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## VLSI-SoC: Design Trends

Andrea Calimera, Pierre-Emmanuel Gaillardon, Kunal Korgaonkar, Shahar Kvatinsky, Andre Reis

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*IFIP is the global non-profit federation of societies of ICT professionals that aims at achieving a worldwide professional and socially responsible development and application of information and communication technologies.*

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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.

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Andrea Calimera · Pierre-Emmanuel Gaillardon ·  
Kunal Korgaonkar · Shahar Kvatinsky ·  
Ricardo Reis (Eds.)


# VLSI-SoC: Design Trends


28th IFIP WG 10.5/IEEE International Conference  
on Very Large Scale Integration, VLSI-SoC 2020  
Salt Lake City, UT, USA, October 6–9, 2020  
Revised and Extended Selected Papers

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# Preface

This book contains extended and revised versions of the highest quality papers presented during the 28th edition of the IFIP/IEEE WG 10.5 International Conference on Very Large Scale Integration (VLSI-SoC 2020), a global system-on-chip design and CAD conference. The 28th edition of the conference was held during October 6–9, 2020, virtually from Salt Lake City, USA. Previous conferences have taken place in Edinburgh, Scotland (1981); Trondheim, Norway (1983); Tokyo, Japan (1985); Vancouver, Canada (1987); Munich, Germany (1989); Edinburgh, Scotland (1991); Grenoble, France (1993); Chiba, Japan (1995); Gramado, Brazil (1997); Lisbon, Portugal (1999); Montpellier, France (2001); Darmstadt, Germany (2003); Perth, Australia (2005); Nice, France (2006); Atlanta, USA (2007); Rhodes Island, Greece (2008); Florianopolis, Brazil (2009); Madrid, Spain (2010); Kowloon, Hong Kong (2011), Santa Cruz, USA (2012), Istanbul, Turkey (2013), Playa del Carmen, Mexico (2014), Daejeon, South Korea (2015), Tallin, Estonia (2016), Abu Dhabi, United Arab Emirates (2017), Verona, Italy (2018), and Cuzco, Peru (2019).

The purpose of this conference, sponsored by the IFIP TC 10 Working Group 10.5, the IEEE Council on Electronic Design Automation (CEDA), and the IEEE Circuits and Systems Society, with the in-cooperation of ACM SIGDA, is to provide a forum for the presentation and discussion of the latest academic and industrial results and developments as well as the future trends in the field of system-on-chip (SoC) design, considering the challenges of nano-scale along with state-of-the-art and emerging manufacturing technologies. In particular, VLSI-SoC 2020 addressed cutting-edge research fields like low-power design of RF, analog and mixed-signal circuits, EDA tools for the synthesis and verification of heterogenous SoCs, accelerators for cryptography and deep learning and on-chip interconnection systems, reliability and testing, and integration of 3D-ICs. The chapters of this new book in the VLSI-SoC series continue its tradition of providing an internationally acknowledged platform for scientific contributions and industrial progress in this field.

For VLSI-SoC 2020, 38 papers out of 74 submissions were selected for oral presentation, and out of those 38 full papers presented at the conference, 16 papers were chosen by a special selection committee to have an extended and revised version included in this book. The selection process for 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 the session chairs as a result of the presentations.

The chapters of this book have authors from Belgium, Brazil, England, France, Germany, Israel, Italy, Japan, and USA. The Technical Program Committee for the regular tracks comprised 93 members from 23 countries.

VLSI-SoC 2020 was the culmination of the work of many dedicated volunteers: paper authors, reviewers, session chairs, invited speakers, and various committee chairs. We thank them all for their contributions.

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

May 2021

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Pierre-Emmanuel Gaillardon  
Kunal Korgaonkar  
Shahar Kvatinsky  
Ricardo Reis

# Organization

The IFIP/IEEE International Conference on Very Large Scale Integration System-on-Chip (VLSI-SoC) 2020 took place during October 6–9, 2020, virtually from Salt Lake City, USA. VLSI-SoC 2020 was the 28th in a series of international conferences, sponsored by IFIP TC 10 Working Group 10.5 (VLSI), IEEE CEDA, and ACM SIGDA. The Organization Committee of the conference consisted of the following colleagues:

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