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Sergio Saponara · Alessandro De Gloria
Editors

Applications in Electronics Pervading Industry, Environment and Society

APPLEPIES 2019

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Preface

The 2019 edition of the conference on *Applications in Electronics Pervading Industry, Environment and Society* was held in Pisa, Italy, on September 11–13, 2019, at the School of Engineering (Aula Magna U. Dini and Aula Magna A. Pacinotti).

During the three days, 110 registered participants, from 35 different entities (25 universities and 10 industries), discussed electronic applications in several domains, demonstrating how electronics has become pervasive and ever more embedded in everyday objects and processes.

The conference had the technical and/or financial support of University of Pisa, University of Genoa, SIE (Italian Association for Electronics), Giakova, and the H2020 European Processor Initiative.

After a strict blind-review selection process, 21 interactive posters and 43 lectures have been accepted (with co-authors from 14 different nations) in 11 sessions focused on circuits and electronic systems and their relevant applications in the following fields: wireless and IoT, health care, vehicles and robots (electrified and autonomous), power electronics and energy storage, cybersecurity, AI and data engineering.

More in details the interactive poster (IP) sessions involved contributions on IP1 *Vehicular, Robotic and Energy Electronic Systems*, IP2 *IoT and Integrated Circuits*, IP3 *Digital Circuits and Systems*, while the oral sessions involved contributions on O1 *Rad-Hard Electronics*, O2 *Internet of Things*, O3 *Processors and Memories*, O4 *VLSI and Signal Processing*, O5 *Digital Circuits and AI Data Processing*, O6 *Sensors and Sensing Electronic Systems*, O7 *Power and High Voltage Electronics*, O8 *Signal and Data Processing*.

There were also two special events:

- A round table on EuroHPC and the European Processor Initiative with contributions from E4, CINECA, STMicroelectronics, University of Bologna, University of Pisa

- A demo session of high-performance instrumentation and prototypes for battery management system, aerospace onboard data communication, high-speed drivers for optical modulators.

The proposed papers, collected in this book, and the talks and roundtables of the special events, prove that the computing, storage and networking capabilities of today electronic systems are such that their applications can fulfill the needs of humankind in terms of mobility, health care, connectivity, energy management, smart production, ambient intelligence, smart living, safety and security, education, entertainment, tourism, and cultural heritage.

To exploit such capabilities, multidisciplinary knowledge and expertise are needed to support a virtuous iterative cycle from user needs to the design, prototyping and testing of new products and services. The latter are more and more characterized by a digital core.

The design and testing cycles go through the whole system engineering process, which includes analysis of users' needs, specification definition, verification plan definition, software and hardware co-design, laboratory and user testing and verification, maintenance management, and lifecycle management of electronics applications. The design of electronics-enabled systems should provide key features such as innovation, high performance, real-time operations, implementations with low-cost and reduced budgets in terms of size, weight and power consumption. To succeed in this, one of the most important factors is the adoption of a suited design flow and relevant electronic design automation (EDA) tools. Platform-based design and meet in the middle between top-down and bottom-up design flows are needed to fulfill the time and cost-related challenges of nowadays' market scenarios.

All these challenging aspects call for the importance of the role of academia as a place where new generations of designers can learn and practice with cutting-the-edge technological tools and are stimulated to devise solutions for challenges coming from a variety of application domains.

The APPLEPIES 2019 conference aims at becoming a reference point in the field of electronics systems design and applications, trying to fill at scientific and technological R&D level a gap that the most farsighted industries have already indicated and are striving to cover.

Pisa, Italy

Sergio Saponara
General Chair

Genoa, Italy

Alessandro De Gloria
Honorary Chair

Contents

Part I Rad-Hard Electronics

1	Advanced Radiation Sensors VLSI Design in CMOS Technology for High Energy Physics Applications	3
	Tommaso Croci, Arianna Morozzi, Pisana Placidi and Daniele Passeri	
2	Design, Operation and BER Test of Multi-Gb/s Radiation-Hard Drivers in 65 nm Technology for Silicon Photonics Optical Modulators	11
	G. Ciarpi, S. Cammarata, S. Faralli, P. Velha, G. Magazzù, F. Palla and Sergio Saponara	
3	A Rad-Hard Bandgap Voltage Reference for High Energy Physics Experiments	19
	G. Traversi, L. Gaioni, M. Manghisoni, M. Pezzoli, L. Ratti, V. Re, E. Riceputi and M. Sonzogni	
4	Analysis and Comparison of Ring and LC-Tank Oscillators for 65 nm Integration of Rad-Hard VCO for SpaceFibre Applications	25
	D. Monda, G. Ciarpi, G. Mangraviti, L. Berti and Sergio Saponara	
5	A Compact Gated Integrator for Conditioning Pulsed Analog Signals	33
	Sara Pettinato, Andrea Orsini, Maria Cristina Rossi, Diego Tagnani, Marco Girolami and Stefano Salvatori	

Part II Internet of Things

6	Multivariate Microaggregation with Fixed Group Size Based on the Travelling Salesman Problem	43
	Armando Maya López and Agustí Solanas	

7	Modular Design of Electronic Appliances for Reliability Enhancement in a Circular Economy Perspective	51
	Simone Orcioni, Cristiano Scavongelli and Massimo Conti	
8	Pest Detection for Precision Agriculture Based on IoT Machine Learning	65
	Andrea Albanese, Donato d’Acunto and Davide Brunelli	
9	Statistical Flow Classification for the IoT	73
	Gennaro Cirillo, Roberto Passerone, Antonio Posenato and Luca Rizzon	
10	Using LPWAN Connectivity for Elderly Activity Monitoring in Smartcity Scenarios	81
	D. Fernandes Carvalho, P. Ferrari, E. Sisinni, P. Bellitti, N. F. Lopomo and M. Serpelloni	

Part III Processors and Memories

11	Characterization of a RISC-V Microcontroller Through Fault Injection	91
	Dario Asciola, Luigi Dilillo, Douglas Santos, Douglas Melo, Alessandra Menicucci and Marco Ottavi	
12	Analyzing Machine Learning on Mainstream Microcontrollers . . .	103
	Vincenzo Falbo, Tommaso Apicella, Daniele Auriolo, Luisa Danese, Francesco Bellotti, Riccardo Berta and Alessandro De Gloria	
13	Quality Aware Selective ECC for Approximate DRAM	109
	Giulia Stazi, Antonio Mastrandrea, Mauro Olivieri and Francesco Menichelli	
14	Digital Random Number Generator Hardware Accelerator IP-Core for Security Applications	117
	Luca Baldanzi, Luca Crocetti, Francesco Falaschi, Jacopo Belli, Luca Fanucci and Sergio Saponara	
15	An Energy Optimized JPEG Encoder for Parallel Ultra-Low-Power Processing-Platforms	125
	Tommaso Polonelli, Daniele Battistini, Manuele Rusci, Davide Brunelli and Luca Benini	

Part IV VLSI & Signal Processing

16	VLSI Architectures for the Steerable-Discrete-Cosine-Transform (SDCT)	137
	Luigi Sole, Riccardo Peloso, Maurizio Capra, Massimo Ruo Roch, Guido Masera and Maurizio Martina	

17	Hardware Architecture for a Bit-Serial Odd-Even Transposition Sort Network with On-The-Fly Compare and Swap	145
	Ghattas Akkad, Rafic Ayoubi, Ali Mansour and Bachar ElHassan	
18	Variable-Rounded LMS Filter for Low-Power Applications	155
	Gennaro Di Meo, Davide De Caro, Ettore Napoli, Nicola Petra and Antonio G. M. Strollo	
19	A Simulink Model-Based Design of a Floating-Point Pipelined Accumulator with HDL Coder Compatibility for FPGA Implementation	163
	Marco Bassoli, Valentina Bianchi and Ilaria De Munari	
20	Bitmap Index: A Processing-in-Memory Reconfigurable Implementation	173
	M. Andrighetti, G. Turvani, G. Santoro, M. Vacca, M. Ruo Roch, M. Graziano and M. Zamboni	

Part V Digital Circuits and AI Data Processing

21	Digital Circuit for the Arbitrary Selection of Sample Rate in Digital Storage Oscilloscopes	183
	M. D'Arco, E. Napoli and E. Zacharelos	
22	An Intelligent Informative Totem Application Based on Deep CNN in Edge Regime	191
	Paolo Giammatteo, Giacomo Valente and Alessandro D'Ortenzio	
23	FPGA-Based Clock Phase Alignment Circuit for Frame Jitter Reduction	199
	Dario Russo and Stefano Ricci	
24	Real-Time Embedded System for Event-Driven sEMG Acquisition and Functional Electrical Stimulation Control	207
	Fabio Rossi, Ricardo Maximiliano Rosales, Paolo Motto Ros and Danilo Demarchi	
25	A Fast Approximation of the Hyperbolic Tangent When Using Posit Numbers and Its Application to Deep Neural Networks	213
	Marco Cococcioni, Federico Rossi, Emanuele Ruffaldi and Sergio Saponara	

Part VI Sensors and Sensing Electronic Systems

26	2-D Acoustic Particle Velocity Sensors Based on a Commercial Post-CMOS MEMS Technology	225
	Andrea Ria, Massimo Piotto, Mattia Cicalini, Andrea Nannini and Paolo Bruschi	

27	A High-SNR Distributed Acoustic Sensor Based on ϕ-OTDR Using a Scalable Phase Demodulation Scheme Without Phase Unwrapping	233
	Yonas Muanenda, Stefano Faralli, Claudio J. Oton and Fabrizio Di Pasquale	
28	Silicon Nanowires as Contact Between the Cell Membrane and CMOS Circuits	243
	P. Piedimonte, D. A. M. Feyen, M. Mercola, E. Messina, M. Renzi and F. Palma	
29	Ultra-Low Power Displacement Sensor	251
	Alessandro Bertacchini, Marco Lasagni and Gabriele Sereni	
30	Simulation of an Optical-to-Digital Converter for High Frequency FBG Interrogator	259
	Vincenzo Romano Marrazzo, Francesco Fienga, Michele Riccio, Luca Maresca, Andrea Irace and Giovanni Breglio	
31	Wireless Sensors for Intraoral Force Monitoring	267
	M. Merenda, D. Laurendi, D. Iero, D. M. D'Addona and F. G. Della Corte	
Part VII Power and High Voltage Electronics		
32	Reinforced Galvanic Isolation: Integrated Approaches to Go Beyond 20-kV Surge Voltage (invited)	277
	Egidio Ragonese, Nunzio Spina, Alessandro Parisi and Giuseppe Palmisano	
33	Experimental Characterization of a Commercial Sodium-Nickel Chloride Battery for Telecom Applications	285
	Federico Baronti, Roberto Di Rienzo, Roberto Roncella, Gianluca Simonte and Roberto Saletti	
34	Design and Development of a Prototype of Flash Charge Systems for Public Transportation	293
	Adriano Alessandrini, Riccardo Barbieri, Lorenzo Berzi, Fabio Cignini, Antonino Genovese, Fernando Ortenzi, Marco Pierini and Luca Pugi	
35	Unsupervised Monitoring System for Predictive Maintenance of High Voltage Apparatus	301
	Christian Gianoglio, Andrea Bruzzone, Edoardo Ragusa and Paolo Gastaldo	
36	Control System Design for Cogging Torque Reduction Based on Sensor-Less Architecture	309
	Dini Pierpaolo and Sergio Saponara	

Part VIII Signal and Data Processing

- 37 Acoustic Emissions Detection and Ranging of Cracks in Metal Tanks Using Deep Learning** 325
Gian Carlo Cardarilli, Luca Di Nunzio, Rocco Fazzolari,
Daniele Giardino, Marco Matta, Marco Re and Sergio Spanò
- 38 Recognizing Breathing Rate and Movement While Sleeping in Home Environment** 333
Maksym Gaiduk, Ralf Seepold, Natividad Martínez Madrid,
Simone Orcioni and Massimo Conti
- 39 A Fast Face Recognition CNN Obtained by Distillation** 341
Luca De Bortoli, Francesco Guzzi, Stefano Marsi, Sergio Carrato
and Giovanni Ramponi
- 40 Fine-Grain Traffic Control for Smart Intersections** 349
Jessica Bellitto, Valentina Schenone, Francesco Bellotti,
Riccardo Berta and Alessandro De Gloria
- 41 A Graph Signal Processing Technique for Vibration Analysis with Clustered Sensor Networks** 355
Federica Zonzini, Alberto Girolami, Davide Brunelli, Nicola Testoni,
Alessandro Marzani and Luca De Marchi
- 42 Guided Waves Direction of Arrival Estimation Based on Calibrated Multiresolution Wavelet Analysis** 363
Michelangelo Maria Malatesta, Nicola Testoni, Alessandro Marzani
and Luca De Marchi
- 43 High-Frame-Rate Ultrasound Color Flow Imaging Based on an Open Scanner** 371
Francesco Guidi, Enrico Boni, Alessandro Dallai, Valentino Meacci
and Piero Tortoli

Part IX Vehicular, Robotic and Energy Electronic Systems

- 44 Empowering Deafblind Communication Capabilities by Means of AI-Based Body Parts Tracking and Remotely Controlled Robotic Arm for Sign Language Speakers** 381
Silvia Panicacci, Gianluca Giuffrida, Luca Baldanzi, Luca Massari,
Giuseppe Terruso, Martina Zalteri, Mariangela Filosa,
Giovanni Tonietti, Calogero Maria Oddo and Luca Fanucci
- 45 Project VELA, Upgrades and Simulation Models of the UNIFI Autonomous Sail Drone** 389
Enrico Boni, Marco Montagni and Luca Pugi

46	DC-Link Capacitor Sizing Method for a Wireless Power Transfer Circuit to Be Used in Drone Opportunity Charging	397
	Andrea Carloni, Federico Baronti, Roberto Di Rienzo, Roberto Roncella and Roberto Saletti	
47	Distributed Video Antifire Surveillance System Based on IoT Embedded Computing Nodes	405
	Alessio Gagliardi and Sergio Saponara	
48	Integrated Simulation Environment for Co-design/Verification of Mechanic, Electronic and Control of Automotive E-Drives: The Smart-Latch Case Study	413
	Emanuele Abbatesse, Davide Dente and Sergio Saponara	
49	Spice Model of Photovoltaic Panel for Electronic System Design	425
	Mirco Muttillio, Tullio de Rubeis, Dario Ambrosini and Giuseppe Ferri	
50	Exhaustive Modeling of Electric Vehicle Dynamics, Powertrain and Energy Storage/Conversion for Electrical Component Sizing and Diagnostic	433
	Gaia Fiore, Lucian Mihet-Popa and Sergio Saponara	
Part X IoT and Integrated Circuits		
51	Analysis of 3-D MPPT for RF Harvesting	443
	Michele Caselli and Andrea Boni	
52	Analysis and Simulation of a PLL Architecture Towards a Fully Integrated 65 nm Solution for the New Spacefibre Standard	451
	Marco Mestice, Bruno Neri and Sergio Saponara	
53	Stability and Startup of Non Linear Loop Circuits	463
	Francesca Cucchi, Stefano Di Pascoli and Giuseppe Iannaccone	
54	IoT Ubiquitous Edge Engine Implementation on the Raspberry PI	469
	Ahmad Kobeissi, Riccardo Berta, Francesco Bellotti and Alessandro De Gloria	
55	Non-intrusive Load Monitoring on the Edge of the Network: A Smart Measurement Node	477
	Hugo Wöhrli and Davide Brunelli	
56	Design of a SpaceFibre High-Speed Satellite Interface ASIC	483
	Pietro Nannipieri, Gianmarco Dinelli, Luca Dello Sterpaio, Antonino Marino and Luca Fanucci	

57	An FPGA Realization for Real-Time Depth Estimation in Image Sequences	489
	Stefano Marsi, Sergio Carrato, Luca De Bortoli, Paolo Gallina, Francesco Guzzi and Giovanni Ramponi	
 Part XI Digital Circuits and Systems		
58	Integration of a SpaceFibre IP Core with the LEON3 Microprocessor Through an AMBA AHB Bus	499
	Gianmarco Dinelli, Gabriele Meoni, Pietro Nannipieri, Luca Dello Sterpaio, Antonino Marino and Luca Fanucci	
59	A RISC-V Fault-Tolerant Microcontroller Core Architecture Based on a Hardware Thread Full/Partial Protection and a Thread-Controlled Watch-Dog Timer	505
	Luigi Blasi, Francesco Vigli, Abdallah Cheikh, Antonio Mastrandrea, Francesco Menichelli and Mauro Olivieri	
60	Estimating the Downlink Data-Rate of a CCSDS File Delivery Protocol IP Core	513
	Gabriele Meoni, Alberto Valverde, Giorgio Magistrati and Luca Fanucci	
61	Automatic Detection of the Carotid Artery Position for Blind Echo-Doppler Blood Flow Investigation	521
	Riccardo Matera and Stefano Ricci	
62	Efficient Mathematical Accelerator Design Coupled with an Interleaved Multi-threading RISC-V Microprocessor	529
	Abdallah Cheikh, Stefano Sordillo, Antonio Mastrandrea, Francesco Menichelli and Mauro Olivieri	
63	AXI4LV: Design and Implementation of a Full-Speed AMBA AXI4-Burst DMA Interface for LabVIEW FPGA	541
	Luca Dello Sterpaio, Antonino Marino, Pietro Nannipieri, Gianmarco Dinelli and Luca Fanucci	
64	3D-HEVC Neighboring Block Based Disparity Vector (NBDV) Derivation Architecture: Complexity and Implementation Analysis	549
	Waqar Ahmad, Naveed Khan Baloch, Fawad Hussain, Muhammad Asif Khan and Maurizio Martina	
	Author Index	559