

**7th International Workshop**  
**Applications in Electronics Pervading Industry, Environment & Society**

**ApplePies 2019, 11-13 September**

School of Engineering, University of Pisa, Largo L. Lazzarino, Pisa, [www.applepies.eu](http://www.applepies.eu)



**Wednesday 11 September**

**Interactive Posters - Aula Magna Pacinotti**

**14.30-15.00 Interactive Posters (IP) Day Opening**, chairs: S. Saponara, A. De Gloria

**15.00-15.50 IP1 Vehicular, Robotic & Energy Electronic Systems**, chair: R. Roncella

**15.50-16.40 IP2 IoT & Integrated Circuits**, chair: F. Bellotti

**16.40-17.30 IP3 Digital Circuits & Systems**, chair: M. Martina

**Thursday 12 September**

**Oral Sessions - Aula Magna Dini**

**10.00-10.15 ApplePies2019 Opening & Institutional welcome**, chairs: S. Saponara, A. De Gloria

**10.15-11.30 O1 Rad-Hard Electronics**, chair: F. Palla

**11.30-11.45 DEMO SESSION (Aula Magna Pacinotti)**

**11.45-13.00 O2 Internet of Things**, chairs: A. Solanas, S. Saponara

**13.00-14.15 Lunch Break**

**14.15-15.30 O3 Processors & Memories**, chair: M. Olivieri

**15.30-16.45 O4 VLSI & Signal Processing**, chair: A. Mansour

**16.45-17.00 DEMO SESSION (Aula Magna Pacinotti)**

**17.00-18.20 O5 Digital Circuits & AI Data Processing**, chair: R. Berta

**20.00-22.30 Social Dinner, Ristorante Alle Bandierine, via Mercanti 4, Pisa**

**Friday 13 September**

**Oral Sessions - Aula Magna Dini**

**9.00-10.40 O6 Sensors & Sensing Electronic Systems**, chair: A. Bertacchini

**10.40-11.40 Round Table: Trend in Italy on EuroHPC & the European Processor Initiative**

(Cineca, E4, STMicroelectronics, University of Bologna, University of Pisa)

**11.40-13.00 O7 Power and High Voltage Electronics**, chair: E. Ragonese

**13.00-14.30 Lunch Break**

**14.30-16.20 O8 Signal & Data Processing**, chair: P. Tortoli

**16.20-16.30 ApplePies 2019 Closing**, chairs: S. Saponara, A. De Gloria



## **Wednesday 11 September**

### **Interactive Posters - Aula Magna Pacinotti**

**14.30-15.00 Interactive Posters (IP) Day Opening**, chairs: *S. Saponara, A. De Gloria*

**15.00-15.50 IP1 Vehicular, Robotic & Energy Electronic Systems**, chair: *R. Roncella*

[Empowering deafblind communication capabilities by means of AI-based body parts tracking and remotely controlled robotic arm for sign language speakers](#), *S. Panicacci, G. Giuffrida, L. Baldanzi, L. Massari, G. Terruso, M. Zalteri, M. Filosa, G. Tonietti, C. M. Oddo, L. Fanucci*

[Project VELA. Upgrades and Simulation Models of the UNIFI Autonomous Sail Drone](#), *E. Boni, M. Montagni, L. Pugi*

[DC-link capacitor sizing method for a wireless power transfer circuit to be used in drone opportunity charging](#), *A. Carloni, F. Baronti, R. Di Rienzo, R. Roncella, R. Saletti*

[Distributed Video Antifire Surveillance System based on IoT Embedded Computing Nodes](#), *A. Gagliardi, S. Saponara*

[Integrated simulation environment for co-design/verification of mechanic, electronic and control of automotive e-drives: the smart-latch case study](#), *E. Abbatessa, S. Saponara, D. Dente*

[Spice model of photovoltaic panel for electronic system design](#), *M. Mutillo, T. de Rubeis, D. Ambrosini, G. Ferri*

[Exhaustive modeling of electric vehicle dynamics, power train and energy storage/conversion for electrical component sizing and diagnostic](#), *G. Fiore, L. Mihet Popa, S. Saponara*

**15.50-16.40 IP2 IoT & Integrated Circuits**, chair: *F. Bellotti*

[Analysis of 3-D MPPT for RF Harvesting](#), *M. Caselli, A. Boni*

[Analysis and simulation of a PLL architecture towards a fully integrated 65nm solution for the new SpaceFibre standard](#), *M. Mestice, S. Saponara, B. Neri*

[Stability and startup of nonlinear loop circuits](#), *F. Cucchi, S. Di Pascoli, G. Iannaccone*

[IoT Ubiquitous Edge Engine Implementation on the Raspberry PI](#), *A. Kobeissi, R. Berta, F. Bellotti, A. De Gloria*

[Non-intrusive Load Monitoring on the Edge of the Network: A Smart Measurement Node](#), *H. Woehrl, D. Brunelli*

[Design of a SpaceFibre High-Speed Satellite Interface ASIC](#), *P. Nannipieri, G. Dinelli, L. Dello Sterpaio, A. Marino, L. Fanucci*

[An FPGA realization for real-time depth estimation in image sequences](#), *S. Marsi, S. Carrato, L. De Bortoli, F. Guzzi, G. Ramponi*

**16.40-17.30 IP3 Digital Circuits & Systems**, chair: *M. Martina*

[Integration of a SpaceFibre IP core with the LEON3 microprocessor through an AMBA AHB bus](#), *G. Dinelli, G. Meoni, P. Nannipieri, L. Dello Sterpaio, A. Marino, L. Fanucci*

[A RISC-V Fault-Tolerant Microcontroller Core Architecture Based on a Hardware Thread Full-Weak protection and a Thread-Controlled Watch-dog Timer](#), *L. Blasi, F. Vigli, A. Cheikh, A. Mastrandrea, F. Menichelli, M. Olivieri*

[Estimating the downlink data-rate of a CCSDS File Delivery Protocol IP Core](#), *G. Meoni, A. Valverde, G. Magistrati, L. Fanucci*

[Automatic detection of the carotid artery position for blind Echo-Doppler blood flow investigation](#), *R. Matera, S. Ricci*

[Efficient mathematic accelerator design coupled with an IMT RISC-V microprocessor](#), *A. Cheikh, S. Sordillo, A. Mastrandrea, F. Menichelli, M. Olivieri*

[AXI4LV: Design and Implementation of a Full Speed AMBA AXI4 Burst DMA Interface for LabVIEW FPGA](#), *L. Dello Sterpaio, A. Marino, P. Nannipieri, G. Dinelli, L. Fanucci*

[3D-HEVC Neighboring Block Based Disparity Vector \(NBDV\) Derivation Architecture: Complexity and Implementation Analysis](#), *W. Ahmad, N. Khan Baloch, F. Hussain, M. Asif Khan, M. Martina*

## **Thursday 12 September, Aula Magna Dini**

**10.00-10.15 ApplePies2019 Opening & Institutional welcome, chairs: S. Saponara, A. De Gloria**

**10.15-11.30 O1 Rad-Hard Electronics, chair: F. Palla**

[Advanced Radiation Sensors VLSI Design in CMOS technology for High Energy Physics Applications](#), T. Croci, A. Morozzi, P. Placidi, D. Passeri

[Design, Operation and BER Test of Multi-Gb/s Radiation-Hard Drivers in 65 nm Technology for Silicon Photonics Optical Modulators](#), S. Cammarata, G. Ciarpi, S. Faralli, P. Velha, G. Magazzù, F. Palla, S. Saponara

[A rad-hard bandgap voltage reference for High Energy Physics experiments](#), G. Traversi, L. Gaioni, M. Manghisoni, M. Pezzoli, L. Ratti, V. Re, E. Riceputi, M. Sonzogni

[Analysis and Comparison of Ring and LC-tank Oscillators for 65 nm Integration of Rad-Hard VCO for SpaceFibre Applications](#), D. Monda, G. Ciarpi, S. Saponara, G. Mangraviti, L. Berti

[A Compact Gated Integrator for Conditioning Pulsed Analog Signals](#), S. Pettinato, A. Orsini, M. C. Rossi, D. Tagnani, M. Girolami, S. Salvatori

**11.45-13.00 O2 Internet of Things, chairs: A. Solanas, S. Saponara**

[Multivariate Microaggregation with Fixed Group Size Based on the Travelling Salesman Problem](#), A. Maya López, A. Solanas

[Modular design of electronic appliances for reliability enhancement in a circular economy perspective](#), S. Orcioni, C. Scavongelli, M. Conti

[Pest detection for Precision Agriculture based on IoT Machine Learning application](#), A. Albanese, D. D'Acunto, D. Brunelli

[Statistical Flow Classification for the IoT](#), G. Cirillo, R. Passerone, A. Posenato, L. Rizzon

[Using LPWAN connectivity for elderly activity monitoring in smartcity scenarios](#), E. Sisinni, D. F. Carvalho, P. Ferrari, P. Bellitti, N. F. Lopomo, M. Serpelloni

**14.15-15.30 O3 Processors & Memories, chair: M. Olivieri**

[Characterization of a RISC-V Microcontroller through Fault Injection](#), D. Ascioffa, L. Dilillo, D. Santos, D. Melo, A. Menicucci, M. Ottavi

[Analyzing Machine Learning on Mainstream Microcontrollers](#), V. Falbo, T. Apicella, D. Aurioso, L. Danese, F. Bellotti, R. Berta and A. De Gloria

[Quality aware selective ECC for approximate DRAM](#), G. Stazi, A. Mastrandrea, M. Olivieri, F. Menichelli

[Digital Random Number Generator Hardware Accelerator IP-Core for Security Applications](#), L. Baldanzi, L. Crocetti, F. Falaschi, J. Belli, L. Fanucci, S. Saponara

[An Energy Optimized JPEG Encoder for Parallel Ultra-Low-Power Processing-Platforms](#), T. Polonelli, D. Battistini, M. Rusci, D. Brunelli, L. Benini

**15.30-16.45 O4 VLSI & Signal Processing, chair: A. Mansour**

[VLSI architectures for the Steerable-Discrete-Cosine-Transform \(SDCT\)](#), L. Solo, R. Peloso, M. Capra, M. Ruo Roch, G. Maserà, M. Martina

[Hardware Architecture for a Bit-Serial Odd-Even Transposition Sort Network with On-The-Fly Compare and Swap](#), G. Akkad, R. Ayoubi, A. Mansour, B. Elhassan

[Variable-Rounded LMS Filter for Low-Power Applications](#), G. Di Meo, D. De Caro, E. Napoli, N. Petra, A. Strollo

[A Simulink Model-based Design of a Floating-point Pipelined Accumulator with HDL Coder Compatibility for FPGA Implementation](#), M. Bassoli, V. Bianchi, I. De Munari

[Bitmap Index: a Processing-in-Memory reconfigurable implementation](#), M. Andrighetti, G. Turvani, G. Santoro, M. Vacca, M. Ruo Roch, M. Graziano, M. Zamboni

**17.00-18.20 O5 Digital Circuits & AI Data Processing, chair: R. Berta**

[Digital Circuit for the Arbitrary Selection of Sample Rate in Digital Storage Oscilloscopes](#), M. D'Arco, E. Napoli, E. Zacharelos

[An Intelligent Informative Totem Application based on deep CNN in Edge Regime](#), P. Giammatteo., G. Valente, A. D'Ortenzio

[FPGA-based Clock Phase Alignment Circuit for Frame Jitter Reduction](#), *D. Russo, D. Ricci*

[Real-Time Embedded System for Event-Driven sEMG Acquisition and FES Control](#), *F. Rossi, R. M. Rosales, P. Motto Ros, D. Demarchi*

[A Fast Approximation of the Hyperbolic Tangent when Using Posit Numbers and its Application to Deep Neural Networks](#), *F. Rossi, M. Cococcioni, S. Saponara, E. Ruffaldi*

## **Friday 13 September, Aula Magna Dini**

**9.00-10.40 O6 Sensors & Sensing Electronic Systems, chair: A. Bertacchini**

[2-D acoustic particle velocity sensors based on a commercial post-CMOS MEMS technology](#), *A. Ria, M. Piotto, M. Cicalini, A. Nannini, P. Bruschi*

[A High-SNR Distributed Acoustic Sensor based on  \$\Phi\$ -OTDR using a Scalable Phase Demodulation Scheme without Phase Unwrapping](#), *Y. Muanenda, S. Faralli, C. J. Oton, F. Di Pasquale*

[Silicon nanowires as contact between the cell membrane and CMOS circuits](#), *P. Piedimonte, D.A.M. Feyen, M. Mercola, A. Messina, M. Renzi, F. Palma*

[Ultra-Low Power Displacement Sensor](#), *A. Bertacchini, M. Lasagni, G. Sereni*

[Simulation of an Optical-to-Digital Converter for High Frequency FBG Interrogator](#), *V. R. Marrazzo, F. Fienga, M. Riccio, L. Maresca, A. Irace, G. Breglio*

[Wireless Sensors for Intraoral Force Monitoring](#), *M. Merenda, D. Laurendi, D. Iero, D. D'Addona, F. Della Corte*

**10.40-11.40 Round Table: Trend in Italy on EuroHPC & the European Processor Initiative**

*A. Bartolini, C. Cavazzoni, F. Magugliani, A. Rossi, S. Saponara*



**11.40-13.00 O7 Power and High Voltage Electronics, chair: E. Ragonese**

[Reinforced Galvanic Isolation: Integrated Approaches to Go Beyond 20-kV Surge Voltage \(invited\)](#), *E. Ragonese, N. Spina, A. Parisi, G. Palmisano*

[Experimental characterization of a commercial Sodium-Nickel chloride battery for telecom applications](#), *F. Baronti, R. Di Rienzo, R. Roncella, G. Simonte, R. Saletti*

[Design and Development of a Prototype of Flash Charge Systems for Public Transportation Systems](#), *A. Alessandrini, R. Barbieri, L. Berzi, F. Cignini, A. Genovese, F. Ortenzi, M. Pierini, L. Pugi*

[Unsupervised Monitoring System for Predictive Maintenance of High Voltage Apparatus](#), *C. Gianoglio, A. Bruzzone, E. Ragusa, P. Gastaldo*

[Control System Design for Cogging Torque Reduction Based on Sensor-less Architecture](#), *P. Dini, S. Saponara*

**14.30-16.20 O8 Signal & Data Processing, chair: P. Tortoli**

[Acoustic Emissions Detection and Ranging of Cracks in metal Tanks using Deep Learning](#), *L. Di Nunzio, G. Cardarilli, M. Re, R. Fazzolari, D. Giardino, S. Spanò, M. Matta*

[Recognizing breathing rate and movement while sleeping in home environment](#), *M. Gaiduk, R. Seepold, N. Martínez Madrid, S. Orcioni, M. Conti*

[A fast face recognition CNN obtained by distillation](#), *L. De Bortoli, F. Guzzi, S. Marsi, S. Carrato, G. Ramponi*

[Fine-grain Traffic Control for Smart Intersections](#), *J. Bellitto, V. Schenone, F. Bellotti, R. Berta, A. De Gloria*

[A graph signal processing technique for vibration analysis with clustered sensor networks](#), *F. Zonzini, A. Girolami, D. Brunelli, N. Testoni, A. Marzani, L. De Marchi*

[Guided waves Direction of Arrival estimation based on calibrated multiresolution wavelet analysis](#), *M. Malatesta, N. Testoni, A. Marzani, L. De Marchi*

[High-frame-rate ultrasound color flow imaging](#), *F. Guidi, E. Boni, A. Dallai, V. Meacci, P. Tortoli*

**16.20-16.30 ApplePies 2019 Closing, chairs: S. Saponara, A. De Gloria**

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