multi-Core Simulation*', Volker Seeker et al., describe a fast, scalable simulation methodology for multi-core platforms based on dynamic binary translation. Their approach has enabled simulation speeds of up to 25,307 MIPs on 32-core ×86 host machines for up to 2,048 processors—simulation performance over two orders of magnitude in advance of leading FPGA architecture simulation technology.

'*Scalable Unified Transform Architecture for Advanced Video Coding Embedded Systems*' by Tiago Manuel Dias et al. describes a high throughput unified architecture for computing transform function in video codecs which can be used as a hardware accelerator for the 2D 4×4 and 2×2 transforms in the H.264/AVC standard. This architecture achieve speedup by a factor of around 120 over pure software implementations of the transform algorithms, allowing real-time transforms for $4{,}320 \times 7{,}680$ Ultra-High Definition Video sequences.

In '*UniTi: Unified Composition and Time for Multi-Domain Model-Based Design*', Rovers and Kuper detail a comprehensive description of their multi-domain modelling and simulation environment for continuous-time, discrete-time and dataflow systems, verifying the approach using a phased-array beamforming case study.

Sundararajan, Jones and Topham use their paper entitled '*The Smart Cache: An Energy-Efficient Cache Architecture Through Dynamic Cache Adaptation*' to describe their unique approach to cache design for low-power embedded systems design. Their reconfigurable cache architecture demonstrates energy-delay characteristics on average 70 and 12 % better than baseline for two and four-core systems respectively.

Finally, in '*Using SDRAM Memories For High Performance Accesses To Two-Dimensional Matrices Without Transpose*', Langemeyer, Pirsch and Blume introduce a new address mapping scheme which exploits the burst capability of modern multi-bank SDRAM architectures to maximise throughput when reading or writing rows or columns of 2D matrices. When applied to 2D-FFT for radar applications, continuous bandwidth utilization of 96–98 % is achieved.

These six papers cover a diverse range of technologies, spanning application modelling, simulation and computing architectures which exemplifies the unique nature of the SAMOS event, and in particular the diversity of SAMOS XI.