

Preface

The 28th International Conference on Architecture of Computing Systems (ARCS 2015) was hosted by the CISTER Research Center at Instituto Superior de Engenharia do Porto, Portugal, from March 24 to 27, 2015 and continues the long-standing ARCS tradition of reporting top-notch results in computer architecture and related areas. It was organized by the special interest group on ‘Architecture of Computing Systems’ of the GI (Gesellschaft für Informatik e. V.) and ITG (Informationstechnische Gesellschaft im VDE), with GI having the financial responsibility for the 2015 edition. The conference was also supported by IFIP (International Federation of Information Processing).

The special focus of ARCS 2015 was on “Reconciling Parallelism and Predictability in Mixed-Critical Systems.” This reflects the ongoing convergence between computational, control, and communication systems in many application areas and markets. The increasingly data-intensive and computational nature of Cyber-Physical Systems is now pushing for embedded control systems to run on complex parallel hardware. System designers are squeezed between the hammer of dependability, performance, power and energy efficiency, and the anvil of cost. The latter is typically associated with programmability issues, validation and verification, deployment, maintenance, complexity, portability, etc. Traditional, low-level approaches to parallel software development are already plagued by data races, non-reproducible bugs, time unpredictability, non-composability, and unscalable verification. Solutions exist to raise the abstraction level, to develop dependable, reusable, and efficient parallel implementations, and to build computer architectures with predictability, fault tolerance, and dependability in mind. The Internet of Things also pushes for reconciling computation and control in computing systems. The convergence of challenges, technology, and markets for high-performance consumer and mobile devices has already taken place. The ubiquity of safety, security, and dependability requirements meets cost efficiency concerns. Long-term research is needed, as well as research evaluating the maturity of existing system design methods, programming languages and tools, software stacks, computer architectures, and validation approaches. This conference put a particular focus on these research issues.

The conference attracted 45 submissions from 22 countries. Each paper was assigned to at least three Program Committee Members for reviewing. The Committee selected 19 submissions for publication with authors from 11 countries. These papers were organized into six sessions covering topics on hardware, design, applications, trust and privacy, and real-time issues. A session was dedicated to the three best paper candidates of the conference. Three invited talks on “The Evolution of Computer Architectures: A View from the European Commission” by Sandro D’Elia, European Commission Unit “Complex Systems & Advanced Computing,” Belgium, “Architectures for Mixed-Criticality Systems based on Networked Multi-Core Chips” by Roman Obermaisser, University of Siegen, Germany, and “Time Predictability in High-Performance Mixed-Criticality Multicore Systems” by Francisco Cazorla,

Barcelona Supercomputing Center, Spain, completed the strong technical program. Four workshops focusing on specific sub-topics of ARCS were organized in conjunction with the main conference, one on Dependability and Fault Tolerance, one on Multi-Objective Many-Core Design, one on Self-Optimization in Organic and Autonomic Computing Systems, as well as one on Complex Problems over High Performance Computing Architectures. The conference week also featured two tutorials, on CUDA tuning and new GPU trends, and on the Myriad2 architecture, programming and computer vision applications.

We would like to thank the many individuals who contributed to the success of the conference, in particular the members of the Program Committee as well as the additional external reviewers, for the time and effort they put into reviewing the submissions carefully and selecting a high-quality program. Many thanks also to all authors for submitting their work. The workshops and tutorials were organized and coordinated by João Cardoso, and the poster session was organized by Florian Kluge and Patrick Meumeu Yonsi. The proceedings were compiled by Thilo Pionteck, industry liaison performed by Sascha Uhrig and David Pereira, and conference publicity by Vincent Nélis. The local arrangements were coordinated by Luis Ferreira. Our gratitude goes to all of them as well as to all other people, in particular the team at CISTER, which helped in the organization of ARCS 2015.

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