



**6th Int. Conf. Applications in Electronics Pervading Industry Environment Society
APPLEPIES 2018**

Pisa, Congress Center Le Benedettine, 26 Sept. 2018

09.30-10.00 **Registration**

10.00-10.10 **APPLEPIES2018 Opening** (general & honorary chairs S. Saponara, A. De Gloria)

10.10-10.30 **Institutional Talks** (Rector of University of Pisa, Dean of the School of Engineering, Head of Information Engineering Department)

Special Event “From the EU ESPRIT MEPI Initiative to the Microelectronics Arno Valley: the Legacy in Applied Electronics & Systems of Pierangelo Terreni”

10.30-10.45 Academic Role of P. Terreni, Last Dean of the Engineering Faculty (R. Saletti)

10.45-11.00 Technology Transfer Role in Applied Electronics & Systems of P. Terreni (L. Fanucci)

11.00-12.00 **Round Table “Legacy in Applied Electronics & Systems”**

F. Bigongiari (Sitael), R. Serventi (AMS), A. Rocchi (Hanking Electronics), R. Mariani (INTEL)

12.00-12.30 **Award ceremony**: University of Pisa Electronic Systems Lab “Pierangelo Terreni” and INTEL Best Paper Award

12.30-13.15 Light lunch

13.15-14.00 **Poster Session P1** (chair F. Bellotti)

14.00-15.00 **O1 Automotive Electronics** (chair M. Grammatikakis)

15.00-16.00 **O2 Healthcare & Bio-electronic Systems** (chair A. Solanas)



IEEE Special Event

16.00-17.00 **IEEE Italy Section Honorary Award to Federico Faggin**

Introduced by T. Tambosso, B. Tellini, S. Saponara; F. Faggin Keynote Talk “*From Silicon Gate to Microprocessors to AI to Consciousness*”

17.00-18.00 **Round Table “Perspectives in Embedded and High Performance Computing”**

Moderator: S. Saponara; Speakers: F. Faggin (FagginFoundation), M. Ceccarelli (EU Commission), F. Magugliani (E4 and European Processor Initiative), E. Guidetti (STMicroelectronics), M. Olivieri (BSC)

18.00-18.45 **O3 Technology and Testing Issues** (chair: T. Erlbacher)

20.30 Social Dinner Ristorante L’Artifafo

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- 09.00-10.00 **O4 Sensors & Transducers** (chair R. Berta)
10.00-11.00 **O5 Signal Processing Systems** (chair A. Mansour)
11.00-11.15 *Memory of C. Pace: Research and Education in Electronics in the South* (C. Giaconia)
11.15-12.00 **Poster Session P2** (chair M. Ruo Roch)
12.00-13.00 **O6 Wireless Circuits and Systems** (chair E. Ragonese)
13.00-14.00 Break
14.00-14.45 **O7 Power and Thermal Electronics** (chair M. Conti)
14.45-16.00 **O8 Digital Circuits and Systems** (chair M. Martina)
16.00-16.10 **APPLEPIES2018 Closing** (general & honorary chairs S. Saponara, A. De Gloria)

List of Accepted Papers

26 Sept., 14.00-15.00 O1 Automotive Electronics (chair M. Grammatikakis)

- A. Kobeissi, F. Bellotti, R. Berta, A. De Gloria. An Artificial Vision Module for Electrical Vehicle Wireless Charging on Raspberry PI 3*
L. Baldanzi, L. Crocetti, M. Bertolucci, L. Fanucci, S. Saponara. Analysis of Cybersecurity Weakness in Automotive In-Vehicle Networking and Hardware Accelerators for Real-time Cryptography
P. Ferrari, A. Flammini, M. Pasetti, S. Rinaldi, F. Simoncini, E. Sisinni. Testing Facility for the Characterization of the Integration of E-Vehicles into Smart Grid in Presence of Renewable Energy
M. Grammatikakis, N. Mouzakitis, E. Ntallaris, V. Piperaki, K. Patelis, G. Vougioukalos. On-the-fly Secure Group Communication on CAN Bus

26 Sept., 15.00-16.00 O2 Healthcare & Bio-electronic Systems (chair A. Solanas)

- D. De Venuto, G. Mezzina. Neuromuscular Disorders Assessment by FPGA-based SVM Classification of Synchronized EEG/EMG*
C. Giaconia, G. Greco, L. Mistretta, R. Rizzo, A. Merla, A. Chiarelli, F. Zappasodi, G. Edlinger. Functional Near Infrared Spectroscopy System Validation for Simultaneous EEG-fNIRS Measurements
C. Ciminelli, D. Conteduca, F. Dell'Olio, M. Cito, G. Brunetti, M. Armenise, T. Krauss. Optoelectronic Microsystem for Quick and Label-free Bacteria Detection
E. Batista, A. Martínez, M. Peña, X. Singla, A. Solanas. HGIS: a Healthcare-oriented Approach to Geographic Information Systems

26 Sept., 18.00-18.45 O3 Technology and Testing Issues (chair T. Erlbacher)

- A. Finocchiaro, G. Girlando, A. Motta, A. Pagani, G. Palmisano. Main Parasitic Effects in Contactless Wafer Testing*
F. Gambini, N. Andriolli, V. Nurra, M. Chiesa, F. Petroni, S. Faralli. Study of Low-Dose Long-Exposure Gamma Radiation Effects on InP DBR Cavity Lasers from Generic Integration Technology
J. Büttner, T. Erlbacher, A. Bauer. Technological Advances Towards 4H-SiC JBS Diodes for Wind Power Applications



27 Sept., 09.00-10.00 **O4 Sensors & Transducers** (chair R. Berta)

P. Bruschi, A. Ria, M. Piotta. A Scalable 2D, Low Power Airflow Probe for Unmanned Vehicle and WSN Applications

D. Russo, V. Meacci, S. Ricci. Electronics System for Velocity Profile Emulation

A. Bertacchini, P. Pavan. An Ultra-Low Cost Triboelectric Flowmeter

A. Scorzoni, P. Placidi, P. Valigi, N. Lovecchio. Electro-Thermal Characterization and Modeling of a 4-Wire Microheater for Lab-On-Chip Systems

27 Sept., 10.00-11.00 **O5 Signal Processing Systems** (chair A. Mansour)

S. Rossi, M. Lenge, A. Dallai, A. Ramalli, E. Boni. Toward the Real Time implementation of the 2-D Frequency-Domain Vector Doppler method

M. Colli, M. Stagnaro, A. Caridi, L. G. Lanza, A. Randazzo, M. Pastorino, D. Caviglia, A. Delucchi. A Field Experiment of Rainfall Intensity Estimation Based on the Analysis of Satellite-to-Earth Microwave Link Attenuation

S. Marsi, J. Bhattacharya, F. Guzzi, S. Carrato, G. Ramponi, L. De Bortoli, F. Cicala, A. Canziani. A Face Recognition System Using Off-the-Shelf Feature Extractors and an Ad-hoc Classifier

G. Akkad, A. Mansour, B. Elhassan, M. Najem, F. Le Roy. Twiddle Factor Generation Using Chebyshev Polynomials and HDL for Frequency Domain Beamforming

27 Sept., 12.00-13.00 **O6 Wireless Circuits and Systems** (chair E. Ragonese)

T. Polonelli, D. Brunelli, A. Bartolini, L. Benini. A LoRaWAN Wireless Sensor Network for Data Center Temperature Monitoring

F. Rossi, P. Motto Ros, S. Sapienza, P. Bonato, E. Bizzi, D. Demarchi. Wireless Low Energy System Architecture for Event-Driven Surface Electromyography

W. D. Scherz, R. Seepold, N. Martinez Madrid, P. Crippa, G. Biagetti, L. Falaschetti, C. Turchetti. Activity Monitoring and Phase Detection Using a Portable EMG/ECG System

A. Cavarra, C. Nocera, G. Papotto, E. Ragonese, G. Palmisano. Transformer Design for 77-GHz Down-Converter in 28-nm FD-SOI CMOS Technology

27 Sept., 14.00-14.45 **O7 Power and Thermal Electronics** (chair M. Conti)

P. Tosato, D. Brunelli, M. Rossi. Investigating an active cooling system powered by a thermoelectric generator

A. Cordopatri, G. Cocorullo. A Smart Torque Control for a High Efficiency 4WD Electric Vehicle

F. Garbuglia, M. Unterhost, L. Buccolini, S. Orcioni, M. Conti. Experimental analysis of Battery Management System algorithms of Li-ion batteries

27 Sept., 14.45-16.00 **O8 Digital Circuits and Systems** (chair M. Martina)

D. Esposito, G. Di Meo, D. De Caro, A. Strollo, E. Napoli. Design of Low-Power Approximate LMS Filters with Precision-Scalability

P. Selvo, M. Masera, R. Peloso, G. Masera, M. Shafique, M. Martina. An Optimized Partial-Distortion-Elimination Based Sum-of-Absolute-Differences Architecture for High-Efficiency-Video-Coding

G. C. Cardarilli, L. Di Nunzio, R. Fazzolari, D. Giardino, M. Matta, M. Re, F. Silvestri, S. Spanò. Efficient Ensemble Machine Learning implementation on FPGA using Partial Reconfiguration

G. Stazi, F. Silvestri, A. Mastrandrea, M. Olivieri, F. Menichelli. Synthesis Time Reconfigurable Floating Point Unit for Transprecision Computing

G. Ciampi, S. Saponara, G. Magazzù, F. Palla. Radiation Hardness by Design Techniques for 1 Grad TID Rad-Hard Systems in 65 nm standard CMOS Technologies

27 Sept., 13.15-14.00 **Poster 1** (Chair F. Bellotti)

F. Falcone, C. Patsakis, A. Solanas. Context-Aware Environments in Passenger Train Transportation Systems: Ideas, Feasibility and Risks



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D. De Venuto, G. Mezzina. *Automatic Perishable Goods Shelf Life Optimization in No-Refrigerated Warehouses by Using a WSN-based Architecture*

V. Meacci, E. Boni, A. Dallai, A. Ramalli, M. Scaringella, F. Guidi, D. Russo, S. Ricci. *FPGA-Based Multi Cycle Parallel Architecture for Real-Time Processing in Ultrasound Applications*

G. Vitale, A. Pagano, L. Mistretta, C. Giaconia. *Adaptive Tuning System and Parameter Estimation of a Digitally Controlled Boost Converter with STM32*

A. Parodi, F. Bellotti, R. Berta, A. De Gloria. *Developing a Machine Learning Library for Microcontrollers*

S. Di Mascio, A. Menicucci, G. Furano, C. Monteleone, M. Ottavi. *The Case for RISC-V in Space*

S. Ricci, V. Meacci, D. Russo, R. Matera. *Encoder-Motor Misalignment Compensation for Closed-Loop Hybrid Stepper Motor Control*

E. Ragonese, A. Parisi, N. Spina, G. Palmisano. *Fully Integrated Galvanically Isolated DC-DC Converters Based on Inductive Coupling*

T. Addabbo, E. Landi, R. Moretti, M. Mugnaini, L. Parri, M. Tani. *A Distributed Condition Monitoring System for the Non-Invasive Temperature Measurement of Heat Fluids Circulating in Turbomachinery Pipes Based on Self-Powered Sensing Nodes*

A. Mohamed, V. Palazzi, S. Kumar, F. Alimenti, P. Mezzanotte, L. Roselli. *Towards Subsea Non-ohmic Power Transfer via a Capacitor-like Structure*

L. Mezzera, M. Di Mauro, M. Tizzoni, A. Turolla, M. Antonelli, M. Carminati. *A Robust Sensing Node for Wireless Monitoring of Drinking Water Quality*

S. Cammarata, G. Fieramosca, B. Neri, S. Saponara, F. Baronti. *Doubly-Balanced Gilbert Cell Down-Conversion Mixer in AMS 0.35 μ m SiGe CMOS for Mode-1 MB-OFDM UWB Receivers*

V. Abdolzadeh, N. Petra. *Efficient Implementation of Recurrent Neural Network Accelerators*

R. Matera, D. Vilkomerson, S. Ricci. *Ultrasound Measurement of the Peak Blood Flow Based on a Doppler Spectrum Model*

27 Sept., 11.15-12.00, **Poster 2** (chair M. Ruo Roch)

E. Rodriguez de Trujillo, R. Seepold, M. Gaiduk, N. Martinez Madrid, S. Orcioni, M. Conti. *Embedded System to Recognize Movement and Breathing in Assisted Living Environments*

M. Nardello, D. Brunelli. *Energy Harvesting with Current Sensors to Sustain Embedded IoT Platforms*

L. Dello Sterpaio, P. Nannipieri, A. Marino, L. Fanucci. *A PXI Based Implementation of a TLK2711 Equivalent Interface*

F. Martina, Y. Muanenda, S. Faralli, F. Di Pasquale. *An FPGA-based Real-Time Acquisition System for a Distributed Acoustic Sensor based on Φ -OTDR*

S. Di Pascoli, G. Ciarpì, S. Saponara. *Sound-based detection and ranging system as example application of a rapid prototyping and low-cost technology for board-level electronic systems education*

G. Stazi, A. Mastrandrea, M. Olivieri, F. Menichelli. *Approximate Memory support for Linux Early Allocators in ARM architectures*

G. Meoni, L. Pilato, G. Ciarpì, A. Palla, L. Fanucci. *Fully Digital Low-Power Implementation of an Audio Front-End for Portable Applications*

G. C. Cardarilli, D. Giardino, M. Matta, M. Re, F. Silvestri, L. Simone, S. Spanò. *Comparison and Implementation of Variable Fractional Delay Filters for Wideband Digital Beamforming*

E. Boni, M. Montagni, L. Pugi. *Autonomous Sail Surface Boats. Design and Testing Results of the MOUNTAINS Prototype*

M. Ruo Roch, M. Martina. *A Low Cost ALS and VLC Circuit for Solid State Lighting*

A. Ricci, M. Silvestrini, M. Conti, M. Caldari, F. Ripa. *Chamberlin State-variable Filter Structure in FPGA for Musical Applications*

L. Pugi, T. Favilli, L. Berzi, E. Locorotondo, M. Pierini. *Brake Blending and Optimal Torque Allocation Strategies for Innovative Electric Powertrains*

M. Rossi, M. Nardello, D. Brunelli. *Smart Coaster: an Example of IoT Design and Implementation*

D. Giardino, M. Matta, M. Re, F. Silvestri, S. Spanò. *IP Generator for Efficient Hardware Acceleration of Self-Organizing Maps*