Complementary Resistive Switch Based Stateful Logic Operations Using Material Implication
Yuanfan Yang, Jimson Mathew, Dhiraj K Pradhan, Marco Ottavi, Salvatore Pontarelli

7.6 Performance and Timing Analysis
Chairs: Wang Wang Yi, Uppsala University, SE Petru Petru Eles, Linköping University, SE

Scalability Bottlenecks Discovery in MPSoC Platforms Using Data Mining on Simulation Traces
Sofiane Lagraa, Alexandre Termier, Frédéric Pétrot

Computing a Language-Based Guarantee for Timing Properties of Cyber-Physical Systems
Neil Dhruva, Pratyush Kumar, Georgia Giannopoulou, Lothar Thiele

Resource Optimization for CSDF-modeled Streaming Applications with Latency Constraints
Di Liu, Jelena Spasic, Jiali Teddy Zhai, Todor Stefanov, Gang Chen

A Layered Approach for Testing Timing in the Model-Based Implementation
BaekGyu Kim, Hyeon I Hwang, Taejoon Park, Sang H. Son, Insup Lee

Model-based Protocol Log Generation for Testing a Telecommunication Test Harness Using CLP
Kenneth Balck, Olga Grinchtein, Justin Pearson

Time-Decoupled Parallel SystemC Simulation
Jan Henrik Weinstock, Christoph Schumacher, Rainer Leupers, Gerd Ascheid, Laura Tosoratto

A Unified Methodology for a Fast Benchmarking of Parallel Architecture
Alexandre Guerre, Jean-Thomas Acquaviva, Yves Lhuillier

7.7 Design-for-Test and Test Access
Chairs: Erik Jan Marinissen, IMEC, BE; Hans-Joachim Wunderlich, Univ. of Stuttgart, DE

Bit-Flipping Scan - A Unified Architecture for Fault Tolerance and Offline Test
Michael E. Imhof, Hans-Joachim Wunderlich

Testing PUF-Based Secure Key Storage Circuits
Mafalda Cortez, Gijs Roelofs, Said Hamdioui, Giorgio Di Natale

Making it Harder to Unlock an LSIB: Honeytraps and Misdirection in a P1687 Network
Adam Zygmuntowicz, Jennifer Dworak, Al Crouch, John Potter

Co-Optimization of Memory BIST Grouping, Test Scheduling, and Logic Placement
Andrew B. Kahng, Ilgweon Kang

8.1 System Simulation and Virtual Prototyping
Organizer: Johannes Stahl, Synopsys, US; Chair: Johannes Stahl, Synopsys, US

Power Modeling and Analysis in Early Design Phases
Bernhard Fischer, Christian Cech, Hannes Muhr

System-level Design Methodology Enabling Fast Development of Baseband MP-SoC for 4G Small Cell Base Station
Shan Tang, Ziyuan Zhu, Yongtao Su
8.2 Hot Topic: Near Threshold Computing (NTC)
Organizer: Michael Huebner, Ruhr-University Bochum, DE
Chair: Michael Huebner, Ruhr-University Bochum, DE

Extreme-Scale Computer Architecture: Energy Efficiency from the Ground up 1018
Josep Torrellas

Voltage Island Management in Near Threshold Manycore Architectures to Mitigate Dark Silicon 1023
Cristina Silvano, Gianluca Palermo, Sotirios Xydis, Ioannis Stamelakos

Resolving the Memory Bottleneck for Single Supply Near-Threshold Computing 1029
Tobias Gemmeke, Mohamed M. Sabry, Jan Stuijt, Praveen Raghavan, Francky Catthoor, David Atienza

8.3 Physical Attacks and Countermeasures
Chairs: Francesco Regazzoni, Alari, CH; Shivam Bhasin, Telecom ParisTech, FR

Efficiency of a Glitch Detector against Electromagnetic Fault Injection 1035
Loic Zussa, Amine Dehbaoui, Karim Tobich, Jean-Max Dutertre, Philippe Maurine, Ludovic Guillaume-Sage, Jessy Clediere, Assia Tria

Analyzing and Eliminating the Causes of Fault Sensitivity Analysis 1041
Nahid Farhady Ghalaty, Aydin Aysu, Patrick Schaumont

A Smaller and Faster Variant of RSM 1047
Noritaka Yamashita, Kazuhiko Minematsu, Toshihiko Okamura, Yukiyasu Tsunoo

A Multiple Fault Injection Methodology Based on Cone Partitioning towards RTL Modeling of Laser Attacks 1053
Athanasios Papadimitriou, David Hély, Vincent Beroulle, Paolo Maistri, Régis Leveugle

8.4 Efficient Designs for Telecom and Financial Applications
Chair: Sergio Saponara, University of Pisa, IT; Amer Baghdadi, Telecom Bretagne, FR

Energy Efficient MIMO Processing: A Case Study of Opportunistic Run-Time Approximations 1057
David Novo, Nazanin Farahpour, Paolo Ienne, Ubaid Ahmad, Francky Catthoor

Energy-Efficient FPGA Implementation for Binomial Option Pricing Using OpenCL 1063
Valentin Mena Morales, Pierre-Henri Horrein, Amer Baghdadi, Erik Hochapfel, Sandrine Vaton

Hardware Implementation of a Reed-Solomon Soft Decoder Based on Information Set Decoding 1069
Stefan Scholl, Norbert Wehn

Ambient Variation-tolerant and Inter Components Aware Thermal Management for Mobile System on Chips 1075
Francesco Paterna, Joe Zanotelli, Tajana Simunic Rosing

Energy Efficient Data Flow Transformation for Givens Rotation Based QR Decomposition 1081
Namita Sharma, Preeti Ranjan Panda, Min Li, Prashant Agrawal, Francky Catthoor

Mode-Controlled Dataflow Based Modeling & Analysis of a 4G-LTE Receiver 1085
Hrishikesh Salunkhe, Orlando Moreira, Kees van Berkel
8.5 Modeling & Specification
Chairs: Wolfgang Mueller, University of Paderborn, DE; Francois PECHEUX, UPMC, FR

An Activity-Sensitive Contention Delay Model for Highly Efficient Deterministic Full-System Simulations 1089
Shu-Yung Chen, Chien-Hao Chen, Ren-Song Tsay

Automatic Specification Granularity Tuning for Design Space Exploration 1095
Jiaxing Zhang, Gunar Schirmer

EDT: A Specification Notation for Reactive Systems 1101
R. Venkatesh, Ulka Shrotri, G. Murali Krishna, Supriya Agrawal

Model-Based Actor Multiplexing with Application to Complex Communication Protocols 1107
Christian Zebelein, Christian Haubelt, Joachim Falk, Tobias Schwarzter, Jürgen Teich

A Novel Model for System-Level Decision Making with Combined ASP and SMT Solving 1111
Alexander Biewer, Jens Gladigau, Christian Haubelt

DeSpErate: Speeding-up Design Space Exploration by Using Predictive Simulation Scheduling 1115
Giovanni Mariani, Gianluca Palermo, Vittorio Zaccaria, Cristina Silvano

8.6 Mapping and Scheduling for Many-Core Embedded Systems
Chairs: Marc Geilen, Eindhoven University of Technology, NL; Sébastien Le Beux, Ecole Centrale de Lyon, FR

Software Architecture of High Efficiency Video Coding for Many-Core Systems with Power-Efficient Workload Balancing 1119
Muhammad Usman Karim Khan, Muhammad Shafique, Jörg Henkel

GPU-EvR: Run-time Event Based Real-time Scheduling Framework on GPGPU Platform 1125
Haeseung Lee, Mohammad Abdullah Al Faruque

Multi-Objective Distributed Run-time Resource Management for Many-Cores 1131
Stefan Wildermann, Michael Glaß, Jürgen Teich

CoMik: A Predictable and Cycle-Accurately Composable Real-Time Microkernel 1137
Andrew Nelson, Ashkan Beyranvand Nejad, Anca Molnos, Martijn Koedam, Kees Goossens

Utilization-aware Load Balancing for the Energy Efficient Operation on the big.LITTLE Processor 1141
Myungsun Kim, Kibeom Kim, James R. Geraci, Seongsoo Hong

hevCDTM: Application-Driven Dynamic Thermal Management for High Efficiency Video Coding 1145
Daniel Palomino, Muhammad Shafique, Hussam Amrouch, Altamiro Susin, Jörg Henkel

Improving Efficiency of Extensible Processors by Using Approximate Custom Instructions 1149
Mehdi Kamal, Amin Ghasemazar, Ali Afzali-Kusha, Massoud Pedram

8.7 Performance Modeling and Delay Test
Chairs: Robert Aitken, ARM, US Mehdi Tahoori, KIT, DE

Efficient Performance Estimation with Very Small Sample Size via Physical Subspace Projection and Maximum A Posteriori Estimation 1153
Li Yu, Sharad Saxena, Christopher Hess, Ibrahim (Abe) M. Elfadel, Dimitri Antoniadis, Duane Boning

Joint Virtual Probe: Joint Exploration of Multiple Test Items’ Spatial Patterns for Efficient Silicon Characterization and Test Prediction 1159
Shuangyue Zhang, Fan Lin, Chun-Kai Hsu, Kwang-Ting Cheng, Hong Wang

Substituting Transition Faults with Path Delay Faults as a Basic Delay Fault Model 1165
Irith Pomeranz
8.8 Hot Topic: Beyond CMOS Ultra-low-power Computing
Organizer: Saibal Mukhopadhyay, Georgia Institute of Technology, US
Chairs: Arijit Raychowdhury, Georgia Institute of Technology, US; Saibal Mukhopadhyay, Georgia Institute of Technology, US

Ultra-low Power Electronics with Si/Ge Tunnel FET 1181
Amit Ranjan Trivedi, Mohammad Faisal Amir, Saibal Mukhopadhyay

Brain-Inspired Computing with Spin Torque Devices 1187
Kaushik Roy, Mrigank Sharad, Deliang Fan, Karthik Yogendra

Toward Ultralow-Power Computing at Extreme with Silicon Carbide (SiC) Nanoelectromechanical Logic 1193
Swarup Bhunia, Vaishnavi Ranganathan, Tina He, Srihari Rajgopal, Rui Yang, Mehran Mehregany, Philip X.-L. Feng

9.1 Hot Topic: CMOS Scaling - from Evolutionary to Revolutionary Computing
Organizers: Thomas Mikolajick, NamLab gGmbH, DE; Ian O'Connor, Lyon Institute of Nanotechnology, FR
Chairs: Thomas Mikolajick, NamLab gGmbH, DE; Ian O'Connor, Lyon Institute of Nanotechnology, FR

III-V Semiconductor Nanowires for Future Devices 1199
H. Schmid, B.M. Borg, K. Moselund, P. Das Kunungo, G. Signorello, S. Karg, P. Mensch, V. Schmidt, H. Riel

Advanced System on a Chip Design Based on Controllable-Polarity FETs 1201
Pierre-Emmanuel Gaillardon, Luca Amaru, Jian Zhang, Giovanni De Micheli

Reconfigurable Silicon Nanowire Devices and Circuits: Opportunities and Challenges 1207
Walter M. Weber, Jens Trommer, Matthias Grube, André Heinzig, Markus König, Thomas Mikolajick

Advancing CMOS with Carbon Electronics 1213
Franz Kreupl

9.2 Low-Cost, High-Performance NoCs
Chairs: Kees Goossens, Eindhoven University, NL; Luca Ramini, University of Ferrara, IT

Application Mapping for Express Channel-Based Networks-on-Chip 1219
Di Zhu, Lizhong Chen, Siyu Yue, Massoud Pedram

Parallel Probe Based Dynamic Connection Setup in TDM NoCs 1225
Shaoteng Liu, Axel Jantsch, Zhonghai Lu

ElastiStore: An Elastic Buffer Architecture for Network-on-Chip Routers 1231
I. Seitanidis, A. Psarras, G. Dimitrakopoulos, C. Nicopoulos

Dynamic Construction of Circuits for Reactive Traffic in Homogeneous CMPs 1237
Marta Ortín, Darío Suárez, María Villarrooya, Cruz Izu, Víctor Viñals

Improving Hamiltonian-based Routing Methods for On-chip Networks: A Turn Model Approach 1241
Poona Bahrebar, Dirk Stroobandt
9.3 Hardware Implementations for Data Security
Chairs: Viktor Fischer, St Etienne, FR; Filippo Melzani, STMicroelectronics, IT

Embedded Reconfigurable Logic for ASIC Design Obfuscation against Supply Chain Attacks 1245
Bao Liu, Brandon Wang

A Minimalist Approach to Remote Attestation 1251
Aurélien Francillon, Quan Nguyen, Kasper B. Rasmussen, Gene Tsudik

Multi Resolution Touch Panel with Built-in Fingerprint Sensing Support 1257
Pranav Koundinya, Sandhya Theril, Tao Feng, Varun Prakash, Jiming Bao, Weidong Shi

HEROIC: Homomorphically Encrypted One Instruction Computer 1263
Nektarios Georgios Tsoutsos, Michail Maniatakos

EDA Tools Trust Evaluation through Security Property Proofs 1269
Yier Jin

9.4 Timing challenges in validation
Chairs: Elena Ioana Vatajelu, Politecnico di Torino, IT; Mark Zwolinski, University of Southampton, UK

Fast STA Prediction-based Gate-level Timing Simulation 1273
Tariq B. Ahmad, Maciej J. Ciesielski

A Cross-Level Verification Methodology for Digital IPs Augmented with Embedded Timing Monitors 1279
V. Guarnieri, M. Petricca, A. Sassone, S. Vinco, N. Bombieri, F. Fummi, E. Macii, M. Poncino

Empowering Study of Delay Bound Tightness with Simulated Annealing 1285
Xueqian Zhao, Zhonghai Lu

Analysis and Evaluation of Per-Flow Delay Bound for Multiplexing Models 1291
Yanchen Long, Zhonghai Lu, Xiaolang Yan

9.5 Hot Topic: Connecting Different Worlds – Technology Abstraction for Reliability-Aware Design and Test
Organizers: Ulf Schlichtmann, Technische Universität München, DE; Andreas Herkersdorf, Technische Universität München, DE
Chairs: Nikil Dutt, University of California, Irvine, US; Mehdi Tahoori, Karlsruhe Institute of Technology, DE

Connecting Different Worlds – Technology Abstraction for Reliability-Aware Design and Test 1295
Ulf Schlichtmann, Veit B. Kleeberger, Jacob A. Abraham, Adrian Evans, Christina Gimmler-Dumont, Michael Glaß, Andreas Herkersdorf, Sani R. Nassif, Norbert Wehn

9.6 Schedulability Analysis
Chair: Rob Davis, University of York, UK; Giuseppe Lipari, ENS – Cachan, FR

Rate-Adaptive Tasks: Model, Analysis, and Design Issues 1303
Giorgio C. Buttazzo, Enrico Bini, Darren Buttle

Acceptance and Random Generation of Event Sequences under Real Time Calculus Constraints 1309
Kajori Banerjee, Pallab Dasgupta

General and Efficient Response Time Analysis for EDF Scheduling 1315
Nan Guan, Wang Yi

The Schedulability Region of Two-Level Mixed-Criticality Systems Based on EDF-VD 1321
Dirk Müller, Alejandro Masrur
9.7  **Timing Analysis and Cell Design**
Chairs: Jose Monteiro, INESC-ID / Tecnico, ULisboa, PT; Elena Dubrova, Royal Institute of Technology, SE

Facilitating Timing Debug by Logic Path Correspondence 1327
Oshri Adler, Eli Arbel, Ilia Averbouch, Ilan Beer, Inna Grijnevitch

Statistical Static Timing Analysis Using a Skew-Normal Canonical Delay Model 1333
Vijaykumar M, V Vasudevan

Leakage-Power-Aware Clock Period Minimization 1339
Hua-Hsin Yeh, Shih-Hsu Huang, Yow-Tyng Nieh

A Deep Learning Methodology to Proliferate Golden Signoff Timing 1345
Seung-Soo Han, Andrew B. Kahng, Siddhartha Nath, Ashok S. Vydyanathan

Aging-aware Standard Cell Library Design 1351
Saman Kiamehr, Farshad Firouzi, Mojtaba Ebrahimi, Mehdi B. Tahoori

Pass-XNOR Logic: A New Logic Style for P-N Junction Based Graphene Circuits 1355
Valerio Tenace, Andrea Calimera, Enrico Macii, Massimo Poncino

Mixed Allocation of Adjustable Delay Buffers Combined with Buffer Sizing in Clock Tree Synthesis of Multiple Power Mode Designs 1359
Kitae Park, Geunho Kim, Taewhan Kim

9.8  **Embedded Tutorial: Memcomputing: The Cape of Good Hope**
Organizers: Yiyu Shi, Missouri University of Science & Technology, US; Hung-Ming Chen, National Chiao Tung University, Taiwan
Chairs: Yiyu Shi, Missouri University of Science & Technology, US; Hung-Ming Chen, National Chiao Tung University, Taiwan, Taiwan

Memcomputing: The Cape of Good Hope 1363
Yiyu Shi, Hung-Ming Chen

MSim: A General Cycle Accurate Simulation Platform for Memcomputing Studies 1366
Chun Zhang, Peng Deng, Hui Geng, Jianming Liu, Qi Zhu, Jinjun Xiong, Yiyu Shi

Energy-Efficient Hardware Acceleration through Computing in the Memory 1371
Somnath Paul, Robert Karam, Swarup Bhunia, Ruchir Puri

10.1  **Hot Topic: Memories Today and Tomorrow**
Organizers: Thomas Mikolajick, NamLab gGmbH, DE; Ian O'Connor, Lyon Institute of Nanotechnology, FR
Chairs: Ian O'Connor, Lyon Institute of Nanotechnology, FR; Thomas Mikolajick, NamLab gGmbH, DE

Exploring the Limits of Phase Change Memories 1377
Matthias Wuttig

Magnetic Memories: From DRAM Replacement to Ultra Low Power Logic Chips 1379

Resistive Memories: Which Applications? 1380
Fabien Clermidy, Natalija Jovanovic, Santhosh Onkaraih, Houcine Oucheikh, Olivier Thomas, Ogun Turkyilmaz, Elisa Vianello, Jean-Michel Portal, Marc Bocquet

Thin Film Printed Ferro-Electric Memories and Integrated Products 1386
Christer Karlsson, Peter Fischer
10.2 Wireless NoCs
Chairs: Giorgos Dimitrakopoulos, Democritus University of Thrace, GR; Valeria Bertacco, University of Michigan, US

An Adaptive Transmitting Power Technique for Energy Efficient mm-Wave Wireless NoCs 1387
Andrea Mineo, Maurizio Palesti, Giuseppe Ascia, Vincenzo Catania

Performance Evaluation of Wireless NoCs in Presence of Irregular Network Routing Strategies 1393
Paul Wettin, Jacob Murray, Ryan Kim, Xinmin Yu, Partha Pratim Pande, Deukhyoun Heo

Low-Latency Wireless 3D NoCs via Randomized Shortcut Chips 1399
Hiroki Matsutani, Michihiro Koibuchi, Ikki Fujiwara, Takahiro Kagami, Yasuhiro Take, Tadahiro Kuroda, Paul Bogdan, Radu Marculescu, Hideharu Amano

Hybrid Wire-Surface Wave Architecture for One-to-Many Communication in Network-on-Chip 1405
Ammar Karkar, Nizar Dahir, Ra'ed Al-Dujaily, Kenneth Tong, Terrence Mak, Alex Yakovlev

Failure Analysis of a Network-on-Chip for Real-Time Mixed-Critical Systems 1409
Eberle A Rambo, Alexander Tschienle, Jonas Diemer, Leonie Ahrendts, Rolf Ernst

10.3 Green Computing Systems
Chairs: Ayse Coskun, Boston University, US; Martino Ruggiero, University of Bologna, IT

Global Fan Speed Control Considering Non-Ideal Temperature Measurements in Enterprise Servers 1413
Jungsoo Kim, Mohamed M. Sabry, David Atienza, Kalyan Vaidyanathan, Kenny Gross

Unveiling Eurora - Thermal and Power Characterization of the Most Energy-Efficient Supercomputer in the World 1419
Andrea Bartolini, Matteo Cacciari, Carlo Cavazzoni, Giampietro Tecchiolli, Luca Benini

Contention Aware Frequency Scaling on CMPs with Guaranteed Quality of Service 1425
Hao Shen, Qinru Qiu

Concurrent Placement, Capacity Provisioning, and Request Flow Control for a Distributed Cloud Infrastructure 1431
Shuang Chen, Yanzhi Wang, Massoud Pedram

COOLIP: Simple yet Effective Job Allocation for Distributed Thermally-Throttled Processors 1437
Pratyush Kumar, Hoeseok Yang, Iuliana Bacivarov, Lothar Thiele

Energy Optimization in 3D MPSoCs with Wide-I/O DRAM Using Temperature Variation Aware Bank-wise Refresh 1441
Mohammadsadegh Sadri, Matthias Jung, Christian Weis, Norbert Wehn, Luca Benini

10.4 System-level Evaluation
Chairs: Pablo Sanchez, University of Cantabria, ES; Florian Letombe, Synopsys, FR

Automatic Detection of Concurrency Bugs through Event Ordering Constraints 1445
Luis Gabriel Murillo, Simon Wawroschek, Jeronimo Castrillon, Rainer Leupers, Gerd Ascheid

Hardware-Based Fast Exploration of Cache Hierarchies in Application Specific MPSoCs 1451
Isuru Nawinne, Josef Schneider, Haris Javaid, Sri Parameswaran

Lorenzo Zuolo, Cristian Zambelli, Rino Micheloni, Salvatore Galfano, Marco Indaco, Stefano Di Carlo, Paolo Prinetto, Pirero Olivo, Davide Bertozzi

Efficient Simulation and Modelling of Non-rectangular NoC Topologies 1463
Ji Qi, Mark Zwolinski

Moving from Co-Simulation to Simulation for Effective Smart Systems Design 1467
Franco Fummi, Michele Lora, Francesco Stefanni, Dimitrios Trachanis, Jan Vanhese, Sara Vinco
10.5 Analysis of Components and Systems
Chairs: Frank Oppenheimer, OFFIS, DE; Todor Stefanov, Leiden University, NL

May-Happen-in-Parallel Analysis Based on Segment Graphs for Safe ESL Models 1471
Weiwei Chen, Xu Han, Rainer Dömer

Timing Analysis of First-Come First-Served Scheduled Interval-Timed Directed Acyclic Graphs 1477

A Dynamic Computation Method for Fast and Accurate Performance Evaluation of Multi-core Architectures 1483
Sébastien Le Nours, Adam Postula, Neil W. Bergmann

Cross-correlation of Specification and RTL for Soft IP Analysis 1489

10.6 Multi-processor and Distributed Systems
Chairs: Orlando Moreira, Ericsson, NL; Benny Akesson, CTU, CZ

Thermal-Aware Frequency Scaling for Adaptive Workloads on Heterogeneous MPSoCs 1495
Heng Yu, Rizwan Syed, Yajun Ha

Partitioned Mixed-Criticality Scheduling on Multiprocessor Platforms 1501
Chuancai Gu, Nan Guan, Qingxu Deng, Wang Yi

Generation of Communication Schedules for Multi-Mode Distributed Real-Time Applications 1507
Akramul Azim, Gonzalo Carvajal, Rodolfo Pellizzoni, Sebastian Fischmeister

10.7 Advances in Synthesis
Chairs: John Hayes, University of Michigan, US; Kim Taemin, Intel Labs, US

Provably Minimal Energy Using Coordinated DVS and Power Gating 1513
Nathaniel A. Conos, Saro Meguerdichian, Foad Dabiri, Miodrag Potkonjak

A Tree Arbiter Cell for High Speed Resource Sharing in Asynchronous Environments 1519
Syed Rameez Naqvi, Andreas Steininger

An Efficient Manipulation Package for Biconditional Binary Decision Diagrams 1525
Luca Amarú, Pierre-Emmanuel Gaillardon, Giovanni De Micheli

Synthesis Algorithm of Parallel Index Generation Units 1531
Yusuke Matsunaga

Automating Data Reuse in High-Level Synthesis 1537
Wim Meeus, Dirk Stroobandt

A Universal Symmetry Detection Algorithm 1541
Peter M. Maurer

Optimization of Design Complexity in Time-Multiplexed Constant Multiplications 1545
Levent Aksoy, Paulo Flores, José Monteiro

Hardware Primitives for the Synthesis of Multithreaded Elastic Systems 1549
G. Dimitrakopoulos, I. Seitanidis, A. Psarras, K. Tsiouris, P. Mattheakis, J. Cortadella

11.0 Special Day Keynote: Organic Electronics - From Lab to Markets 1553
Karl Leo - Technische Universität Dresden, DE
11.1 Embedded Tutorial: Alternatives to CMOS
Organizers: Ian O'Connor, Lyon Institute of Nanotechnology, FR; Thomas Mikolajick, NamLab gGmbH, DE
Chairs: Ian O'Connor, Lyon Institute of Nanotechnology, FR; Thomas Mikolajick, NamLab gGmbH, DE

Spintronics for Low-Power Computing 1554
Yue Zhang, Weisheng Zhao, Jacques-Olivier Klein, Wang Kang, Damien Querlioz, Youguang Zhang, Dafiné Ravelosona, Claude Chappert

CHAMELEON: CHANNEL Efficient Optical Network-on-Chip 1560
Sébastien Le Beux, Hui Li, Ian O'Connor, Kazem Cheshmi, Xuchen Liu, Jelena Trajkovic, Gabriela Nicolescu

Low-Voltage Organic Transistors for Flexible Electronics 1566
Ute Zschieschang, Reinhold Rödel, Ulrike Kraft, Kazuo Takimiya, Tarek Zaki, Florian Letzkus, Jörg Butschke, Harald Richter, Joachim N. Burghartz, Wei Xiong, Boris Murmann, Hagen Klauk

11.2 Transitioning NoC Design Techniques to Future Challenges
Chairs: Masoud Daneshtalab, University of Turku, FI; Hiroki Matsutani, Keio University, JP

Brisk and Limited-Impact NoC Routing Reconfiguration 1572
Doowon Lee, Ritesh Parikh, Valeria Bertacco

Thermal Management of Manycore Systems with Silicon-Photonic Networks 1578
Tiansheng Zhang, José L. Abellán, Ajay Joshi, Ayse K. Coskun

Assessing the Energy Break-Even Point between an Optical NoC Architecture and an Aggressive Electronic Baseline 1584
Luca Ramini, Paolo Grani, Hervé Tatenguem Fankem, Alberto Ghiribaldi, Sandro Bartolini, Davide Bertozzi

DCM: An IP for the Autonomous Control of Optical and Electrical Reconfigurable NoCs. 1590
Wolfgang Büter, Christof Osewold, Daniel Gregorek, Alberto Garcia-Ortiz

Minimally Buffered Single-Cycle Deflection Router 1594
Gnaneswara Rao Jonna, John Jose, Rachana Radhakrishnan, Madhu Mutyam

11.3 Industry Relevant Research and Practice for System Design
Chairs: Emil Matus, Technische Universität Dresden, DE; Norbert Wehn, TU Kaiserslautern, DE

The Metamodeling Approach to System Level Synthesis 1598
Wolfgang Ecker, Michael Velten, Leily Zafari, Ajay Goyal

Logic Synthesis of Low-power ICs with Ultra-wide Voltage and Frequency Scaling 1600
Yu Pu, Juan Echeverri, Maurice Meijer, Jose Pineda de Gyvez

Formal Verification of Taint-propagation Security Properties in a Commercial SoC Design 1602
Pramod Subramanyan, Divya Arora

Early Design Stage Thermal Evaluation and Mitigation: The Locomotiv Architectural Case 1604
Tanguy Sassolas, Chiara Sandionigi, Alexandre Guerre, Alexandre Aminot, Pascal Vivet, Hela Boussetta, Luca Ferro, Nicolas Peltier

Multi-Disciplinary Integrated Design Automation Tool for Automotive Cyber-Physical Systems 1606
Arquimedes Canedo, Mohammad Abdullah Al Faruque, Jan H. Richter

Predictive Parallel Event-driven HDL Simulation with A New Powerful Prediction Strategy 1608
Seiyang Yang, Jaehoon Han, Doowhan Kwak, Namdo Kim, Daeseo Cha, Junhyuck Park, Jay Kim
11.4 Enabling validation on fast platforms
Chairs: Ronny Morad, IBM, IL; Franco Fummi, Universita' di Verona, IT

ArChiVED: Architectural Checking via Event Digests for High Performance Validation 1611
Chang-Hong Hsu, Debapriya Chatterjee, Ronny Morad, Raviv Gal, Valeria Bertacco

Coverage Evaluation of Post-silicon Validation Tests with Virtual Prototypes 1617
Kai Cong, Li Lei, Zhenkun Yang, Fei Xie

Effective Post-Silicon Failure Localization Using Dynamic Program Slicing 1623
Ophir Friedler, Wisam Kadry, Arkadiy Morgenshtein, Amir Nahir, Vitali Sokhin

Design-for-Debug Routing for FIB Probing 1629
Chia-Yi Lee, Tai-Hung Li, Tai-Chen Chen

Functional Test Generation Guided by Steady-State Probabilities of Abstract Design 1633
Jian Wang, Huawei Li, Tao Lv, Tiancheng Wang, Xiaowei Li

Automated System Testing Using Dynamic and Resource Restricted Clients 1637
Mirko Caspar, Mirko Lippmann, Wolfram Hardt

11.5 Memory Resource Allocation and Scheduling in MPSoC
Chairs: Andreas Herkersdorf, Technische Universitat Munchen, DE; Donatella Sciuto, Politecnico di Milano, IT

Scenario-aware Data Placement and Memory Area Allocation for Multi-Processor System-on-Chips with Reconfigurable 3D-stacked SRAMs 1641
Meng-Ling Tsai, Yi-Jung Chen, Yi-Ting Chen, Ru-Hua Chang

Optimized Buffer Allocation in Multicore Platforms 1647
Maximilian Odendahl, Andres Goens, Rainer Leupers, Gerd Ascheid, Benjamin Ries, Berthold Vöcking, Tomas Henriksson

Memory-Constrained Static Rate-Optimal Scheduling of Synchronous Dataflow Graphs via Retiming 1653
Xue-Yang Zhu, Marc Geilen, Twan Basten, Sander Stuijk

A Constraint-Based Design Space Exploration Framework for Real-Time Applications on MPSoCs 1659
Kathrin Rosvall, Ingo Sander

Reliability-Aware Mapping Optimization of Multi-Core Systems with Mixed-Criticality 1665
Shin-Haeng Kang, Hoeseok Yang, Sungchan Kim, Iuliana Bacivarov, Soonhoi Ha, Lothar Thiele

From Simulink to NoC-based MPSoC on FPGA 1669
Francesco Robino, Johnny Öberg

11.6 System-Level Thermal Estimation and Management
Chairs: Coskun Ayse, Boston University, US; Wolfgang Nebel, OFFIS, DE

Minimal Sparse Observability of Complex Networks: Application to MPSoC Sensor Placement and Run-time Thermal Estimation & Tracking 1673
Santanu Sarma, Nikil Dutt

mDTM: Multi-Objective Dynamic Thermal Management for On-Chip Systems 1679
Heba Khdr, Thomas Ebi, Muhammad Shafique, Hussam Amrouch, Jörg Henkel

Thermal Management of Batteries Using a Hybrid Supercapacitor Architecture 1685
Donghwa Shin, Massimo Poncino, Enrico Macii

Thermal Analysis and Model Identification Techniques for a Logic + WIDEIO Stacked DRAM Test Chip 1691
Francesco Beneventi, Andrea Bartolini, Pascal Vivet, Denis Dutoit, Luca Benini
Adaptive Power Allocation for Many-core Systems Inspired from Multiagent Auction Model 1695
Xiaohang Wang, Baoxin Zhao, Terrence Mak, Mei Yang, Yingtao Jiang, Masoud Daneshtalab, Maurizio Palesi

Unified, Ultra Compact, Quadratic Power Proxies for Multi-Core Processors 1699
Muhammad Yasin, Anas Shahrour, Ibrahim (Abe) M. Elfædel

11.7 Power and Emerging Technologies in Reconfigurable Computing
Chairs: Diana Goehringer, Ruhr-University Bochum (RUB), DE; Fabrizio Ferrandi, Politecnico di Milano, IT

Exploiting STT-NV Technology for Reconfigurable, High Performance, Low Power, and Low Temperature Functional Unit Design 1703
Adarsh Reddy Ashammagari, Hamid Mahmoodi, Houman Homayoun

A Power-Efficient Reconfigurable Architecture Using PCM Configuration Technology 1709
Ali Ahari, Hossein Asadi, Behnam Khaleghi, Mehdi B. Tahoori

Extending Lifetime of Battery-Powered Coarse-Grained Reconfigurable Computing Platforms 1715
Shouyi Yin, Peng Ouyang, Leibo Liu, Shaojun Wei

3D FPGA Using High-density Interconnect Monolithic Integration 1721
Ogun Turkyilmaz, Gérald Cibrario, Olivier Rozeau, Perrine Batude, Fabien Clermidy

Joint Communication Scheduling and Interconnect Synthesis for FPGA-based Many-Core Systems 1725
Alessandro Cilardo, Edoardo Fusella, Luca Gallo, Antonino Mazzeo

A Novel Embedded System for Vision Tracking 1729
Antonis Nikitakis, Theofilos Paganos, Ioannis Papaefstathiou

11.8 Embedded Tutorial: GPGPUs: How to Combine High Computational Power with High Reliability
Organizers: Matteo Sonza Reorda, Politecnico di Torino, IT
Chairs: Dimitris Gizopoulos, University of Athens, GR; Rob Aitken, ARM, US

GPGPUs: How to Combine High Computational Power with High Reliability 1733

12.1 Hot Topic: The Future of Interfacing to the Natural World
Organizers: Ian O'Connor, Lyon Institute of Nanotechnology, FR; Thomas Mikolajjck, NamLab gGmbH, DE
Chairs: Thomas Mikolajjck, NamLab gGmbH, DE; Ian O'Connor, Lyon Institute of Nanotechnology, FR

Integrated Circuits Processing Chemical Information: Prospects and Challenges 1742
A. Richter, A. Voigt, R. Schüffny, S. Henker, M. Völp

Interfacing to Living Cells 1743
Rudy Lauwereins

Video Analytics Using Beyond CMOS Devices 1746
Vijaykrishnan Narayanan, Suman Datta, Gert Cauwenberghs, Don Chiarulli, Steve Levitan, Philip Wong

Energy Efficient Neural Networks for Big Data Analytics 1751
Yu Wang, Boxun Li, Rong Luo, Yiran Chen, Ningyi Xu, Huazhong Yang

12.2 Hot topic: How Secure are PUFs Really? On the Reach and Limits of Recent PUF Attacks
Organizer: Ulrich Rührmair, TU München, DE
Chair: Ulf Schlichtmann, TU München, DE

Special Session: How Secure are PUFs Really? On the Reach and Limits of Recent PUF Attacks 1753
Ulrich Rührmair, Ulf Schlichtmann, Wayne Burleson
PUFs at a Glance 1757
Ulrich Rührmair, Daniel E. Holcomb

PUF Modeling Attacks: An Introduction and Overview 1763
Ulrich Rührmair, Jan Sölter

Hybrid Side-Channel / Machine-Learning Attacks on PUFs: A New Threat? 1769
Xiaolin Xu, Wayne Burleson

Physical Vulnerabilities of Physically Unclonable Functions 1775
Clemens Helfmeier, Christian Boit, Dmitry Nedospasov, Shahin Tajik, Jean-Pierre Seifert

Protocol Attacks on Advanced PUF Protocols and Countermeasures 1779
Marten van Dijk, Ulrich Rührmair

Quo Vadis, PUF? Trends and Challenges of Emerging Physical-Disorder Based Security 1785
Masoud Rostami, James B. Wendt, Miodrag Potkonjak, Farinaz Koushanfar

12.3 Multimedia Systems
Chairs: Theocharides Theocharis, University of Cyprus, CY; Cristiana Bolchini, Politecnico di Milano, IT

Flexible and Scalable Implementation of H.264/AVC Encoder for Multiple Resolutions Using ASIPs 1791
Hong Chinh Doan, Haris Javaid, Sri Parameswaran

A Flexible ASIP Architecture for Connected Components Labeling in Embedded Vision Applications 1797
Juan Fernando Eusse, Rainer Leupers, Gerd Ascheid, Patrick Sudowe, Bastian Leibe, Tamon Sadasue

Image Progressive Acquisition for Hardware Systems 1803
Jianxiong Liu, Christos Bouganis, Peter Y.K. Cheung

High-Quality Real-Time Hardware Stereo Matching Based on Guided Image Filtering 1809
Christos Ttofis, Theocharis Theocharides

12.4 Physical Aspects
Chair: Carl Sechen, University of Texas at Dallas, US; Jens Lienig, TU Dresden, DE

Optimization of Standard Cell Based Detailed Placement for 16 nm FinFET Process 1815
Yuelin Du, Martin D. F. Wong

Signature Indexing of Design Layouts for Hotspot Detection 1821
Cristian Andrades, M. Andrea Rodriguez, Charles C. Chiang

Metal Layer Planning for Silicon Interposers with Consideration of Routability and Manufacturing Cost 1827
Wen-Hao Liu, Tzu-Kai Chien, Ting-Chi Wang

12.5 System-level Design Space Exploration
Chairs: Frederic Petrot, TIMA, FR; Luciano Lavagno, Politecnico di Torino, IT

Non-Intrusive Integration of Advanced Diagnosis Features in Automotive E/E-Architectures 1833
Ulrich Abelein, Alejandro Cook, Piet Engelke, Michael Glaß, Felix Reimann, Laura Rodríguez Gómez, Thomas Russ, Jürgen Teich, Dominik Ull, Hans-Joachim Wunderlich

ABACUS: A Technique for Automated Behavioral Synthesis of Approximate Computing Circuits 1839
Kumud Nepal, Yueting Li, R. Iris Bahar, Sherief Reda

Automatic Generation of Custom SIMD Instructions for Superword Level Parallelism 1845
Taemin Kim, Yatin Hoskote
12.6 Error Resilience and Power Management
Chairs: William Fornaciari, Politecnico di Milano – DEIB, IT; Kim Gruettner, OFFIS, DE

ASLAN: Synthesis of Approximate Sequential Circuits 1857
Ashish Ranjan, Arnab Raha, Swagath Venkataramani, Kaushik Roy, Anand Raghunathan

VRCon: Dynamic Reconfiguration of Voltage Regulators in a Multicore Platform 1863
Woojoo Lee, Yanzhi Wang, Massoud Pedram

Coarse-grained Bubble Razor to Exploit the Potential of Two-Phase Transparent Latch Designs 1869
Hayoung Kim, Dongyoung Kim, Jae-Joon Kim, Sungjoo Yoo, Sunggu Lee

FEPMA: Fine-Grained Event-Driven Power Meter for Android Smartphones Based on Device Driver Layer Event Monitoring 1875
Kitae Kim, Donghwa Shin, Qing Xie, Yanzhi Wang, Massoud Pedram, Naehyuck Chang

12.7 Built-in Self-test Solutions for Mixed-signal and RF ICs
Chairs: Jacob A. Abraham, University of Texas at Austin, US; Marian Verhelst, KU Leuven, BE

An Analog Non-Volatile Neural Network Platform for Prototyping RF BIST Solutions 1881
Dzmitry Maliuk, Yiorgos Makris

Built-In Self-Test and Characterization of Polar Transmitter Parameters in the Loop-Back Mode 1887
Jae Woong Jeong, Sule Ozev, Shreyas Sen, Vishwanath Natarajan, Mustapha Slamani

A Flexible BIST Strategy for SDR Transmitters 1893
Emanuel Dogaru, Filipe Vinci dos Santos, William Rebernak

Sigma-Delta Testability for Pipeline A/D Converters 1899
Antonio Gines, Gildas Leger

12.8 Panel: Future SoC Verification Methodology: UVM Evolution or Revolution?
Organizer: Alex Goryachev, IBM Research – Haifa, IL
Chair: Rolf Drechsler, University of Bremen/DFKI, DE

Future SoC Verification Methodology: UVM Evolution or Revolution? 1905
Rolf Drechsler, Christophe Chevallaz, Franco Fummi, Alan J. Hu, Ronny Morad, Frank Schirrmeister, Alex Goryachev