



# IEEE EUROCON

## *Torino 2023*

POLITECNICO DI TORINO / JULY 6 - 8, 2023



# FINAL PROGRAM

[www.2023.ieee-eurocon.org](http://www.2023.ieee-eurocon.org)

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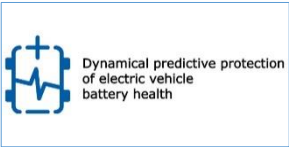


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## Welcome Message from the Conference Chairs

On behalf of the IEEE Italy Section and the IEEE Region 8, it is our great pleasure to warmly welcome all of you to the 20th Edition of EUROCON in Torino, Italy, from Wednesday July 6th to Saturday, July 8th, 2023. After the COVID pandemics, this year conference will be held in presence, aiming to make people meet again after years of remote meetings.

EUROCON is a major international forum for the exchange of ideas, theory basics, design methodologies, techniques and experimental results between academia, research institutions and practitioners from industry. It covers all fields of electrical and electronic engineering, ICT and computer science covered by IEEE Societies and it is one of the flagship conferences of the IEEE Region 8, the largest region of IEEE including Europe, Africa and Middle East.

The core purpose of EUROCON is to foster technological innovation and excellence in the fields of electrical, electronic, information science and engineering.

Specifically, the main purposes of the event are:

- to promote and to strengthen partnerships and cooperation between academia and industry;
- to increase the public's understanding and awareness of how engineering and technology can positively affect quality of life;
- to promote discussion between the research community and government bodies about effective and successful research policies;
- to disseminate recent advancements, discoveries and applications;
- to discuss ideas and to promote cooperation between researchers working in different research areas.

The main sessions of EUROCON 2023 have been organized with the IEEE Region 8 and the support of over 30 Chapters and Affinity Groups of the IEEE Italy Section. The range of topics covered is broad and includes topics ranging from transportation electrification to healthcare, power components and applications, computer science and magnetism, and many others.

The EUROCON program is highly varied, including one plenary session with 3 keynote speakers and the one Honorary Award, 2 invited sessions, 27 regular technical sessions, 2 special sessions, 8 workshops, 3 tutorials. The program this year is enriched by various special events with competitions to the whole range of young students and professionals (WiE competition for secondary schools, B.S. and M.S. Student Competition, R8 Student Paper Contest, Best PhD and Young Professional demo competition, Best entrepreneurship demo & poster competition, Best student video & poster competition), panels and six workshops. The award ceremony with the announcement of the winners of the various competitions and of the best paper award will take place during the conference dinner and the closing session.

Special thanks to the Gold and Silver supporters, as well as the supporters linked to specific projects. Special thanks also to the Technical Program Chairs, Track Chairs and reviewers who ensured the quality of the papers presented. Special thanks to the organizers and speakers of the numerous events. And of course special thanks to all the Authors who have chosen to send their contributions to EUROCON this year. Contributions from Authors coming from 48 countries

of 4 continents have been accepted for presentation. The papers presented will be proposed for publication on IEEE Xplore.

About 250 delegates are going to attend the event, having fruitful time with prospective colleagues by presenting their latest on-going research achievements, sharing ideas, thoughts and visions with the goal of shaping a better future for the benefit of humanity.

In addition to the stimulating program of the conference, Torino, a multifaceted city rich in historic splendor, former Italian Capital, is a great venue to see, touch, feel and taste the Italian culture. We hope all the attendees can spend some days in this beautiful city.

We sincerely hope all attendees will have a stimulating time while sharing research findings with colleagues as well as exchanging and discussing new ideas. We wish all enjoy the 2023 IEEE International Conference on Smart Technologies.

The IEEE EUROCON 2023 General Co-Chairs

*Gianfranco Chicco*

*Sergio Rapuano*

# IEEE EUROCON 2023 Committee

## Honorary Chair

Vincenzo Piuri, Region 8 Director 2023-2024, University of Milan

## General Chairs

Gianfranco Chicco, Politecnico di Torino

Sergio Rapuano, University of Sannio

## Steering Committee

Nadezda Kunicina, IEEE R8, Latvia, Chair

Mike Hinchey, IEEE R8, Ireland

Boris Dumnic, IEEE R8, Serbia

Ljupco Karadzinov, IEEE R8, North Macedonia

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Ermanno Cardelli, University of Perugia, Italy

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Sabrina Grassini, Politecnico di Torino

## Publicity Chairs

Gaetano Zizzo, University of Palermo

Enrico Pons, Politecnico di Torino

## Communications Chair

Stefano Ferrari, University of Milan

## Publication Chair

Daniela Proto, University of Naples “Federico II”

## Entrepreneurship Events Chair

Tiziana Tambosso, IEEE Italy Section Entrepreneurship Committee Coordinator

## Industry Chairs

Dario Petri, University of Trento

Toni Mattila, IEEE Region 8 Action for Industry Committee Chair

## Students and Young Professionals Events Chairs

Federica Battisti, University of Padova

Stefano Selleri, University of Florence

**Tutorials Chair**

Angela Russo, Politecnico di Torino

**Treasurer**

Pisana Placidi, University of Perugia

**Women in Engineering Events Chairs**

Dajana Cassioli, University of L'Aquila

Patrizia Lamberti, University of Salerno

**Local Organizing Committee Chairs**

Alessandro Ciocia, Politecnico di Torino, Student and Volunteer Activity Chair

Pietro Colella, Politecnico di Torino, Technical Activity Chair

Fabrizio Dabbene, Institute IEIIT of the National Research Council of Italy

Andrea Mazza, Politecnico di Torino, Logistics Chair

Vincenzo Randazzo, Politecnico di Torino, IEEE Italy Section Young Professionals Board Member

**Webmaster**

Gianluca Mazzilli, Athena Srl

# IEEE EUROCON 2023 Plenary Speakers

Plenary Session - Thursday July 6 - H 11:00



## Trends in Power Electronics with focus on wide-bandgap materials technology and applications

**Orio Bellezza**

*President, Technology, Manufacturing, Quality and Supply Chain - STMicroelectronics*

### ABSTRACT

The evolution of power electronics has been driven by the demand for more efficient, reliable and cost-effective power conversion and control. The need for power electronics has never been greater as we face the urgent global challenge of decarbonization. Power technologies enabled the development of high-efficiency power supplies, inverters for renewable energy systems. Electric vehicles rely on power electronics to control the motor drive, battery charging and other critical functions. Power electronics also enable the development of fast charging infrastructure, which is essential for making electric vehicles more practical and convenient. There are several types of power semiconductors used in electric vehicles and power conversion applications, including insulated-gate bipolar transistors (IGBTs), metal-oxide-semiconductor field-effect transistors (MOSFETs), based on traditional silicon technology. Today, power semiconductors technologies continue to evolve with the development of new materials, devices, and control techniques. Some of the latest developments in power electronics include wide-bandgap (WBG) semiconductors, such as silicon carbide (SiC) and gallium nitride (GaN), which have higher switching speeds and can operate at higher temperatures than traditional silicon devices. These new materials are enabling the development of more efficient and compact power converters for a variety of applications, from electric vehicles to power grids.

### SPEAKER BIOGRAPHY

Orio Bellezza is STMicroelectronics' President, Technology, Manufacturing, Quality and Supply Chain and has held this position since May 31st, 2018. He has been responsible for Front-End Manufacturing since 2008 and his mandate was expanded in 2018 to cover ST's technology, manufacturing operations, supply chain, and quality. Bellezza is a member of ST's Executive Committee. Bellezza joined SGS-ATES, a predecessor company to STMicroelectronics, in 1984 as a fab process engineer. He soon moved to ST's Central R&D organization and participated in several key projects, including the introduction of process technology modules for





manufacturing sub-micron non-volatile memories. In 1996, Bellezza was appointed Director of ST's R&D facility in Agrate and led its upgrade and expansion into a manufacturing and development center for non-volatile memory and smart-power technologies. In 2002, he became Vice President of Central R&D, and in 2005, was appointed Vice President and Assistant General Manager of Front-End Technology and Manufacturing. Bellezza also serves as Managing Director of the ST Italy legal entity. He has published multiple technical papers and earned several patents in non-volatile memories. Orio Bellezza was born in Bergamo, Italy, in 1959, and graduated cum laude with a degree in Chemistry from the University of Milan, Italy.

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## Energy transition: electrification, digitalization, market, resilience

**Marcelo Masera**

*Politecnico di Torino*

### **ABSTRACT**

The energy transition is a global trend firmly under way, going on now for several years for tackling environmental and climate-related concerns. In the last years, the acceleration of the climate related policies and initiatives has put electricity system at the centre of the debate concerning the decarbonisation of society. While it is impossible to envisage the diminution of greenhouse gases emissions without an electricity-centred economy, there are many issues to be solved regarding technologies, investments, market regulation, and social equity at the national and global scales.

The speech will highlight the role and limitations of public policies in the promotion of electrification, and the synergies with the digitalization of the assets and systems. On the other hand, it will discuss the emerging problems about markets caused by the prevalence of renewable energy sources, and the need to rethink the resilience of systems for anticipating the set of capabilities that will be required for the reliable and secure supply of energy.

### **SPEAKER BIOGRAPHY**

Marcelo Masera is since 1st September 2022 senior researcher at the Department of Energy, Politecnico di Torino in Italy. He is in charge of guiding research on energy systems, smart grids, and resilience. He was Head of the Unit "Energy Security, Distribution and Markets" at the Directorate "Energy, Transportation and Climate" of the Joint Research Centre of the European Commission from 2011 to June 2022. The unit has premises in Petten, the Netherlands, and

Ispra, Italy, and its main mission is to provide support to European policy makers and national authorities in relevant topics. The main lines of activity are electricity systems and markets, natural gas systems and markets, digitalisation of energy, and interoperability. Since 2000 he is officer of the European Commission, working at the Joint Research Centre. Between 2000 and 2010 he was responsible for the JRC group dealing with Critical Infrastructure Protection, theory of failures in cyber-physical systems and cybersecurity related aspects. His background is in Electronics and Electricity Engineering.

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## Enabling the Energy Transition

**Franco Pierro**

*e-distribuzione*

### ABSTRACT

Climate change is currently imposing decarbonization challenging goals with the purpose of reducing CO<sub>2</sub> emissions both at global and local level.

To support the energy transition Italy is deploying the PNIEC and PNRR economic programs, to sustain the growth of green energy production and to enable consumptions electrification.

In this framework, the DSO role is crucial to connect to the distribution infrastructure both final customers and small energy producers. For this reason, our electrical grid will be widespread, efficient and resilient and will develop faster than ever before, where our primary substation will act as its pumping heart.

To match a fast-paced grid expansion E-Distribuzione will implement quick works' scheduling, Project management and control tools, extensive components' standardization and innovative contract management methodologies. The two main examples are the Licensing Engineering contract, for the land scouting and the permitting process management, and the EPC contract, for end-to-end works' management, from the engineering to the commissioning.

These are our goals, but they are also the issues for everyone who wants to look forward.

### SPEAKER BIOGRAPHY

Franco Pierro was graduated in Nuclear Engineering at Pisa University where he also obtained a PhD in Nuclear Safety.



At Pisa University he carries out, as collaborator to research, activities on thermo-hydraulics and innovative plant design and collaborates with Ansaldo Nucleare for Westinghouse new Nuclear Power Plant (NPP) design.

He joined Enel in March 2007 in the new-born department of Nuclear Technical Area and was seconded to Slovak Republic (Slovenské Elektrárne) at the Mochovce NPP initially as Design Engineer (Nuclear Safety Analyst) then Project Engineering and finally from 2012 to 2015 as Head of the Nuclear Safety Department.

In January 2016 he was called to Enel SpA Holding where he held the role of Industrial organizational development; from September 2018 to July 2021, he held the role of head of the Planning and Organization of the Global Enel Grids where he was responsible for guiding the organizational changes of the Business Line.

Since August 2021 he has held the role of Head of Project Management and Construction Italy, with the main purpose of HV substation construction throughout all the value chain from permitting, engineering, construction, testing and commissioning.



## Pasquale Pistorio

*Honorary Award 2022 of the IEEE Italy Section for “The rebuilder of European Semiconductor industry, able to combine profit and environmental/social sustainability”*

### **SPEAKER BIOGRAPHY**

Pasquale Pistorio graduated in 1963 in Electrical Engineering from the Polytechnic of Turin. He joined Motorola in Milan, Italy, in 1967, and rose through the ranks to become, by 1977, Corporate Vice President of the company, based in Phoenix, Arizona, and General Manager of the International Semiconductor Division. In July 1980, Pistorio accepted the challenge to return to Italy as President and Chief Executive Officer of the SGS Group, the only Italian microelectronics company. Pistorio turned around the state-owned company within two years, and his commitment to build it into a large scale broadline semiconductor manufacturer led to one of his most significant achievements: the successful integration of SGS with the semiconductor division of Thomson-CSF, in 1987. As President and CEO of the new company SGS-Thomson (subsequently renamed STMicroelectronics), Pistorio developed its diverse product portfolio based on high-growth applications and a worldwide network of strategic alliances. The successful business model enabled STMicroelectronics to position itself amongst the top five semiconductor manufacturers by the year 2000, and the company was listed in the

New York, Paris, and Milan stock exchanges. While bringing the near bankrupt SGS from about 100 Million USD in sales in 1980 to a leading world company STMicroelectronics with 8.7 Billion USD in revenues in his last year as CEO in 2004, Pistorio also forged a strong company culture characterized by integrity, pursuit of excellence, and commitment to social and environmental responsibility.

As early as 1993, Pasquale set up a companywide Environmental Decalogue with quantitative targets and programs for emissions reductions, waste reduction, recycling, among others, and a roadmap towards Carbon Neutrality, making the company within a few years a pioneer and leader in sustainability, winning numerous accolades including the US Environmental Protection Award for two years, and the European Quality Award. In 2002, Pistorio was voted among the top 50 “Stars of Europe” by Business Week and number 1 in Time Magazine’s “Top 25 Movers and Shakers” list. As a member of the UN ICT Task Force under Kofi Annan, Pistorio founded the STFoundation in 2001, to provide IT Literacy skills to highly marginalized communities. Today, STFoundation counts nearly one million trainees globally.

During his career, Pistorio championed pioneering European programs such as JESSI (Join European Sub-micron Silicon Initiative) and MEDEA (Microelectronics for European Applications). He has been Chairman of the Advisory Council of the European Union’s Nanotechnology Platform (ENIAC), sat in the Executive Committee of the World Business Council for Sustainable Development and at the European Round Table (ERT) of Industrialists.

Upon his retirement as President and CEO of STMicroelectronics in March 2005, he was nominated Honorary President of the company by the Advisory Board. The same year, he created the Pistorio Foundation, dedicated to providing educational opportunities to children in need.

Pistorio has served as Chairman of Telecom Italia in 2007 and as Vice President for Innovation and Research of Confindustria (2005 to 2009). He has been a board member of Fiat, Telecom Italia, Brembo, ATOS Origin, Chartered Semiconductor, and STATS ChipPAC. Pistorio is Cavaliere del Lavoro in Italy, Officer of the National Order of Merit of Malta, Officier de la Legion d’Honneur and Commandeur de l’Ordre National du Merite of the French Republic, recipient of the “Ouissam Alaouite” by the kingdom of Morocco, and Honorary Citizen of Singapore. He has been awarded the Lifetime Achievement Award by Reed Electronics Group, as part of the European Electronics Industry Awards; the IEEE Ernst Weber Engineering Leadership Recognition; the ACE Lifetime Achievement Award by the EETimes; the IEEE Robert N. Noyce Medal Award; and the Ellis Island Medal of Honor.

Pistorio has received Honorary Degrees from the Universities of Genova, Malta, Pavia, Catania, Palermo, del Sannio Benevento, Bicocca and Bristol.

## IEEE EUROCON 2023 Tutorials

Tutorial Session - Thursday July 6 - H 08:30



### Inductive charging systems for electric vehicles: basic concepts, design and standardization

**Vincenzo Cirimele**

*University of Bologna, Italy*

#### ABSTRACT

This tutorial aims to describe the basic principles, implementation architectures, and main electromagnetic modeling aspects of inductive-type wireless charging (IPT) systems for electric vehicles in both static and moving vehicle conditions.

The tutorial presents the main design equations and design aspects related to the choice of materials and components for power electronic converters, sizing and implementation of coils, compensation capacitors, and relevant aspects related to their effective circuit and electromagnetic modeling.

Part of the course also analyzes the main critical issues related to the integration of IPT systems in the highway environment through the practical experience gained during the realization of the Polito Charge While Driving i.e., the prototype of dynamic IPT system developed within the European project FABRIC.

The tutorial concludes with a quick excursus on the current international regulatory scenario.

#### SPEAKER BIOGRAPHY

Vincenzo Cirimele received the M.Sc. in Electrical Engineering (summa cum laude) in 2013 from the Politecnico di Torino where he held the position of Assistant Professor at the Department of Energy “G. Ferraris” from November 2017 to September 2020.

In February 2017, he received the PhD in Electronics Engineering (with honors) from the Politecnico di Torino and the PhD in Electrical Engineering from the Université Paris-Saclay.

From September 2020 to November 2021, he was a technical responsible for the R&D and Innovation group of the company Movyon s.p.a. of Autostrade per l'Italia group where he supervised projects related to energy sustainability and development of highway electric

mobility. To date, he is a Senior Assistant Professor at the Department of Electrical, Electronic, and Information Engineering “G. Marconi” of the University of Bologna.

His research interests mainly concern technologies for electric mobility, inductive power transmission, electromagnetic modeling and simulation, and power electronics.



## Skyrmionics: from the topology to the applications

**Riccardo Tomasello**

*Politecnico di Bari, Italy*

### ABSTRACT

Magnetic skyrmions are fascinating, localized non-collinear textures which combine intriguing topological and applicative properties for information carrier applications. Initially studied and observed in bulk materials, nowadays they can be stabilized in a variety of systems spanning from magnetic multilayers to ferrimagnets. Skyrmions promise an unrivalled performance for a new generation of low-power devices - oscillators, detectors, unconventional computing - with the racetrack memory being the utmost investigated.

This tutorial aims at providing an overview on skyrmions, starting from their topological features, discussing the majority of the milestone discoveries, and reviewing technological applications up to the most recent device implementations.

### SPEAKER BIOGRAPHY

Riccardo Tomasello is an assistant professor (RTD-B) in the Department of Electrical and Information Engineering, Politecnico di Bari, Italy. In 2016, he received the European Ph.D. in “System and Computer Engineering” from the University of Calabria, Italy. He was a post-doctoral fellow at the University of Perugia, Italy, in 2016 and 2017, and at the Foundation for Research and Technology - Hellas, Heraklion, Greece from 2018 to 2021, where he was also the scientific coordinator of the project “ThunderSKY” (<http://thundersky.iacm.forth.gr>). His main research activity has been the theoretical study and micromagnetic modeling of spintronic devices (spin-torque nano-oscillators, spin-transfer-torque magnetic random-access memory, microwave detectors, energy harvesters), with particular focus on magnetic skyrmions. He was a visiting scholar at the Northwestern University, Evanston, University of California, Irvine, USA, University of Salamanca, Spain, and Bogazici University, Turkey.

# Faber: a Hardware/Software Toolchain for Image Registration

**Eleonora D'Arnese, Davide Conficconi**

*Politecnico di Milano, Italy*

## ABSTRACT

The Faber tutorial will guide the participants to discover how to automate and accelerate rigid image registration. It will focus on the exploration of the capabilities of Faber to support developers in designing, customizing, and deploying their image registration pipelines exploiting FPGA-based hardware accelerators with a cross-platform abstraction layer on top of PYNQ framework. The tutorial provides a general understanding of rigid/affine image registration while focusing on the principles at the basis of the development and integration of hardware accelerators within software pipelines. Finally, it allows the attendees to directly experience hands-on practice in the end-to-end development of the proposed image registration pipeline.

## SPEAKERS BIOGRAPHIES



**Eleonora D'Arnese** got her B.Sc. and M.Sc. in Biomedical Engineering from Politecnico di Milano in 2016 and 2018, respectively. In 2018 she also received her M.Sc. in Bioengineering from the University of Illinois at Chicago, Chicago, IL, USA. She then received her Ph.D. in Information Technology in the area of Computer Science and Engineering from Politecnico di Milano. Currently, she is a Post-Doctoral Researcher at Politecnico di Milano, and her research focuses on the acceleration and optimization of medical image processing procedures and computer vision.



**Davide Conficconi** got his Ph.D. in Information Technology at Politecnico di Milano in 2022, where he is currently a Post-Doctoral researcher. He received his B.Sc. and M.Sc. in Computer Engineering from Politecnico di Milano in 2015 and 2018, respectively. His research interests revolve around domain-specific architectures combined with reconfigurable architectures, especially FPGAs, design methodologies, hardware-software interfacing, and design automation techniques. He is expanding his research interests toward quantum computing for acceleration and automation. He is serving in the Artifact Evaluation

Committee of ASPLOS, CGO, PLDI conferences, and as journal reviewer for different boards of IEEE, ACM, Elsevier.

# IEEE EUROCON 2023 Keynote Speakers

Keynote - Friday July 7



## Threats or resources? Distributed energy systems and power system resilience

**Pierluigi Mancarella**

*The University of Melbourne, Australia, and The University of Manchester, UK*

### ABSTRACT

Distributed energy resources (DER) are becoming widespread in most countries worldwide. In particular, rooftop solar photovoltaics and battery energy storage systems (including in energy community schemes), and soon electric vehicles too, are poised to play an essential role towards power system decarbonisation and more consumer-centric markets. However, they also fundamentally challenge the traditional way power systems and markets have been operated and planned. In this regard, recent events throughout the world have highlighted how ultra-deep penetration of DER could make the grid more “fragile” and pose a threat to power system resilience. Hence, ongoing debates refer to how DER should be securely integrated into systems and markets, provide grid services, and eventually contribute to enhancing power system resilience.

In this keynote talk we will discuss fundamental techno-economic challenges and opportunities emerging in the presence of large shares of DER, with focus on their role in the context of power system resilience and the benefits that DER aggregation schemes (e.g., virtual power plants and microgrids) could bring. Several case studies from a number of recent events and projects around the world will be used to exemplify the concepts presented.

### SPEAKER BIOGRAPHY

Pierluigi Mancarella is the Chair Professor of Electrical Power Systems at The University of Melbourne (Australia), where he is also the Energy Systems program leader at the Melbourne Energy Institute, and Professor of Smart Energy Systems at The University of Manchester (UK). His key research interests include techno-economic modelling and analysis of multi-energy systems, grid and market integration of renewables and distributed energy resources, energy



infrastructure planning under uncertainty, and security, reliability and resilience of low-carbon networks.

Pierluigi is a Fellow of the IEEE, an IEEE Power and Energy Society Distinguished Lecturer, and the Convenor of the Cigre C6/C2.34 Working Group on “Flexibility provision from distributed energy resources”. He holds the 2017 veski Innovation Fellowship for his work on urban-scale virtual power plants, is a recipient of an international Newton Prize 2018 for his work on power system resilience in Chile, and was the technical chair of the 2022 International Microgrids Symposium and the inaugural chair of the Energy working group of the IEEE European Public Policy Initiative. He has been visiting researcher/professor in a number of international institutions, including NREL in Colorado, Tsinghua University in China, Ecole Centrale de Lille in France, and the Universidad de Chile.

Pierluigi is author of several books and over 400 research papers and reports, and is an Editor of the IEEE Transactions on Power Systems, the IEEE Transactions on Energy Markets, Policy and Regulation, and the Oxford Open Energy journal.

Currently he is actively involved in a number of research and consultancy projects with industry and policy makers in Australia and internationally, particularly in the areas of integrated planning of electricity-hydrogen infrastructure, development of distributed energy markets, and reliable and resilient planning of future energy systems.

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## Keynote - Saturday July 8



### The History Activity Committee of the IEEE Italy Section: features and activities

**Massimo Guarnieri**

*University of Padua, Italy*

#### **ABSTRACT**

The IEEE Italy Section has an articulated structure composed of chapters, committees, and affinity groups. Among them, the History Activity Committee is local corresponding of the central IEEE History Committee and the Region 8 History Activities. It is active in proposing milestones which celebrate major Italian contributions to the development of IEEE related science and technology and in publishing historical notes, which are booklets of scientific and technological interest. In addition, the HAC promotes events of historical interest and advertise

on them. Two major events organized this year are the LOL with AISI, the Italian Association for the History of Engineering, and HISTELCON 2023, the 8th IEEE History of Electrotechnology Conference that will be held in Florence on 7-9 September 2023.

### **SPEAKER BIOGRAPHY**

MD in Electrical Engineering in 1979, MBA in 1986, PhD in 1987. Full Professor in 2000.

He works in numerical and experimental research on electrochemical energy storage.

He created the Electrochemical Energy Storage and Conversion Laboratory of the University of Padua. He is/was PI of several projects funded by public and private bodies.

He promoted MoUs with the University of Tennessee (USA) and Tokyo University of Agriculture and Technology (J) and agreements with MIT (USA), Vanderbilt University (USA), Fraunhofer-ICT (Germany) and Skoltech (Russia).

He represents the University of Padua in EERA Batteries JP and chairs the Technological Committee of Flow Batteries Europe. He authored 168 scientific papers indexed in Scopus and is the inventor of seven patents. He is ranked in the World's Top 2% Scientists by Stanford University.



## Introduction of IEEE Standardization Process to Scholars

### **Tuncer Baykas**

*IEEE Standards Coordinator, IEEE Region 8*

### **ABSTRACT**

With an active portfolio of nearly 1,300 standards and projects under development, IEEE is a leading developer of industry standards in a broad range of technologies that drive the functionality, capabilities, and interoperability of products and services, transforming how people live, work, and communicate. In this workshop we will cover IEEE Standards association main standardization areas, such as Communications, Networks, Electronics, Power and Energy, Mobile Computing, Cloud Computing, Industrial Applications, Artificial Intelligence, Safety, and Compliance Assessment. In addition we provide examples of how scholars from academia join the standardization process.

### **SPEAKER BIOGRAPHY**

Tuncer Baykas (Senior Member, IEEE) received the Ph.D. degree in electrical engineering from the University of Ottawa, in 2007. He joined the National Institute of Information and Communications Technology, Japan, in 2007. During his tenure, he contributed to multiple standardization projects, including 802.15.3c, 802.11ad, and 1900.7. He served as the Chair for

IEEE 802.19.1 coexistence in TVWS Task Group. In 2022, he joined Ofinno Inc. He is currently IEEE Standards Coordinator in Region 8, the Vice Chair of 802.19 Working Group and 802.11bb Light Communications Task Group. He has over 50 major journal and conference publications, and three U.S. and 37 Japanese patents. His research interests include THz communications, spectrum sharing, and radar signal processing. He was one of the recipients of Turkish Academy of Sciences Young Researcher Award, IEEE-SA Standards Board Award, and IEEE-SA Certificate of Appreciation. He served as a Guest Editor for IEEE Communications Magazine and a Board Member for IEEE Comsoc MMTC E-Letters.

## IEEE EUROCON 2023 Venue

IEEE EUROCON 2023 will be held at **Politecnico di Torino**, 6-8 July 2023.

Main entrance of Politecnico di Torino (to Foyer and Aula Magna):

- Corso Duca degli Abruzzi 24

Two possible entrances for the Conference Session Area:

- Via Pier Carlo Boggio 71
- Corso Castelfidardo 34/A

### CONFERENCE ROOMS

#### Registration:

- Thursday 6 July 2023 morning: Foyer of Aula Magna (Welcome Desk), entrance from Corso Duca degli Abruzzi 24
- Thursday 6 July 2023 afternoon and following days: Conference session area, entrance from via Pier Carlo Boggio 71 or corso Castelfidardo 34/A

**Tutorials**, 6 July 2023 in the morning: Rooms “S”, underground floor

**Conference Opening**, 6 July 2023 in the morning: Aula Magna

**Coffee break 6 July 2023 in the morning**: Foyer of Aula Magna

**Parallel sessions and events**, 6 July 2023 and following days: Conference session area, Rooms I

**Coffee breaks and lunches 6-8 July 2023**: Conference session area, Rooms “I”



# IEEE EUROCON 2023 Conference Dinner

Friday July 7

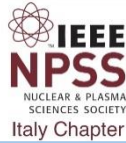
The Conference Dinner will be held at the *Museo dell'Automobile* on **Friday, July 19**.



IEEE EUROCON 2023 Technical Co-Sponsors

 AES Chapter – IEEE Italy Section	 IEEE MTT-S / AP-S CHAPTER Central and Southern Italy	 Italy Chapter
 Italy	 ITALY CHAPTER	 ITALY CHAPTER 75 <sup>TH</sup> ANNIVERSARY TRANSISTOR
 Italy Chapter	 Italy Chapter	 Italy Chapter
 ITALY SECTION	 Geoscience and Remote Sensing South Italy Chapter	 GRS29 Central-North Italy Chapter
 History Activity Committee Italy Section		 IEE Industrial Electronics Society IE/IA/PEL Italy (No) Section Jt. Chapter
 IES Italy Chapter	 IEEE INFORMATION THEORY SOCIETY ITALY SECTION CHAPTER	 ITALY CHAPTER









## IEEE EUROCON 2023 Patrons

GUSE GRUPPO UNIVERSITARIO  
SISTEMI ELETTRICI PER L'ENERGIA



Sezione Piemonte - Valle D'Aosta



## Program Schedule - Thursday, July 6

THURSDAY - JULY 6th, 2023						
Registration Desk Opens						
8:15 CEST						
08:30 - 10:30 CEST	Room 1S	Room 3S	Room 9S	Room 11S		
	Tutorial T1 Inductive charging systems for electric vehicles: design and standardization <i>Vincenzo Grimele</i>	Tutorial T2 Symposium on the innovations in the applications <i>Riccardo Tomasello</i>	Tutorial T3 Faber: a High-Performance Toolchain for Image Registration <i>Eleonora D'Amese / Davide Conficconi</i>	Competition for Secondary Schools: Best Paper-Reading Student Prize <i>(organized by WIE AG Italy)</i> Chair: <i>Patrizia Lamberti</i>		
10:30 - 11:00 CEST	BREAK					
<p>(AULA MAGNA)</p> <p>OPENING CEREMONY</p> <p>Welcome: <i>Vincenzo Piuri, Tiziana Tambosso, Sergio Rapiuno, Gianfranco Chicco, Institutional representatives</i></p> <p>Plenary Speech, <i>Orio Bellezza</i>: Trends in Power Electronics with focus on WBG materials technology and applications</p> <p>Plenary Speech, <i>Marcelo Masera</i>: Energy transition: electrification, digitalization, market, resilience</p> <p>Plenary Speech, <i>Stefano Verrini</i>: Energy transition: challenges and opportunities</p> <p>IEEE Italy Section Honorary Award: <i>Pasquale Platano</i></p> <p>Introduction on the Technical Programme: <i>Sabrina Grassini, Giambattista Grosso</i></p>						
LUNCH						
13:30 - 14:30 CEST	Room 11	Room 3I	Room 5I	Room 7I	Room 9I	Room 11I
14:30 - 16:30 CEST	Workshop Modernization of the Electricity Industry <i>(organized by IEEE R8)</i> Chair: <i>Nihal Ben Youssef</i>	Technology and digital innovations in <i>(organized by EMB18, C016 and TM14)</i> Chairs: <i>Eleonora D'Amese, Lorella Cannavacciuolo</i>	Artificial intelligence in industrial automation A <i>(organized by CIS11)</i> Chair: <i>Stefano Rovetta</i>	Geoscience and Remote Sensing <i>(organized by EMB29 and GRS29a2)</i> Chairs: <i>Patrizia Savi</i>	Special Session IEEE R8 Student Paper Contest Finals <i>(organized by IEEE R8)</i> Chair: <i>Vera Markovic</i>	WIE Poster Session GENEVA (Gender Equality IN Research and Innovation) <i>(organized by WIE Italy)</i> Chair: <i>Roberta Di Pace</i>
	Best PhD Students & YPs Competition Demo Competition <i>(organized by VPAG Italy)</i> Chair: <i>Sergio Rapiuno</i>					
BREAK						
16:30 - 17:00 CEST	Smaller and smarter: new trends in radiation detectors <i>(organized by WPS05)</i> Chair: <i>Roberto Ratti, Vincent Giffon</i>	Computational intelligence in healthcare A <i>(organized by EMB18 and CIS11)</i> Chairs: <i>Roberto Ratti, Gennaro Gamastra, Riccardo Barbieri</i>	Artificial intelligence in industrial automation B <i>(organized by CIS11)</i> Chair: <i>Dagiana Cassiolli</i>	Smart grids <i>(organized by PE31)</i> Chairs: <i>Daniela Proto, Pietro Colicella</i>	Special Session IEEE R8 Student Paper Contest Finals <i>(organized by IEEE R8)</i> Chair: <i>Vera Markovic</i>	WIE Poster Session GENEVA (Gender Equality IN Research and Innovation) <i>(organized by WIE Italy)</i> Chair: <i>Roberta Di Pace</i>
17:00 - 18:30 CEST						

Program Schedule - Friday, July 7

FRIDAY - JULY 7TH, 2023							Conference Area
	Room 11	Room 31	Room 51	Room 71	Room 81	Room 91	Room 111
8:30 - 10:15 CEST	Grid Integration A Speakers: Patrizia Limberti, Enrico Pons Invited Speaker: Carmen Garcia Chair: Angela Russo, Cesar Diaz-Londono	Energy management and energy conversion systems Speakers: Patrizia Limberti, Enrico Pons Invited Speaker: Carmen Garcia Chair: Angela Russo, Cesar Diaz-Londono	Computational Intelligence (organized by EMER18 and EMER19) Speakers: Patrizia Limberti, Enrico Pons Invited Speaker: Carmen Garcia Chair: Angela Russo, Cesar Diaz-Londono	Industrial applications (organized by EMER18 and EMER19) Speakers: Patrizia Limberti, Enrico Pons Invited Speaker: Carmen Garcia Chair: Angela Russo, Cesar Diaz-Londono		Workshop EMER18/EMER19 project (part 1) (organized by INRM) Chair: Massimo Pasquale	
10:15 - 10:45 CEST	Hydro Storage						
10:45 - 11:45 CEST	Threats or resources? Distributed energy systems and power system resilience Keynote: Patrizia Limberti A Clips Act for Europe: vision and remarks Keynote: Patrizia Limberti Chair: Angela Russo, Cesar Diaz-Londono			IEEE Membership and Volunteering Speakers: Patrizia Limberti, Enrico Pons Invited Speaker: Carmen Garcia Chair: Angela Russo, Cesar Diaz-Londono			Best Entrepreneurship Video Competition (organized with IEEE Rn) Chair: Angelo Pasquale
11:45 - 13:00 CEST	Grid services and flexibility (organized by RE3) Speakers: Patrizia Limberti, Enrico Pons Invited Speaker: Carmen Garcia Chair: Angela Russo, Cesar Diaz-Londono	Signal processing (organized by SPOT) Speakers: Patrizia Limberti, Enrico Pons Invited Speaker: Carmen Garcia Chair: Angela Russo, Cesar Diaz-Londono	Magnetic materials and composites (organized by MAG23) Speakers: Patrizia Limberti, Enrico Pons Invited Speaker: Carmen Garcia Chair: Angela Russo, Cesar Diaz-Londono	Invited Speaker: Davide Corbelli From Domain-specific to Quantum Computing Reconfigurable Systems (organized by QV16) Chair: Massimo Pasquale		Workshop EMER18/EMER19 project (part 2) (organized by INRM) Chair: Massimo Pasquale	Best Student Video & Poster Competition (organized by SB POLITO and INRM) Chair: Angelo Pasquale
13:00 - 14:00 CEST							
14:00 - 14:30 CEST	Introduction to SMC and SMC Italy Speakers: Giancarlo Ferraro, Patrizia Limberti Invited Speaker: Carmen Garcia Chair: Angela Russo, Cesar Diaz-Londono	Grid integration B Speakers: Patrizia Limberti, Enrico Pons Invited Speaker: Carmen Garcia Chair: Angela Russo, Cesar Diaz-Londono	Grid integration B Speakers: Patrizia Limberti, Enrico Pons Invited Speaker: Carmen Garcia Chair: Angela Russo, Cesar Diaz-Londono	RF and microwave devices and applications (organized by RF23) Speakers: Patrizia Limberti, Enrico Pons Invited Speaker: Carmen Garcia Chair: Angela Russo, Cesar Diaz-Londono			
14:30 - 16:30 CEST	System, Man & Cybernetics (organized by SMC Society) Speakers: Patrizia Limberti, Enrico Pons Invited Speaker: Carmen Garcia Chair: Angela Russo, Cesar Diaz-Londono	Grid integration B Speakers: Patrizia Limberti, Enrico Pons Invited Speaker: Carmen Garcia Chair: Angela Russo, Cesar Diaz-Londono	Sensors and data applications (organized by SB18) Speakers: Patrizia Limberti, Enrico Pons Invited Speaker: Carmen Garcia Chair: Angela Russo, Cesar Diaz-Londono	Let's learn to grow: tech startups to successful ventures (organized with IEEE Rn) Chair: Massimo Pasquale			Presentation HACSBOHT, Chaznikolou (IEEE Rn) B.S. and M.S. Student Competition (Part 1: formation of the teams and initial activity) (organized with IEEE Rn) Chair: Massimo Pasquale
16:30 - 17:00 CEST							
17:00 - 18:30 CEST	System, Man & Cybernetics (organized by SMC Society) Speakers: Patrizia Limberti, Enrico Pons Invited Speaker: Carmen Garcia Chair: Angela Russo, Cesar Diaz-Londono	Energy systems and applications (organized by RE3) Speakers: Patrizia Limberti, Enrico Pons Invited Speaker: Carmen Garcia Chair: Angela Russo, Cesar Diaz-Londono	Electrical system control, diagnostics and simulation (organized by DE12) Speakers: Patrizia Limberti, Enrico Pons Invited Speaker: Carmen Garcia Chair: Angela Russo, Cesar Diaz-Londono	Smart systems (organized by SB19) Speakers: Patrizia Limberti, Enrico Pons Invited Speaker: Carmen Garcia Chair: Angela Russo, Cesar Diaz-Londono		Workshop The versatility of magnetism: an overview of spintronics, energy and biomimetic applications Panel 1: Spintronics Chair: Massimo Pasquale	B.S. and M.S. Student Competition (Part 2: final activity) (organized with INRM) Chair: Massimo Pasquale
18:30 - 20:30 CEST							
20:30 - 23:00 CEST							

# Program Schedule - Saturday, July 8

SATURDAY - JULY 8th, 2023							Conference Area
	Room 11	Room 31	Room 51	Room 71	Room 91	Room 111	
09:00 - 10:30 CEST	Workshop The Electric Renaissance: the Italian Path (organized by <i>Ordine degli Ingegneri Torino</i> and <i>AIEIT Torino</i> ) Panel 1: Where Are We Now and Where Are We Headed? Chair: Roberto Napoli	Powertrain design and vehicular technology (organized by <i>IE13/IA34PEL35 and VT06/COM19</i> ) Chair: Luca Pugi	Computer science, quantum solutions and digital twins (organized by <i>CO16</i> ) Chairs: Davide Conficconi, Beatrice Bianchini  Invited Speaker Filippo Gabriele Praticò: Immersive simulations and HMI for next-generation mobility	Instrumentation and measurement (organized by <i>IM09</i> ) Chairs: Leopoldo Angrifani, Sergio Rapuano	Workshop IEEE WIE AG Italy Section annual meeting 2023 (organized by <i>WIE AG Italy</i> ) Chair: Patrizia Lamberti	Special Session B.S. and M.S. Student Competition (Part 3: presentations) (organized with <i>SKN</i> and <i>POLITO</i> ) Chair: Vinko Lesić	
10:30 - 11:00 CEST	BREAK						
11:00 - 11:30 CEST	Workshop The Electric Renaissance: the Italian Path (organized by <i>Ordine degli Ingegneri Torino</i> and <i>AIEIT Torino</i> ) Panel 2: Technological Breakthrough Options Chair: Roberto Napoli	The History Activity Committee of the IEEE Italy Section: features and activities Speaker: Massimo Guarneri ( <i>Section-History</i> ) Introduction of IEEE Standardization Process to Scholars Speaker: Tuncer Baykara ( <i>IEEE R0 Standards</i> )		Workshop A new era for funding: the role of gender equality and diversity (organized by <i>WIE R8 and WIE AG Italy</i> ) Chair: Dalana Cassioli		Workshop Soft skills for technical profiles: truth or myths Chair: Marco Santambrogio  Invited Speaker Giacomo Oliveri: Teaching to Next-Generation Engineers — Self Evaluation, Participatory Learning, and Final Examinations in E-XAM	Exhibition
11:30 - 13:00 CEST	Renewable energy (organized by <i>PE31</i> ) Chair: Alessandro Ciocia		Robotics and automation (organized by <i>RA024</i> ) Chair: Giambattista Grasso				
13:00 - 13:30 CEST	CLOSING CEREMONY Award Ceremony						
13:30 - 14:00 CEST	OPEN BUFFET						

## Technical Program - Thursday, July 6

08:15 - 17:30	Politecnico di Torino - Foyer of Aula Magna - Corso Duca degli Abruzzi 24 <b>REGISTRATIONS</b>
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08:30 - 10:30	Room 1S - Underground Floor <b>TUTORIAL T1</b>
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### **Inductive charging systems for electric vehicles: basic concepts, design and standardization**

Vincenzo Cirimele, *University of Bologna, Italy*

08:30 - 10:30	Room 3S - Underground Floor <b>TUTORIAL T2</b>
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### **Skymionics: from the topology to the applications**

Riccardo Tomasello, *Politecnico di Bari, Italy*

08:30 - 10:30	Room 9S - Underground Floor <b>TUTORIAL T3</b>
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### **Faber: a Hardware/Software Toolchain for Image Registration**

Eleonora D'Arnese, Davide Conficconi, *Politecnico di Milano, Italy*

08:30 - 10:30	Room 11S - Underground Floor <b>STUDENT COMPETITION - Competition for Secondary Schools: Best Female-leading Student Projects</b> Organized by WiE AG Italy <b>Chair:</b> Patrizia Lamberti, <i>IEEE WiE AG Italy</i>
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10:30 - 11:00 *Politecnico di Torino - Foyer of Aula Magna*  
**COFFEE BREAK**

11:00 - 13:30 *Politecnico di Torino - Aula Magna*  
**PLENARY SESSION**

### Opening Ceremony

**Welcome:** *Vincenzo Piuri, Tiziana Tambosso, Sergio Rapuano, Gianfranco Chicco*, Institutional representatives

### Plenary Speech

Orio Bellezza: Trends in Power Electronics with focus on WBG materials technology and applications

### Plenary Speech

Marcelo Masera: Energy transition: electrification, digitalization, market, resilience

### Plenary Speech

Franco Pierro: Enabling the energy transition

### IEEE Italy Section Honorary Award

Pasquale Pistorio

**Introduction on the Technical Programme:** *Sabrina Grassini, Giambattista Gruosso*

13:30 - 14:30 *Politecnico di Torino - Conference session area, Rooms "I"*  
**LUNCH**

14:30 - 16:30 *Room 11*  
**WORKSHOP - Modernization of the Electricity Industry**  
Organized by IEEE R8 AFI  
**Chair:** Nihel Ben Youssef

**Welcome** - Nihel Ben Youssef (IEEE R8 Action for Industry)

### Digitalization, Power Systems, and the Skill Shortage

*Enrico Ragaini* - ABB

**Unbreak the future: the new sustainable circuit breakers' era**

*Francesco Racheli - Col Group*

**Factors of modernization of the electricity industry with reference to companies and distribution networks as an enabling factor of development and energy transition**

*Alfonso Sturchio - e-distribuzione*

**Q&A & Round Table** - Moderator: *Nihel Ben Youssef* (IEEE R8 Action for Industry)

14:30 - 15:45 Room 3I

**Session 1.1 - Technology and digital innovations in healthcare**

Organized by EMB18, C016 and TM14

**Chairs:** Eleonora D'Arnese, Lorella Cannavacciuolo

**14:30 Stain Transfer Using CycleGAN for Histopathological Images**

Lorenzo Veronese, Isabella Poles and Eleonora D'Arnese (Politecnico di Milano, Italy); Marco D Santambrogio (Politecnico di Milano & MIT, Italy)

**14:45 Improving Sleep Quality Through an Arduino-Based Environment Sleep Monitoring System**

Carolina Salvadè, Virginia Tasso and Filippo Carloni (Politecnico di Milano, Italy); Marco D Santambrogio (Politecnico di Milano & MIT, Italy)

**15:00 Towards a Lightweight 2D U-Net for Accurate Semantic Segmentation of Kidney Tumors in Abdominal CT Images**

Luca Drole, Isabella Poles and Eleonora D'Arnese (Politecnico di Milano, Italy); Marco D Santambrogio (Politecnico di Milano & MIT, Italy)

**15:15 Disentangling the Link Between Telemedicine and Organization: Evidence From Case Studies**

Lorella Cannavacciuolo, Guido Capaldo and Cristina Ponsiglione (University of Naples Federico II, Italy)

**15:30 Digital Solution: Breaking the Barriers to Address Stigma of Mental Health**

Ahmed Mohammed Nabil Al-Gindy (Canadian University Dubai, United Arab Emirates)

14:30 - 16:00 Room 5I

**Session 1.2 - Artificial intelligence in industrial automation A**

Organized by CIS11

**Chair:** Stefano Rovetta

- 14:30 Design and Development of a Low-Cost Automated Parking System for Developing Countries**  
Joy Bhowmik, Md Fahad Monir, Sayed Abdullah Al Naiyem and Md Asfaqur Rahman (Independent University, Bangladesh); Bijoy Bhowmik (University of Michigan, USA); Tarem Ahmed (Independent University, Bangladesh (IUB), Bangladesh)
- 14:45 Ablation Studies in Activation Maps for Explainable Semantic Segmentation in Industry 4.0**  
Rokas Gipiskis (Vilnius University, Lithuania); Diletta Chiaro, Daniela Annunziata and Francesco Piccialli (University of Naples Federico II, Italy)
- 15:00 A Unified Solution for CNN Template Construction With RWC Algorithm**  
Waqas Gulzar (University of Catania, Italy); Arturo Buscarino and Luigi Fortuna (Università degli Studi di Catania, Italy)
- 15:15 Intelligent Road Safety: IoT-Enabled Drunk Driving and Accident Detection System**  
Md. Ashikur Rahman, Fatematuz Jahura, Jahid Hasan and Md. Akram Hossain Ridoy (Independent University Bangladesh, Bangladesh); Md Fahad Monir (Independent University, Bangladesh); Tarem Ahmed (Independent University, Bangladesh (IUB), Bangladesh)
- 15:30 Exploring the Efficacy of BERT in Bengali NLP: A Study on Sentiment Analysis and Aspect Detection**  
Md Junayed Hossain, Sheikh Md. Abdullah and Mohammad Barkatullah (Independent University Bangladesh, Bangladesh); Md Fahad Monir (Independent University, Bangladesh)
- 15:45 Experimental Digital Twin of a Tunnel Ring Building Erector**  
Aymen Gannouni, Ali-Emil Naqwi, Hans Aoyang Zhou, Anas Abdelrazeq and Frank Hees (RWTH Aachen University, Germany); Robert H. Schmitt (Laboratory for Machine Tools and Production Engineering WZL of RWTH Aachen Univ, Germany)

**14:30 - 16:00**      *Room 71*  
**Session 1.3 - Geoscience and Remote Sensing**  
Organized by GRS29 and GRS29#2  
**Chair:** Patrizia Savi

- 14:30 An Open Architecture for Signal Monitoring and Recording Based on SDR and Docker Containers: A GNSS Use Case**  
Iman Ebrahimi Mehr, Alex Minetto and Fabio Dovis (Politecnico di Torino, Italy); Emanuele Pica, Claudio Cesaroni and Vincenzo Romano (Istituto Nazionale di Geofisica e Vulcanologia, Italy)



- 14:45 Putting Hydrogeological Data “Into Orbit”: The Geometry of Thermo-Hydraulic Transients**  
Giovanni F Crosta (University of Milan Bicocca & Biblioteca Quadrelli Crosta, Italy)
- 15:00 Signal Preprocessing Towards IoT Acoustic Data for Farm Pest Detection**  
Destiny Kwabla Amenyedzi and Micheline Kazeneza (University of Rwanda, Rwanda); Anthony Vodacek (Rochester Institute of Technology, USA); Theofrida Julius Maginga (University of Rwanda & Sokoine University of Agriculture, Rwanda); Nzanywayingoma Frederic, Philibert Nsengiyumva and Peace Bamurigire (University of Rwanda, Rwanda); Emmanuel Ndashimye (Carnegie Mellon University Africa & University of Rwanda, Rwanda)
- 15:15 Ionospheric Scintillation Simulation Based on Neural Networks**  
Moisés José Freitas (Instituto Tecnológico de Aeronáutica, Brazil); Alison Moraes (Instituto de Aeronautica e Espaço, Brazil); Emanuel Costa (Pontifícia Universidade Católica do Rio de Janeiro (PUC-Rio), Brazil); Marcos R. O. A. Máximo (Instituto Tecnológico de Aeronáutica, Brazil); Clodoaldo Souza Faria Junior (São Paulo State University (Unesp), Brazil)
- 15:30 Remote Sensing Indicators of Air Quality and Economic Activity**  
Hanna Yailymova (Igor Sikorsky Kyiv Polytechnic Institute & Space Research Institute NAS Ukraine and SSA Ukraine, Ukraine); Andrii Kolotii (Space Research Institute NAS Ukraine and SSA Ukraine & National Technical University of Ukraine Igor Sikorsky Kyiv Polytechnic Institute, Ukraine); Nataliia Kussul (Igor Sikorsky Kyiv Polytechnic Institute & Anhalt University of Applied Science, Germany); Andrii Shelestov (Igor Sikorsky Kyiv Polytechnic Institute & Space Research Institute NAS Ukraine and SSA Ukraine, Ukraine)
- 15:45 Machine Learning Models and Technology for Classification of Forest on Satellite Data**  
Yevhenii Salii and Volodymyr Kuzin (Igor Sikorsky Kyiv Polytechnic Institute, Ukraine); Anton Hohol (Kyiv-Mohyla Academy National University, Ukraine); Nataliia Kussul (Igor Sikorsky Kyiv Polytechnic Institute, Ukraine & Anhalt University of Applied Science, Germany); Hanna Yailymova (Igor Sikorsky Kyiv Polytechnic Institute & Space Research Institute NASU-SSAU, Ukraine)

14:30 - 16:20 *Room 9I*  
**Special Session - IEEE R8 Student Paper Contest Finals**  
Organized by IEEE R8  
**Chair:** Vera Markovic

**14:30 Introduction**

- 14:40 Low-Temperature Admittance Spectroscopy for Defect Characterization in Cu(In, Ga)(S, Se)<sub>2</sub> Thin-Film Solar Cells**  
Jonathan Parion and Romain Scaffidi (ICTEAM (UCLouvain), Belgium); Denis Flandre (Université catholique de Louvain, Belgium); Guy Brammertz and Bart Vermang (IMO-IMOMEC, Belgium)
- 15:05 Coarse-Graining of Molecular Dynamics Using Neural Ordinary Differential Equations**  
Jakub Lála (Francis Crick Institute, United Kingdom (Great Britain)); Stefano Angioletti-Uberti (Imperial College London, United Kingdom (Great Britain))
- 15:30 Evaluation of Inertial Measurement Units and Non-Invasive Muscle Contraction Sensors for Monitoring Cycling Biomechanics**  
Saša Obradović and Sara Stančin (University of Ljubljana, Slovenia)
- 15:55 Knowledge Distilled Ensemble Model for sEMG-Based Silent Speech Interface**  
Qihan Yang, Wenqiang Lai, Ye Mao, Endong Sun and Jiangnan Ye (Imperial College London, United Kingdom (Great Britain))

**14:30 - 16:00 Room 111**  
**WiE Poster Session - GENEVA (Gender Equality iN rEsearch and innoVAtion)**  
Organized by WiE Italy  
**Chair:** Roberta Di Pace

**14:30 - 16:30 Demo Area**  
**Best PhD Students & YPs Demo Competition**  
Organized with YP AG Italy  
**Chair:** Sergio Rapuano

**16:30 - 17:00 Politecnico di Torino - Conference Session Area**  
**COFFEE BREAK**

**17:00 - 18:15 Room 11**  
**Session 2.1 - Smaller and smarter: new trends in radiation detectors**  
Organized by NPS05  
**Chairs:** Lodovico Ratti, Vincent Goiffon

- 17:00 Single-Photon Avalanche Diode for Scalable Particle Detection**  
Ming-Lo Wu, Emanuele Ripicini, Jad Benserhir, Francesco Gramuglia, Ekin Kizilkan, Claudio Bruschini and Edoardo Charbon (EPFL, Switzerland)
- 17:15 A Zero Dead-Time Front-End Channel in 28 nm CMOS for Future High Energy Physics Detectors**  
Andrea Galliani (INFN, Sezione di Pavia, Italy); Luigi Gaioni and Massimo Manghisoni (Università degli Studi di Bergamo, Italy); Valerio Re (University of Bergamo, Italy); Elisa Riceputi (Università degli Studi di Bergamo, Italy); Gianluca Traversi (University of Bergamo, Italy)
- 17:30 Design of CMOS Monolithic Avalanche Detectors for Charged-Particle Timing With Sub-Nanosecond Resolution**  
Lucio Pancheri and Thomas Corradino (University of Trento and TIFPA-INFN, Italy); Coralie Neubüser (TIFPA-INFN Trento, Italy)
- 17:45 Enhanced Photodetection Properties of CVD-Grown MoS<sub>2</sub> Nanosheets Onto Ag-Nanoparticles Decorated Substrates**  
Driss Mouloua (Picardie Jules Verne University & Institut National de La Recherche Scientifique, France); Mimoun El Marssi (University of Picardie Jules Verne, France); My Ali El Khakani (INRS-EMT, Université du Québec, Canada); Mustapha Jouiad (University of Picardie Jules Verne, France)
- 18:00 Bringing In-Sensor Intelligence in Radiation Detectors: A Short Review**  
Marco Carminati, Susanna Di Giacomo, Michele Ronchi, Giacomo Borghi and Carlo Fiorini (Politecnico di Milano, Italy)

17:00 - 18:15

Room 3I

**Session 2.2 - Computational intelligence in healthcare A**

Organized by EMB18 and CIS11

**Chair:** Riccardo Barbieri

- 17:00 Multiple Machine Learning Intelligent Approaches for the Heart Disease Diagnosis**  
Sanjay Dhanka (Sliet, India); Surita Maini (SLIET Longowal, India)
- 17:15 A Patient-Centric Machine Learning-Based Phone Application for Predicting the Risk of Polycystic Ovarian Syndrome**  
Navkaran Singh (National University Hospital, Singapore); Mantej Singh (Johns Hopkins University, USA); Toe Teoh Teik (Nanyang Technological University, Singapore); Mahesh Choolani (National University Hospital, Singapore); Thiam Chye Tan (Duke NUS Medical School, Singapore)

**17:30 Medical Named Entity Recognition (MedNER): A Deep Learning Model for Recognizing Medical Entities (Drug, Disease) From Scientific Texts**

Md Saef Ullah Miah (Universiti Malaysia Pahang & American International University-Bangladesh, Malaysia); Junaida Sulaiman (Universiti Malaysia Pahang, Malaysia); Talha Bin Sarwar (University Malaysia Pahang (UMP), Malaysia); Saima Sharleen Islam (University of Trento, Italy); Mizanur Rahman (Universiti Malaysia Pahang, Malaysia); Md. Samiul Haque (Tiger IT, Malaysia)

**17:45 Unsupervised Segmentation of Human Placenta Tissues Using Hyperspectral Image Analysis**

Hamzeh Issa (University of Eastern Finland & Norwegian University of Science and Technology, Norway); Mohammad Jaber (University of Eastern Finland, Finland); Aslak Tøn, Fernando Linares and Maria Santandreu Oliver (University of Eastern Finland, Norway); Joni Hyttinen (University of Eastern Finland, Finland); Antti-Pekka Elomaa and Sami Puustinen (Kuopio University Hospital, Finland)

**18:00 Multimodal Emotion Recognition From Voice and Video Signals**

Paola Barra (Università Degli Studi di Napoli Parthenope, Italy); Zied Mnasri (Università Degli Studi di Napoli L'Orientale, Italy); Danilo Greco (University of Genoa & Università Degli Studi di Napoli Parthenope, Italy)

17:00 - 18:00

Room 5I

**Session 2.3 - Artificial intelligence in industrial automation B**

Organized by CIS11

Chair: Dajana Cassioli

**17:00 Power Theory Based Dimensionality Reduction for Fault Detection and Identification in Power Electronics**

Daniel Vahle, Christian Vorobev and Volker Staudt (Ruhr-University of Bochum, Germany)

**17:15 A Reinforcement Learning Based Controller for Optimal Speed Control of a DC Motor Using Deep Q-Network Algorithm**

Federico Rossi, Giambattista Gruosso and Giancarlo Storti Gajani (Politecnico di Milano, Italy)

**17:30 Online Junction Temperature Estimation of Power Semiconductor Devices Using Neural Network and Model-Based Design**

Oleksandr Solomakha, Valentyna Afanasenko and Ingmar Kallfass (University of Stuttgart, Germany)

**17:45 Data Exchange Interoperability Protocol for Electric Vehicle Charging Systems Infrastructure**

Faizura Haneem (Universiti Teknologi Malaysia & MAMPU, Malaysia); Mohd Nazri Kama (Universiti Teknologi Malaysia, Malaysia); Roshaimieza Mat Adam (MAMPU, Malaysia); Sufyan Basri (UTM, Malaysia); Hazlifah Mohd Rusli (Universiti Teknologi Malaysia, Malaysia); Haslina Md. Sarkan (University of Technology Malaysia, Malaysia)

17:00 - 18:00

Room 71

**Session 2.4 - Smart grids**

Organized by PE31

**Chairs:** Daniela Proto, Pietro Colella

**17:00 Benefits of an Advanced AC OPF Model in the Croatian Transmission Network**

Karlo Šepetanc (University of Zagreb, Croatia); Tomislav Plavsic (HOPS, Croatia); Vladimir Valentić and Renata Rubeša (Croatian Transmission System Operator, Croatia); Hrvoje Pandzic (Fer, Croatia)

**17:15 Indirect Cyber-Physical Attack With Combined Circuit Breaker and Excitation System**

Seema Yadav (Motilal Nehru National Institute of Technology, India); Nand Kishor (Østfold University College, Norway); Shubhi Purwar (MNNIT, India); Saikat Chakrabarti (Indian Institute of Technology Kanpur, India)

**17:30 A Game Theory Approach (VCG-PSO) for Optimal P2P Energy Trading in Blockchain-Enabled Microgrids**

Oussama Laayati (University Hassan 1 Settat & Mohamed VI Polytechnic University, Morocco); Hicham El hadraoui (UM6P, Morocco); Mostafa Bouzi (FST SETTAT, Morocco); Adila El Maghraoui and Ilyass Mousaid (UM6P, Morocco); Ahmed Chebak (Mohammed VI Polytechnic University (UM6P), Morocco)

**17:45 Detection of Consumer Electrical Load Profile Anomalies**

Michael Farrugia, Kenneth Scerri and Andrew Sammut (University of Malta, Malta)

17:00 - 18:30

Room 91

**Special Session - IEEE R8 Student Paper Contest Finals**

Organized by IEEE R8

**Chair:** Vera Markovic

**17:00 Smart Assistive Wearable Device for Alzheimer's Patients**

Sarah Alyafeai, Rawan Duhaithem, Sara Alamoudi and Kawthar Moria (King Abdulaziz University, Saudi Arabia); Marwa Tharwat (King Abdul-Aziz University, Saudi Arabia)

17:00 - 18:30

*Room 111*

**WiE Poster Session - GENEVA (Gender Equality iN rEsearch and innoVAtion)**

Organized by WiE Italy

**Chair:** Roberta Di Pace

17:00 - 18:30

*Demo Area*

**Best PhD Students & YPs Demo Competition**

Organized with YP AG Italy

**Chair:** Sergio Rapuano

## Technical Program - Friday, July 7

08:15 - 17:30 *Politecnico di Torino - Conference session area*  
**REGISTRATIONS**

08:30 - 10:00 *Room 11*  
**Session 3.1 - Grid integration A**  
Organized by IE13  
**Chairs:** Patrizia Lamberti, Enrico Pons

- 08:30 Optimum Allocation of Distributed Energy Resources for Voltage Stability Enhancement and Loss Reduction**  
Khalid S. Aljebreen and Alaa E. Hussein (King Fahd University of Petroleum and Minerals, Saudi Arabia); Mohammad A. Abido (KFUPM, Saudi Arabia)
- 08:45 Power Quality Analysis of an Open-Pit Mine Electrical Network: Case Study Benguerir MinEx**  
Adila El Maghraoui (UM6P, Morocco); Younes Ledmaoui (Hassania School of Public Works, Morocco); Oussama Laayati (University Hassan 1 Settat & Mohamed VI Polytechnic University, Morocco); Ahmed Chebak (Mohammed VI Polytechnic University (UM6P), Morocco)
- 09:00 Optimal Allocation and Sizing of Shunt Active Power Filter in Radial Distribution Systems Using Particle Swarm Optimization**  
Mario Primorac (Josip Juraj Strossmayer University of Osijek & FERIT Osijek, Croatia); Zvonimir Klaic (FERIT Osijek, Croatia); Matej Žnidarec (Computer Science and Information Technology Osijek, Croatia); Heidi Adric (FERIT Osijek, Croatia)
- 09:15 Using Machine Learning to Advance Computational Efficiency in Stochastic Hosting Capacity Evaluations**  
Justice Chihota, Lewis Waswa and Bernard Bekker (Stellenbosch University, South Africa)
- 09:30 INVITED - Policies for Grid Integration of Pumped Hydro Storage**  
Carmen Lucia Tancredo

08:30 - 10:00

Room 3I

**Session 3.2 - Energy management and energy communities**

Organized by PE31

**Chairs:** Angela Russo, Cesar Diaz-Londono**08:30 Stochastic Energy Management for the Italian UNIVPM Campus as a Multi-Carrier Energy Hub Participating in the Day-Ahead Market**

Marialaura Di Somma and Amedeo Buonanno (ENEA, Italy); Martina Caliano (ENEA - Italian National Agency for New Technologies, Energy and Sustainable Economic Development, Italy); Linggang Jin and Mosé Rossi (Marche Polytechnic University, Italy); Giorgio Graditi (ENEA, Italy); Gabriele Comodi (Università Politecnica delle Marche, Italy)

**08:45 Electrical Energy Storage in a Renewable Energy Community: A Planning Approach**

Fabio Mottola and Daniela Proto (University of Naples Federico II, Italy); Angela Russo (Politecnico di Torino, Italy)

**09:00 Optimization and Redistribution Strategies for Italian Renewable Energy Communities**

Marta Stentati (Università di Siena, Italy); Simone Paoletti (Universita' di Siena, Italy); Antonio Vicino (Università degli Studi di Siena, Italy)

**09:15 Direct and Inverse Neural Modelling of Buildings HVAC Systems**

Elisa Belloni (University of Perugia, Italy); Francesco Riganti Fulginei (Roma TRE University, Italy); Gabriele Lozito (University of Florence, Italy); Davide Poli (University of Pisa, Italy)

**09:30 Example Application of an Energy Management of Energy Resources in Industrial Facilities With Renewables**

Marta Sophia Potyka (Technische Universität Dresden, Germany); Peter Schegner (TU Dresden, Germany)

**09:45 Autoencoders for Hourly Load Profile Reconstruction in Renewable Energy Communities**

Matteo Intravaia, Lorenzo Becchi, Marco Bindi, Libero Paolucci and Francesco Grasso (University of Florence, Italy)

08:30 - 10:00

Room 5I

**Session 3.3 - Computational intelligence in healthcare B**

Organized by EMB18 and CIS11

**Chairs:** Anna Maria Bianchi, Danilo Greco



- 08:30 Repurposing Electroencephalographic Signal for Automatic Segmentation of Intra-Operative Periods Under General Anesthesia**  
Oriane Saint Aubin (Assistance Publique - Hôpitaux de Paris, France); Ines Khemir (EPITA, France); Jade Perdereau (Assistance Publique - Hôpitaux de Paris, France); Cyril Touchard and Fabrice Vallee (Assistance Publique de Hôpitaux de Paris Lariboisière - Saint Louis Hospitals, France); Jerome Cartailier (Assistance Publique de Hôpitaux de Paris Lariboisière - Saint Louis Hospitals & Inserm U942, France)
- 08:45 On Using Meta-Learning to Overcome Challenges in Speaker Localization**  
Mahdi Mahmoud Barhoush (Kopernikusstraße 16 & RWTH University, Germany); Ahmed Hallawa (University Hospital RWTH Aachen, Germany); Anke Schmeink (RWTH Aachen University, Germany)
- 09:00 Variational Mode Decomposition and a Light CNN-LSTM Model for Classification of Heart Sound Signals**  
Mahmoud Fakhry (Aswan University, Egypt); Ascension Gallardo-Antolin (Universidad Carlos III de Madrid, Spain)
- 09:15 Effects of Varying k in Lk Norm Similarity Measures on a Reinforcement Learning-Based Clinical Decision Support System**  
Cristian Drudi, Maximiliano Mollura and Riccardo Barbieri (Politecnico di Milano, Italy)
- 09:30 Comparison of Multi-Site Neuroimaging Data Harmonization Techniques for Machine Learning Applications**  
Inês W Sampaio (Politecnico di Milan, Italy); Emma Tassi (Politecnico di Milano & Neurosciences and Mental Health Fondazione IRCCS Ca Granda Ospedale Maggiore Policlinico, Italy); Marcella Bellani (University of Verona, Italy); Francesco Benedetti and Sara Poletti (IRCCS Ospedale San Raffaele, Italy); Gianfranco Spalletta and Fabrizio Piras (Fondazione IRCCS Santa Lucia, Italy); Anna M. Bianchi (Politecnico di Milano, Italy); Paolo Brambilla (Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Italy); Eleonora Maggioni (Politecnico di Milan, Italy)
- 09:45 Classification of Sensory Neural Signals Through Deep Learning Methods**  
Elisa Vasta, Antonio Coviello, Umberto Spagnolini and Maurizio Magarini (Politecnico di Milano, Italy)

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*08:30 - 10:00*      *Room 71*  
**Session 3.4 - Industrial applications**  
Organized by CS23 and EMC27  
**Chairs:** Chiara Ravazzi, Xinglong Wu

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- 08:30 An Algebraic Approach to the Identification of Linear Continuous Systems Using Laguerre Networks**  
Antonia Pender (Zagreb University of Applied Sciences, Croatia); Josip Kasac, Danko Brezak and Juraj Benic (University of Zagreb, Croatia)

- 08:45 An Affordable and Effective IoT-Based Home Automation and Security System for Everyone**  
Mahbubul Haq Bhuiyan (Independent University, Bangladesh (IUB), Bangladesh);  
 Rezaul Khan Ahad, Abrar Jawad Haque and Md Fahad Monir (Independent University,  
 Bangladesh); Tarem Ahmed (Independent University, Bangladesh (IUB), Bangladesh)
- 09:00 An Approach to Provide Functional Identity Privacy in Future Railway Communications**  
 Vasil Vatakov (Todor Kableshkov University of Transport, Bulgaria); Ivaylo Atanasov  
 (Technical University of Sofia, Bulgaria); Evelina Pencheva (Todor Kableshkov  
 University of Transport, Bulgaria)
- 09:15 Educational Certification on Ethereum Blockchain: Analysis on How BCert and UZHBC Differ**  
Tanvir Ahmed Aadeef and Md Fahad Monir (Independent University, Bangladesh);  
 Sanzar A Alam (Independent University, Bangladesh & Debug BD Ltd., Bangladesh)
- 09:30 Passive Loop Optimisation for HV Joint Zone**  
Michele Quercio, Federico Campanelli and Aldo Canova (Politecnico di Torino, Italy)
- 09:45 Characterization of the Shielding Properties of a Power Transformer Enclosure**  
Michele Quercio (Politecnico di Torino, Italy); Lorenzo Barlassina (BeShielding Srl,  
 Italy); Aldo Canova (Politecnico di Torino, Italy)

08:30 - 10:15 *Room 9I*  
**WORKSHOP - EMPIR HEFMAG project (part 1)**  
 Organized by INRiM Torino  
**Chair:** Massimo Pasquale

08:30 - 13:00 *Demo Area*  
**Best Student Research Video&Poster Competition**  
 Organized with SB POLITO and HKN POLITO  
**Chair:** Mario Vařak

08:30 - 13:00 *Room 11I*  
**Best Entrepreneurship Idea demo&poster Competition**  
 Organized with IEEE R8  
**Chair:** Nihel Ben Youssef

10:15 - 10:45 Politecnico di Torino - Conference Session Area  
**COFFEE BREAK**

10:45 - 11:45 Room 11  
**KEYNOTE SPEAKERS**

### **Threats or resources? Distributed energy systems and power system resilience**

**Keynote Speaker:** *Pierluigi Mancarella*

Organized by PE31

### **A Chips Act for Europe: vision and remarks**

**Keynote Speaker:** *Enrico Sangiorgi*

Organized by ED15

10:45 - 11:45 Room 7I  
**IEEE Membership and Volunteering**  
 Organized by IEEE R8 MD  
**Speaker:** Mohab Mangoud

10:45 - 13:00 Room 9I  
**WORKSHOP - EMPIR HEFMAG project (part 2)**  
 Organized by INRiM Torino  
**Chair:** Massimo Pasquale

11:45 - 13:00 Room 1I  
**Session 4.1 - Grid services and flexibility**  
 Organized by PE31  
**Chairs:** Samuele Grillo, Carmen Lucia Tancredo

### **11:45 Flexibility of Electric Vehicle Chargers in Residential, Workplace, and Public Locations Based on Real-World Data**

Cesar Diaz-Londono and Paolo Maffezzoni (Politecnico di Milano, Italy); Luca Daniel (MIT, USA); Giambattista Gruosso (Politecnico di Milano, Italy)

### **12:00 Economic and Environmental Impact of Electric Vehicles Trends on Jointly-Acting Renewable Self-Consumers Groups**

Nicola Blasuttigh (University of Trieste, Italy); Simone Negri (Politecnico di Milano, Italy); Alessandro Massi Pavan (University of Trieste, Trieste, Italy)

**12:15 Flexibility Aggregation Perimeter for Ancillary Services in Radial Distribution Systems: An Application**

Giovanni Mercurio Casolino, Arturo Losi and Luca Del Greco (University of Cassino, Italy)

**12:30 ANN Based Energy Management System for V2X - EV Aggregator in Cold Climate Application**

Camille-Laurie Normandeau (École de Technologie Supérieure & Opal RT Technologies, Canada); Mohammad Khenar (Université du Québec en Outaouais, Canada); Jean-Nicolas Paquin (OPAL-RT Technologies, Canada); Kamal Al-Haddad (Ecole de technologie supérieure, Canada)

**12:45 A Methodology for Sizing Energy Storage Systems for Grid-Supporting Services**

Federico Rossi (Politecnico di Milano, Italy); Pier Luigi Marongiu (Sardegna, Italy); Samuele Grillo (Politecnico di Milano, Italy)

11:45 - 13:00

Room 3I

**Session 4.2 - Signal processing**

Organized by SP01

**Chair:** David Alejandro Urquiza Villalonga

**11:45 Analyzing the Dynamics of Eco-Friendly Tensegrity Structures: A System Identification Study**

Shahzeb Zafeer (University of Catania, Italy); Arturo Buscarino (Università degli Studi di Catania, Italy); Carlo Famoso (DIEEI, University of Catania, Italy); Luigi Fortuna (Università degli Studi di Catania, Italy)

**12:00 New Approach in the Creation of Region of Support of an Advanced Optimal Space/Spatial-Frequency Filter**

Veselin N. Ivanović and Nevena Radovic (University of Montenegro, Montenegro)

**12:15 Hardware Evaluation of Interference Alignment Algorithms Using USRPs for Beyond 5G Networks**

David Alejandro Urquiza Villalonga (Carlos III University of Madrid, Spain); Alejandro López Barrios (UC3M, Spain); María Julia Fernandez-Getino Garcia (University Carlos III of Madrid, Spain)

**12:30 On Hardware Implementations of Two-Dimensional Fast Fourier Transform for Radar Signal Processing**

Vukan D. Damjanović (University of Belgrade, Serbia); Marija L. Petrović and Vladimir M. Milovanović (University of Kragujevac, Serbia)

- 12:45 Design of an Experimental Electronic Nose for Data Collection for Food Quality**  
Lionel Affognon (University of Abomey-Calavi, Benin); Abdoulaye Diallo (University of Gaston Berger, Senegal); Cherif Diallo (Universite Gaston Berger & SAMOVAR Research Lab, Senegal); Eugène C. Ezin (Institut de Formation et de Recherche en Informatique (IFRI), Benin)

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11:45 - 13:00 *Room 5I*  
**Session 4.3 - Magnetic materials and components for energy applications**  
Organized by MAG33  
**Chairs:** Peter Zacharias, Luigi Solimene

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- 11:45 Neural Estimator for Inductor Losses in Buck DCDC Converters Operating in CCM**  
Gabriele Lozito (University of Florence, Italy); Vittorio Bertolini (Università degli Studi di Perugia, Italy); Francesco Riganti Fulginei (Roma TRE University, Italy); Elisa Belloni (University of Perugia, Italy); Michele Quercio (Politecnico di Torino, Italy)

- 12:00 A Nonlinear Behavioral Model of a Ferrite-Core Inductor With Fixed-Frequency Sinusoidal Voltage Input**  
Alessandro Ravera, Alberto Oliveri, Matteo Lodi and Marco Storace (University of Genoa, Italy)

- 12:15 Experimental Measurements and Numerical Computations of a Ferromagnetic Core Made by Means of Additive Manufacturing**  
Marco Stella (University of Perugia, Italy); Vittorio Bertolini (Università degli Studi di Perugia, Italy); Francesco Riganti Fulginei (Roma TRE University, Italy); Andrea Di Schino and Antonio Faba (University of Perugia, Italy)

- 12:30 Circuit Modelling of Static Magnetic Losses of Ferrite Cores and Application on an LLC Converter**  
Vittorio Bertolini (Università degli Studi di Perugia, Italy); Marco Stella (University of Perugia, Italy); Riccardo Scorretti (University of Perugia, Italy & CNRS, France)

- 12:45 Separation of AC and DC Flux Linkage Using the Example of Buck Converters**  
Peter Zacharias and Xiao Yu (Universität Kassel, Germany)

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11:45 - 13:00 *Room 7I*  
**Session 4.4 - Information theory**  
Organized by IT012  
**Chair:** Maurizio Magarini

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- 11:45 INVITED - From Domain-specific to Quantum Computing: the Role of Reconfigurable Systems**  
Davide Conficconi  
Organized by C016

- 12:00 Bitrate Analysis in 5G Networks for Video Streaming Services Using L-Moment Ratio Diagrams**  
 Juan Antonio Ortega Aparicio and David Cortés Polo (Universidad Rey Juan Carlos, Spain); Javier Carmona-Murillo (Universidad de Extremadura, Spain); Mihaela I. Chidean (Universidad Rey Juan Carlos, Spain)
- 12:15 Dirty-Paper Coding for Secret-Key Agreement Using the Linear Deterministic Model**  
Mustapha Elhalabi (Community College of Qatar, Qatar); Hoda Mokbel (Sagesse University, Lebanon)
- 12:30 OFDM Sidelobe Suppression by Time Domain Extended Active Interference Cancellation**  
Robert Frankenberg (Siemens, Austria); Christoph F Mecklenbräuker (TU Wien, Austria)
- 12:45 Highly Portable Open Source Array & Phased Antenna Simulator**  
Merve Tascioglu Yalcinkaya (Barkhausen-Institut gGmbH, Germany); Padmanava Sen (Research Group Leader, Barkhausen Institut gGmbH, Germany); Mehrab Ramzan and Gerhard Fettweis (Barkhausen Institut, Germany)

13:00 - 14:30 *Politecnico di Torino - Conference session area, Rooms "I"*  
**LUNCH**

14:00 - 14:30 *Politecnico di Torino - Conference Area*  
**POSTER SESSION - COMPETITIONS**

14:30 - 15:45 *Room 1I*  
**Session 5.1 - System, Man & Cybernetics A**  
 Organized by SMC28  
**Chair:** Giancarlo Fortino

**14:30 INVITED - Introduction to SMC and SMC Italy**

Giancarlo Fortino and Mariagrazia Dotoli  
 Organized by SMC Society

**15:00 A Contactless Sensing Method for Social Activity Recognition**

Qimeng Li and Raffaele Gravina (University of Calabria, Italy); Weilin Zang and Ye Li (Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences, China); Hongyu Wang and Giancarlo Fortino (University of Calabria, Italy)

- 15:15 Exploring the Mental State Intersection by Brain-Computer Interfaces, Cellular Automata and Biofeedback**  
Tommaso Colafiglio, Domenico Lofù and Paolo Sorino (Polytechnic University of Bari, Italy); Fabrizio Festa (Conservatorio di Musica Duni Matera, Italy); Tommaso Di Noia and Eugenio Di Sciascio (Polytechnic University of Bari, Italy)
- 15:30 Using Digital Twin to Detect Cyber-Attacks in Industrial Control Systems**  
Jacopo Pisani (Università Degli Studi Roma Tre, Italy); Graziana Cavone (Università Degli Studi di Roma Tre, Italy); Federica Pascucci (Università Degli Studi Roma Tre, Italy); Laura Giarre (Università di Modena e Reggio Emilia, Italy)

*14:30 - 15:45 Room 3I*  
**Session 5.2 - Grid integration B**  
Organized by IE13  
**Chairs:** Nicola Blasuttigh, Marziyeh Hemmati

- 14:30 Energy Management System for the Optimal Operation of a Grid-Connected Building With Renewables and an Electric Delivery Vehicle**  
Stefano Bracco and Matteo Fresia (University of Genoa, Italy)
- 14:45 The Influence of State-Of-Charge Estimation Errors on Electric Vehicle Aggregator Benefits in Frequency Containment Reserves**  
Chaowan Jamroen, Dulpichet Rerkpreedapong and Sanchai Dechanupaprittha (Kasetsart University, Thailand); Poria Astero (Aalto University, Finland)
- 15:00 Mitigation of  $2\omega$ -Ripple in PMSG-Based Wind Turbine Under Unbalanced Grid Voltages Using DOBC Along With Notch Filter**  
Moayad Alanani (United Arab Emirates University, United Arab Emirates); Rachid Errouissi (UAEU, United Arab Emirates)
- 15:15 Integrating Point Absorber Wave Energy Converters Into the Grid: An Adaptive and Stable Solution**  
Marziyeh Hemmati and Giambattista Gruosso (Politecnico di Milano, Italy)
- 15:30 Fault Ride Through Improvement Employing Individual Phase Linked Dynamic Braking Resistor for Wind Energy Integrated MMC-HVDC Transmission Network**  
Md Ismail Hossain (King Fahd University of Petroleum and Minerals, Saudi Arabia); Md. Shafiul Alam (King Fahd University of Petroleum & Minerals, Saudi Arabia); Mohammad A. Abido (KFUPM, Saudi Arabia)

14:30 - 16:30

Room 5I

**Session 5.3 - Sensors and data management in medical applications**

Organized by EMB18

**Chairs:** Sergio Cerutti, Manuela Galli**14:30 INVITED - Simultaneous recordings of MEG and intracerebral EEG**

Christian-George Bénar

**15:00 New Approach to Discover Meaningful Terms to Specify Cause of Death From Narratives Verbal Autopsy Using TF-IDF and the LDA Topic Model**

Mansour Diouf (University Iba der Thiam of Thies, Senegal); Mouhamadou Thiam (Université Iba der Thiam de Thiès, Senegal); Mathieu Roche (CIRAD, France)

**15:15 Middleware for Resource Sharing in Fog Computing With IoT Applications**

Hezekiah Yeng Samwini, Muhammad Awais and Ella G Pereira (Edge Hill University, United Kingdom (Great Britain))

**15:30 Optimization of Witness Selection for Ensuring the Integrity of Data in a Blockchain-Assisted Health-IoT System**

Rambod Pakrooh, Abdollah Jabbari and Carol J Fung (Concordia University, Canada)

**15:45 Inertial-Based Six-Minute Walking Test Assessment in Post-Covid Patients: Preliminary Results**

Serena Cerfoglio (Politecnico di Milano & IRCCS Istituto Auxologico Italiano, Italy); Paolo Capodaglio (IRCCS Istituto Auxologico Italiano & University of Turin, Italy); Paolo Rossi (Clinica Hildebrand Centro di Riabilitazione Brissago, Switzerland); Federica Verme and Gabriele Boldini (IRCCS Istituto Auxologico Italiano, Italy); Viktoria Cvetkova (Clinica Hildebrand Centro di Riabilitazione Brissago, Switzerland); Manuela Galli (Politecnico di Milano, Italy); Veronica Cimolin (Politecnico di Milano & IRCCS Istituto Auxologico Italiano, Italy)

**16:00 Quantitative Comparison Between Male and Female Soccer Players Motor Performance**

Giacomo Villa (Politecnico di Milano & Euleria Health, Italy); Foivos Papaioannou and Marta Galeotti (Euleria Health, Italy); Manuela Galli (Politecnico di Milano, Italy); Veronica Cimolin (Politecnico di Milano & IRCCS Istituto Auxologico Italiano, Italy)

**16:15 Anaesthesia Monitoring: From Conventional to AI-Enabled Data Acquisition Methods**

Xiaoxiao Liu (22 the Orchard, Castletroy, Co. Limerick, V94 DTY7., Ireland); Sean McGrath and Colin Flanagan (University of Limerick, Ireland); Liaoyuan Zeng (University of Electronic Science and Technology of China, China); Yiming Lei (School of EECS, Peking University, China)



14:30 - 16:00	<p><i>Room 7I</i></p> <p><b>Session 5.4 - RF and microwave devices and applications</b></p> <p>Organized by AP05/ED15/MTT17</p> <p><b>Chair:</b> Simona Donati Guerrieri</p>
14:30	<p><b>Design, Fabrication and Testing of Chewing Gum-Based Electronic Components and Sensors</b></p> <p><u>Goran Stojanovic</u>, Bojana Novakovic and Bojan Petrovic (University of Novi Sad, Serbia)</p>
14:45	<p><b>Synergic Exploitation of TCAD and Deep Neural Networks for Nonlinear FinFET Modeling</b></p> <p>Lida Kouhalvandi, Eva Catoggio and <u>Simona Donati Guerrieri</u> (Politecnico di Torino, Italy)</p>
15:00	<p><b>Screen-Printed Graphene Film Circuit Model for Microwave Applications</b></p> <p><u>Fabio Peinetti</u> (Politecnico di Torino, Italy); Simone Quaranta (Istituto Materiali Nanostrutturati - CNRISMN, Italy); Patrizia Savi (Politecnico di Torino, Italy)</p>
15:15	<p><b>Spatial Distribution of Microwave Device Harmonic Electrical Variables Through T-Dependent TCAD Simulations</b></p> <p><u>Eva Catoggio</u>, Simona Donati Guerrieri, Fabrizio Bonani and Giovanni Ghione (Politecnico di Torino, Italy)</p>
15:30	<p><b>Selected Metal Oxides Thin Films for Gas-Sensing Application in the Microwave Frequency Range</b></p> <p><u>Artur Rydosz</u>, Kamil Staszek, Dominik Grochala and Slawomir Gruszczynski (AGH University of Science and Technology, Poland); Yevhen Yashchysyn (Warsaw University of Technology, Poland); Dmytro B. But (CENTERA Laboratory, Institute of High Pressure Physics PAS, Poland &amp; V. Ye. Lashkaryov Institute of Semiconductor Physics NASU, Ukraine)</p>
15:45	<p><b>An XGBoost Machine Learning Technique for RF Energy Harvesting Prediction in IP-Enabled IoT Devices</b></p> <p>Obumeme Obiajulu Umeonwuka, Babatunde Segun Adejumoobi and <u>Thokozani Calvin Shongwe</u> (University of Johannesburg, South Africa)</p>

14:30 - 16:30	<p><i>Room 8I</i></p> <p><b>WORKSHOP - Let ideas to grow: tech transfer from research labs to successful realities - Panel 1</b></p> <p>Organized with IEEE R8</p> <p><b>Chairs:</b> Tiziana Tambosso, Marco Santambrogio</p>
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### 14:30 -14:40 - Welcome to Participants

Tiziana Tambosso - IEEE Italy Section Entrepreneurship Committee

Marco D. Santambrogio - Politecnico di Milano & NECSTLab

### Panel 1: Entrepreneurship - how to develop your entrepreneurial idea

Panel Chairs: Tiziana Tambosso & Marco D. Santambrogio

**14:40 - 14:55** - Vincenzo Piuri - IEEE R8 Director

IEEE programs to support entrepreneurship

**14:55 - 15:05** - Laura Prinzi - PoliHub - Innovation park and startup accelerator of Politecnico di Milano

PoliHub strategy for supporting innovative startups

**15:05 - 15:15** - Massimo Calzoni - Invitalia (National Agency for Inward Investment and Economic Development)

Invitalia programs to support innovative startups

**15:15 - 15:25** - Valentina Fioroni - APRE (Agency for the Promotion of European Research)

Horizon Europe program to support SME, start-up, spin-off (EIC Accelerator)

**15:25 - 15:35** - Nicolò Sanarico - Primo Ventures

A quick overview of the current status of the Italian startup & VC market

**15:35 - 15:45** - Leopoldo Angrisani - CeSMA

How Competence Centers can support and help grow startups

**15:45 - 16:30** - Q&A & Round Table

Moderator: Marco D. Santambrogio

**14:30 - 16:30**

*Room 9I*

**WORKSHOP - The versatility of magnetism: an overview on recent research in spintronics, energy and biomedicine applications**

Organized by MAG33

**Panel 1: Spintronics - Chair: Vito Puliafito**

**Panel 2: Energy - Chair: Carlo Ragusa**

### 14:30 -14:35 - Welcome to Participants

Vito Puliafito, *Politecnico di Bari*, Paola Tiberto, *INRIM Torino*, Carlo Ragusa, *Politecnico di Torino*

**Panel 1: Spintronic**

Panel Chairs: Vito Puliafito

**14:35 - 15:10** - Philippe Talatchian - SPINTEC, France, INVITED

Harnessing Stochastic and Microwave Spintronics for Unconventional Computing

**15:10 - 15:25** - Luciano Mazza - Politecnico di Bari, Italy

Simulating spintronic Ising solvers for combinatorial optimization problems

**15:25 - 15:40** - Eleonora Raimondo - Università di Messina, Italy

Static and dynamic study of skyrmions in magnetic multilayers: field-driven collapsing dynamics and temperature-gradient-driven motion

**Panel 2: Energy**

Panel Chairs: Carlo Ragusa

**15:40 - 16:15** - Frédéric Mazaleyrat - Université Paris-Saclay, France, INVITED

Modelization of powder cores permeability by statistical average chain approximation

**16:15 - 16:30** - Luigi Solimene - Politecnico di Torino, Italy

Analysis and design of inductive components and related materials for power electronics applications

**14:30 - 16:30**

*Room 111*

**Presentation HAC/SIGHT**, Theodoros Panagiotis Chatzinikolaou (IEEE R8)

**B.S. and M.S. Student Competition**

Part 1: formation of the Teams and initial activity

Organized with HKN POLITO and SB POLITO

**Chair:** Vinko Lešić

**16:30 - 17:00**

*Politecnico di Torino - Conference Session Area*

**COFFEE BREAK**

**17:00 - 18:00**

*Room 11*

**Session 6.1 - System, Man & Cybernetics B**

Organized by SMC28

**Chairs:** Laura Giarre, Giuseppe D'Aniello

- 17:00 A BERT-Based Approach to Intent Recognition**  
 Federico Roma and Giuseppe Sansonetti (Roma Tre University, Italy); Giuseppe D'Aniello (University of Salerno, Italy); Alessandro Micarelli (Università Roma 3, Italy)
- 17:15 An Optimization Tool for Displacing Photovoltaic Arrays in Polygonal Areas**  
 Nicola Mignoni, Raffaele Carli and Mariagrazia Dotoli (Politecnico di Bari, Italy)
- 17:30 Set-Theoretic Receding Horizon Control for Nonlinear Systems: A Data-Driven Approach**  
 Francesco Giannini, Giuseppe Franzè, Francesco Pupo and Giancarlo Fortino (University of Calabria, Italy)
- 17:45 A Distributed Ensemble of Diverse Deep Learning Models for Predicting COVID-19 Cases**  
Mohammad Mehedi Hassan (King Saud University, Saudi Arabia); Mabrook AL-Rakhami (Chair of Pervasive and Mobile Computing & King Saud University, Saudi Arabia); Salman A AlQahtani and Ahmed Zohier Elhendi (King Saud University, Saudi Arabia)

17:00 - 17:45 Room 3I

**Session 6.2 - Energy systems and applications**

Organized by PE31 and CSC41

**Chairs:** Alessandro Lo Schiavo, Andrea Mazza

- 17:00 Optimal Voltage Profile for MPPT in Piezoelectric Energy Harvesters Loaded by Diode Bridge Rectifiers**  
 Luigi Costanzo, Alessandro Lo Schiavo and Massimo Vitelli (Università degli Studi della Campania Luigi Vanvitelli, Italy)
- 17:15 Stochastic Description of a Matched-Load Mechanical Energy Harvester**  
Kailing Song (Univ School for Adv Studies Pavia, Italy); Michele Bonnin (Politecnico di Torino, Italy); Fabio Traversa (MemComputing, Inc., USA); Fabrizio Bonani (Politecnico di Torino, Italy)
- 17:30 100kW 6-12 Krpm ALA Rotor Traction Motor: Preliminary Design With Key Electromagnetic FEM Validation**  
 Ion Boldea (University of Timisoara, Romania); Ileana Torac (Romanian Academy Timisoara Branch, Romania); Lucian Nicolae Tutelea (Politehnica University Timisoara, Romania)

17:00 - 18:00

Room 51

**Session 6.3 - Electrical system control, diagnostics and insulation**

Organized by PE31 and DEI32

**Chairs:** Filippo Spertino, Paolo Seri

**17:00 Electric Field Enhancement During Voltage Polarity Reversals in Lapped HVDC Cables**  
Bassel Diban and Giovanni Mazzanti (University of Bologna, Italy); Antonio Battaglia (TERNA, Italy); Massimo Marzinotto (Terna, Italy)

**17:15 Voltage Profile Improvement in Distribution Network Under Transient Solar Radiation Conditions**  
Anju Yadav (MNNIT Allahabad, India); Nand Kishor (Østfold University College, Norway); Richa Negi (Motilal Nehru National Institute of Technology, India); Mikael Opas and Petra Raussi (VTT Technical Research Centre of Finland, Finland)

**17:30 X-In-The-Loop Test Environment for Standardized Development of Photovoltaic Inverters**  
Philipp Schmitz (Hochschule Bonn-Rhein-Sieg, Germany); Derk Gonschor and Marco Jung (Bonn-Rhein-Sieg UAS, Germany)

**17:45 Data-Driven Diagnostics for Electric Traction Systems: A Study of Induction Motor**  
Hicham El hadraoui (UM6P, Morocco); Oussama Laayati (University Hassan 1 Settat & Mohamed VI Polytechnic University, Morocco); Ahmed Chebak (Mohammed VI Polytechnic University (UM6P), Morocco); Adila El Maghraoui (UM6P, Morocco); Erroumayssae Sabani (Chouaib Doukkali University, Morocco); Mourad Zegrari (Université Hassan II Casablanca, Morocco)

17:00 - 17:45

Room 71

**Session 6.4 - Smart sensors**

Organized by SEN39

**Chairs:** Heinz-Christoph Neitzert, Catalina Ramirez

**17:00 Motion Measurement Methods for Nonlinear Analysis of Electrostatic MEMS Resonators**  
Mehdi Ghommem and Basil Alattar (American University of Sharjah, United Arab Emirates); Michael Lherbette (SmarAct Metrology); Alaaeldin Elhady and Eihab Abdel-Rahman (University of Waterloo, Canada)

**17:15 Codesign Simple Technology to Automate the Irrigation of Small Crops in Rural Communities in Colombia**  
Catalina Ramirez (Universidad de los Andes, Colombia); Sebastian Arevalo (Master, Colombia); Federico De Angulo (Andes, Colombia); Matteo Deponti (Politecnico di Milano, Italy); Paula Castro (UniAndes, Colombia)

**17:30 Very Simple and Sensitive Low-Cost PEDOT: PSS Temperature and Breathing Sensor**  
Heinz-Christoph Neitzert (Salerno University, Italy)

*17:00 - 18:30 Room 8I*

**WORKSHOP - Let ideas to grow: tech transfer from research labs to successful realities - Panel 2**

Organized with IEEE R8

**Chairs:** Tiziana Tambosso, Mirko Coggi

**17:00 - 17:05 - Introduction**

**17:05 - 17:15** - Marco D. Santambrogio - Politecnico di Milano  
 Leonardo the “Multimagineering” Project

**17:15 - 17:20** - Marios Antoniou - IEEE VP-TA  
 Some examples of successful startups - guidelines for success

**17:20 - 17:30** - Bruno Vusini, Managing Director - AMC Instruments  
 AMC Instruments - from an idea to the market

**17:30 - 17:40** - Guido Walter Di Donato, CEO - GenoGra  
 GenoGra: Next-Generation Genome Analysis Pipeline

**17:40 - 17:50** - Sara Notargiacomo, CBO - HUXelerate  
 Huxelerate: Bringing Software Performance Optimization Research into the Market

**17:50 - 18:00** - Andrea Gulisano, Chief Executive - Wave for Energy

**18:00 - 18:30** - Q&A round table  
 Moderator: Mirko Coggi (Politecnico di Milano)

*17:30 - 18:30 Room 9I*

**WORKSHOP - The versatility of magnetism: an overview on recent research in spintronics, energy and biomedicine applications**

Organized by MAG33

**Panel 3: Biomedicine - Chair:** Paola Tiberto

**Panel 3: Biomedicine**

Panel Chairs: Paola Tiberto

**17:00 - 17:35** - Marco Coisson - INRIM, Torino, Italy, INVITED  
 Fe-oxide Nanoparticles for Magnetic Hyperthermia: Routes for Determining their Heating Power

**17:35 - 17:50** - Gabriele Barrera - INRIM, Torino, Italy  
 Factors affecting Magnetic Particle Imaging: Frequency-sustained Hysteresis and Dipole-dipole Interactions

**17:50 - 18:05** - Riccardo Ferrero - INRIM, Torino, Italy  
 Influence of magnetic nanoparticles clustering and magnetic field excitation on hyperthermia properties

<i>17:00 - 18:30</i>	<i>Room 111</i> <b>B.S. and M.S. Student Competition</b> Part 2: team work Organized with HKN POLITO and SB POLITO <b>Chair:</b> Vinko Lešić
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<i>19:00 - 20:30</i>	<b>Bus transportation to the Museo dell'Automobile and short free visit to the museum</b>
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<i>20:30 - 23:00</i>	<i>Museo dell'Automobile - Torino</i> <b>CONFERENCE DINNER</b> <b>IEEE Region 8 Student Paper Awards</b> <b>Conference Competition Awards</b>
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## Technical Program - Saturday, July 8

08:30 - 12:00 *Politecnico di Torino - Conference session area*  
**REGISTRATIONS**

09:00 - 10:30 *Room 11*  
**WORKSHOP - The Electric Renaissance: the Italian Path**  
 Organized with Ordine degli Ingegneri Torino and AEIT Torino  
**Panel 1: Where Are We Now and Where Are We Headed?**  
**Chair:** Roberto Napoli

**09:00 - 09:10 - Welcome to the Participants by the Presidents of:**

- **Beppe Ferro**, Presidente Ordine degli Ingegneri della Provincia di Torino
- **Giuseppe Parise**, Presidente generale AEIT (Associazione Italiana di Elettrotecnica, Elettronica, Automazione, Informatica e Telecomunicazioni)

**09:10 - 10:30 - Session 1: Where are we now and where are we headed?**

**Chair:** Roberto Napoli

**09:10 - 09:35** - Changes are required - the realistic Italian options

Roberto Napoli, Politecnico di Torino

**09:35 - 10:00** - Preparing the new human resources and research environment in the Academia  
 Matteo Sonza Reorda, Vice-Rector for Research, Politecnico di Torino

**10:00 - 10:25** - The Italian research visions

Fabrizio Pilo, ENSIEL and CIREDE delegate, Univ. of Cagliari

**10:25 - 10:30** - Closing Remarks and Q&A

09:00 - 10:15 *Room 31*  
**Session 7.1 - Powertrain design and vehicular technology**  
 Organized by IE13/IA34/PEL35 and VT06/COM19  
**Chair:** Luca Pugi



- 09:00 Simulation of an Innovative Moving Recharge System for Public Transportation Systems**  
Luca Pugi, Adriano Alessandrini, Lorenzo Berzi and Giovanni Nassini (University of Florence, Italy); Fernando Ortenzi (ENEA, Italy); Fabio Cignini (Enea & Research Centre, Italy)
- 09:15 Application of Static Parking Recharge to Multi Modal Fuel Cell Trains**  
Luca Pugi (University of Florence, Italy); Carlo Carcasci (Dept. Of Industrial Engineering, University of Florence, Italy); Francesco Poli, Alessandro Mati and Lorenzo Berzi (University of Florence, Italy)
- 09:30 Rule-Based Energy Supervisory in Racing Hybrid-Electric Powertrain for Minimizing the Racetrack Time**  
Alessandro Campanini, Mattia Simonazzi, Fabio Peirano and Claudio Rossi (University of Bologna, Italy)
- 09:45 LETSCOPE: Lifecycle Extensions Through Software-Defined Predictive Control of Power Electronics**  
Anqi Chu (Karlsruhe Institute of Technology, Germany); Chris Hermann (University of Stuttgart, Germany); Johannes Silz and Johannes Pfau (Karlsruhe Institute of Technology, Germany); Kevin Muñoz Barón (University of Stuttgart, Germany); Nidhi Anantharajaiah, Patrick Schmidt, Tim Hotfilter, Xiang Xie and Juergen Becker (Karlsruhe Institute of Technology, Germany); Ingmar Kallfass and Jörg Roth-Stielow (University of Stuttgart, Germany); Wilhelm Stork (Karlsruhe Institute of Technology, Germany)
- 10:00 Impact of the Increasing Integration of Photovoltaic Systems and Charging Stations for Electric Vehicles With Vehicle-To-Grid Concept on Voltage Stability of the Distribution Grid**  
Ruzica Kljajic and Nemanja Mišljenović (FERIT Osijek, Croatia); Predrag Marić (Josip Juraj Strossmayer University of Osijek, Croatia)

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09:00 - 10:30 *Room 51*  
**Session 7.2 - Computer science, quantum solutions and digital twins**  
Organized by C016  
**Chairs:** Davide Conficconi, Beatrice Bianchini

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- 09:00 Comparative Analysis of Tabular Generative Adversarial Network (GAN) Models for Generation and Validation of Power Grid Synthetic Datasets**  
Darshana Upadhyay and Qiaodan Luo (Dalhousie University, Canada); Jaume Manero (Universitat Politècnica de Catalunya, Spain); Marzia Zaman (Cistel Technology Inc., Canada); Srinivas Sampalli (Dalhousie University, Canada)

- 09:15 Co-Designing an FPGA-Accelerated Encryption Library With PYNQ: The Pynqrypt Case Study**  
Roberto Bertolini, Filippo Carloni and Davide Conficconi (Politecnico di Milano, Italy)
- 09:30 A Bird's Eye View on Quantum Computing: Current and Future Trends**  
Beatrice Branchini, Davide Conficconi, Francesco Peverelli and Donatella Sciuto (Politecnico di Milano, Italy); Marco D Santambrogio (Politecnico di Milano & MIT, Italy)
- 09:45 On the Design and Characterization of Set Packing Problem on Quantum Annealers**  
Marco Venere, Giuseppe Sorrentino, Beatrice Branchini, Davide Conficconi, Elisabetta Di Nitto and Donatella Sciuto (Politecnico di Milano, Italy); Marco D Santambrogio (Politecnico di Milano & MIT, Italy)
- 10:00 Exploring the Suitability of a Digital Twin- and eXtended Reality-Based Telepresence Platform for a Collaborative Robotics Training Scenario Over Next-Generation Mobile Networks**  
 Davide Calandra, Filippo Gabriele Praticcò, Jacopo Fiorenza and Fabrizio Lamberti (Politecnico di Torino, Italy)
- 10:15 INVITED - Immersive simulations and HMI for next-generation mobility**  
 Filippo Gabriele Praticcò

09:00 - 10:15 Room 7I

**Session 7.3 - Instrumentation and measurement**

Organized by IM09

**Chairs:** Leopoldo Angrisani, Sergio Rapuano

- 09:00 High-Speed Eddy Current Detection of Welding Artifacts**  
Ondrej Fidra and Radislav Smid (Czech Technical University in Prague, Czech Republic)
- 09:15 Characterization of Digitizers for Combined and Composite Waveform**  
Stefano Emilio Caria (INRiM & Politecnico di Torino, Italy); Ahmet Merev (TÜBITAK National Metrology Institute, Turkey); Paolo E Roccato (Istituto Nazionale di Ricerca Metrologica, Italy); Serkan Dedeoglu (TUBITAK National Metrology Institute, Turkey)
- 09:30 Experimental Methodology for Measuring Performance of 3D Printed Coiled Flow Reactors**  
Aleksandar Josifovic and Maria Cecilia Barrera (University of Strathclyde, United Kingdom (Great Britain)); Damien Leech and Ricky Wildman (University of Nottingham, United Kingdom (Great Britain)); Gareth I Alford (GSK, United Kingdom (Great Britain)); Alastair Florence and Cameron Brown (University of Strathclyde, United Kingdom (Great Britain))

**09:45 Enhancing Industrial Inspection With Efficient Edge Illumination x-Ray Phase Contrast Simulations**

Nicholas Francken and Pavel Paramonov (University of Antwerp, Belgium); Jan Sijbers (University of Antwerp, Belgium, Belgium); Jan De Beenhouwer (University of Antwerp, Belgium)

**10:00 WiFi Indoor Positioning System Based on OpenWRT**

Rebeca Estrada (Escuela Superior Politécnica del Litoral, Espol, Guayaquil, Ecuador & Facultad de Ingeniería en Electricidad y Computación, Ecuador); Irving Valeriano (Escuela Superior Politecnica del Litoral, Ecuador); Xavier Aizaga and Lourdes Vargas (Escuela Superior Politecnica del Litoral Espol, Ecuador); Nelson Vera (Escuela Superior Politécnica del Litoral, Ecuador); Diego Zambrano (Escuela Superior Politecnica del Litoral Espol, Ecuador)

09:00 - 10:30

Room 9I

**WORKSHOP - IEEE WIE AG Italy Section annual meeting 2023**

Organized by WiE AG Italy

**Chair:** Patrizia Lamberti

09:00 - 10:30

Room 11I

**Special Session - B.S. and M.S. Student Competition**

Part 2: presentations

Organized with HKN POLITO and SB POLITO

**Chair:** Vinko Lešić

10:30 - 11:00

Politecnico di Torino - Conference Session Area

**COFFEE BREAK**

11:00 - 13:00

Room 1I

**WORKSHOP - The Electric Renaissance: the Italian Path**

Organized with Ordine degli Ingegneri Torino and AEIT Torino

**Panel 2: Technological Breakthrough Options**

**Chair:** Roberto Napoli

**11:00 - 13:00 - Session 3: Technological Breakthrough Options**

Chair: Roberto Napoli

**11:00 - 11:25** - The hydrogen option

Massimo Santarelli, Hydrogen Team Politecnico di Torino

**11:25 - 11:55** - Successful nuclear technologies of the fast-growing NewCleo Company

Luciano Cinotti, Chief Scientific Officer NewCleo

**11:55 - 12:20** - The role of the transmission system and the smart interactions with the distributed generation

Enrico Maria Carlini, Terna Power System Planning and Permitting

**12:20 - 12:40** - The Industrial vision

Marco Paludetto, *Global Product Manager Smart Power ABB*

**12:40 - 13:00** - Closing Remarks and Q&A

11:00 - 11:30

Room 3I

#### KEYNOTE SPEAKERS

### The History Activity Committee of the IEEE Italy Section: features and activities

**Speaker:** *Massimo Guarnieri*

(IEEE Italy Section-History)

### Introduction of IEEE Standardization Process to Scholars

**Speaker:** *Tuncer Baykas*

(IEEE R8 Standards)

11:00 - 13:00

Room 9I

#### **WORKSHOP - A new era for funding: the role of gender equality and diversity**

Organized by WiE R8 and WiE AG Italy

**Chair:** Dajana Cassioli

11:00 - 13:00

Room 11I

#### **WORKSHOP - Soft skills for technical profiles: truth or myths**

**Chair:** Marco Santambrogio

### Invited Speaker

Giacomo Oliveri: Teaching to Next-Generation Engineers - Self Evaluation, Participatory Learning, and Final Examinations in E-XAM

11:30 - 12:45

Room 3I

**Session 8.1 - Renewable energy**

Organized by PE31

**Chair:** Alessandro Ciocia

**11:30 Implementation and Comparative Assessment of MPPT Techniques in MPC Based Grid-Connected PV System**

Jubaer Ahmed (Edinburgh Napier University, United Kingdom (Great Britain)); Prabhat R Bana and Mohammad Amin (Norwegian University of Science and Technology, Norway)

**11:45 A Novel Quasi-Resonant Battery Charger for Photovoltaic Applications**

Stefano Cerutti, Francesco Musolino and Paolo S. Crovetto (Politecnico di Torino, Italy)

**12:00 Towards the Electrical Self-Sufficiency of a University Campus: Techno-Economic Case Studies**

Alessandro Ciocia, Valeria Cocina, Giovanni Grosso and Gianfranco Chicco (Politecnico di Torino, Italy); Davide Astolfi (University of Perugia, Italy); Filippo Spertino (Politecnico di Torino, Italy)

**12:15 Performance Optimization of a Residential Microgrid Balancing Economic and Energy Issues**

Marialaura Di Somma (ENEA, Italy); Vincenzo Di Dio (University of Palermo, Italy); Salvatore Favuzza (Università di Palermo, Italy); Francesco Montana, Vincenzo Porgi and Gaetano Zizzo (University of Palermo, Italy)

**12:30 Enhancing Wind Turbine Power Curve Monitoring With eXplainable Artificial Intelligence Techniques**

Davide Astolfi (University of Perugia, Italy); Fabrizio De Caro and Alfredo Vaccaro (University of Sannio, Italy)

11:30 - 12:45

Room 5I

**Session 8.2 - Robotics and automation**

Organized by RA024

**Chair:** Giambattista Gruosso

**11:30 Classification of EEG Signals Using a Common Spatial Pattern Based Motor-Imagery for a Lower-Limb Rehabilitation Exoskeleton**

Chih-Jer Lin and Chia-Hui Lin (National Taipei University of Technology, Taiwan)

**11:45 Development of Programmable Logic Controller Emulator With QEMU**

Petar Kovač, Ardian Pantina, Stjepan Gros and Damir Sumina (University of Zagreb, Croatia)

**12:00 Real-Time Performance Monitoring of CNC Milling Machines Using ROS 2 and AWS IoT Towards Industry 4.0**

Deep Patel (IIITDM Kancheepuram, India); Sreekumar Muthuswamy (IIITD&M Kancheepuram, India); Chayan Maiti (IIITDM Kancheepuram, India)

**12:15 Robotics Framework for Object Tracking Using FPGA With Novel Automatic Image Labelling**

Mads F Høffer, Karl-Emil Storm S Koldkjær, Ditlev S Andersen, Victor D Herlev, Søren D. Abrahamsen, Frederik F. Nyboe, Nicolaj H. Malle and Emad S. Ebeid (University of Southern Denmark, Denmark)

**12:30 Design of an Automated Flotation Cell for Laboratory Operations Using Model-Based System Engineering**

Amine Ennawaoui (Green Tech Institute Mohammed VI Polytechnic University, Morocco); Younes Chhiti (ENSC, Ecole Nationale Supérieure de Chimie, Ibn Tofail University - Kenitra & ILO-Université Mohammed VI Polytechnique - Ben Guerir, Morocco); Mohammed Bensitel (Laboratory of Catalysis and Corrosion of Materials (LCCM), Morocco); Ilyass Mousaid (UM6P, Morocco); Chouaib Ennawaoui (National School of Applied Sciences, Chouaib Doukkali University, El Jadida, Morocco); Ahmed Chebak (Mohammed VI Polytechnic University (UM6P), Morocco)

13:00 - 13:30

**CLOSING CEREMONY  
Award Ceremony**

Dr. Roger P. WELLINGER (1919-2014), IEEE Reg.8 Director 1969-70, the pioneer who laid the foundation of the first EUROCON, 1971 in Lausanne, Switzerland

**Speaker:** Hugo F. Wyss

13:30 - 14:00

*Politecnico di Torino - Conference Session Area*  
**OPEN BUFFET**