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Reconfigurable Computing: Architectures, Tools and Applications

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Preface

With the number of transistors on a single chip now reaching into the billions for mass-produced devices, answering the question of what to actually *use* them for becomes ever more pressing. Conventional approaches of implementing larger cache sizes and deeper cache hierarchies are no longer efficient when attempting to gain performance, and can even be detrimental when saving power is also a design objective.

Reconfigurable computing (RC) attempts to exploit the growing transistor budgets by mapping part or all of a computation into *dedicated* hardware architectures, instead of executing the application on a general-purpose fixed instruction-set processor. Contemporary configurable devices allow for the definition of specific compute and storage units, adapted to the functions, bit-widths and control structures of a given algorithm. This adaptation can even be performed at run-time, fitting the topology of the underlying architecture to the specific needs of the *current execution*. Looking forward to future nano-scale circuit technologies, the flexibility enabled by reconfiguration can also be seen as a basic technique for overcoming permanent and transient failures of the inherently unreliable device fabrics.

To actually realize the potential of reconfigurable technology, numerous advances in a wide number of research fields are necessary. These include hardware architecture, software tools, operating systems, and design methodologies, as well as algorithmic innovation at the application-level itself. The International Symposium of Applied Reconfigurable Computing (ARC) aims to bring together researchers working on all of these aspects, emphasizing research that shows how RC can benefit specific applications or domains.

With 88 papers, the seventh ARC symposium, held during March 23–25, 2011 in Belfast (UK) had a record number of submissions, up from 66 in 2009 and 71 in 2010. They came from 22 countries, showing the global interest in this field of research: UK (14), Germany (13), France (12), Japan (7), USA (6), Spain (6), Sweden (5), China (4), Ireland (3), The Netherlands (3), India (3), Brazil (2), Canada (1), Denmark (1), Greece (1), Iran (1), South Korea (1), Norway (1), Poland (1), Romania (1), Singapore (1), Vietnam (1).

The submissions were evaluated by three members of the Program Committee. Based on their recommendations, the Chairs selected 24 contributions as full papers for oral presentation (27% acceptance rate) and 15 short papers as posters, giving an overall acceptance rate of 44%. The spectrum of topics addressed by this program reflects a broad part of the research in reconfigurable technology.

We would like to thank all authors for their contributions to ARC 2011. Also, we are grateful for the support of the Program Committee, which shouldered the unexpectedly heavy review load at short notice. Finally, we acknowledge the continued support of Springer in making the ARC symposia series a success.

January 2011

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Roger Woods
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ARC 2011, organized by the Queen's University of Belfast, was the seventh in a series of international symposia on applications-oriented research in reconfigurable computing.

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