

Applepies Conference 2023

Programme of the authors' sessions

Thursday, September 28th

9.30 – 11.15: Oral session 1 – Chair: Massimo Ruo Roch, Polytechnic of Turin

1. A. Dolmeta, M. Mirigaldi, M. Martina and G. Masera, *LOKI Low-latency Open-source Kyber-accelerator Ips*
2. S. Di Matteo, L. Zulberti, F. C. Lapenna, P. Nannipieri, L. Crocetti, L. Fanucci and S. Saponara, *A PUF-based Secure Boot for RISC-V Architectures*
3. M. Barbirotta, F. Menichelli, A. Mastrandrea, A. Cheikh, M. Angioli, S. Jamili and M. Olivieri, *Heterogeneous Tightly-Coupled Dual Core architecture against SEE*
4. G. Ciarpi, M. Mestice, D. Rossi and S. Saponara, *Wire Bonding: Limitations and Opportunities for High-Speed Serial Communications*
5. S. Jamili, A. Mastrandrea, A. Cheikh, M. Barbirotta, F. Menichelli, M. Angioli and M. Olivieri, *Universal Hardware Emulator for Verification IPs on FPGA: A Novel and Low-Cost Approach*
6. M. Barbirotta, M. Angioli, A. Mastrandrea, A. Cheikh, S. Jamili, F. Menichelli and M. Olivieri, *Single Event Transient Reliability Analysis on a Fault-Tolerant RISC-V Microprocessor Design*
7. D. Angeloni, L. Canese, G. C. Cardarilli, L. Di Nunzio, M. Re and S. Spanò, *A RISC-V Hardware Accelerator for Q-Learning Algorithm*
8. L. Di Marino, F. Fienga, V. R. Marrazzo, A. Borghese, G. Breglio, A. Irace, F. V. Lupo, O. Mukhanov, M. Arzeo and M. Riccio, *Efficient Optimization of SFQ-Based Logic Circuits: Introducing a Novel Methodology for Performance and Design Enhancement*

14.45 – 15.50: Short oral 1 - Chair: Luca Lazzaroni, University of Genova

1. A. Ria, A. Motroni, F. Gagliardi, M. Piotto and P. Bruschi, *The SensiTag: an innovative BAP RFID TAG for environmental multi-sensing*
2. E. A. Cortez Médiçi, R. Petrino and R. Cortez, *Crack Auscultation in Asphalt Pavements using Computer Vision*
3. M. Grammatikakis, S. Ninidakis and G. Kornaros, *Digital Twins for Remote ECG Monitoring*
4. M. Gragnaniello, A. Borghese, V. R. Marrazzo, G. Breglio, A. Irace and M. Riccio, *A Microcontroller System for Human-Emotion Recognition Based on Infrared Camera and Edge-AI*
5. A. Boiko, M. Gaiduk, N. Martínez Madrid and R. Seepold, *Evaluation of a Contactless Accelerometer Sensor System for Heart Rate Monitoring during Sleep*
6. W. D. Scherz, J. J. Perea, R. Seepold and J. A. Ortega, *Definition of emotional states interval for application of artificial intelligence and stress estimation*
7. L. Lazzaroni, A. Pighetti, F. Bellotti, A. Capello, M. Cossu and R. Berta, *Automated Parking in CARLA: a Deep Reinforcement Learning-based Approach*
8. A. Fotia, A. Macheda, M. R. Sebti, C. Nunnari and M. Merenda, *Design of a portable water pollutants detector exploiting ML techniques suitable for IoT devices integration*
9. R. Di Dio, G. Aurilio, R. Di Rienzo and R. Saletti, *Machine learning for SOC estimation in Li-ion batteries*
10. I. R. Morales, M. Liz Crespo and S. Carrato, *Open source remote diagnostics platform for custom instrumentation in nuclear applications*
11. M. Calonge, E. Batista, J. Hernandez-Castro and A. Solanas, *Where are my cryptos?*
12. E. Batista, A. Martínez-Ballesté, J. R.-Llompарт and A. Solanas, *Towards Context-Aware Classrooms: Lessons Learnt from the ACTUA project*
13. J. Machin, E. Batista and A. Solanas, *Multi-Agent Systems for Pervasive Electronics: A Case Study in School Classrooms*
14. G. Coviello, A. Florio, G. Brunetti, C. Ciminelli and G. Avitabile, *Analysis of the Divider Control Policy for a Fractional Low-Power Time Synchronization Algorithm*

15. N. Kaouk, L. Amer, T. Yaacoub, Y. Bakouny, C. Hajjar, F. Khatounian, J. Amara, R. Slim, A. Mansour and C. Yaghi, *Detecting Patient Readiness for Colonoscopy through Bowel Image Analysis: A Machine Learning Approach*.
16. M. Zilaie, Z. Mohammadkhani, K. A. Asrari, S. Noghabi and S. R. Talebiyan, *Investigating and Importance of Fetal Monitoring Methods and Presenting a New Method According to Convolutional Deep Learning Based on Image Processing to Separate Fetal Heart Signal from Mother*

16.10 – 17.10: Special session In-Home Measurement and Analysis of Health-Related Physiological Parameters – Chair Maksym Gaiduk, HTWG Konstanz, University of Applied Sciences

1. A. Cabri, S. Rovetta, F. Masulli, A. Sharma, P. G. Meo and M. Magliulo, *Remote Healthcare System based on AIoT*
2. R. Kraft, A. Simón-Soro, J. A. Ortega, N. Martinez, L. Gonzales, W. D. Scherz and R. Seepold, *Oral Health Phenotype of Postmenopausal Women Us-ing AI*
3. E. Stahl, M. Haghi, W. D. Scherz and R. Seepold, *Prototyping a Compact Form Factor Module for Physiological Measurement with Multiple Applications During the Daily Routine*
4. R. Goldoni, A. Ria, D. Galimberti, P. Dongiovanni, L. Strambini and G. Tartaglia, *Simultaneous detection of pH, antioxidant capacity and conductivity through a low-cost wireless sensing platform*
5. M. Moro, M. Cellerino, M. Inglese, M. Casadio, F. Odone and N. Noceti, *On the assessment of gray code kernels for motion characterization in people with multiple sclerosis: a preliminary study*

17.10 – 18.35: Oral session 2 – Chair: Mauro Olivieri, Università La Sapienza di Roma

1. F. Pacini, P. Dini and L. Fanucci, *Cooperative driver assistance for electric wheelchair*
2. F. Zonzini, E. Ragusa, L. De Marchi and P. Gastaldo, *Evaluating the effect of intrinsic sensor noise for vibration diagnostic in the compressed domain using Convolutional Neural Networks*
3. G. Poletti, A. Albanese, M. Nardello and D. Brunelli, *Tiny Neural Deep Clustering: An Unsupervised Approach for Continual Machine Learning on the Edge*
4. A. Pighetti, F. Bellotti, C. Oh, L. Lazzaroni, L. Forneris, M. Fresta and R. Berta, *Investigating Adversarial Policy Learning for Robust Agents in Automated Driving Highway Simulations*
5. F. Rossi, G. Mugnaini, S. Saponara, C. Cavazzoni and A. Sciarappa, *Evaluation of AI and Video Computing Applications on Multiple Heterogeneous Architectures*
6. L. Fiaschi, F. Rossi, M. Cococcioni and S. Saponara, *Speeding up Non-Archimedean Numerical Computations using AVX-512 SIMD Instructions*
7. A. Dabbous, M. Fresta, F. Bellotti and R. Berta, *Neural Architecture for Tennis Shot Classification on Embedded System*

Friday, September 29th

9.00 – 10.50: Oral session 3 - Chair: Ali Mansour, ENSTA Bretagne

1. M. Ruo Roch and M. Martina, *A low cost open platform for development and performance evaluation of IoT and IIoT systems*
2. V. Marazzi, E. Monaco, C. Nani and D. Manstretta, *A 0.94V Dynamic Bias Double Tail Comparator for high-speed applications in 5nm technology*
3. G. Bellacci, F. Neri, L. Pugi, A. Giachetti, E. Barlacchi and N. Baldanzini, *Preliminary frequency response analysis of a contact force measurement system for rail applications*
4. A. Kociu, L. Pugi, L. Berzi, E. Zacchini, M. Delogu and N. Baldanzini, *Electrochemical and thermal modelling of a Li-ion NMC pouch cell*
5. N. Nicodemo, R. Di Rienzo, A. Verani, F. Baronti, R. Roncella and R. Saletti, *Low-Cost Configurable Electronic Load for Lithium Ion Batteries Testing*
6. A. Elhanashi, S. Saponara, P. Dini, Q. Zheng, A. Saide, W. Li and S. Neale, *Assembly of solder beads with a Surface Mount Technology resistor with optoelectronic tweezers & freezing-drying techniques*
7. L. Crocetti, F. Falaschi, S. Saponara and L. Fanucci, *Secure Data Authentication in Space Communications by High-efficient AES-CMAC Core in Space-Grade FPGA*
8. L. Crocetti and S. Saponara, *On the Usage of Isomorphic Fields in Hardware AES Modules for Optimizing the Efficiency*
9. M. Zauli, L. M. Peppi, V. A. Arcobelli, L. Di Bonaventura, V. Coppola, S. Mellone and L. De Marchi, *Preliminary development of a full-digital smart system for chest auscultation and further Internet of Medical Things framework*

15.50 – 16.40: Oral session 4 - Chair: Massimo Ruo Roch, Polytechnic of Turin

1. M. K. El Dine, H. Al Haj Hassan, A. Nasser, C. Zaki, A. Moawad and A. Mansour, *Reducing Energy Consumption in NB-IoT by Compressing Data and aggregating Transmission*
2. C. Riboldi, D. M. Crafa, C. Fiorini and M. Carminati, *A Compact Continuous Analyzer of Particulate Matter Radioactivity*
3. A. Galliani, L. Gaioni and G. Traversi, *Data Acquisition System for a 28 nm flash-ADC based programmable front end channel for HEP experiments*
4. M. Pellegrini, G. Coviello, G. Brunetti, F. Angelini, I. Lagravinese, G. Manca, F. A. Gentile, R. Vittori and C. Ciminelli, *Design and development of new wearable and protective equipment for human spaceflights*

16.40 – 18.10: Short oral 2 - Chair: Francesco Bellotti, University of Genova

1. D. Pau, W. Ben Yahmed and J. Raynor, *A Deeply Quantized Classifier for Very Low Resolution ToF Imaging*
2. R. Moretti, T. Addabbo, A. Fort and V. Vignoli, *An Advanced Customizable Circuit Simulator to Investigate Memristor Dynamics*
3. F. Spinelli, T. Addabbo, R. Moretti, V. Vignoli, G. D. Licciardo, P. Vitolo and A. Rubino, *Monitoring Hardware True Random Number Generators with Artificial Neural Networks: Problem Modeling and Training Dataset Generation*
4. F. Guella, E. Valpreda, M. Caon, G. Masera and M. Martina, *TEMET: Truncated REconfigurable Multiplier with Error Tuning*
5. R. Della Sala and G. Scotti, *On Enhancing the Throughput of the Latched Ring Oscillator TRNG on FPGA*
6. G. Simonte, R. Di Rienzo, N. Nicodemo, A. Verani, F. Baronti, R. Roncella and R. Saletti, *Novel battery parallelization approach using DC/DC partial power converter in micro-grids*
7. L. Crocetti, F. Falaschi, S. Saponara and L. Fanucci, *Highly-efficient Galois Counter Mode Symmetric Encryption Core for the Space Data Link Security Protocol*

8. B. Li, Q. Zheng, X. Tian, A. Elhanashi and S. Saponara, *A Pedestrian detection method based on YOLOv7 model*
9. D. Qiao, Q. Zheng, X. Tian, A. Elhanashi and S. Saponara, *Dynamic capture algorithm based on visual background extractor (vibe) algorithm*
10. X. Zhu, Q. Zheng, X. Tian, A. Elhanashi, S. Saponara and P. Dini, *Car recognition based on HOG feature and SVM classifier*
11. M. Cossu, R. Berta, L. Forneris, M. Fresta, L. Lazzaroni, J.-L. Sauvaget and F. Bellotti, *YoloP-based Pre-processing for Driving Scenario Detection*
12. L. Pugi, L. di Carlo, A. Kociu, L. Berzi and M. Delogu, *A Tool for Design and Simulation of Battery Operated Trains*
13. P. Nannipieri, S. Di Matteo, L. Crocetti, L. Zulberti, L. Fanucci and S. Saponara, *Cycle-Accurate Verification of the Cryptographic Co-Processor for the European Processor Initiative*
14. N. Ferrante, F. Terrosi, L. Maruccio, F. Rossi, L. Fanucci and A. Bondavalli, *HUSTLE: A Hardware Unit for Self-Test-Libraries Efficient Execution*
15. L. A. Hattouti, R. Di Rienzo, N. Nicodemo, A. Verani, F. Baronti, R. Roncella and R. Saletti, *SoC estimation LSTM trained with experimental and synthetic datasets*
16. G. Ciarpi, E. Nocetti, L. Ceragioli, M. Mestice, D. Rossi and S. Saponara, *Smart Kinetic Floor System for Energy Harvesting and Data Acquisition in High Foot-Traffic Areas*
17. L. Forneris, R. Berta, A. Capello, M. Cossu, M. Fresta, F. Tango and F. Bellotti, *A Synthetic Dataset Generator for Automotive Overtaking Maneuver Classification*
18. S. Lugani, E. Ragusa, R. Zunino and P. Gastaldo, *Lightweight neural networks for affordance segmentation: enhancement of the decoder module*
19. M. Fresta, A. Dabbous, F. Bellotti, A. Capello, L. Lazzaroni, A. Pighetti and R. Berta, *Low-Cost, Edge-Cloud, End-to-End System Architecture for Human Activity Data Collection*
20. P. Dhungana, R. Singh and H. Dhungana, *Machine learning model for fault detection in safety critical system*
21. A. Chawraba, A. Rizik, A. Randazzo and D. Caviglia, *Real-Time Sea Wave Monitoring using FMCW Radar*
22. R. Khalife, R. Mrad, A. Dabbous and A. Ibrahim, *Real-Time Implementation of Tiny Machine Learning Models for Hand Motion Classification*
23. R. Kheirlddeen, A. Shaito, H. Hajj Hassan, A. Cherry, A. Dabbous and M. Hajj-Hassan, *Modeling and Simulation of Optically Transparent Brain Computer Interfaces*