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IFIP was founded in 1960 under the auspices of UNESCO, following the First World Computer Congress held in Paris the previous year. An umbrella organization for societies working in information processing, IFIP's aim is two-fold: to support information processing within its member countries and to encourage technology transfer to developing nations. As its mission statement clearly states,

*IFIP's mission is to be the leading, truly international, apolitical organization which encourages and assists in the development, exploitation and application of information technology for the benefit of all people.*

IFIP is a non-profitmaking organization, run almost solely by 2500 volunteers. It operates through a number of technical committees, which organize events and publications. IFIP's events range from an international congress to local seminars, but the most important are:

- The IFIP World Computer Congress, held every second year;
- Open conferences;
- Working conferences.

The flagship event is the IFIP World Computer Congress, at which both invited and contributed papers are presented. Contributed papers are rigorously refereed and the rejection rate is high.

As with the Congress, participation in the open conferences is open to all and papers may be invited or submitted. Again, submitted papers are stringently refereed.

The working conferences are structured differently. They are usually run by a working group and attendance is small and by invitation only. Their purpose is to create an atmosphere conducive to innovation and development. Refereeing is also rigorous and papers are subjected to extensive group discussion.

Publications arising from IFIP events vary. The papers presented at the IFIP World Computer Congress and at open conferences are published as conference proceedings, while the results of the working conferences are often published as collections of selected and edited papers.

Any national society whose primary activity is about information processing may apply to become a full member of IFIP, although full membership is restricted to one society per country. Full members are entitled to vote at the annual General Assembly, National societies preferring a less committed involvement may apply for associate or corresponding membership. Associate members enjoy the same benefits as full members, but without voting rights. Corresponding members are not represented in IFIP bodies. Affiliated membership is open to non-national societies, and individual and honorary membership schemes are also offered.

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Alex Orailoglu · H. Fatih Ugurdag  
Luís Miguel Silveira · Martin Margala  
Ricardo Reis (Eds.)

# VLSI-SoC: At the Crossroads of Emerging Trends

21st IFIP WG 10.5/IEEE International Conference  
on Very Large Scale Integration, VLSI-SoC 2013  
Istanbul, Turkey, October 6–9, 2013  
Revised and Extended Selected Papers

 Springer

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## Preface

This book contains extended and revised versions of the highest-quality papers that were presented during the 21<sup>st</sup> edition of the IFIP/IEEE WG10.5 International Conference on Very Large Scale Integration (VLSI-SoC), a global system-on-chip design and CAD conference. This edition of the conference was held at Novotel Hotel in Istanbul, Turkey (October 6–9, 2013). Previous conferences have taken place in Edinburgh, Trondheim, Vancouver, Munich, Grenoble, Tokyo, Gramado, Lisbon, Montpellier, Darmstadt, Perth, Nice, Atlanta, Rhodes, Florianopolis, Madrid, Hong Kong, and Santa Cruz.

The purpose of this conference, which was sponsored by IFIP TC 10 Working Group 10.5, the IEEE Council on Electronic Design Automation (CEDA), and the IEEE Circuits and Systems Society, and In-Cooperation of ACM SIGDA, was to provide a forum for the exchange of ideas and presentation of industrial and academic research results in the field of microelectronics design. The current trend toward increasing chip integration and technology process advancements have brought new challenges both at the physical and system design levels as well as in the test of these systems. The VLSI-SoC conference aims to address these exciting new issues.

The quality of submissions (244 papers from 48 countries, excluding PhD Forum and embedded tutorials) made the selection process a very difficult one. Finally, 49 were accepted as full papers (6 pages in the proceedings), 19 as short papers (4 pages), and 14 as extended abstracts (2 pages). Out of the 48 full papers presented at the conference, 11 papers were chosen by a selection committee to have an extended and revised version included in this book. An extended version of a previously unpublished high-quality paper from VLSI-SoC 2012 is also included. The selection process of these papers considered the evaluation scores during the review process as well as the review forms provided by members of the technical program committee and session chairs as a result of the presentations. The Technical Program Committee comprised 97 members.

The chapters of this book have authors from Algeria, France, Germany, Greece, Italy, Japan, Sweden, Switzerland, United Arab Emirates, and USA.

VLSI-SoC 2013 was the culmination of the work of many dedicated volunteers: paper authors, reviewers, session chairs, invited speakers, and various committee chairs and members, especially the local organizers. We thank them all for their contributions. We also thank Aydin Dirican, Cagatay Ozmen, and Nurettin Tan (University of Massachusetts Lowell) for their critical help in the revision of the book chapters.

This book is intended for the VLSI community, mainly those who did not have the chance to attend the conference. We hope you will enjoy reading this book and that you will find it useful in your professional life and for the development of the VLSI community as a whole.

July 2015

Alex Orailoglu  
H. Fatih Ugurdag  
Luís Miguel Silveira  
Martin Margala  
Ricardo Reis

## Organization

The IFIP/IEEE International Conference on Very Large Scale Integration-System-on-Chip (VLSI-SoC) 2013 took place during October 6–9, 2013, in Novotel, Istanbul, Turkey. VLSI-SoC 2013 was the 21<sup>st</sup> in a series of international conferences, sponsored by IFIP TC 10 Working Group 10.5 (VLSI), IEEE CEDA, and ACM SIGDA.

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