SIE-2021 TRIESTE

Technical Program

52ND ANNUAL MEETING OF THE ASSOCIAZIONE SOCIETÀ ITALIANA DI ELETTRONICA

Contents date: June 25th, 2021 15:00

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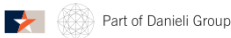
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Program at a glance

Wednesday, July 7

11:00-14:00	**Registration**
12:40-14:00	**LUNCH**
14:00-14:20	**Welcome Address**
14:20-16:20	**Oral Sessions** A: Electronic Systems and Applications I B: Sensors, Microsystems and Instrumentation I
16:20-16:40	**COFFEE BREAK**
16:40-17:20	**Invited Lecture** ***V. John Mathews*** *Oregon State University* *Neuroprostheses for amputees and patients with spinal cord injuries*
17:20-18:40	**Oral Sessions** A: Electronic Systems and Applications II B: Power Electronics
20:00	**WELCOME RECEPTION**

Program at a glance

Thursday, July 8

08:40-10:00	**Oral Sessions**
	A: Optoelectronics and Photonics I B: Electronic Systems and Applications III
10:00-10:40	**Invited Lecture**
	Sergio Saponara
	University of Pisa
	Autonomous, Connected and Electrified Vehicle Revolution
10:40-11:00	**COFFEE BREAK**
11:00-13:00	**Oral Sessions**
	A: Sensors, Microsystems and Instrumentation II B: Microwave Electronics
13:00-14:20	**LUNCH**
14:20-15:00	**Invited Lecture**
	Claudio Silenzi
	Ferrari gestione sportiva
	Electronics in Formula 1
15:00-16:20	**Oral Sessions**
	A: Optoelectronics and Photonics II B: Micro and Nano Electronic Devices Integrated Circuits and Systems I
16:20-16:40	**COFFEE BREAK**
16:40-18:40	**Oral Sessions**
	A: Optoelectronics and Photonics III B: Integrated Circuits and Systems II
20:30	**SOCIAL DINNER**

Program at a glance

08:40-10:20	**ECSEL-Italy** *The JU ECSEL in the perspective of the new Horizon Europe program*
10:20-10:40	**COFFEE BREAK**
10:40-11:20	**Invited Lecture** **Nicola Blefari-Melazzi** *University of Rome Tor Vergata* *5G: key issues and examples of application*
11:20-11:40	**Industry Presentation** **Alessia Ruggieri** *Analog Devices* *Analog Devices Graduate Program: a unique early career path*
11:40-12:00	**Industry Presentation** **Livio Tenze** *ESTECO* *ECG/EEG signals acquisition, a study case*
12:00-12:20	**Recognition & Awards**
12:20-12:50	**IEEE Fellow Lectures** **Daniele Ielmini** *Politecnico di Milano* *In-memory computing: status and outlook*
13:00-14:20	**LUNCH**
14:20-15:00	**SIE Executive Board Meeting & Open Discussion**
17:30	**SOCIAL TOUR**

Invited Lecture

V. John Mathews

16.40-17.20, Wednesday July 7
Aula Magna

Oregon State University

NEUROPROSTHESES FOR AMPUTEES AND PATIENTS WITH SPINAL CORD INJURIES

ABSTRACT
Recent technological innovations such as functional neuro-muscular stimulation (FNS) offer considerable benefits to paralyzed individuals. FNS can produce movement in paralyzed muscles by the application of electrical stimuli to the nerves innervating the muscles. The first part of this talk will describe how smooth muscle movements can be evoked using electrical stimulation via electrode arrays inserted into peripheral nerves. Animal experiments demonstrating the feasibility of the method will be described. The second part of this talk will describe efforts to interpret human motor intent from bioelectrical signals. Machine learning algorithms for accomplishing this objective will be presented. The decoded information can then be used to evoke desired movements of paralyzed muscles or to control prosthetic devices in patients with limb loss. Results of experiments involving human amputee subjects will be described and discussed.

BIOGRAPHY
V John Mathews is a professor in the School of Electrical Engineering and Computer Science (EECS) at the Oregon State University. He received his Ph.D. and M.S. degrees in electrical and computer engineering from the University of Iowa, Iowa City, Iowa in 1984 and 1981, respectively, and the B.E. (Hons.) degree in electronics and communication engineering from the Regional Engineering College (now National Institute of Technology), Tiruchirappalli, India in 1980. He was with the Department of Electrical and Computer Engineering at the University of Utah from 1985 until 2015. He served as the chairman of the ECE department at Utah from 1999 to 2003, and as the head of the School of EECS from 2015 to 2017. Mathews' research interests are in the theory and applications of signal processing and machine learning techniques in neural engineering, biomedicine, and structural health management. He is the author of the book Polynomial Signal Processing, published by Wiley, and co-authored with Professor G. L. Sicuranza, University of Trieste, Italy. He has published more than 175 technical papers, and is the inventor on ten patents.
Mathews is a Fellow of IEEE. He was the Vice President - Finance of the IEEE Signal Processing Society during 2003-2005, and the Vice President - Conferences of the Society during 2009-2011. He is a past associate editor of the IEEE Transactions on Signal Processing, and the IEEE Signal Processing Letters, and has served on the editorial boards of the IEEE Journal of Selected Topics in Signal Processing and the IEEE Signal Processing Magazine. He is a recipient of the 2008-09 Distinguished Alumni Award from the National Institute of Technology, Tiruchirappalli, India, IEEE Utah Section's Engineer of the Year Award in 2010, and the Utah Engineers Council's Engineer of the Year Award in 2011. He was a distinguished lecturer of the IEEE Signal Processing Society for 2013 and 2014, and is the recipient of the 2014 IEEE Signal Processing Society Meritorious Service Award.

Invited Lecture

Sergio Saponara

10.00-10.40, Thursday July 8
Aula Magna

University of Pisa

ELECTRONICS AT THE CORE OF THE AUTONOMOUS, CONNECTED AND ELECTRIFIED VEHICLES REVOLUTION

ABSTRACT

The talk, based on the IEEE DL held by S. Saponara, will discuss how Electronics is the core technology for the Autonomous, Connected and Electrified Vehicles Revolution and its social, economic, and environmental impacts. The autonomous and V2X networking capabilities of vehicles pose new challenges in terms of security, safety and AI-computing. These issues can be solved by a new generation of HW accelerated circuits and systems, such those developed in the European Processor Initiative. Furthermore, the transition towards electrified vehicle is boosted by high-efficient power-drive and smart converter circuits discussed in the talk.

BIOGRAPHY

Sergio Saponara, IEEE DL, is Full Professor at University of Pisa, where he is President of the BS and MS courses in Electronic Engineering, Director of the Summer School Enabling Technologies for IoT and of the specialization course Automotive Electronics and Powertrain Electrification. Marie Curie Fellow in IMEC in 2002, in 2014 he co-founded IngeniArs srl. Co-author of 300 indexed scientific publications and 20 patents, and AE of many IEEE and SpringerNature journals, he is PI of UNIPI in several on-going projects like European Processor Initiative, The European Pilot, Textarossa, Hiefficient.

Claudio Silenzi

14.20-15.00, Thursday July 8
Aula Magna

Ferrari gestione sportiva

ELECTRONICS IN FORMULA 1

ABSTRACT

The development of electronics in Formula 1 is an activity that has several specific aspects, compared to industrial activities. Development times are extremely short, workloads are seasonal, FIA regulations impose restrictions on what is allowed to be done. The reaction times to problems must be extremely short, and the class of components is closer to aerospace than to automotive.

BIOGRAPHY

Graduated from the University of Rome "La Sapienza" in Electronic Engineering. He initially carried out various jobs in the field of software development, and then joined Magneti Marelli Autronica in Turin, where he was involved in the design of control units. After a short period in Milan in charge of Alfa Romeo motorsport, he became a control systems developer as a resident engineer at Ferrari, where he initially dealt with gearbox control and then became responsible for the software development of the entire car, and then also responsible for hardware development. He was chosen in a small group to conceive, design and build the first energy recovery system for Ferrari formula 1, which then went on track successfully for a period of six years. He is currently responsible for the development of electronics in Ferrari's motorsport department. He is a member of the steering committee of the faculty of Electronics at the University of Modena and holds courses in Advanced Automotive Electronics (AAE) at the Motorvehicle University of Emilia-Romagna (Muner).

Invited Lecture

[Nicola Blefari-Melazzi]()

10.40-11.20, Friday July 9
Aula Magna

University of Roma Tor Vergata
Director of CNIT

5G: KEY ISSUES AND EXAMPLES OF APPLICATIONS

ABSTRACT

5G is the fifth generation of the global cellular network. Together with high-capacity fixed networks, 5G will provide the connectivity needed for our country's digital transformation. With respect to previous generations, 5G continues an evolutionary path: its new radio improves performance in terms of speed, latency, terminal density and power consumption. However, the real novelty of 5G is the revolution it entails in terms of creating and facilitating new and diversified services and enabling new non-human users. Thanks also to its software network and full integration with the cloud, 5G will enable new use scenarios, with a significant impact in every sector: agriculture, commerce, defence, energy, finance, health, industry, media, public administration, safety, transport, tourism. In addition, applications' sectors will be more and more actively involved in the creation and provision of services, taking full part in the 5G value chain. These characteristics taken together will give rise to an epochal transformation, also in terms of skills required to the technicians of the sector.

To efficiently support such diverse and demanding new applications 5G introduces several innovations, while posing new issues, especially in terms of security. In this talk I will present the main high-level characteristics and innovations of 5G, some open issues and examples of applications of special interest.

BIOGRAPHY

Nicola Blefari-Melazzi is a full Professor of Telecommunications at the University of Roma Tor Vergata, where he served as Chair of the PhD program in Telecommunications Engineering, Chair of the undergraduate and graduate programs in Telecommunications Engineering and Chair of the Department of Electronic Engineering. He is currently the Director of CNIT (National Inter-University Consortium for Telecommunications, http://www.cnit.it/), a non-profit Consortium among 37 Italian Universities. More than 1,300 people, belonging to the participating universities, collaborate with CNIT, while the number of own-employees is more than 100.

His research projects have been funded by Italian Ministries, by the Italian National Research Council, by major companies (e.g., Ericsson, Telecom Italia), by the ESA and by the EU. He has participated in 31 EU projects, playing the role of project coordinator and PI for seven of them. He has been an elected member of the board of the 5G Public Private Partnership association (https://5g-ppp.eu/), a 1.4 Billion Euro initiative established to create the next generation of networks. He evaluated many research proposals and projects in EU programs and served as TPC member, TPC Chair, General Chair and Steering Committee Chair for IEEE Conferences and guest editor for IEEE Journals. He is an area editor for Elsevier's Computer Networks. He is author/co-author of about 250 papers. His research interests lie in the performance evaluation, design and control of telecommunications networks.

Electronic Systems and Applications I

14:20 – 16:20, Wednesday, July 7
Aula Magna
Chair: Riccardo Berta

14:20-14:40

Ultra Constrained Neural Networks: Training and Deployment

Edoardo Ragusa, Christian Gianoglio, Rodolfo Zunino and Paolo Gastaldo

Department of Naval, Electrical, Electronic, Telecommunications Engineering (DITEN), University of Genoa, Genoa, Italy

14:40-15:00

Project and Development of an Italian Offline Embedded Voice Assistant

Luca Lazzaroni, Francesco Bellotti, Alessandro De Gloria, and Riccardo Berta

Department of Naval, Electrical, Electronic, Telecommunications Engineering (DITEN), University of Genoa, Genoa, Italy

15:00-15:20

Microwave Sensing and Machine-Learning for Food Safety

Marco Ricci[1], Bernardita Štitić[2], Luca Urbinati[1], Giuseppe Di Guglielmo[3], Jorge A. Tobon Vasquez[1], Luca P. Carloni[3], Francesca Vipiana[1], and Mario R. Casu[1]

1 Dept. of Electronics and Telecommunications, Politecnico di Torino, Torino, Italy
2 School of Engineering, Pontificia Universidad Católica de Chile, Santiago, Chile
3 Dept. of Computer Science, Columbia University, New York, USA

15:20-15:40

Implementation of Area-Efficient Physical Unclonable Functions Based on Cellular Neural Networks

Tommaso Addabbo, Ada Fort, Riccardo Moretti, Marco Mugnaini, Hadis Takaloo, and Valerio Vignoli

Department of Information Engineering and Mathematics, University of Siena, Italy

15:40-16:00

Design and Implementation of a Graphic User Interface for IoT application

Alessio Capello, Riccardo Berta, Francesco Bellotti, and Alessandro De Gloria

Department of Naval, Electrical, Electronic, Telecommunications Engineering (DITEN), University of Genoa, Genoa, Italy

16:00-16:20

Enabling autonomous navigation on UAVs with onboard MCU based camera and TinyML

Andrea Albanese, Markus Profunser, and Davide Brunelli

Department of Industrial Engineering, University of Trento, Trento, Italy

Sensors, Microsystems and Instrumentation I

14:20 – 16:20, Wednesday, July 7
Aula 0B
Chair: Nunzio Cennamo

14:20-14:40

The ORION Chipset for the X-γ Imaging Spectrometer onboard of the THESEUS Space Mission

Filippo Mele[1], Irisa Dedolli[1], Giuseppe Bertuccio[1], Massimo Gandola[12], Marco Grassi[1], Piero Malcovati[3], Riccardo Campana[4], Fabio Fuschino[4], Claudio Labanti[3], and Mauro Fiorini[4]

1 Dip. di Elettronica Informazione e Bioingegneria, Politecnico di Milano, Como, Italy,
2 Fondazione Bruno Kessler, Trento, Italy,
3 Univ. degli Studi di Pavia, Pavia, Italy,
4 Istituto Nazionale di Astrofisica (INAF), Bologna, Italy,
5 INAF, Milan, Italy

14:40-15:00

SEIRA Sensor for Multiwavelength DNA detection

Valentina Di Meo[1], Massimo Moccia[2], Gennaro Sanità[13], Alessio Crescitelli[1], Annalisa Lamberti[3], Vincenzo Galdi[2], Ivo Rendina[1] and Emanuela Esposito[1]

1 Institute of Applied Sciences and Intelligent Systems Unit of Naples, National Research Council, Naples, Italy,
2 Fields & Waves Lab, Department of Engineering, University of Sannio, Benevento, Italy,
3 Department of Molecular Medicine and Medical Biotechnology, University of Naples Federico II, Naples, Italy

15:00-15:20

Noise Reduction and Data Fusion in a Redundant System of MEMS Inclinometers

Alessandro Nastro[1], Marco Ferrari[1], Camilla Irine Mura[2], Andrea Labombarda[2], Marco Viti[2], Sandro Dalle Feste[2], and Vittorio Ferrari[1]

1 Department of Information Engineering, University of Brescia, Brescia, Italy
2 STMicroelectronics, Milan, Italy

15:20-15:40

Sensitivity, Selectivity and Chemical Noise Models for ion-sensitive FETs

Leandro Julian Mele[1], Pierpaolo Palestri[1] and Luca Selmi[2]

1 DPIA, University of Udine, Udine, Italy
2 DIEF, University of Modena and Reggio Emilia, Modena, Italy

15:40-16:00

16 × 16 SPAD array with sub-ns gating and 75 ps timing jitter for non-line-of-sight imaging

Simone Riccardo, Enrico Conca, Vincenzo Sesta, Mauro Buttafava, and Alberto Tosi

Dip. di Elettronica, Informazione e Bioingegneria, Politecnico di Milano, Milano, Italy

16:00-16:20

Vibration Monitoring at the Extreme Edge via Frequency Domain Decompositions

Federica Zonzini[1], Francesca Romano[1], Antonio Carbone[1], Matteo Zauli[1], and Luca De Marchi[12]

1 Advanced Research Center on Electronic Systems, University of Bologna, Bologna, Italy
2 DEI Department, University of Bologna, Bologna, Italy

Electronic Systems and Applications II

17:20-17:40

Flexible Real-Time Ultrasound Open Platform with an Arbitrary Number of Independent Channels

Daniele Mazierli, Alessandro Ramalli, Enrico Boni, Francesco Guidi, and Piero Tortoli

Department of Information Engineering, University of Florence, Firenze, Italy

17:40-18:00

Merged M-PSK Carrier and Timing Recovery

Daniele Giardino[1], Gian Carlo Cardarilli[1], Luca Di Nunzio[1], Rocco Fazzolari[1], Alberto Nannarelli[2], Marco Re[1], and Sergio Spanò[1]

1 Department of Electronic Engineering, University of Rome "Tor Vergata", Rome, Italy
2 Department of Applied Mathematics and Computer Science, Danmarks Tekniske Universitet, 2800 Kgs. Lyngby, Denmark

18:00-18:20

Electrochemical Impedance Spectroscopy Estimation Method Robust towards Nonlinearities

Simone Orcioni[1], Massimo Conti[1], Chiara Giosuè[2] and Alberto Carini[3]

1 Dipartimento di Ingegneria dell'Informazione, Università Politecnica delle Marche, Ancona,
2 Dipartimento di Scienze e Ingegneria della Materia, dell'Ambiente ed Urbanistica, Università Politecnica delle Marche, Ancona,
3 Dipartimento di Ingegneria e Architettura, Università degli Studi di Trieste, Trieste

18:20-18:40

A New Class of Digital Circuits for the Design of Entropy Sources in Programmable Logic

Tommaso Addabbo, Ada Fort, Riccardo Moretti, Marco Mugnaini, Hadis Takaloo, and Valerio Vignoli

Department of Information Engineering and Mathematics, University of Siena, Italy

Power Electronics

17:20 – 18:40, Wednesday, July 7
Aula 0B
Chair: Giorgio Spiazzi

17:20-17:40

Gate Driver for p-GaN HEMTs with Real-Time Monitoring Capability of Channel Temperature

Alessandro Borghese, Michele Riccio, Luca Maresca, Giovanni Breglio, and Andrea Irace

Department of Electrical Engineering and Information Technologies, University of Naples Federico II, Naples, Italy

17:40-18:00

Investigations on Operating Condition Variations in Open-Loop Active Gate Drivers

Erica Raviola, Matteo Vincenzo Quitadamo, and Franco Fiori

Electronics and Telecom. Dpt. (DET), Politecnico di Torino, Turin, Italy

18:00-18:20

Input Admittance Passivity Enhancement of Grid-Connected Inverters Using Multisampled Control

Ivan Z. Petric[1], Paolo Mattavelli[2], Simone Buso[1], and Tommaso Caldognetto[2]

1 Dept. of Information Engineering (DEI), University of Padova, Padova, Italy
2 Dept. of Management and Engineering (DTG), University of Padova, Vicenza, Italy

18:20-18:40

Conduction Loss Reduction of Isolated Bidirectional DC-DC Triple Active Bridge

Ahmed A. Ibrahim, Tommaso Caldognetto, Paolo Mattavelli

Dept. of Management and Engineering (DTG), University of Padova, Vicenza, Italy

Optoelectronics And Photonics I

08:40 – 10:00, Thursday, July 8
Aula Magna
Chair: Luigi Zeni

08:40-09:00

Optical Properties of MAPbI3 through the Tetragonal-Orthorhombic Phase Transition

Alessia Di Vit[1]o, Alessandro Pecchia[2], Matthias Auf der Maur[1], and Aldo Di Carlo[13]

1 Department of Electronics Engineering, University of Rome Tor Vergata, Rome, Italy,
2 CNR ISMN, Monterotondo (Rome), Italy,
3 CNR ISM, Rome, Italy

09:00-09:20

Bias Effects on the Electro-Optic Response of Ge-on-Si Waveguide Photodetectors

Matteo G. C. Alasio[1], Marco Vallone[1], Alberto Tibaldi[12], Francesco Bertazzi[12], Soha Namnabat[3], Donald Adams[3], Prakash Gothoskar[3], Fabrizio Forghieri[3], Giovanni Ghione[1], Michele Goano[12]

1 Dipartimento di Elettronica e Telecomunicazioni, Politecnico di Torino, Torino, Italy
2 IEIIT-CNR, Torino, Italy,
3 Cisco Systems, Allentown, PA 18195, USA

09:20-09:40

InGaAs/InP SPAD with 1 kcps Dark Count Rate and 25% Detection Efficiency for Quantum Applications

Fabio Signorelli[1], Fabio Telesca[1], Adriano Della Frera[2], Alessandro Ruggeri[2], Andrea Giudice[2], and Alberto Tosi[1]

1 Dipartimento di Elettronica, Informazione e Bioingegneria, Politecnico di Milano, Milano, Italy.

2 Micro Photon Devices Srl, Bolzano, Italy

09:40-10:00

Numerical Analysis and Fabrication Process Flow of a Tunable Phase Shifter Based on Liquid Crystals and Polymeric Slot Waveguide

Badrul Alam, Flavio Cornaggia, Antonio d'Alessandro, and Rita Asquini

Dept. of Information Engineering, Electronics and Telecommunications,
Sapienza University of Rome, Rome, Italy

Electronic Systems and Applications III

08:40-09:00

Towards Personalized Agriculture by In-Vivo Plant Stem Electrical Impedance Measurement

Paolo Motto Ros, Umberto Garlando, Stefano Calvo, Alessandro Sanginario, and Danilo Demarchi

Dipartimento di Elettronica e Telecomunicazioni, Politecnico di Torino, Turin, Italy

09:00-09:20

Vital Control Module PCB for On-Board Equipment in Autonomous Train Operations

Giovanni Mezzina[1], Alessandro Di Benedetto[1], Cataldo Luciano Saragaglia[1], Giuseppe Narracci[1], Daniela De Venuto[1], Salvatore De Simone[2], and Diana Serra[2]

1 Department of Electrical and Information Engineering, Politecnico di Bari, Italy
2 Rete Ferroviaria Italiana SpA, Ricerca e Sviluppo – Sviluppo Sistemi, Afragola (Naples), Italy

09:20-09:40

A P300-based m-Health System for Neurocognitive Impairment Progress Assessment

Giovanni Mezzina and Daniela De Venuto

Department of Electrical and Information Engineering, Politecnico di Bari, Italy

09:40-10:00

Fault Resilience Analysis of an Interleaved Multi-Threading RISC-V Processor Core

Marcello Barbirotta, Abdallah Cheikh, Antonio Mastrandrea, Francesco Menichelli, and Mauro Olivieri

Sapienza University of Rome, Italy

Sensors, Microsystems and Instrumentation II

11:00 – 13:00, Thursday, July 8
Aula Magna
Chair: Nunzio Cennamo

11:00-11:20

Design and Experimental Measurements of a Plastic 3D-Printed Waveguide Antenna for Shallow Object Microwave Imaging

Luca Bossi, Pierluigi Falorni, and Lorenzo Capineri

Department of Information Engineering, Università degli Studi di Firenze, Firenze, Italy

11:20-11:40

Front-End Electronics for Single X-ray Pulse Detection in Radiation Dosimetry

Sara Pettinato[12], Marco Girolami[2], Riccardo Olivieri[3], and Stefano Salvatori[12]

1 Faculty of Engineering, Università degli Studi "Niccolò Cusano", Rome, Italy,
2 Istituto di Struttura della Materia, Consiglio Nazionale delle Ricerche, Rome, Italy,
3 U.o.s.d. Clinical Risk Management San Giovanni Addolorata Hospital, Rome, Italy

11:40-12:00

Colloidal Quantum Dots- Based Sensors for Explosive Detection

Federica Mitri[1], Andrea de Iacovo[1], Serena de Santis[1], Carlo Giansante[2], Davide Spirito[3], Giovanni Sotgiu[1], and Lorenzo Colace[1]

1 Department of Engineering, University Roma Tre, Rome, Italy
2 CNR Nanotec, Lecce, Italy,
3 IHP Leibniz Institut für innovative Mikroelektronik, Frankfurt, Germany

12:00-12:20

Amorphous Silicon Based Biosensor For Milk's Fat Detection
Alessio Buzzin, Rita Asquini, Domenico Caputo, and Giampiero de Cesare

Dept. of Information Engineering, Electronics and Telecommunications, Sapienza University of Rome, Rome, Italy

12:20-12:40

Mixed-Signal Electronics for Closed-Loop Control of Complex Photonic Circuits

Francesco Zanetto, Vittorio Grimaldi, Fabio Toso, Alessandro Perino, Giorgio Ferrari and Marco Sampietro

Dipartimento di Elettronica, Informazione e Bioingegneria, Politecnico di Milano, Milano, Italy

12:40-13:00

Portable Lab-on-Chip System Suitable for Fluorescence Detection

Nicola Lovecchio[1], Giampiero de Cesare[2], Augusto Nascetti[2], Lorenzo Iannascoli[1], and Domenico Caputo[1]

1 Department of Information Engineering, Electronic and Telecommunications, Sapienza University of Rome, Rome, Italy
2 School of Aerospace Engineering, Sapienza University of Rome, Rome, Italy

Microwave Electronics

11:00-11:20

A 28-30 GHz Receiver Front-End for High Data Rate Cubesat Applications

Valentina Palazzi[1], Guendalina Simoncini[1], Giordano Cicioni[1], Raffaele Salvati[1], Luca Roselli[1], Paolo Mezzanotte[1], Federico Dogo[2], Mario Fragiacomo[2], Anna Gregorio[2,3], Federico Alimenti[1]

1 Department of Engineering, University of Perugia, Perugia, Italy
2 Picosats s.r.l., Padriciano, Area Science Park, Trieste, Italy
3 Department of Physics, University of Trieste, Trieste, Italy

11:20-11:40

Microwave and mm-Wave Radars: Enabling Advanced and Intelligent Sensing

Emanuele Cardillo[1], Changzhi Li[2], and Alina Caddemi[1]

1 Department of Engineering, University of Messina, Messina, Italy
2 Department of Electrical and Computer Engineering, Texas Tech University, Lubbock, TX, USA

11:40-12:00

Recent Advancements in Gan Technologies for Millimetre Wave Applications

Sergio Colangeli, Paolo Colantonio, Walter Ciccognani, Franco Di Paolo, Rocco Giofrè, Patrick E. Longhi and Ernesto Limiti

MIMEG, Electronic Engineering Dept., University of Rome Tor Vergata, Rome, Italy

12:00-12:20

Development of Digital and Analog Functionalities for an X-band GaAs Core-Chip with Ultra-Low-Power 18-bit Serial-to-Parallel Interface

Chiara Ramella[1,3], Patrick Longhi[2,3], Lorenzo Pace[2,3], Abbas Nasri[1,3], Motahhareh Estebsari[1,3], Walter Ciccognani[2,3], Marco Pirola[1,3], and Ernesto Limiti[2,3]

1 DET, Politecnico di Torino, Torino, Italy
2 DIE, Università di Roma Tor Vergata, Roma, Italy
3 Microwave Engineering Center for Space Applications (MECSA), Roma, Italy

12:20-12:40

Efficient Large-Signal Thermal TCAD of a FinFET Small-Power Class A PA

Eva Catoggio, Simona Donati Guerrieri, Fabrizio Bonani, and Giovanni Ghione

Department of Electronics and Telecommunications, Politecnico di Torino, Torino, Italy

12:40-13:00

Low-Frequency Time-Domain Measurements for Assessing Transistor Degradation

Gianni Bosi[1], Valeria Vadalà[2], Rocco Giofrè[2], Antonio Raffo[1], and Giorgio Vannini[1]

1 Department of Engineering, University of Ferrara, Ferrara, Italy
2 E.E. Department, University of Rome, Tor Vergata, Rome, Italy

Optoelectronics And Photonics II

15:00 – 16:20, Thursday, July 8
Aula Magna
Chair: Luigi Zeni

15:00-15:20

Distributed Acoustic Sensing for Automatic Traffic Counting and Classification

Ester Catalano, Agnese Coscetta, Enis Cerri, Luigi Zeni and Aldo Minardo

Department of Engineering, Università della Campania "Luigi Vanvitelli", Aversa, Italy

15:20-15:40

Seismic and Acoustic Hydrophones for Underwater Monitoring: the OPTIMA Project

Francesco Antonio Bruno[12], Mohammed Janneh[1], Marco Pisco[12], Gregortz Gruca[3], Stefan Werzinger[3,] Niek Rijnveld[3], Fabio Peluso[4], Giuseppe De Pasquale[4], Sergio Guardato[5], Gianpaolo Donnarumma[5], Giovanni Iannaccone[5], Antonello Cutolo[2], and Andrea Cusano[12]

1 Optoelectronic Division - Department of Engineering, University of Sannio, Benevento, Italy,
2 CeRICT scrl- Optoelectronics &Photonics Center, Benevento, Italy,
3 OPTICS11 B.V., De Boelelaan, HV Amsterdam, The Netherlands,
4 Leonardo Global Solutions Spa, Pozzuoli, Italy,
5 Istituto Nazionale di Geofisica e Vulcanologia, Osservatorio-Vesuviano (INGV- OV), Napoli, Italy.

15:40-16:00

3D-Printed Patches Embedding FBGs for Deformation Monitoring

Pasquale Di Palma, Agostino Iadicicco, and Stefania Campopiano

Department of Engineering, University of Naples "Parthenope", Naples, Italy

16:00-16:20

Light Extraction and Optical Crosstalk in Nano- and MicroLED Arrays

Katarzyna Kluczyk-Korch[1], Alessia Di Vito[2], and Matthias Auf der Maur[2]

1 Department of Physics, University of Warsaw, Poland
2 Department of Electronic Engineering, University of Rome Tor Vergata, Rome, Italy

Micro- and Nano-Electronic Devices

15:00 – 15:40, Thursday, July 8
Aula 0B
Chair: Fernanda Irrera

15:00-15:20 **Ferroelectric Based CMOS Devices for Energy Efficient Neuromorphic Computing**

Riccardo Fontanini, Mattia Segatto, Daniel Lizzit, Francesco Driussi, and David Esseni

Università degli Studi di Udine, Udine, Italy

15:20-15:40 **Large-Scale CMOS-Compatible Process for Silicon Nanowires Growth and Si-BC8 Formation**

Ivan Mazzetta, Fernanda Irrera, and Fabrizio Palma

DIET, Sapienza University of Rome, Rome, Italy

Integrated Circuits and Systems I

15:40-16:00 **Arbitrary Sampling Rate Selection in Digital Storage Oscilloscopes with Multichannel Architectures**

Ettore Napoli, Efstratios Zacharelos, Mauro D'arco and Antonio G.M. Strollo

Department of Electrical Engineering and Information Technology, University of Napoli Federico II, Napoli, Italy

16:00-16:20 **A 6.25 GHz Rad-Hard Phase-Locked Loop for the new SpaceFibre Standard**

Marco Mestice, Bruno Neri and Sergio Saponara

Department of Information Engineering, University of Pisa, Pisa, Italy

Optoelectronics And Photonics III

16:40 – 18:40, Thursday, July 8
Aula Magna
Chair: Luigi Zeni

16:40-17:00

Plasmonic Sensors Based on Gold Nanogratings for Biochemical Sensing Applications

Francesco Arcadio[1], Luigi Zeni[1], Girolamo D'Agostino[2], Chiara Perri[1], Guido Chiaretti[2], Giovanni Porto[2], and Nunzio Cennamo[1]

1 Department of Engineering, University of Campania Luigi Vanvitelli, Aversa, Italy
2 Moresense srl, Milan, Italy

17:00-17:20

SARS-CoV-2 Sensor Based on a Plasmonic POF Probe Combined with an MIP Receptor

Nunzio Cennamo[1], Girolamo D'Agostino[2], Francesco Arcadio[1], Chiara Perri[1], Guido Chiaretti[2], Giovanni Porto[2], Eva Maria Parisio[3], Giulio Camarlinghi[3], Chiara Vettori[3], Francesco Di Marzo[4], Rosario Cennamo[4], and Luigi Zeni[1]

1 Department of Engineering, University of Campania Luigi Vanvitelli, Aversa, Italy
2 Moresense srl, Milan, Italy
3 San Luca Hospital, Usl Toscana Nord Ovest, Lucca, Italy
4 Ospedale Valtiberina, Usl Toscana Sud-Est, Sansepolcro, Italy

17:20-17:40

A Lab-on-Fiber Platform for Light-Triggered Locoregional Drug Delivery and Cancer Treatment

Gaia Maria Berruti[1], Tania Mariastella Caputo[12], Anna Aliberti[1], Giuseppe Quero[1], Patrizio Vaiano[1], Alessandra Boniello[2], Sofia Principe[2], Angela Maria Cusano[2], Giovanni Vito Persiano[1], Marco Consales[1], and Andrea Cusano[12]

1 Engineering Department, University of Sannio, Benevento, Italy
2 Centro Regionale Information Communication Technology - CeRICT scrl, Benevento, Italy

17:40-18:00

Cancer Biomarker Detection Using Highly Sensitive Metasurface-Enhanced Lab-On-Fiber Biosensors

Patrizio Vaiano[1], Giorgia Celetti[1], Sara Assunta Ucci[2], Paola Cicatiello[2], Sara Spaziani[2], Angela Maria Cusano[2], Giuseppe Quero[1], Alberto Micco[2], Maria Principe[1], Giovanni Vito Persiano[1], Marco Consales[12], and Andrea Cusano[12]

1 Optoelectronic Division – Department of Engineering, University of Sannio, Benevento, Italy
2 Centro Regionale Information Communication Technology – CeRICT, Benevento, Italy

18:00-18:20

Long Period Fiber Grating Functionalized with Graphene Oxide for Biosensing Applications

Flavio Esposito, Anubhav Srivastava, Stefania Campopiano, and Agostino Iadicicco

Department of Engineering, University of Naples "Parthenope", Napoli, Italy

18:20-18:40

Colour-Sensitive Conjugated Polymer Inkjet-Printed Pixelated Artificial Retina Model Studied via a Bio-hybrid Photovoltaic Device

Manuela Ciocca[12], Pavlos Giannakou[2], Paolo Mariani[1], Lucio Cinà[3], Aldo Di Carlo[41], Mehmet O. Tas[2], Hiroki Asari[5], Serena Marcozzi[6], Antonella Camaioni[6], Maxim Shkunov[2], Thomas M. Brown[1]

1 Department of Electronic Engineering, University of Rome Tor Vergata, Rome, Italy
2 Advanced Technology Institute, Department of Electrical and Electronic Engineering, Faculty of Engineering and Physical Sciences, University of Surrey, Guildford, UK
3 Cicci Research srl., Grosseto, Italy
4 Istituto di Struttura della Materia, CNR-ISM, Roma, Italy
5 European Molecular Biology Laboratory, Epigenetics and Neurobiology Unit, Monterotondo, Italy
6 Department of Biomedicine and Prevention, University of Rome Tor Vergata, Rome, Italy

Integrated Circuits and Systems II

16:40 – 18:40, Thursday, July 8
Aula 0B
Chair: Carlo Samori

16:40-17:00

Energy-Efficient Smart Implication Logic-in- Memory Computing with STT-MTJ

Raffaele De Rose[1], Tommaso Zanotti[2], Francesco Maria Puglisi[2], Felice Crupi[1], Paolo Pavan[2] and Marco Lanuzza[1]

1 DIMES, University of Calabria, Rende, Italy
2 DIEF, University of Modena and Reggio Emilia, Modena, Italy

17:00-17:20

Device-Circuit Co-Design of Logic-in-Memory Circuits Using a Physics-Based Compact Model

Tommaso Zanotti, Francesco Maria Puglisi and Paolo Pavan

DIEF, Università degli studi di Modena e Reggio Emilia, Modena (MO), Italy

17:20-17:40

A Gated Oscillator Clock and Data Recovery Circuit for Nanowatt Wake-Up and Data Receivers

Matteo D'Addato[12], Alessia Maria Elgani[12], Luca Perilli[2], Eleonora Franchi[12], Antonio Gnudi[12], Roberto Canegallo[3], and Giulio Ricotti[3]
1 Electrical, Electronic and Information Engineering Department "Guglielmo Marconi", University of Bologna, Bologna, Italy,
2 Advanced Research Center on Electronic Systems "Ercole De Castro", University of Bologna, Bologna, Italy,
3 STMicroelectronics, Agrate Brianza and Cornaredo, Italy

17:40-18:00

MIRA: a Low-Noise Pixelated ASIC for Micro-Channel Plate Readout

Edoardo Fabbrica[12], Marco Carminati[12], and Carlo Fiorini[12]

1 Dipartimento di Elettronica, Informazione e Bioingegneria, Politecnico di Milano, Milano, Italy
2 Istituto Nazionale di Fisica Nucleare (INFN), Sezione di Milano, Milano, Italy

18:00-18:20

Vega: A 10-Core SoC for IoT End-Nodes with Heterogeneous DNN Acceleration and MRAM-Based On-Chip Parameter Storage

Francesco Conti[1], Davide Rossi[1], Giuseppe Tagliavini[2], and Luca Benini[13]

1 Dipartimento di Ingegneria dell'Energia Elettrica e dell'Informazione, Università di Bologna, Bologna, Italy
2 Dipartimento di Informatica – Scienze e Ingegneria, Università di Bologna, Bologna, Italy
3 Integrated Systems Laboratory, ETH Zurich, Zurich, Switzerland

18:20-18:40

Customizable Vector Acceleration in a RISC-V Microprocessor Family

Abdallah Cheikh, Stefano Sordillo, Antonio Mastrandrea, Francesco Menichelli, and Mauro Olivieri

Sapienza University of Rome, Italy

08:40 – 10:20, Friday, July 9
Aula Magna
Chair: Enrico Sangiorgi

08:40-08:50

ECSEL Italy presentation

Livio Baldi

ECSEL-IT Coordinator

The ECSEL Mirror Group Italy has been established in Italy at the end of 2015, with the purpose to support the Italian participation in the ECSEL Joint Undertaking. It involves the Italian government through the Ministries of Research and University (MIUR) and of Economic Development (MISE), the Regions, the Large Enterprise, the SMEs, the ANIE Federation and AEIT-AMES.

08:50-09:10

ECSEL SRIA

Paolo Azzoni

EUROTECH S.p.A.

Since 2017, the three ECSEL Private Partners AENEAS, ARTEMIS-IA and EPoSS have combined their SRAs into one common ECS-SRA. This year 15 section teams with 53 section leaders and co-leaders and nearly 300 contributors have created this major update: the Strategic Research and Innovation Agenda (SRIA) 2021.

09:10-09:30

5E Roadmap e Digital Showcase

Serena Zerbinati

MESAP

MESAP (Meccatronica e Sistemi Avanzati di Produzione) is a Turin based association aimed to promote and favour collaborative projects among Industries, Universities and Research Centers.

09:30-09:50

The new KDT JU

Enrico Macii

Politecnico di Torino

In 2021 the 7-years old JU ECSEL will come to an end. Work is in progress to guarantee a seamless transition to the new JU KDT (Key Digital technologies).

09:50-10:10

Horizon Europe for Electronics

Henri Rajbenbach

European Commission

The EU-Officer Henri Rajbenbach will illustrate the highlights of the new Horizon Europe and the opportunities for the Electronics community.

10:10-10:20

APRE support for Horizon Europe

Marta Calderaro

APRE

APRE – Agenzia per la Promozione della Ricerca Europea - aims to sustain and facilitate the Italian participation to the Reasearch and Innovation Programs (R&I) of the EU, through a

variety of services.

Industry Presentations

11:20-11:40

Analog Devices Graduate Program: a unique early career path

Alessia Ruggieri

Analog Devices

New College Graduates (NCGs) are struggling to find their footing in the job market and sometimes they are facing a real uphill battle.
Analog Devices presents an innovative early career path expressly designed for NCGs joining the industry word: the ADI's Graduate Program. This period consists of a unique opportunity to learn and grow in an industry-leading company that offers cutting edge technology, within a multicultural and global environment. Where employers are empowered to Act with Courage, to Build great teams, to Create the future, and to Drive for Excellence.

11:40-12:00

ECG/EEG signals acquisition, a study case

Livio Tenze

ESTECO

There is an increasing interest in the processing and acquisition of neural stimulus. Recently many companies have started internal projects in order to create control environments driven by neural signals.
In this project we have developed a complete acquisition system, its main purpose was to acquire the neural signals, filter them, display and store.
The system is based on the Texas Instruments ADS1299 integrated circuit, which is able to simultaneously acquire up to 8 EEG/ECG channels: the mentioned IC provides a scalable solution with the possibility to leverage on a daisy chain connection (so the number of acquired channels can be a multiple of 8).
The developed board is driven by a commercial Raspberry ARM based computer, capable of managing the SPI connection to the IC, to acquire data and send it via the Ethernet interface.
The sent data was then handled by a C++ program providing a graphical Qt based solution running on a remote computer: the graphical interface is able to process data in real-time (notch filtering, LP filtering and so on) in order to make signals clear and understandable for the end-users.

IEEE Fellow Lectures

12:20 – 12:50, Friday, July 9
Aula Magna
Chair: Giovanni Ghione

In-memory computing: status and outlook

Daniele Ielmini

Politecnico di Milano, Milano, Italy

Digital computing is reaching its ultimate limits: device scaling becomes every year more difficult and more expensive, while the energy consumed in data centers every year worldwide increases tremendously due to pervasive data sharing and processing. In-memory computing offers the opportunity to significantly improve the energy efficiency of computation by processing the data in situ, thus eliminating the memory bottleneck of von Neumann architectures. In this talk I will provide an overview of recent advances of in-memory computing along three major research lines: in-memory accelerator of deep neural networks (DNNs), brain-inspired neuromorphic computing and linear algebra accelerators. The most popular IMC architectures, such as matrix-vector multiplication (MVM) with resistive switching memory (RRAM) and closed-loop circuits for solving matrix problems, will be shown. I will present recent case studies and discuss the major challenges in terms of memory device precision, scaling and 3D integration.

Off-line Video Presentations

Area 1: Integrated Circuits and Systems

1.1 **Programming Algorithm of Phase Change Memory Cells for Analog In-Memory Computing**
Alessio Antolini[1], Eleonora Franchi Scarselli[1], Antonio Gnudi[1], Andrea Lico[1], Marcella Carissimi[2], Marco Pasotti[2], Paolo Romele[2] and Roberto Canegallo[2]
1 ARCES DEI, University of Bologna, Italy,
2 STMicroelectronics, Agrate Brianza, Italy

1.2 **Radiation-Hard Integrated Circuits for RF High-speed Aerospace and High Energy Physics Applications**
Gabriele Ciarpi[2], Danilo Monda[1], Simone Cammarata[1], Marco Mestice[1], Guido Magazzù[2], Fabrizio Palla[2], Daniele Rossi[1], Bruno Neri[1] and Sergio Saponara[1]
1 Università di Pisa, Dipartimento di Ingegneria dell'Informazione, Pisa, Italy
2 Istituto Nazionale di Fisica Nucleare, Sezione di Pisa, Pisa, Italy

1.3 **Reconfigurable Datapath for Hardware Acceleration of Convolutional Neural Network**
Marco Vitone, Nicola Petra
Department of Electrical Eng. and Information Tech., University of Naples Federico II, Naples, Italy

Area 2: Micro- and Nano-Electronic Devices

2.1 **Analysis of Counterfeit Electronics**
Giovanna Mura, Giovanni Martines, and Roberto Murru
Department of Electrical and Electronic Engineering, University of Cagliari, Cagliari, Italy

2.2 **Common Source and Word Line Electrodes Effect on ESF3 Memory Program Operation**
Ivan Mazzetta and Fernanda Irrera
DIET, Sapienza University of Rome, Rome, Italy

Area 3: Microwave Electronics

3.1 **Integrated Avalanche Noise Sources for Milllimeter-Wave On-Chip Noise Measurements**
Guendalina Simoncini[1], Gianluca Brozzetti[2], Daniele Dal Maistro[2], and Federico Alimenti[1]
1 Department of Engineering, University of Perugia, Perugia, Italy
2 Infineon Technologies Austria, Villach, Austria

3.2 **Development of GaN/Si Power Amplifiers for Space Applications at Millimeter-wave**
Chiara Ramella[14], Corrado Florian[24], Marco Pirola[14], and Paolo Colantonio[34]
1 DET, Politecnico di Torino, Torino, Italy
2 DEI, Università di Bologna, Bologna, Italy
3 EED, Università di Roma Tor Vergata, Roma, Italy
4 Microwave Engineering Center for Space Applications (MECSA), Roma, Italy

3.3 **Diamond Devices for Microwave Systems**
Walter Ciccognani, Sergio Colangeli, Patrick E. Longhi, and Ernesto Limiti
Electronic Engineering Department, University of Roma Tor Vergata, Rome, Italy

Off-line Video Presentations

Area 4: Sensors, Microsystems and Instrumentation

4.1 **Simple, Power Efficient Interface for AC-Excited Differential Capacitive Sensors**
Emiliano Sisinni[1], Alessandro Depari[1], Paolo Ferrari[1], Alessandra Flammini[1], Stefano Rinaldi[1], Gianluca Barile[2], Giuseppe Ferri[2], and Vincenzo Stornelli[2]
1 Department of Information Engineering, University of Brescia, Brescia, Italy
2 Dept. Industrial and Information Engineering & Economics, University of L'Aquila, L'Aquila, Italy

4.2 **Diagnostic Analytics for Pixelated Particle Detectors: A Case Study**
Werner Oswaldo Florian Samayoa[123], Luis Guillermo Garcia Ordonez[123], Romina Molina[123], Bruno Valinoti[123], Maria Liz Crespo[13], Sergio Carrato[2], Giovanni Ramponi[2], Andres Cicuttin[13], and Stefano Levorato[3]
1 Multidisciplinary Laboratory, ICTP, Trieste, Italy
2 Department of Engineering and Architecture, Università degli Studi di Trieste, Trieste, Italy
3 Trieste Section, INFN, Trieste, Italy

4.3 **Towards a Modular 8 Channels TDC Design for Coincidence Measurements**
Marco Cautero[1], Sergio Carrato[1], Gabriele Brajnik[12], Giuseppe Cautero[12], Rudi Sergo[2], Luigi Stebel[2], Fabio Garzetti[3], Nicola Corna[3], Nicola Lusardi[3], Andrea Costa[3], Enrico Ronconi[3], Simone Salgaro[3], and Angelo Geraci[3]
1 DIA, University of Trieste, Trieste, Italy
2 Elettra Sincrotrone Trieste, Trieste, Italy
3 DEIB, Politecnico di Milano, Milano, Italy

4.4 **Dual Pyroelectric Sensor for Cell Line Characterization**
Salvatore Andrea Pullano[1], Marta Greco[1], Daniela P. Foti[2], Antonio Brunetti[1], and Antonino S. Fiorillo[1]
1 Department of Health Sciences, Magna Græcia University, Catanzaro, Italy
2 Department of Clinical and Experimental Medicine, Magna Græcia University, Catanzaro, Italy

4.5 **DCR and Crosstalk Characterization of Single and Dual-Tier CMOS SPAD Arrays**
Joana Minga[12] and Gianmarco Torilla[12]
1 Dipartimento di Ingegneria Industriale e dell'Informazione, Università di Pavia, Pavia, Italy
2 INFN, Pavia, Italy

4.6 **SPAD-Based CMOS Flash Lidar with Pulse-Coding Technique**
Alessandro Tontini[1], Roberto Passerone[2], and Matteo Perenzoni[1]
1 Sensor and Devices, Fondazione Bruno Kessler, Trento, Italy
2 Department of Information Engineering and Computer Science, University of Trento, Trento, Italy

4.7 **Acoustic Emission Sensor Node for Long-Term Monitoring**
Michelangelo Maria Malatesta[1], Denis Bogomolov[1], Federica Zonzini[1], Matteo Zauli[1], Nicola Testoni[1], Alessandro Marzani[3] and Luca De Marchi[1]
1 ARCES, University of Bologna, Bologna, Italy
2 DEI, University of Bologna, Bologna, Italy
3 DICAM, University of Bologna, Bologna, Italy

4.8 **Sensor/Actuator-based Wireless and Wearable System for Active Hand Pose Sensing**
Alfiero Leoni[1], Davide Colaiuda[1], Vincenzo Stornelli[1], Vito Errico[2], Angela Scioscia Santoro[2], and Giovanni Saggio[2]
1 Department of Industrial and Information Engineering and Economics, University of L'Aquila
2 Department of Electronic Engineering, University of Tor Vergata Rome

4.9 **Objective Assessment of Walking Impairments in Myotonic Dystrophy by Means of a Wearable Technology and a Novel Severity Index**
Giovanni Saggio[1], Alessandro Manoni[2], Vito Errico[1], Erica Frezza[3], Ivan Mazzetta[2], Rosario Rota[2], Roberto Massa[3], and Fernanda Irrera[2]
1 Department of Electronic Engineering, University Tor Vergata, Rome, Italy
2 Department of Information Engineering, Electronics and Telecommunication, Sapienza University of Rome, Italy
3 Department of Systems Medicine, Section Neurology, Tor Vergata University of Rome, Rome, Italy

Off-line Video Presentations

4.10 **Contactless Readout of Piezoelectric MEMS Resonator Sensors Through Time-Gated Technique**
Marco Baù[1], Marco Ferrari[1], Habiba Begum[23], Abid Ali[23], Joshua E.-Y. Lee[23], and Vittorio Ferrari[1]
1 Dept. of Information Engineering, University of Brescia, Brescia, Italy
2 Dept. of Electrical Engineering, City University of Hong Kong, Kowloon, Hong Kong
3 State Key Laboratory of Terahertz and Millimeter Waves, City University of Hong Kong, Kowloon, Hong Kong

Area 5: Optoelectronics and Photonics

5.1 **Optical Fiber Sensor for Uranium Detection in Water**
Nunzio Cennamo[1], Maria Pesavento[2], Daniele Merli, Antonella Profumo[2], Letizia De Maria[3], Francesco Arcadio[1], and Luigi Zeni[1]
1 Department of Engineering, University of Campania Luigi Vanvitelli, Aversa, Italy
2 Department of Chemistry, University of Pavia, Pavia, Italy
3 RSE S.p.A., Technologies for Transmission & Distribution Department, Milan, Italy

5.2 **Comparing Oxide-Confined and Buried Tunnel Junction VCSEL performance**
Alberto Gullino[1], Simone Pecora[1], Alberto Tibaldi[12], Francesco Bertazzi[12], Michele Goano[12], and Pierluigi Debernardi[2]
1 Dipartimento di Elettronica e Telecomunicazioni, Politecnico di Torino, Torino, Italy
2 CNR-IEIIT, Torino, Italy

5.3 **Distributed Acoustic Sensing for Liquid Detection**
Agnese Coscetta, Ester Catalano, Enis Cerri, Luigi Zeni, and Aldo Minardo
Department of Engineering, Università della Campania "Luigi Vanvitelli", Aversa, Italy

5.4 **Integrated Optoelectronics on Fiber**
Armando Ricciardi[1], Michael Zimmer[2], Norbert Witz[2], Alberto Micco[1], Mathias Kaschel[3], Joachim Burghartz[3], Michael Jetter[2], Peter Michler[2], Andrea Cusano[1], and Simone Luca Portalupi[2]
1 Department of Engineering, University of Sannio, University of Sannio, Benevento, Italy
2 Institut für Halbleiteroptik und Funktionelle Grenzflächen, Center for Integrated Quantum Science and Technology (IQ[ST]) and SCoPE, University of Stuttgart, Stuttgart, Germany

5.5 **Thermo-plasmonics Lab-on-Fiber Optrodes**
Sofia Principe[1], Martino Giaquinto[1], Alberto Micco[1], Maria Alessandra Cutolo[1], Michele Riccio[2], Giovanni Breglio[2], Andrea Irace[2], Armando Ricciardi[1], and Andrea Cusano[1]
1 Optoelectronics Group, Department of Engineering, University of Sannio, Benevento, Italy
2 Department of Electrical Engineering and Information Technology, University of Naples Federico II, Naples, Italy

5.6 **Fiber Bragg Grating Sensors for Temperature Monitoring During Thermal Ablation of Tumors**
Elena De Vita, Agostino Iadicicco, and Stefania Campopiano
Department of Engineering, University of Naples "Parthenope", Naples, Italy

5.8 **Developments on Silicon Photonic Devices for High Energy Physics and Quantum Computing**
Simone Cammarata[12] and Sergio Saponara[1]
1 Dipartimento di Ingegneria dell'Informazione, Università di Pisa, Pisa, Italy
2 Istituto Nazionale di Fisica Nucleare, Pisa, Italy

5.9 **SERS Platform for Ultrasensitive and High-Specific Tumor Biomarker Identification in Liquid Biopsy**
Sara Spaziani[12], Stefano Managò[3], Giuseppe Quero[12], Gianluigi Zito[4], Francesco Galeotti[5], Marco Pisco[12], Anna Chiara De Luca[3], and Andrea Cusano[12]
1 Optoelectronic Division - Department of Engineering, University of Sannio, Benevento, Italy
2 CeRICT scrl - Optoelectronics&Photonics Center, Benevento, Italy
3 Institute of Biochemistry and Cell Biology (IBBC), CNR, Napoli, Italy
4 Institute of Applied Sciences & Intelligent Systems (ISASI), CNR, Napoli, Italy
5 Istituto di Scienze e Tecnologie Chimiche "Giulio Natta" (SCITEC), CNR, Milano, Italy

5.10 **High-performance 4H-SiC p-i-n UV Photodiode**
Elisa Demetra Mallemace[1], Sandro Rao[1], and Francesco Giuseppe Della Corte[2]
1 Department of Engineering, University of 1 Department of Information Engineering Infrastructures and Sustainable Energy (DIIES), Università "Mediterranea" di Reggio Calabria, Reggio Calabria, Italy
2 Dipartimento di Ingegneria Elettrica e delle Tecnologie dell'Informazione (DIETI), University of Naples Federico II, Naples, Italy

5.11 **Dielectric Metasurface for Multiple Optical Trapping**
Giuseppe Brunetti[1], Donato Conteduca[2], Giovanna Marocco[1], Nicola Sasanelli[1], Mario Nicola Armenise[1], and Thomas F. Krauss[2], and Caterina Ciminelli[1],
1 Optoelectronics Laboratory, Politecnico di Bari, Bari, Italy
2 Photonics Group, Department of Physics, University of York, Heslington, York, UK

Area 6: Power Electronics

6.1 **Pulsating DC Link DC/AC Converter with Zero Voltage Transition Based on SiC Power MOSFETs**
Daniele Marciano, Giovanni Busatto, Simone Palazzo, Annunziata Sanseverino, Davide Tedesco, and Francesco Velardi
Department of Electrical and Information Engineering, University of Cassino and Southern Lazio, Cassino, Italy

6.2 **Three-phase Modular Multilevel Converter with Optimized Capacitor Sizing for Low Voltage Applications**
Tarek Younis[1], Paolo Mattavelli[1], Igino Toigo[2], and Michele Corradin[2]
1 Dept. of Management and Engineering, University of Padova, Vicenza, Italy
2 Socomec, Vicenza, Italy

6.3 **Limit-cycle Free Digitally Controlled Power Converter**
Ahmed Abdullah, Paolo Crovetti, and Francesco Musolino
Department of Electronics and Telecommunications (DET), Politecnico di Torino, Torino, Italy

Area 7: Electronic Systems and Applications

7.1 **Hardware Acceleration for Reinforcement Learning Q-Learning Algorithm**
Sergio Spanò[1], Gian Carlo Cardarilli[1], Luca Di Nunzio[1], Rocco Fazzolari[1], Daniele Giardino[1], Marco Matta[1], Alberto Nannarelli[2], and Marco Re[2]
1 Department of Electronic Engineering, University of Rome "Tor Vergata", Rome, Italy
2 Department of Applied Mathematics and Computer Science, Danmarks Tekniske Universitet, 2800 Kgs. Lyngby, Denmark

7.2 **Bi-Plane Imaging for Enhanced Medical Diagnosis with an Ultrasound Research Scanner**
Claudio Giangrossi[1], Alessandro Ramalli[1], Carlo Palombo[2], and Piero Tortoli[2]
1 Dept. of Information Engineering, University of Florence, Florence, Italy
2 Dept. of Surgical, Medical, Molecular Pathology & Critical Care Medicine, Univ. of Pisa, Pisa, Italy

7.3 **Non-Linear Convolutional Neural Network for Real Image Noise Reduction**
Stefano Marsi[1], Jhilik Bhattacharya[2], Romina Molina[134], and Giovanni Ramponi[1]
1 IPL, Engineering and Architecture Department, University of Trieste, Trieste, Italy
2 CSED, Thapar University, Punjab 147004, India
3 Electronic Department, National University of San Luis (UNSL), San Luis, Argentina
4 MLAB, The Abdus Salam International Centre for Theoretical Physics, Trieste, Italy

Off-line Video Presentations

7.4 **Autonomous Edge Learning and Inferencing Pipeline**
Fouad Sakr[1,2], Riccardo Berta[1], Alessandro De Gloria[1], Joseph Doyle[2], and Francesco Bellotti[1]
1 Department of Naval, Electrical, Electronic, Telecommunications Engineering (DITEN), University of Genoa, Genoa, Italy
2 School of Electronic Engineering and Computer Science, Queen Mary University of London, UK

7.5 **SMAC-engine: a Bit-Serial Accelerator for CNN-based Internet-of-Things Applications**
Maurizio Capra[1], Massimo Ruo Roch[1], Guido Masera[1], Francesco Conti[2], and Maurizio Martina[1]
1 Dipartimento di Elettronica e Telecomunicazioni, Politecnico di Torino, Torino, Italy
2 Dipartimento di Ingegneria dell'Energia Elettrica e dell'Informazione "Guglielmo Marconi", Università di Bologna, Bologna, Italy

7.6 **Lithium-ion Batteries Recharge Optimization**
Massimo Conti and Simone Orcioni
Dipartimento di Ingegneria dell'Informazione, Università Politecnica delle Marche, Ancona, Italy

7.7 **Resource Optimization in MEC-based Networks for Indoor Robotics Environment**
Ayub Shah, Roberto Passerone, Tadeus Prastowo, and Luigi Palopoli
Department of Information Engineering and Computer Science, University of Trento, Trento, Italy

7.8 **ICT Platform for Water Stress Management in Quality Viticulture**
Silvia Loddo, Paolo Meloni, and Massimo Barbaro
Department of Electrical and Electronic Engineering, University of Cagliari, Cagliari, Italy

7.9 **A Low-Power RTLS for Safety in the Workplace**
Matteo Nardello, Luca Santoro, and Davide Brunelli
Department of Industrial Engineering, University of Trento, Trento, Italy

Social events

Welcome Reception

Caffe` degli Specchi
Piazza Unità d'Italia 7, 34121 Trieste
http://www.caffespecchi.it/
20:00 – 22:30, Wednesday, July 7

The organization committee is pleased to invite all the participants to the Welcome Reception that will be held in Caffè degli Specchi, a historical "caffè" of Trieste, located in the magnificent Piazza Unità di Italia.
"Caffè degli Specchi opened in 1839 as a meeting place of intellectuals and merchants and has always been the "salotto buono" (untranslatable, a nice place where you can pleasantly talk) of Trieste. In the nineteenth century, it was the main meeting place of irredentists, and at the end of the second World War it became the headquarter of the British Navy. The name Caffé degli Specchi has been given by the founder, who decorated the walls with many mirrors, engraved with representations of important historical events of 1800. In this way, the room was particularly bright, a good way to save lamps oil.
Today the caffé is very popular and when the weather allows it the external tables facing the square are full of customers." (https://annascrigni.com/i-caffe-storici-di-trieste/)

Social Dinner

Savoy Restaurant by Eataly
Savoia Excelsior Palace
20:30 – 23:00, Thursday, July 8

"In the sophisticated Mitteleuropean ambience of the Savoy Restaurant by Eataly, the elegant furnishings and impeccable service reflect the Savoia Excelsior Palace's true splendor.
The chef's collaboration with Eataly – the champion of Italian gourmet excellence around the world – involves a process of selecting the finest ingredients and artisanal producers, favoring short supply chains."
(https://www.starhotelscollezione.com/en/our-hotels/savoia-excelsior-palace-trieste/dining/ristorante-savoy.html)

Social Tour

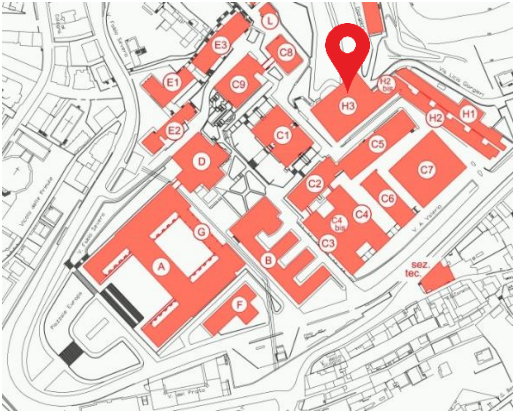### Trieste Walking Tour
Visit of Trieste City Center
17:00-19:00 , Friday, July 9
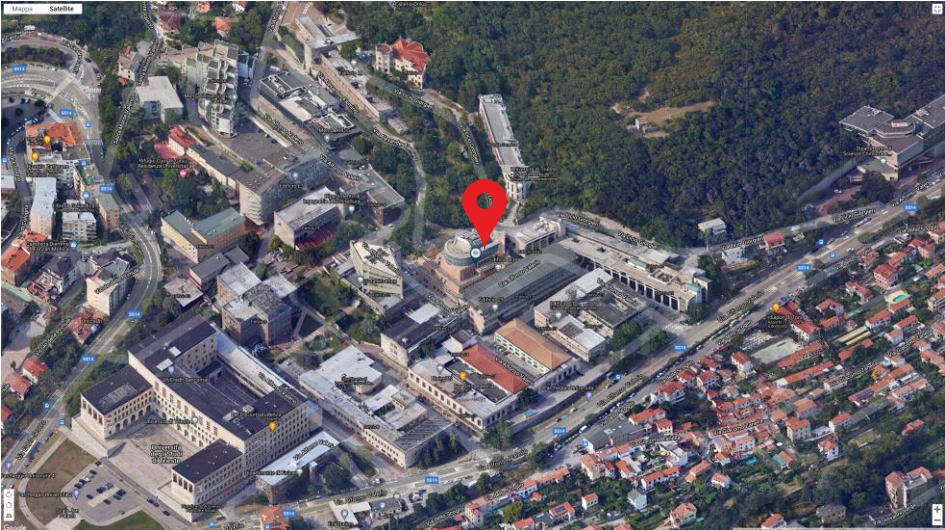Meeting Place: Piazza Unità d'Italia
in front of the City Hall

The Social Tour will take the participants around the city center, to discover its magnificent buildings and his Mitteleuropean history.

Conference Venue

The **SIE 2021** Annual Meeting will be held in the Trieste University campus, Building H3,
via Valerio 12/2
34127, Trieste

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