

Application of Concurrency to System Design

Concurrent computing systems were investigated by scientists since early 1960s. Many formal methods were introduced for their specification and verification, for example: Petri nets, process algebras (CCS, CSP, pi-calculus), VDM++, etc. These formal models were employed in many application areas, where concurrency played an important role: electronic circuits, real-time systems, embedded systems, mobile and wireless networks, cyber-physical systems, business processes, just to name a few.

With the emergence of new hardware architectures and new programming paradigms to support them, the concurrency theory and practical methodologies are becoming increasingly important for model-driven design of embedded systems.

This special issue solicits original research contributions related to theory, algorithms, and case studies arising in the area of concurrent systems, with particular focus on embedded systems design.

Topics of interest include, but are not limited to:

- Design methods, tools and techniques based on models of computation and concurrency: data-flow models, communicating automata, Petri nets, process algebras, graph rewriting, state charts, MSCs, etc.
- Graph transformations as an elementary model of concurrency and many applications; logics for concurrency (e.g., modal and temporal logics).
- High-performance and massively parallel architectures: many-core processors, Systems and Networks on Chip, dataflow architectures.
- Hard real-time & embedded systems: concurrency, security and safety-critical issues.
- Concurrency issues in ad-hoc, mobile and wireless networking, wireless sensor networks, and communication protocols.
- Synchronous and asynchronous circuit design, globally asynchronous locally synchronous systems, interface design, multi-clock systems, functional and timing verification.
- High-scalability system design: load balancing, network & memory management, power proportionality, decentralised control, cloud and swarm computing.
- Resource management: task and communication scheduling, resource, memory and power management, fault-tolerance and Quality of Service.
- Business process modelling, simulation and verification, (distributed) workflow execution, business process (de-)composition, inter-organisational and heterogeneous workflow systems, computer-supported collaborative work systems, web services.
- Software engineering for concurrent systems: languages, verification, synthesis, and cross-layer optimisation.
- Compositional design and modelling of concurrent systems, modular synthesis and analysis, distributed simulation and implementation, distributed control, adaptive systems, supervisory control.
- Hardware/software co-design, platform-based design, component-based design, energy-aware design, refinement techniques, hardware/software abstractions, co-simulation and verification.
- (Industrial) case studies of general interest, gaming applications, consumer electronics and multimedia, automotive systems, (bio-)medical applications, internet and grid computing, etc.
- Systems of systems (e.g., cyber-physical systems, ambient systems): design, verification and deployment.
- Software and hardware memory models, DRAM scheduling, cache coherency, memory-aware algorithms.

Submitted papers should not have been previously published nor be currently under consideration for publication elsewhere. Conference papers may only be submitted if the paper was completely re-written or substantially extended (30%). The papers should be submitted via the Manuscript Central website and should adhere to standard ACM TECS formatting requirements. The page count limit is 25.

Authors should submit their journal version at Manuscript Central adhering to the formatting instructions on the TECS Web page and indicate that you are submitting to the Special Issue on Application of Concurrency to System Design on the first page and in the field "Author's Cover Letter:" in Manuscript Central. For additional questions please send an email to the Guest Editors.

Timetable:

Submission due 1 October 2014
First review results: approx. December 2014
Final copy deadline: approx. February 2015

Please notice that the scheduled review dates are approximate dates and subject to change. We will kindly inform you about the review results as soon as a decision was made. Questions regarding the disclosure of the review results should be addressed to the Guest Editors.

Guest Editors:

- *Kamel Barkaoui, Cedric Conservatoire National des Arts et Métiers, France, [Email](#)*
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