region 8 IEEE

IEEE ITALY SECTION

Università degli Studi di Palermo

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20th IEEE MEDITERRANEAN ELETROTECHNICAL CONFERENCE

IEEE MELECON 2020

LIVE EVENTS / JUNE 15 - 18, 2020

VIRTUAL CONFERENCE

CONFERENCE **PROGRAM**

For further information, visit the website
www.melecon2020.org

IAS IEEE INDUSTRY APPLICATIONS SOCIETY Linking Research to Practice

ABB

IEEE Entrepreneurship

Città di Palermo

sensors an Open Access Journal by MDPI

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WELCOME MESSAGE FROM THE IEEE MELECON 2020 GENERAL CHAIRS

It is our great pleasure to welcome you to the 20th Edition of the Mediterranean Electrotechnical Conference (MELECON) that initially scheduled to be held on June 16-18, 2020 in Palermo, has been moved to Virtual, due to COVID-19 sanitary emergency.

IEEE MELECON 2020 is a major international forum presenting design methodologies, techniques and experimental results in emerging electro-technologies. It is one of the flagship conferences of the IEEE

Region 8 (the largest region of IEEE including Europe, Africa and Middle East).

This year the main tracks of the conference are: Smart Mobility, Industry 4.0, Smart Healthcare and Smart Grids. The strong technical programs with 18 sessions, 5 keynote speakers, 6 invited speakers and 5 tutorials is enriched by a number of special events with competitions (R8 Student Paper Contest, Best Research Activity Pitch Presentation of PhD Students and Young Professionals, Best Entrepreneurship Activity Pitch Presentation) and panels (WIE special event and Special Meeting on Innovative startups and entrepreneurs).

This year we have the Technical sponsorship of Industry Application Society and IEEE Entrepreneurship and the financial sponsorship of ABB.

The Award Ceremony, will take place during the closing session with the announcement of the winners of the various competitions and of the best paper award.

We would like to give a greatly welcome to MELECON 2020, the conference participation is free of charge in order to allow all interested people to take part in this special "virtual" edition of MELECON.

Warmest Regards,

Tiziana Tambosso
Guido Ala
Bernardo Tellini

TECHNICAL PROGRAM COMMITTEE CHAIRS' WELCOME LETTER

The Technical Program of 20TH IEEE MEDITERRANEAN ELETROTECHNICAL CONFERENCE 2020 is very rich: it includes 19 technical sessions with 128 contributed papers, a student paper contest session, 11 invited talks and keynote speakers, five tutorials on very hot topics and a Special meeting on innovative start ups & entrepreneurs in which incubators, associations and foundations can share their ideas for nurturing a favourable ecosystem toward an altruistic model of economy.

In addition the program includes:

- a Student & Young Professional Video Competition with the focus on "My research in 5 minutes";
- a Start Ups & Entrepreneurs Video Competition with the focus on "My entrepreneurship idea in 5 minutes";
- a WIE event organized by the IEEE Women in Engineering Italian Affinity Group in cooperation with other two Italian Associations AICA and AEIT;

We would like to thank all technical sponsors for their support and promotion, the track chairs and session chairs for their essential work of organization and management of the technical sessions, all the reviewers who assured a high quality of papers.

Last but not least, a special thank to the organizing team of the University of Palermo whose effective contribution and enthusiastic work ensured the realization of this event.

Hope you all can enjoy IEEE MELECON 2020!

With our best regards,

Giambattista Gruosso
Gaetano Zizzo

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Vincenzo Di Dio, University of Palermo

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Salvatore Favuzza, University of Palermo

Vincenzo Di Dio, University of Palermo

Special Meeting and Exhibition for "Innovative Start Up and Entrepreneurship"

Vincenzo Piuri (IEEE Italy Section Entrepreneurship Coordinator)

Tiziana Tambosso (Corresponding member of IEEE Region 8 Action for Industry Sub-Committee)

Women in Engineering Event

Dajana Cassioli, IEEE Italy Section WIE-AG Chair

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IEEE MELECON 2020 LIVE STREAMING EVENTS

MONDAY, JUNE 15 - TUTORIALS		
09:00 - 11:00 CET	**TUTORIAL 1 - TRACK 3** INtra-body communication technologieS In smarT healthcarE (INSITE) *Laura Galluccio (University of Catania, Italy), Anna Vizziello and Pietro Savazzi (University of Pavia, Italy)*	**TUTORIAL TRACK 4** IoT based methods and architectures for demand response in smart grids *Pierluigi Siano (University of Salerno)*
11:00 - 13:00 CET	**TUTORIAL TRACK 1** Smart and sustainable mobility adaptation amid Corona Virus pandemic *Carla Alexandra Silva (Universidade de Lisboa, Lisbon, Portugal)*	
14:00 - 16:00 CET	**TUTORIAL 2 - TRACK 3** Human behavior and decision making: multidisciplinary approach for investigation. Fundamentals and latest advances in research and technology *Debora Bettiga and Margherita Pillan (Politecnico di Milano, Italy)*	
16:00 - 18:00 CET	**TUTORIAL TRACK 2** LoRa Technology for IoT applications *Ilenia Tinnirello (University of Palermo, Italy)*	

TUESDAY, JUNE 16	
14:00 - 15:30 CET	OPENING SESSION OPENING KEYNOTE: Enrico Maria Carlini, *TERNA S.p.A.*
16:30 - 18:30 CET	R8 STUDENT PAPER CONTEST SESSION

WEDNESDAY, JUNE 17	
10:30 - 12:00 CET	STUDENT & YP VIDEO COMPETITION
14:00 - 15:30 CET	WIE EVENT

THURSDAY, JUNE 18	
10:30 - 12:00 CET	START UPS AND ENTREPRENEURS VIDEO COMPETITION
14:00 - 17:30 CET	SPECIAL MEETING ON INNOVATIVE STARTUPS & ENTREPRENEURS
17:30 - 17:45 CET	CLOSING SESSION AWARD CEREMONY

PROGRAM SCHEDULE - LIVE STREAMING EVENTS
MON, JUNE 15, 2020

09:00 - 11:00 CET
TUTORIAL - INtra-body communication technologieS In smarT healthcarE (INSITE)
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Debora Bettiga and Margherita Pillan (Politecnico di Milano, Italy)

16:00 - 18:00 CET
LoRa Technology for IoT applications
Ilenia Tinnirello (University of Palermo, Italy), Domenico Garlisi (CNIT)

Read more HERE

PROGRAM SCHEDULE - LIVE STREAMING EVENTS
TUE, JUNE 16, 2020

14:00 - 14:30 CET
OPENING SESSION

14:30 - 15:30 CET
OPENING KEYNOTE

Italy: mediterranean electricity hub. An overview of Terna's HVDC links for strengthening res integration

Enrico Maria Carlini, TERNA S.p.A.

Read more HERE

16:30 - 18:30 CET
R8 STUDENT PAPER CONTEST SESSION

Device for visual kinesthetic navigation of the blind and visually impaired
Kristjan Stopar, *University of Maribor, Slovenia*

An Improved Variable Neighbourhood Search Algorithm for Selective Dial-a-Ride Problems
Mark Cauchi, *University of Malta, Malta*

A Four-Quadrant Switched Capacitor DC-DC Convertor Enabling Power-Efficient Lab-Grade Potentiostats
Matthias Swiggers, *KU Leuven, Belgium*

Object-Centric Street Scene Synthesis with Generative Adversarial Networks
Maxim Van den Abeele, *KU Leuven, Belgium*

Drones for Sheep Livestock Monitoring
Najla Fahad E M Al-Thani, *Qatar University, Qatar*

PROGRAM SCHEDULE - LIVE STREAMING EVENTS
WED, JUNE 17, 2020

10:30 - 12:00 CET
STUDENT & YP VIDEO COMPETITION

14:00 - 15:30 CET
WIE EVENT

The Vision of Industry on Digital Evolution in Her Words

LIVE PANEL SESSION
Moderator: Dajana Cassioli, *Chair of the WIE AG IEEE Italy Section*
Interactivity Director: Patrizia Lamberti, *Vice-Chair of the WIE AG IEEE Italy Section*

14:00 - 14:30	Opening and Interactive Session
14:30 - 15:15	**Live Panel Discussion** with Renata MELE, Daniela SCARAMUCCIA, Silvia CIVARDI, Debora STEFANI and Roberto SARACCO
15:15 - 15:30	Closing Interactive Session

Participation in this WIE event is FREE OF CHARGE!

The five recorded presentations (slides with audio commentary) will be made available on June 12th and must be attended prior to the live event.

Read more HERE

PROGRAM SCHEDULE - LIVE STREAMING EVENTS
THU, JUNE 18, 2020

10:30 - 12:00 CET
START UPS AND ENTREPRENEURS VIDEO COMPETITION

14:00 - 17:30 CET
SPECIAL MEETING ON INNOVATIVE STARTUPS & ENTREPRENEURS

14:00 - 14:10	Welcome to participants Vincenzo Piuri, IEEE Italy Section Entrepreneurship Committee Tiziana Tambosso, IEEE R8 Action for Industry Committee
14:10 - 16:00	Panel 1: Entrepreneurship supports Moderator: Vincenzo Piuri
16:10 - 17:30	Panel 2: Successful Startups Moderator: Tiziana Tambosso

Read more HERE

17:30 - 17:45
CLOSING SESSION
AWARD CEREMONY

IEEE MELECON 2020 ON WeConf

IEEE MELECON 2020 will take place on ***WeConf*** platform that will use the Microsoft Teams platform for the live part of the Program (see Program Schedule). The IEEE MELECON 2020 Program consists of two kinds of events the live and semi-live (part of the event is pre-recorded and part is live) and the "on demand" Technical Program.

Live and semi-live events will be registered and available together with the "on demand" technical program on WeConf platform from June 15 to July 31. The access to the platform WeConf is open to all interested people. Free registration is required for participants to "on demand" Technical Program (to be GDPR compliant). Participation is free of charge. All the IEEE MELECON 2020 participants that are interested to follow the live and semi-live events, before entering WeConf are suggested to install Microsoft Teams (official link for software download).

IEEE MELECON 2020 on WeConf - https://weconf.eu/ieee-melecon-2020

IEEE MELECON 2020 Program Schedule - https://weconf.eu/ieee-melecon-2020/schedule

IEEE MELECON 2020 Free Registration - http://melecon2020.org/registration.html

IEEE MEDITERRANEAN
ELETROTECHNICAL CONFERENCE
MELECON 2020
VIRTUAL CONFERENCE JUNE 16-18, 2020

weconf

IEEE MELECON 2020 KEYNOTE SPEAKERS

OPENING KEYNOTE

LIVE EVENT - Tue, June 16, 2020
H 14:30 - 15:30

Italy: mediterranean electricity hub. An overview of Terna's HVDC links for strengthening res integration

Enrico Maria Carlini, *TERNA S.p.A.*

Graduated in Electrical Engineering with first class of honors from the faculty of 'La Sapienza Roma' University in 1991, Enrico Maria Carlini currently serves as Director of Dispatching and Operation at Terna Rete Italia. As a responsible for the "real-time" control of the National Electricity System, his main areas of attention today include: National Dispatching, Regional Control & Switching Centers, Market and operational planning, Remote control & operation system, System analysis, System protection, defense and dynamics, Operational resilience, etc. In the past Enrico occupied various management positions within Terna, as a Director of 'Grid Planning and Interconnection' between 2016 and 2018, head of the 'Management and Engineering of the Electric System' department since 2013 and responsible for the Regional Control Centre of Southern Italy since 2011. Alongside with his position in Terna, he plays several leading roles in the key organizations of the energy community, among which: ENTSO-E, Cigrè, SEERC, IEC, CEI, AEIT. Most notably, his latest achievements include: membership of the AEIT Presidential Council (from December 2019), Presidency of CORESO Regional Security Coordination initiative (btw. 2019 and 2020), membership of Cigrè SC C2 "Power System Operation and Control" (from 2017), President of CEI TC 8/123 "System requirements for electricity supply and infrastructure management" (from 2017), President of IEC TC99 "Insulation coordination and system engineering of high voltage electrical power installations above 1,0 kV AC and 1,5 kV DC" (btw. 2007 and 2016). Over nearly three decades of experience in the electricity sector, Enrico has published nearly 100 papers dealing with core technical concepts for the energy transition, digital transformation and the evolution of regulatory framework. Most notably, major objectives of his work cover topics related to distributed generation and RES integration; network development plan; restoration plan; HVDC links; energy storage; ancillary services market and capacity remuneration mechanisms; market coupling for the Internal Electricity Market; interoperability and coordination between TSO and DSOs; regional cooperation of TSOs, etc.

KEYNOTE - TRACK 1

Green ship design: marine transportation electrification and research challenges

Giorgio Sulligoi, *University of Trieste, Italy*

ABSTRACT - The keynote will present main trends and reasons for transportation electrification in the marine sector. The keynote will cover the following aspects:

- Ships power system evolution.
- Shipboard electrical applications (Integrated Power Systems).
- MVDC power systems on ships.
- Integrated Electrical/Electronics ships Power Systems design (methods and tools).
- Analysis, evaluation and re-design of different types of shipboard power systems.

SPEAKER BIO - Giorgio Sulligoi (Senior Member IEEE) earned the Ph.D. (University of Padua, 2005) and the M.Sc. (University of Trieste, 2001), both in Electrical Engineering. He is the founder and Director of the grid connected & marine Electric Power Generation and Control laboratory (EPGC lab.) at the Department of Engineering and Architecture of the University of Trieste. He joined the University of Trieste as an Assistant Professor of Electric Power Generation and Control by 2007, tenured since 2010, appointed Associate Professor of Shipboard Electrical Power Systems since 2016 and elevated to Full Professor in 2019. Dr. Sulligoi has been Deputy Rector for Community Affairs and Business Relations of the University of Trieste, Italy in 2013-2019. Prior to joining University of Trieste, he worked as Deputy Manager R&D in a small private industrial company (M.A.I. Control Systems, Milan, Italy) where he has developed, tested and commissioned innovative releases of digital voltage control systems for power stations participating to primary and secondary voltage regulation, both in Italy and abroad. Dr. Sulligoi spent a semester (2003/2004) at the University College of Cork (Dept. of Engineering) as a visiting Ph.D. student. He carried out an internship (2000/2001) at the Fincantieri design center of Trieste (Merchant Ships – Electrical and Automation office). He is the author of more than 130 scientific papers in the fields of shipboard power systems, all-electric ships, generators modeling and voltage control, where he also has earned some scientific awards. He is one of the technical program chairmen of ESARS (the International Conference on Electrical Systems for Aircraft, Railway and Ship Propulsion). He has been the Scientific Manager of the MVDC

Large Ship research program (funder: Regional Government of Trieste, lead partner: Fincantieri; research partners: University of Trieste, Polytechnic of Milan) and of the Naval Smart Grid research program (funder and lead partner: Italian Navy; research partners: University of Trieste, Polytechnic of Milan, University of Rome "Sapienza"), both in the field of the next generation integrated power systems for all electric ships. Dr. Sulligoi is a member of many technical/scientific committees and working groups in the field of marine electrical applications. He is a Registered Professional Engineer in Italy. He is member of IEEE (PES, PELS, IAS). He is a reviewer for a number of International Conferences and Journals . He is the Vice-President of the AEIT (Italian Association of Electrical Engineers) Section of the Friuli Venezia Giulia region. In the past, he has been a member of the Board of Directors of ACEGAS-APS S.p.A., distribution system operator in Trieste/Padua (traded on Milan Stock Exchange), Italy, and a member of the Board of Directors of Sincrotrone Trieste S.c.p.A., a joint stock company of national interest managing the Synchrotron Light Source "Elettra" and the Free Electron Laser "FERMI@Elettra" research laboratories in Trieste, Italy. Presently he is a member of the Board of Directors of the Maritime Technology Cluster of the Friuli Venezia Giulia region (MARE-TC FVG), in Italy, where he served also as President of the Technical-Scientific Committee. He is also member of the Boards of Directors of CINEAS (Italian Consortium in Insurance Engineering), ENSIEL (Italian Consortium on Power Systems) and CINIGEO (Italian Consortium on Georesources).

KEYNOTE - TRACK 2

A cloud on time

Johan Eker, *Ericsson Research*

ABSTRACT - The second wave of cloud service goes beyond the usual web services and includes digitalization of industrial systems. Systems that until recently have been confined to the factory floor are now being moved to the cloud. Digitalization of industry right now is mostly about data collection and rarely about closed loop control. There are several reasons for this, ranging from old habits, to security and timing concerns. Cloud services today operate on a best effort basis in general and in particular give no timing guarantees whatsoever. The timing uncertainty is inherent in the current cloud model due to a focus on compute density and resource pooling to maximize utilization, and thus minimizing cost. Until now, neither has the networks, wired or wireless, connecting the cloud service given any such guarantees. However, that is about to change. 5G URLLC will provide predictable and low latency communication, which will make cellular technology an attractive alternative for industrial applications, e.g. manufacturing and process control. In addition to the 5G standard, IEEE TSN is providing the means for predictable wired communication. Pairing these standards with predictable virtualization technologies, we have the foundation for a predictable cloud, suitable for real-time control systems.

SPEAKER BIO - Johan Eker is a Principal Researcher at Ericsson Research, Sweden. He received his Ph.D. in automatic control from Lund University in 1999 and subsequently joined the Ptolemy group at UC Berkeley. Since 2013 he is an adjoint professor in Automatic Control at Lund University. His research interests range from programming language design for parallel hardware, real-time control systems, mobile communications. software design for mobile devices, adaptive resource management, IoT and cloud technology. He is the co-designer of the CAL Actor Language, which is part of the MPEG standard ISO/IEC 23001-4:2011. He holds 62 granted patents in the areas of telecom, IoT and cloud computing. He is participating in a range of program committees and research projects on topics such as real-systems, signal processing, software development, cloud technology, brain-computer interfaces, and AI. He is involved in the operation of the Ericsson Research Data Center and works with industrial cloud applications.

KEYNOTE - TRACK 3

Developing and application of electronic noses in health care

Andreas Voss, *Ernst-Abbe-Hochschule, Jena, Germany*

ABSTRACT - In recent decades, improvements in materials, sensors, electronics and signal processing technologies have led to a rapid increase in the development and application of electronic noses (eNoses). Among the available gas sensing methods, semiconducting metal oxide gas sensors (SMOS) devices have several unique advantages, such as low cost, small size, easy measurement, durability, ease of fabrication and low detection limits (ppm level). In addition, most SMOS-based sensors are more durable and somewhat resistant to poisoning. For these reasons, they have quickly gained popularity and have become the most widely used gas sensors today. Electronic nasal systems are used among others in the food and pharmaceutical industry and also in the military. Recently eNoses have been developed for medical applications. eNoses can distinguish between different types of diseases and their severity by analyzing body odor. Especially disease-related metabolic changes, but also any kind of drug consumption can be detected on the skin surface and/or exhaled breath. We were able to show that such eNoses can be successfully used to improve the diagnosis of various diseases ranging from kidney disease to various types of carcinoma and heart disease. These and other international studies provide evidence that, after a necessary validation, a cost-effective, portable and fast working eNose system could be useful for improved diagnostics and health protection.

SPEAKER BIO - Andreas Voss (Male) is since 1997 Full Professor in Biosignal Processing and Medical Informatics at the Ernst-Abbe-Hochschule (EAH) in Jena, Germany. Before that, he worked as leader of the Biosignal Processing research group at the Max-Delbrueck-Centre for Molecular Medicine in Berlin. In 2015, he founded the Institute of Innovative Health Technologies IGHT at the EAH where he acts up to now as the director and coordinates the research between five different departments. His research interest are linear and non-linear analysis of multivariate and multiscale data and systems analysis (e.g. risk stratification in different diseases), characterizing autonomic regulation (heart diseases, schizophrenia, depression, stress...), time-frequency analyses, knowledge based interpretation of physiological and pathophysiological regulations, and electronic senses (electronic nose). Prof. Voss (h-index 37, RG score 43.54) published more than 300 papers in peer reviewed journals. He is member of scientific societies (DGBMT, European Society of

Cardiology, and IEEE), organizer, co-organizer and associated editor of various national and international conferences as well as member of scientific boards of various other academic events and scientific journals. He acts as reviewer and for many international journals, conferences and grant agencies.

KEYNOTE - TRACK 4

Cyber Security and Big Data Issues for Smart Grid Systems

Seref Sagiroglu, *Gazi University, Turkey*

ABSTRACT - Big data has potential to provide opportunities not only many fields but also power grid sectors enhancing technical, organizational, social and economic gains and contributions. The current potential of applying big data approaches for better planning, managing, designing, and securing power grid operations are very challenging tasks and needs significant efforts. This talk will cover the issues of computational complexity, data security and privacy, cost, management, planning and integration of big data into power grid systems and also focus on the key challenges of cyber security and big data issues.

SPEAKER BIO - Prof. Dr. Seref Sagiroglu completed his undergraduate education in 1987 at Erciyes University, Department of Electronics Engineering. He completed his doctoral studies at the University of Wales College of Cardiff (now Cardiff University, UK) in 1994. He continues his academic career as a professor in Software Engineering at Gazi University Computer Engineering Department. Prof. Sagiroglu has an outstanding academic with h-index=32 and i10-index=82; more than 3750 citation; 60 SCI/SSCI indexed articles, 100 national and international indexed articles; 200 national and international conference and symposium articles. He has also author and/or editor of more than 20 books, owns 6 patents and has completed national and international projects on security, big data, intelligent modeling and control, biometric, electromagnetic fields, etc. Sagiroglu has organised more than 50 national and international events on 5G, Big Data, Machine Learning, Deep Learning, Information and Cyber Security, IPv6, etc. as chairman or co-chairman. Some of them are: International Conference on Information Security and Cryptology (www.iscturkey.org); IEEE International Conference on Computer Science and Engineering (www.ubmk.org); IEEE Big Data, Deep Learning and Fighting Cyber Terrorisms (www.ibigdelft.org); IEEE International Conference on Machine Learning and Applications (www.icmla-conferences.org); Big Data Analytics, Security and Privacy Workshop (www.bigdatacenter.gazi.edu.tr); National Cyber Terrorism Conference (www.siberteror.org); Turkey Open Data Conference (www.acikveriturkiye.org); IEEE 5G Summit-Istanbul (www.ieeesummit.org); National IPv6 Conference (www.ipv6.org). He has also been founding members of Information Security Association (www.bilgiguvenligi.org.tr); Turkish Science Research Foundation (www.tubav.org.tr), and The Foundation of the People

Caring for the Future (www.gonder.org.tr). Sagiroglu has/had such duties as: President and Executive Committee Member of Information Security Association; President and Member of Turkish Science and Research Foundation; Director of Graduation School of Science and Technology at Gazi University; Head of Computer Engineering Department, Gazi University; Member of IEEE Biometric Task Force; President of IPv6 Council Turkey (www.ipv6forumtr.org); Editors of International Journal of Information Security Science (www.ijiss.org); International Journal of Information Security Engineering (in Turkish) (www.dergipark.gov.tr/ubgmd) and CyberMag (www.cybermag.com); General Director of FutureTech (www.futuretech.com.tr); Member of Cyber Security Group of Higher Education Council of Turkey; Supervisors to Havelsan; IT Regulatory Body of Turkey (BTK) and Personal Data Protection Regulatory Body of Turkey (KVKK). Prof. Sagiroglu has delivered as invited or keynote speakers more than 500 seminars, talks, conferences at universities, schools, sectors, TV and Radio Programs, institutions and organisations in the topics of Information Security, Big and Open Data, Cyber Security and Defense, Artificial Intelligence, Computer and Software Engineering, Privacy, Biometrics, Innovation Culture Creation, IPv6, 5G, etc.

IEEE MELECON 2020 INVITED SPEAKERS

Electromagnetic Compatibility in the Aircraft sector: Lightning indirect effects and innovative protection techniques for safety improvement in the air transportation systems

Presented by: Hari Prasad Rimal, *Engineering Department, University of Perugia, Italy*

ABSTRACT - Advancement in technologies has established at least two new trends in the operation and design of aircraft structure. There is increase in the use of miniaturized, solid state components in the avionic equipments, the practice that loses robustness over functionality. Similarly, the body structure of the modern aircrafts are increasingly constructed from the carbon fibre and its composites, the practice that reduces the electromagnetic shielding, as a result the electromagnetic cleanliness inside the aircraft is compromised during the transient events such as the lightning phenomenon. In the light of these facts, the lightning indirect effect protection of the avionic equipments is still a challenging job. We present an inductive filter in combination with a Metal Oxide Varistor (MOV) for a robust and reliable protection of the avionic equipments against the lightning indirect effects. Ferromagnetic core or ferrite inductor and a MOV combination has been proposed to analyse their performance in protecting the Equipments under Test (EUT) for the indirect lightning waveforms reported in the International standard for Airborne equipments RTCA/DO-160G. The results from the test of this protection system on actual avionic equipment such as DC-DC converter are also presented.

An introduction to patterns for the Internet of Robotic Things in the Ambient Assisted Living scenario

Authors: Bruno Andò, Luciano Cantelli , Vincenzo Catania, Ruben Crispino, Dario Calogero Guastella, Salvatore Monteleone and Giovanni Muscato

Presented by: Giovanni Muscato, *University of Catania, Italy*

ABSTRACT - The Internet of Things paradigm envisions the interoperation among objects, people, and their surrounding environments. In the last decade, the spread of IoT-based

solutions has been supported in a plethora of domains and scenarios by Academia, Industry, and Standards-Setting Organizations. The wide variety of applications and the need for a higher level of autonomy and interaction with the environment have recently led to the raise of the Internet of Robotic Things (IoRT), where the smart objects become autonomous robotic systems. As denoted in recent literature, many of the proposed solutions in the IoT field have to tackle similar challenges regarding management of resources, interoperation among objects, and interaction with users and the environment. Given that, the concept of IoT Pattern has been recently introduced. In software engineering a pattern is defined as a general solution that can be applied to a class of common problems. It is a template suggesting a solution for the same problem occurring in different contexts. In a similar fashion an IoT pattern provides a guide to design an IoT solution with the difference that the software is not the only element involved. Starting from this idea, we propose the novel concept of IoRT pattern. We will focus on the pattern identification and authoring process, by abstracting examples also in the assisted living scenario.

Evaluating the effectiveness of the "Individual Assistance Plan" for Italian chronic patients

Authors: Anna Alloni (Biomeris, Italy); Daniele Santonastaso (DSPS Solutions, Italy); Marco Villa (ATS Valpadana, Italy); Matteo Gabetta and Mauro Bucalo (Biomeris, Italy); Silvana Quaglini (Università di Pavia, Italy)

Presented by: Silvana Quaglini, *University of Pavia, Pavia, Italy*

ABSTRACT - The aim of this work is the evaluation of a relatively new intervention for chronic patients in Italy, namely the PAI, i.e., "Piano Assistenziale Individuale" (Individual Care Plan). It is a service based on the paradigm of the personalised medicine, which should optimize several aspects of the individual care, such as patients' compliance to therapy, ease of access to care delivery, and a tighter monitoring of the patient's status on the long run. The expected outcomes from the PAI introduction are both the improvement of the patients' status and reduction of costs for the care provider. A case-control study has been performed, involving more than 20000 patients, and preliminary results seem to confirm the effectiveness of the new service, in particular by reducing patients' access to hospital and emergency room.

Personalized Detection of Explosive Cough Events in Patients With Pulmonary Disease

Authors: Bruno M Rocha, Diogo Pessoa, Paulo Carvalho and Rui Pedro Paiva (University of Coimbra, Portugal)

Presented by: Paulo Carvalho, *University of Coimbra, Coimbra, Portugal*

ABSTRACT - We present a new method for the discrimination of explosive cough events based on a combination of spectral and pitch-related features. The method was tested on 16 distinct partitions of a database with 9 patients. After a pre-processing stage where non-relevant segments were discarded, we have extracted eight features from each of the other segments and have fed them to the classifiers. Four types of algorithms were implemented to classify the events, with Bayesian classifiers achieving the best performance. Preliminary results showed that performance increased when the analysis was performed on individual subjects and when specific sensor locations were chosen. These results demonstrate that personalizing the analysis is a promising approach and shed some light on where to put sensors when automatic analysis is performed in the future.

Contribution of smart prosumers to the grid reliability

Presented by: Diego Arnone, *Engineering I.I. S.p.A*.

ABSTRACT - The power grid is continuously evolving toward the Smart Grid concept: data and electricity move together, and Information Technology plays an even more central role in this emerging panorama. Big and small energy producers as well as consumers become both reactive and proactive stakeholders that must communicate each other and cooperate by finding a compromise between their own strategic objectives and the maximization of the power grid reliability. Demand Response, prosumers aggregation, smart storage, energy sector coupling technologies are only some for the solutions under development to mitigate the power grid voltage and frequency fluctuations. Engineering I.I. S.p.A. is a big Italian IT company, founded 40 years ago, that gets more than one forth of its revenues from the Energy and Utilities domain. Thanks to huge investments in research and development activities, Engineering is actively participating to more than 100 research co-funded initiatives, both national and H2020 research projects. A significant number of these projects are focused on the design and development of innovative IT solutions for the power grid, the energy producers and the consumers. In the role of key technology provider, Engineering has taken part of more than 20 research projects concerning the collaboration between power grid and smart prosumers and

this allows the company to offer reliable solutions to big customers like TERNA, ENEL, IREN and many other players in the energy domain. The speech will be an overview of a small subset of the "smart energy projects" that are currently ongoing in the Engineering Research and Development Laboratory.

Status and main technological challenges of the EU DEMO nuclear fusion reactor.

Authors: Pietro A. Di Maio (University of Palermo, Italy); Ilenia Catanzaro (University of Palermo, Italy); Pierluigi Chiovaro (University of Palermo, Italy); Ruggero Forte (University of Palermo, Italy); Ivo Moscato (University of Palermo, Italy); Andrea Quartararo (University of Palermo, Italy); Eugenio Vallone (University of Palermo, Italy)

Presented by: Pietro A. Di Maio, *University of Palermo, Italy*

ABSTRACT - One of the most important action envisaged by the Roadmap to Fusion Electricity Horizon 2020 is the conceptual design of a number of DEMO(nstration) plant design options. For the preliminary studies, a pulsed "low extrapolation" system is adopted, based on technologies and reliable regimes of operation which can be gathered by the ITER project [1]. In this early phase of the DEMO project, emphasis has been given to those engineering aspects and design integration issues that actually affect the architecture of a nuclear power plant, e.g. technology readiness, power conversion features, safety and related licensing aspects. This paper provides an overview of the status and main technological challenges of the EU DEMO nuclear fusion reactor.

IEEE MELECON 2020 TUTORIALS

MELECON 2020 Tutorials are pre-recorded. At the end of each tutorial there is a Q&A time (15 - 30 minutes typically) "live" with the speakers.
Tutorials will be available "on demand" on WeConf platform from June 16th to July 31st
Participation is open to all and free of charge.

TRACK 1 - Mon, June 15
H 11.00 - 13.00 CET

Smart and sustainable mobility adaptation amid Corona Virus pandemic

Carla Alexandra Silva, *Universidade de Lisboa, Lisbon, Portugal*

SUMMARY - This tutorial shows trends, before and after the CORONA virus outbreak, related to: air quality; shared mobility; public transportantion (mobility of people); eletric vehicle sales; and energy demand (highlight to eletricity and renwables share). It shows how cycling lanes are increasing, car space is being transformed in to pop up pedestrian or wider cycling lanes. New rules in public transportation enforcing social distancing and increased hygiene boost 50% lower passenger occupancy, leading to higher MJ/pkm and post-covid loss of revenue. It shows a SWOT-Strenghts; Weaknesses; Opportunities and Threads analysis of having the virus in our community in terms of our commuting/road transport system and our air quality and global warming impact. Internet of Things and digitalization boost is proved, e.g., by commuter applications, tracking people gathering and drone information systems, etc. Major opportunities for autonmous vehicle at public transportation and last mile delivery are exploited. Finally some concluding remarks are presented as take away lessons.

SPEAKER BIO – **Carla Silva** is a Mechanical Engineering and got the PhD degree in Mechanical Engineering in 2005, in the area of internal combustion engine vehicle simulation, University of Lisbon, Portugal. She went for a post doc at both IST and University of Michigan working on CO2 mitigation in road vehicles. She was a senior researcher at the Institute of Mechanical Engineering IDMEC 2008-2015. She is now assistant professor at the Department of Geographic, Geophysics and Energy Engineering. She teaches, in the integrated master of Energy and Environment Engineering, the courses of Sustainable Mobility, Bioenergy, Combustion Technologies, Life cycle Assessment and Electrical circuits. She has supervised more than 50 MSc and 10 Phd students. She has 2 books, 4 book chapters, more than 50 papers in

international peer-reviewed journals (h=26 google scholar) and more than 50 papers in international conferences. Has been awarded with 8 prizes, including the best mechanical engineering internship and the 3M prize for innovation. Areas of interest are system energy and emission analysis; new fuels; biomass; biorefinery; alternative road vehicle simulation; energy and environment impacts; city air quality; life cycle assessment, indicators for sustainable systems.

TRACK 2 - Mon, June 15
H 16.00 - 18.00 CET

LoRa Technology for IoT applications

Ilenia Tinnirello, *University of Palermo, Italy*
Domenico Garlisi, *CNIT, Italy*

SUMMARY - In this tutorial we present the main features of LoRa technology and LoRaWAN systems, for the deployment of large-scale IoT applications. First, we present some basic concepts of LoRa modulation and discuss the implications on coverage and interference-rejection capabilities. We show that collisions between packets modulated with the same Spreading Factor (SF) usually lead to channel captures, while different spreading factors can indeed cause packet loss if the interference power is strong enough. Second, we discuss some simple models able to quantify the achievable capacity in a typical LoRa cell: we show that high SFs, generally seen as more robust, can be severely affected by inter-SF interference and that different criteria for deciding SF allocations within the cell may lead to significantly different results. We discuss the capacity improvements that can be achieved by increasing the density of LoRa gateways. Finally, we present some real-world applications and experimental data from one of the biggest Italian LoRaWAN provider.

SPEAKERS BIO - **Ilenia Tinnirello** received the Ph.D. degree in telecommunications engineering from the University of Palermo in 2004, where she is currently an Associate Professor. She has also been a Visiting Researcher with the Seoul National University, South Korea, since 2004, and the Nanyang Technological University of Singapore since 2006. Her research activities have been mainly focused on wireless networks, in particular on the design and prototyping of protocols and architectures for reconfigurable wireless networks, 5G cellular networks and IoT applications. She has been involved in several European research projects, including the FP7 FLAVIA project in the role of Technical coordinator, and the H2020 WiSHFUL, Flex5Gware and SymbIoTe projects.

Domenico Garlisi is CNIT researcher working at the University of Palermo. He received a Ph.D. degree in Engineering Electronic and Telecommunication at the University of Palermo, in 2014. He has been involved in several national and European research projects, he has worked on H2020 WiSHFUL project, H2020 Flex5Gware project and H2020 Symbiote project. He is involved in national project on IoT LPWA. He has been a visiting researcher at the Department of

Computer Science, UCLA, in 2013, working on wireless protocol optimizations for vehicular networks. His main research are related to wireless networks, software defined radio, IoT networks, vehicular networks and wireless systems for user localization and testing.

TRACK 3 - Mon, June 15
H 09.00 - 11.00 CET

INtra-body communication technologieS In smarT healthcarE (INSITE)

Laura Galluccio, *University of Catania, Italy*
Anna Vizziello, *University of Pavia, Italy*
Pietro Savazzi, *University of Pavia, Italy*

SUMMARY - In this tutorial novel and safe communication technologies for intra-body area networks will be discussed. In particular this tutorial will focus on ultrasounds and coupling techniques for communications inside the human body with the specific aim of overcoming the limitations and weaknesses of the currently employed radio frequency waves (e.g. those considered in IEEE 802.15.4 and IEEE 802.15.6 standards for low power and Wireless Body Area Networks) and performing efficient, low power and safe communications. To this aim we will start by describing a generic architecture for BANs, analyzing the proposed standards and then we will focus more in detail on the body issues, thus highlighting the unique features of the human tissues. To this aim, we will discuss what are the design aspects to be taken into account upon devising protocols and architectures to support smart wireless healthcare, by also identifying limits and drawbacks of existing methodologies. Then, we will recall basics on ultrasounds physics and coupling by explaining how these technologies can be proficouously employed for overcoming the weaknesses of solutions so far proposed. The tutorial will be mainly focused on illustration of the physical aspects of these non-radio frequency (RF) techniques able to send biomedical data over tissues and attention will be also devoted to practical aspects related to experimental testbeds and activities in these fields by shading light on their high Technology Readiness Level.

Program outline: 1. Intra Body Area Networks (IBAN): application requirements and design aspects 2 Architecture and Standards for Body Area Networks. 3. IBAN: State of the Art on RF solutions. 4. Alternative RF techniques: Ultrasounds (US) & Coupling Methods. 5. Basics on US physics, suitability for use in smart wireless healthcare, State of the art for IBAN 6. Basics on Coupling Techniques: Inductive Coupling (IC), Capacitive Coupling (CC)Galvanic coupling (GC), State of the art for IBAN. 7. Communication techniques comparison (US, IC, CC, GC). 8. Experimental testbeds of US and Coupling Techniques. 9.Open issues/challenges. The 3 speakers will alternate in the presentation by discussing approximately 3 of the above sections each.

SPEAKERS BIO – **Laura Galluccio** received her laurea degree in Electrical Engineering from University of Catania, Catania, Italy, in 2001. In March 2005 she got her Ph.D. in Electrical, Computer and Telecommunications Engineering at the same university under the guidance of Prof. Sergio Palazzo. Since 2002 she is also at the Italian National Consortium of Telecommunications (CNIT), where she worked as a Research Fellow within the VICOM (Virtual Immersive Communications) and the SATNEX Projects. Since November 2010 to October 2019 she has been Assistant Professor at University of Catania. From November 2019 she is Associate professor at the same university. Her research interests include unconventional networks including ultrasonic and microfluidic networks, ad hoc and sensor networks in general, protocols and algorithms for wireless networks, and network performance analysis. From May to July 2005 she has been Visiting Scholar at the COMET Group, Columbia University, NY working with Prof. Andrew T. Campbell. In September 2015 she has been Visiting Professor at Central Supelec, Gif-sur-Yvette, Paris. She is senior member of the IEEE. Dr. Galluccio is and has been Leading Guest Editor of Elsevier Journals, and IEEE Magazines. She serves and has served in the Editorial Board of IEEE Transactions on Wireless Communications, Elsevier Computer networks, IEEE Communication Letters, Wireless Communications and Mobile Computing (WCMC), and Elsevier Ad Hoc Networks Journal. She has been involved in the Organizing Committee and TPCs of numerous conferences such as ACM NanoCom 2020 (TPC Co-Chair), ACM MobiHoc 2019 (Local Arrangment Chair and Workshop Co-Chair), European Wireless 2018 (General Co-Chair), European Wireless 2017 (Workshop Chair), First International Workshop on Smart network Technologies and Edge computing for the Tactile Internet (STET 2018), jointly held with IEEE NetSoft 2018 (Co-chair), International Workshop on Network Intelligence (NI 2019) Machine Learning for Networking, jointly held with IEEE Infocom 2019 (TPC Co-chair), International Workshop on Network Intelligence "Learning and Optimizing Future Networks" (NI 2020) jointly held with IEEE Infocom 2020 (TPC Co- Chair), UNconventional Intrabody Communication in Bodynets 2014 and 2015 (Special Track organizer).She serves/has served also in the TPC of prestigious conferences such as IEEE Infocom, Globecom and ICC. She was awarded the Best Paper award by the IEEE Communications Society e-health Technical Committee in 2017 for the paper G. Castorina, L. Galluccio, S. Palazzo, "On modeling information spreading in bacterial nano-networks based on plasmid conjugation" IEEE Trans. on Nanobioscience, Vol. 15, No. 6, 2016. She is co-author of two international patents in the field of Unconventional communications.

Anna Vizziello received the Laurea degree in electronic engineering and the Ph.D. degree in electronics and computer science from the University of Pavia, Italy, in 2007 and in 2011, respectively. Currently she is a Senior Research Assistant with the Telecommunication and Remote Sensing Laboratory, University of Pavia, Italy, under the Research Grant on "Intra-body communication systems for nervous signal transmissions". In 2015-2017 she was working on communication algorithms for N-RFID network within the national PRIN GRETA Project and in 2014-2016 she was involved in a collaboration with SIAE microelettronica company for a high data rate modem design. She has been Visiting Researcher in several universities: in 2011 and 2016 she was with Northeastern University, Boston, MA, working on communications for

implanted sensors; from 2009 to 2010 with the Broadband Wireless Networking Lab, Georgia Institute of Technology, Atlanta, GA, under the supervision of Prof. I. F. Akyildiz, and in 2009 and 2010 with the Universitat Politècnica de Catalunya, Barcelona, Spain, on the subject of cognitive radio networks in the European FP7 FARAMIR Project. From 2007 to 2009, she collaborated as researcher with the European Centre for Training and Research in Earth quake Engineering (EUCENTRE) for biomedical data transmission within the EU PROETEX Project and an Italy-Turkey FIRB Project. Since 2013 she collaborates with the European Commission as Referee for the peer evaluation process of the proposals for FET call and H2020 ICT call. She has been included in the 2018 list of "N2Women: Rising Stars in Computer Networking and Communications" for outstanding and impactful contributions in the area of networking/communications, supported by the IEEE Communication Society. In 2017-2018 she has been Guest Editor for the Special Issue "Internet of Wearable and Implantable Medical Things: Theory and Applications" – Sensors Journal, and currently is Associate Editor on IET Electronics Letters and Executive Editor on Transactions on Emerging Telecommunications Technologies. As expert in the field, she has been invited to deliver talks on the subject of "Wireless Networks of Sensors and Implants", including UPC, Barcelona, Spain, April 9-13, 2018 and Centre for Health Technologies, Pavia, Italy, October 13, 2016, among the others. She has been involved in several research projects and published her research in international journals and conferences, on the topic of intra-body networks, 5G radio technologies, cognitive and wireless sensor networks. She has been often involved as Technical Program Committee (TPC) member of several international conferences (more than thirty), such as IEEE ICC 2019, IEEE GLOBECOM 2017, IEE ICC 2017, IEEE INFOCOM 2015.

Pietro Savazzi received his Laurea degree in Electronics Engineering and Ph.D. degree in Electronics and Computer Science from the University of Pavia, Italy, in 1995 and in 1999, respectively. In 1999, he joined Ericsson Lab Italy, in Milan, as a system designer, working on broadband microwave systems. In 2001, he moved to Marconi Mobile, Genoa, Italy, as a system designer in the field of 3G wireless systems. Since 2003, he has been working at the University of Pavia where he is currently teaching courses on signal processing, wireless communications, and wireless sensor networks for biomedical applications. His main research interests are in wireless communications and sensor systems, with a focus on modulation and coding, adaptive signal processing, MIMO architectures, intra-body networks, and wearable wireless sensors. During his research activities, he has been involved in several research projects and contracts, some of them as the principal investigator. He authored more than 70 papers, in both international journals and conferences, and one patent. He is or has been a member of the Technical Program Committee for several conferences like, for instance, IEEE International Conference on Wireless for Space and Extreme Environments (WiSEE), IEEE Vehicular Technology Conference, IEEE Sensors. He served as a frequent reviewer for several international conferences and journals, including IEEE Transactions on Communications, IEEE Access, IEEE Communications Letters, IEEE Transactions on Broadcasting, IEEE Transactions on Green Communications and Networking, IEEE Sensors Journal, IEEE ICC and Globecom conferences. Since 2018, he has been serving as an associate editor for IEEE Access.

TRACK 3 - Mon, June 15
H 14.00 - 16.00 CET

Human behavior and decision making: multidisciplinary approach for investigation. Fundamentals and latest advances in research and technology

Debora Bettiga, *Politecnico di Milano, Italy*
Margherita Pillan, *Politecnico di Milano, Italy*

SUMMARY - What expressed by the conscious mind - through interviews, surveys, market research, focus groups - is not a complete and correct representation of actual wishes and behaviors of individuals. On the other hand, a series of unconscious physiological manifestations are able to give indications about how people react, evaluate and filter communication stimuli. Functional monitoring of biological data provides information on human stress, engagement, cognitive and emotional responses that find applications in the development of services for personal wellbeing and for the optimization of the interactive systems. This emerging field of research lies at the intersection of different disciplines, such as neuro- and bioscience, psychology, bioengineering, marketing and design. This tutorial provides the fundamentals as well as the latest advances in research and technology about the application of the neuroscientific methods, which include neural, biometric and psychophysical activity detection, to analyze and understand individuals' decision-making process, experience and behaviors. The tutorial will cover the following topics:

- Methods and tools that support the analysis of the decision-making process of individuals, in terms of both cognitive drivers and affective drivers and their interplay
- Neural and psychophysical activity as a response to external stimuli
- Methodological contributions on the use of mix-method approaches to research
- Design and industrial applications of neural and biometric methods

SPEAKERS BIO - **Debora Bettiga** is Assistant Professor in Marketing at the Department of Management, Economics and Industrial Engineering (DIG) of Politecnico di Milano. She conducts research inside 'PHEEL - Physiology, Emotions and Experience Lab' of Politecnico di Milano. Debora does research in marketing, centered on the analysis of the consumer behavior along the purchase process and in interaction with companies. The main research fields are neuro- and biomarketing, centred on the analysis of consumers biometric responses (attention, interest, memorization, emotions) to marketing stimuli (e.g. advertising, new products). Research is conducted through both traditional marketing methods, such as surveys, interviews, experiments and case study method and through the application of neuroscience and bioscience methods to marketing.

Margherita Pillan PhD, is associate professor and scientific director of the Interaction and Experience Design Research Lab – IEX (link) at the Department of Design at Politecnico di Milano. She is program board director of the MSc in Digital and Interaction Design at the Design School at Politecnico (link) and member of the management Committee of the interdepartmental research laboratories Pheel and Brain (link, link). At Politecnico, she teaches courses of Communication Design and of UX Design. Margherita Pillan is author of more than eighty scientific papers and of four books and her research focus is on user experience and on Interaction and Service design. In this realm, she developed an expertise about design methods.

TRACK 4 - Mon, June 15
H 09.00 - 11.00 CET

IoT based methods and architectures for demand response in smart grids

Pierluigi Siano, *University of Salerno, Italy*
Gaetano Zizzo, *University of Palermo, Italy*

SUMMARY - The increasing penetration of renewable energy sources and the empowerment of consumers as a central and active solution to deal with the generation variability are paving the path towards local energy markets. The tutorial is focused on the local smart electricity market where even small size consumers and prosumers can sell/buy the locally produced electrical energy or power to contribute to the balance of the power system. The local electricity market is managed by a commercial aggregator, organized as a Virtual Power Plant (VPP), that gathers the energy/power flexibility offered from its consumers/prosumers portfolio. The proposed local smart energy market is managed by a cyber-physical platform based on blockchain, able to guarantee a real competitive behavior in the market and the mutual interactions between different systems (electrical system, telecommunication system, system for blockchain transactions), the aggregator and the industrial, commercial and domestic consumers and prosumers. Prosumers involved in the local market managed by the aggregator will optimally change their consumption patterns and power generation according to a price signal or an activation request to provide ancillary services.

SPEAKER BIO - **Pierluigi Siano** (M'09–SM'14) received the M.Sc. degree in electronic engineering and the Ph.D. degree in information and electrical engineering from the University of Salerno, Salerno, Italy, in 2001 and 2006, respectively. He is a Professor and Scientific Director of the Smart Grids and Smart Cities Laboratory with the Department of Management & Innovation Systems, University of Salerno. His research activities are centered on demand

response, on the integration of distributed energy resources in smart grids and on planning and management of power systems. He has co-authored more than 450 papers including more than 250 international journal papers that received more than 8400 citations with an H-index equal to 46. He received the award as 2019 Highly cited Researcher by ISI Web of Science Group. He has been the Chair of the IES TC on Smart Grids. He is Editor for the Power & Energy Society Section of IEEE Access, IEEE TRANSACTIONS ON INDUSTRIAL INFORMATICS, IEEE TRANSACTIONS ON INDUSTRIAL ELECTRONICS, Open Journal of the IEEE IES and of IET Renewable Power Generation.

Gaetano Zizzo obtained the Ph D degree in Electrical Engineering from the University of Palermo with a thesis on "Interconnected grounding systems in medium and high voltage installations". Since 2006 he has been working with the Electric Power System group of the Engineering Department of the same University.

He is author of more than 200 papers, book chapters and technical reports.

His main research interests are: Demand Response, Load Aggregation, Power Systems' design and Operation, Power Systems Dynamics, Renewable Energy Sources and Energy Storage, Grounding Systems, Electrical Safety. Since 2011 he is involved in various research projects of the University of Palermo in collaboration with the Italian Agency for Energy and Environment (ENEA) on the transition of small Mediterranean islands towards more efficient and smart electrical systems.

He is Editor of some international journals (Solar Energy, Renewable Energy Focus, IEEE Access, Mathematical Problems in Engineering and Sustainability, Applied Sciences, Sustainability), and Guest Editor of several special issues of Energies, Sustainability and Applied Sciences.

IEEE WIE EVENT

The Vision of Industry on Digital Evolution in Her Words

The plenary session is organized in five presentations of 20-minute each by five distinguished speakers. Four women industry managers will give technical presentations on the vision of the future and their company's strategy in one of the IEEE MELECON 2020 reference topics: Smart Mobility, Industry 4.0, Smart HealthCare and Smart Grids. The fifth presentation will provide a cross-sectional view on digital evolution and future directions. Due to the COVID-19 emergency, the conference will be held in virtual electronic mode and the plenary session is organized in two parts: recorded presentations and a live session. The five recorded presentations (slides with audio commentary) will be made available on **June 12th** and must be attended prior to the live event scheduled on **June 17th**. The live event consists of a 60-minute telematic debate on the topics proposed in the recorded presentations. Participation in this WIE event is **FREE OF CHARGE**!

Dates and scheduled activities

From **June 12th, 2020** - Prior on-demand access to the talks:

Track 1: Smart Mobility ***Smart city: transforming cities in the digital age***
Renata MELE, *Head of Smart city ecosystem development- Global e-City - Enel X*

Track 2: Industry 4.0 ***'Industry 4.0', a new Human-AI partnership***
Daniela SCARAMUCCIA, *Director, Industry LTS Business Development - IBM Italy*

Track 3: Smart Healthcare ***Smart Healthcare: Solutions for renal patients @ Fresenius Medical Care***
Silvia CIVARDI, *CEO Fresenius Medical Care Italy*

Track 4: Smart Grid ***Smart Grids and Beyond***
Debora STEFANI, *Head of Optic Fiber Program, Enel Global Infrastructure and Networks*

The Digital Evolution ***Digital Reality is becoming Reality***
Roberto SARACCO, *IEEE Future Direction Board*

Venue

Electronic Virtual Conference - visit the websites http://melecon2020.org and https://site.ieee.org/italy-wie/

Wed, June 17, 2020
14:00 – 15:30 CET - LIVE PANEL SESSION

14:00 - 14:30	Opening and Interactive Session (www.menti.com)
14:30 - 15:15	**Live Panel Discussion** with Renata MELE, Daniela SCARAMUCCIA, Silvia CIVARDI, Debora STEFANI and Roberto SARACCO
15:15 - 15:30	Closing Interactive Session

Online Presentation Details (available from June 12th, 2020)

Smart city: transforming cities in the digital age

Urbanization is one of the global transformative phenomena of the contemporary society: urban population growth will put an enormous pressure on the infrastructures and the challenge of powering cities in a sustainable way, now and in the future, is a key issue.
But how to drive the sustainable energy transition in cities? And how can companies help cities deliver their services?
The pillars of the sustainable energy transitions in cities are in decarbonization, electrification, energy efficiency and digitalization: in the talk, the Enel X vision on sustainable urban transition will be presented, with a focus on the role of digital platform. The integrated approach to urban services can foster the decarbonization and electrification of cities, while leveraging digitalization to enhance resilience and closer interaction between PAs and citizens.

'Industry 4.0', a new Human-AI partnership

Exponential technologies can support operational agility and flexibility and allow companies to respond to market changes. Thanks to technologies such as sensors, drones, wearables, augmented reality (AR), virtual reality (VR), AI, cloud and edge computing real-time signals and information can be collected, connected and analyzed, providing insights that can create new services, business models and revenue streams, cost efficiency and personalized experiences for customers and employees and build agile and intelligent processes. This is in a nutshell Industry 4.0.
Successfully Industry 4.0 transformation can be found in various sectors (e.g. from construction, to manufacturing and to healthcare) and functions (e.g. from predictive maintenance to cognitive manufacturing, from operational efficiency to knowledge management and smart supply chains).
A revolution is underway, made possible by the convergence of vision and skills coupled with technology. It is a new human-AI partnership, where artificial intelligence can increase human intelligence.

Smart Healthcare: Solutions for renal patients @ Fresenius Medical Care

Kidney disease is a global epidemic that is straining healthcare systems and diminishing the quality of life for millions of people who are coping with cardiovascular diseases, diabetes, and other related chronic conditions. The scope and complexity of the problem requires an unprecedented level of collaboration to attack root causes of kidney disease, galvanize diverse peer communities, and better identify innovation wherever it occurs worldwide. As a vertically integrated global healthcare company, Fresenius Medical Care

is working to transform renal care worldwide and pioneer solutions that can have a large-scale impact on patient care. Three key areas will be addressed during the talk:

- Emerging trends in healthcare and digitalization impacts: how healthcare spending and care delivery will change the way the systems works and is organized
- Identifying innovations for care transformation: use the potential of modern technologies to contribute to healthcare transformation through industry changes and new business models
- Providing holistic renal care: increase access to care, contribute to sustainability, innovate the delivery of care through digital solutions and patient's centric approach

The opportunity to bring emerging science and technologies into standard patient care is a unique value of a vertically integrated company like Fresenius Medical Care whose domain includes science, product development, manufacturing, service provision, patients' management worldwide.

Smart Grids and Beyond

Enel Group operates in 34 countries with 63000 people and is a leader in the energy sector. Global Business Line Infrastructure & Networks is the first private network operator in the world with 73 million of end customers, operating in 8 countries, in Europe and South America.
In the transition of the energy market, the Distributor is going to play a role more and more decisive as a manager of electrical assets but also as a key driver for improving the relationship with the customer. Scenarios as decentralisation, electrification, decarbonisation are significantly shaping the future evolution of the distributor, by making smart grids essential for strengthening our resilience and capability of enabling a flexible ecosystem.
Thanks to digitalization, electricity is becoming increasingly accessible for everyone, changing customer-network interaction, driving and promoting the sustainable development of future digital cities, and contributing to the decarbonisation of the economy.
Getting an increasingly digitalized and resilient network is our top priority.

Digital Reality is becoming Reality

The countermeasures to the pandemic have accelerated the Digital Transformation. Business moved as much as possible to the cyberspace, so did education and social life. What was already benefitting from a life in the cyberspace picked up steam, what was not scrambled to shift to the cyberspace. In the process we discovered that we had the technology to support business and life in the cyberspace. We also discovered that we would be better off if we could have better technology. The pandemic will be over, let's hope sooner than later, but the shift will not be reversed, at least not completely, hence we will feel the gap between the tech we have and the one we would like to have. It is this gap that in the coming 2-3 years will steer innovation. The talk will address the gap and the expected tech evolution we can reasonably expect in the near future, from sensors to intelligence, from communication to communication fabric, from automation to autonomous systems, from learning to leveraging distributed knowledge, from societal data analytics to personal digital twins.

Organized By

IEEE Italy Section WIE AG, in collaboration with **AICA** and **AEIT**. Info: cassioli@ieee.org

SPECIAL MEETING ON INNOVATIVE STARTUPS AND ENTREPRENEURS

This special meeting is structured in two panels dedicated to entrepreneurship financial and institutional supports and to some examples of successful startups. The first panel will focus on entrepreneurship supports for success. Funding, organization, management, business strategies and planning, incubators, guidance, mentorship, and institutional supports will be discussed with a particular focus on the COVID-19 scenario and consequences. The second panel will present some examples of successful and innovative startups with accent on challenges at time of pandemic.

Thu, June 18, 2020
14:00 - 17:30 CET

14:00 - 14:10 **Welcome to participants**
Vincenzo Piuri, *IEEE Italy Section Entrepreneurship Committee*
Tiziana Tambosso, *IEEE R8 Action for Industry Committee*

14:10 - 16:00 **Panel 1: Entrepreneurship supports**
Moderator: Vincenzo Piuri

14:10 - 14:25	Joanne Wong - IEEE Entrepreneurship
14:25 - 14:40	Giulia Zanotti - Invitalia
14:40 - 14:55	Fiammettà Pantò - EIT Health RIS Hub Sicilia - CONSORZIO ARCA
14:55 - 15:10	Antonio Carbone - APRE (Agency for the Promotion of European Research
15:10 - 15:25	Roberto della Marina - Venture Factory
15:25 - 15:40	Salma Baghdadi - Startup Ecosystem Manager at Smart Capital

16:10 - 17:30 **Panel 2: Successful startups**
Moderator: Tiziana Tambosso

16:10 - 16:20	Maria Rosaria Plutino - CEO - ATHENA Green Solutions S.r.l.
16:20 - 16:30	Lidia Pieri - CEO -Sibylla Biotech s.r.l.
16:30 - 16:40	Karim Beguir – CEO – Instadeep
16:40 - 16:50	Franco Tecchia – CTO - KIBER project- VRMedia s.r.l.
16:50 - 17:00	Simona Ester Rombo - CEO - Kazaam Lab
17:00 - 17:30	Q&A

TECHNICAL SESSIONS – PROGRAM SUMMARY

Virtual Sessions will be available from **June 16th** to **July 31st** on *WeConf* Platform.

On the platform will be available a Q&A window where participants can address their questions to the speakers and will receive the answers.

MELECON 2020 on ***WeConf*** **-** https://weconf.eu/ieee-melecon-2020

MELECON 2020 Free Registration

All technical Sessions are available for live streaming and on demand, archived viewing.
There is no cost to participate as an attendee.
All interested people will be able to see the video of the technical program from June 16th to July 31st and post questions. The authors (contributed, invited, keynotes) can answer by e-mail to each question. Also *live* and *semi-live* events will be free and open to all registered people. In this case the Q&A are live and a recorded archive will be available later for on demand viewing.
Register here - http://melecon2020.org/registration.html

TRACK 1 - SMART MOBILITY

Session 1.1

Electric vehicle transportation systems and their environmental impact, charging infrastructure and grid integration

Chairs: Rosa Mastromauro, *University of Firenze, Italy*
Elena Breaz, *UBTM, France*

From electric mobility to hydrogen mobility: current state and possible future expansions

Guido Ala, University of Palermo, Italy
Vincenzo Castiglia, *University of Palermo, Italy*
Gabriella Di Filippo, University of Palermo, Italy
Rosario Miceli, *University of Palermo, Italy*
Pietro Romano, *University of Palermo, Italy*
Fabio Viola, *University of Palermo, Italy*

Acoustic Impact of Electric Vehicles

Filippo G. Praticò, *University "Mediterranea", Italy*
Paolo G. Briante, *University "Mediterranea", Italy*
Greta Speranza, *University "Mediterranea", Italy*

Selective harmonic mitigation with asymmetrical staircase voltage waveform for a three-phase fivelevel Cascaded H-Bridge Inverter

Giuseppe Schettino, *University of Palermo, Italy*
Nicola Campagna, *University of Palermo, Italy*
Ciro Spataro, *University of Palermo, Italy*
Antonino Oscar Di Tommaso, *University of Palermo, Italy*
Rosario Miceli, *University of Palermo, Italy*
Fabio Viola, *University of Palermo, Italy*

Cost-benefit analysis for multiple agents considering an electric vehicle charging/discharging strategy and grid integration

Mahsa Bagheri Tookanlou, *Northumbria University, UK*
Mousa Marzband, *Northumbria University, UK*
Ameena Al Sumaiti, *Khalifa University, UAE*
Andrea Mazza, *Politecnico di Torino, Italy*

Modeling of Magnetorheological Fluids Relative Magnetic Permeability by using a Neural Network approach

Paweł Kowol, *Silesian University of Technology, Poland*
Marcin Szczygieł, *Silesian University of Technology, Poland*
Grazia Lo Sciuto, *University of Catania, Italy*
Giacomo Capizzi, *University of Catania, Italy*

Outlier Removal for Improving the Accuracy of Electric Vehicle Behavior Prediction

Kunihiro Miyazaki, *The University of Tokyo, Japan*
Kenji Tanaka, *The University of Tokyo, Japan*

Session 1.2 - PART I

Transportation electrification, electric & hybrid vehicle, interconnected cities

Chairs: Luca Pugi, *University of Firenze, Italy*
Cyril Spiteri Staines, *University of Malta, Malta*

An analytical evaluation of rotor eccentricity effects on synchronous drives with surface mounted permanent magnet brushless motors

Andrea Del Pizzo, *University of Naples Federico II, Italy*
Luigi Pio Di Noia, *University of Naples Federico II, Italy*
Emanuele Fedele, *University of Naples Federico II, Italy*

Performance Comparison of modified modulation Techniques for Quasi-Z-Source Converters

Giuseppe Schettino, *University of Palermo, Italy*
Nicola Campagna, *University of Palermo, Italy*
Antonino Oscar Di Tommaso, *University of Palermo, Italy*

Vincenzo Castiglia, *University of Palermo, Italy*
Rosario Miceli, *University of Palermo, Italy*
Fabio Viola, *University of Palermo, Italy*

Modelling, simulation and characterization of a supercapacitor

Vincenzo Castiglia, *University of Palermo, Italy*
Nicola Campagna, *University of Palermo, Italy*
Ciro Spataro, *University of Palermo, Italy*
Claudio Nevoloso, *University of Palermo, Italy*
Fabio Viola, *University of Palermo, Italy*
Rosario Miceli, *University of Palermo, Italy*

A prototypal PCB board for the EMI characterization of SiC-based innovative switching devices

Filippo Pellitteri, *University of Palermo, Italy*
Massimo Caruso, *University of Palermo, Italy*
Salvatore Stivala, *University of Palermo, Italy*
Antonino Parisi, *University of Palermo, Italy*
Vincenzo Vinciguerra, *University of Palermo, Italy*
Angelo Messina, *University of Palermo, Italy*
Guido Ala, *University of Palermo, Italy*
Fabio Viola, *University of Palermo, Italy*
Rosario Miceli, *University of Palermo, Italy*
Alessandro Busacca, *University of Palermo, Italy*

A Low Cost Programmable Hardware for Online Spectroscopy of Lithium Batteries

Tommaso Serni, *University of Florence, Italy*
Edoardo Locorotondo, *University of Florence, Italy*
Luca Pugi, *University of Florence, Italy*
Lorenzo Berzi, *University of Florence, Italy*
Marco Pierini, *University of Florence, Italy*
Vincenzo Cultrera, *University of Florence, Italy*

Session 1.2 - PART II

Transportation electrification, electric & hybrid vehicle, interconnected cities

Chairs: Luca Pugi, *University of Firenze, Italy*
Cyril Spiteri Staines, *University of Malta, Malta*

Design and Testing of a Flash Recharge System for a Bus including foreseen effects in terms of Storage Life Extension

Adriano Alessandrini, *University of Florence, Italy*
Riccardo Barbieri, *University of Florence, Italy*
Lorenzo Berzi, *University of Florence, Italy*
Luca Pugi, *University of Florence, Italy*
Marco Pierini, *University of Florence, Italy*
Fabio Cignini, *Centro Ricerche Casaccia ENEA, Italy*
Antonino Genovese, *Centro Ricerche Casaccia ENEA, Italy*
Fernando Ortenzi, *Centro Ricerche Casaccia ENEA, Italy*
Edoardo Locorotondo, *University of Florence, Italy*

Motion Control in Resonant Frequency for an Electrified Implement

Ilja Stasewitsch, *Technische Universitat Braunschweig, Germany*
Michaela Pußack, *Technische Universitat Braunschweig, Germany*
Jan Schattenberg, *Technische Universitat Braunschweig, Germany*
Ludger Frerichs, *Technische Universitat Braunschweig, Germany*

Sensorless Current Control at the Handwheel in Steer-by-Wire

Kris Scicluna, *University of Malta, Malta*
Cyril Spiteri Staines, *University of Malta, Malta*
Reiko Raute, *University of Malta, Malta*

Sensorless Position Control at the Steered Wheel in Steer-by-Wire

Kris Scicluna, *University of Malta, Malta*
Cyril Spiteri Staines, *University of Malta, Malta*
Reiko Raute, *University of Malta, Malta*

Power Flow Simulation of DC Railway Power Supply Systems with Regenerative Braking

Fulin Fan, *University of Strathclyde, UK*
Brian G. Stewart, *University of Strathclyde, UK*

Session 1.3

Smart mobility of people and goods

Chairs: Carlo Cecati, *University of L'Aquila, Italy*
Giuseppe Tomasso, *University of Cassino, Italy*

KEYNOTE - Green ship design: marine transportation electrification and research" challenges

Giorgio Sulligoi, *University of Trieste, Italy*
Read more HERE

Exploiting free-floating car sharing rewards to support a free year of daily commute

Eder Ollora Zaballa, *Technical University of Denmark, Denmark*

Audio surveillance of roads using deep learning and autoencoder-based sample weight initialization

Zied Mnasri, *Università degli studi di Genova, Italy*
Stefano Rovetta, *Università degli studi di Genova, Italy*
Francesco Masulli, *Università degli studi di Genova, Italy*

Death/Birth and SNR Detection for Vehicular Kalman Channel Trackers

Diego Mendez-Romero, *Universidad Carlos III de Madrid, Spain*
M. Julia Fernandez-Getino Garcıa, *Universidad Carlos III de Madrid, Spain*

Analysis of Current Ripple effect on Lithium batteries

Mirko Marracci, *DESTeC, University of Pisa, Italy*
Paolo Bolognesi, *DESTeC, University of Pisa, Italy*
Alice Buffi, *DESTeC, University of Pisa, Italy*
Gianluca Caposciutti, *DESTeC, University of Pisa, Italy*
Bernardo Tellini, DESTeC, *University of Pisa, Italy*

Session 1.4

Air transportation, avionics and aerospace, more electric aircrafts

Chairs: Antonio Faba, *University of Perugia, Italy*
Armin Dietz, *University of Nurberg, Germany*

INVITED - Electromagnetic Compatibility in the Aircraft sector: Lightning indirect effects and innovative protection techniques for safety improvement in the air transportation systems

Hari Prasad Rimal, *University of Perugia, Italy*

Efficient and Robust Modeling of Vector Magnetic Hysteresis: An Engineering Approach

Abdelrahman Mohamed Ghanim, *University of Perugia, Italy*
Hari Prasad Rimal, *University of Perugia, Italy*

On the Use of Feedforward Neural Networks to Simulate Magnetic Hysteresis in Electrical Steels

Simone Quondam Antonio, *University of Perugia, Italy*
Francesco Riganti Fulginei, *Roma TRE University, Italy*
Hari Prasad Rimal, *University of Perugia, Italy*
Abdelrahman Mohamed Ghanim, *University of Perugia, Italy*

Neural Modelling of Magnetic Materials for Aircraft Power Converters Simulations

Ermanno Cardelli, *University of Perugia, Italy*
Antonino Laudani, *Roma TRE University, Italy*
Gabriele Maria Lozito, *Roma TRE University, Italy*
Valentina Lucaferri, *Roma TRE University, Italy*
Alessandro Salvini, *Roma TRE University, Italy*
Simone Quondam Antonio, *University of Perugia, Italy*
Franesco Riganti Fulginei, *Roma TRE University, Italy*

Overview of the mechanical, thermal vacuum and EMI/EMC tests performed for the AMS-02 UTTPS space qualification campaign

Lorenzo Mussolin, *University of Perugia, INFN, Italy*
Bruna Bertucci, *University of Perugia, INFN, Italy*
Antonio Faba, *University of Perugia, Italy*

Giovanni Ambrosi, *INFN, Italy*
Gianluca Scolieri, *INFN, Italy*
Francesco Tissi, *University of Perugia, Italy*
Matteo Gaggiotti, *University of Perugia, Italy*
Giulio Morelli, *University of Perugia, Italy*
Zhan Zhang, *Massachussets Insitute of Technology, USA*
Vladimir Koutsenko, *Massachussets Insitute of Technology, USA*
Carlos Solano *Massachussets Insitute of Technology, USA*
Alexander Kulemzin, *Massachussets Insitute of Technology, USA*
Youmin Yu, *Sun Yat-Sen University, China*
Ken Bollweg, *NASA-JSC, USA*
Phillip B. Mott, *NASA-JSC, Jacobs, USA*
Craig Clark, *NASA-JSC, Jacobs, USA*
Tim Urban, *NASA-JSC, Business Integra, USA*
Hsing Ju, *NASA-JSC, Business Integra, USA*
Thorsten Siedenburg, *University Aachen, Germany*
Chan Hoon Chung, *RWTH Aachen University, Germany*
Franco De Angelis, *SERMS, Italy*

Analysis of Polygon Connected ATRU for the More-Electric Aircraft

Daniel Farrugia, *University of Malta, Malta*
Maurice Apap, *University of Malta, Malta*
Alexander Micallef, *University of Malta, Malta*
Cyril Spiteri Staines, *University of Malta, Malta*

TRACK 2 - INDUSTRY 4.0

Session 2.1
Industrial applications
Chairs: Luis Almeida, *University of Porto, Portugal*
Alessandro Papadopoulos, *Mälardalen University, Sweden*

KEYNOTE - A cloud on time

Johan Eker, *Ericsson Research*
Read more HERE

Charlie and the CryptoFactory: Towards Secure and Trusted Manufacturing Environments

Antonis Michalas, *University, Tampere, Finland*
Tamas Kiss, *University of Westminster, UK*

A cloud-edge smart infrastructures for road safety

Giovanni Laudante, *SMA Roady Safety s.r.l, Italy*
Vincenzo Musone, *SMA Roady Safety s.r.l, Italy*
Massimiliano Rak, *University of Campania Luigi Vanvitelli, Italy*
Salvatore Venticinque, *University of Campania Luigi Vanvitelli, Italy*
Giovanni Salzillo, *University of Campania Luigi Vanvitelli, Italy*

Li-Ion Batteries Releasable Capacity Estimation with Neural Networks on Intelligent IoT Microcontrollers

Giulia Crocioni, *STMictroelectronics, Italy*
Danilo Pau, *STMictroelectronics, Italy*
Giambattista Gruosso, *Politecnico di Milano, Italy*

Leak Detection Algorithm for Pipelines in Noisy Environments

Georgios-Napoleon Papastavrou, *University of Thessaloniki, Greece*
Georgios-Panagiotis Kousiopoulos, *University of Thessaloniki, Greece*
Dimitrios Kampelopoulos, *University of Thessaloniki, Greece*
Nikolaos Karagiorgos, *University of Thessaloniki, Greece*
Dimitrios Porlidas, *Hellenic Petroleum S.A, Greece*
Spyridon Nikolaidis, *University of Thessaloniki, Greece*

Session 2.2
Wireless systems
Chairs: Marco Balato, *University of Napoli Federico II, Italy*
Fabio Viola, *University of Palermo, Italy*

An Experimental Validation of the Naïve Approach to Angle of Arrival Estimation for Green WSNs

Antonello Florio, *Polytechnic University of Bari, Italy*
Gianfranco Avitabile, *Polytechnic University of Bari, Italy*
Giuseppe Coviello, *Polytechnic University of Bari, Italy*

Efficient Transmission of Live Multi-View Video in LTE-A Cellular Networks using D2D Cooperation

John Zammit, *University of Malta, Italy*
Carl James Debono, *University of Malta, Italy*

Relay Node Selection in Bluetooth Mesh Networks

Marco Reno, *University of Catania, Italy*
Raul Rondon, *Mid Sweden University, Sweden*
Lucia Lo Bello, *University of Catania, Italy*
Gaetano Patti, *University of Catania, Italy*
Aamir Mahmood, *Mid Sweden University, Sweden*
Alfio Lombardo, *University of Catania, Italy*
Mikael Gidlund, *Mid Sweden University, Sweden*

A Battery-free Asset Monitoring System based on RF Wireless Power Transfer

Roberto La Rosa, *STMicroelectronis, Italy*
Catherine Dehollain, *Ecole Polytechnique Federale de Lausanne, Switzerland*
Filippo Pellitteri, *University of Palermo, Italy*
Rosario Miceli, *University of Palermo, Italy*
Patrizia Livreri, *University of Palermo, Italy*

Self-powered wireless IoT nodes for emergency management

Massimo Merenda, *University Mediterranea of Reggio Calabria, Italy*
Riccardo Carotenuto, *University Mediterranea of Reggio Calabria, Italy*
Francesco Giuseppe Della Corte, *University Mediterranea of Reggio Calabria, Italy*
Filippo Giammaria Praticò, *University Mediterranea of Reggio Calabria, Italy*
Rosario Fedele, *University Mediterranea of Reggio Calabria, Italy*

A Novel Plasmonic Nanoantenna for High Efficiency Energy Harvesting Applications

Patrizia Livreri, *University of Palermo, Italy*
Giuseppe Raimondi, *University of Palermo, Italy*

Optimization of diode bridge rectifier output voltage in Train Suspension Energy Harvesters

Luigi Costanzo, *Università degli Studi della Campania Luigi Vanvitelli, Italy*
Alessandro Lo Schiavo, *Università degli Studi della Campania Luigi Vanvitelli, Italy*
Massimo Vitelli, *Università degli Studi della Campania Luigi Vanvitelli, Italy*
Lei Zuo, *Virginia Tech, USA*

Session 2.3
Artificial Intelligence and Big Data Analytics
Chairs: Francesco Masulli, *University of Genova, Italy*
Ethem Alpaydn, *Bogazici University, Turkey*

Negative Selection Algorithm Based Intrusion Detection Model

Salau-Ibrahim Taofeekat Tosin, *Al-Hikmah University, Nigeria*
Jimoh Rasheed Gbenga, *University of Ilorin, Nigeria*

LED junction temperature prediction using machine learning techniques

Massimo Merenda, *(DIIES) and HWA s.r.l., University Mediterranea, Italy*
Carlo Porcaro, *(DIIES) and HWA s.r.l., University Mediterranea, Italy*
Francesco Giuseppe Della Corte, *(DIIES) and HWA s.r.l., University Mediterranea, Italy*

A Novel Fitness Tracker Using Edge Machine Learning

Massimo Merenda, *(DIIES) and HWA s.r.l., University Mediterranea, Italy*
Miriam Astrologo, *University Mediterranea, Italy*
Damiano Laurendi, *(DIIES) and HWA s.r.l., University Mediterranea, Italy*
Vincenzo Romeo, *University Mediterranea, Italy*
Francesco Giuseppe Della Corte, *(DIIES) and HWA s.r.l., University Mediterranea, Italy*

Generalization Capacity Analysis of Non-Intrusive Load Monitoring using Deep Learning

Halil Çimen, *Konya Technical University and Konya Technical University, Turkey*
Emilio J. Palacios-Garcia, *Aalborg University, Denmark*
Nurettin Çetinkaya, *Konya Technical University, Turkey*
Morten Kolbæk, *Aalborg University, Denmark*
Giuseppe Sciume, *University of Palermo, Italy*
Juan Vasquez, *Aalborg University, Denmark*
Josep M. Guerrero, *Aalborg University, Denmark*

Attention-based Model for Evaluating the Complexity of Sentences in English Language

Daniele Schicchi, *University of Palermo, Italy*
Giovanni Pilato, *National Research Council, Italy*
Giosue Lo Bosco, *University of Palermo, Italy*

An Approach for Objective Quality Assessment of Image Inpainting Results

Dylan Seychell, *University of Malta, Malta*
Carl J. Debono, *University of Malta, Malta*

Educational Stream Data Analysis: A Case Study

Gabriella Casalino, *University of Bari, Italy*
Giovanna Castellano, *University of Bari, Italy*
Andrea Mannavola, *University of Bari, Italy*
Gennaro Vessio, *University of Bari, Italy*

Session 2.4
Robotics, Automation and Advanced Manufacturing
Chairs: Adriano Fagiolini, *University of Palermo, Italy*
Izzal Azid Sheikh, *University of South Pacific, Fiji*

INVITED - An introduction to patterns for the Internet of Robotic Things in the Ambient Assisted Living scenario

Giovanni Muscato, *University of Catania, Italy*

Investigations of the Methods of Time Delay Measurement of Stochastic Signals Using Cross-correlation with the Hilbert Transform

Robert Hanus, *Rzeszów University of Technology, Poland*
Marcin Zych, *AGH University of Science and Technology, Poland*
Rafał Chorzępa, *Rzeszów University of Technology, Poland*
Anna Golijanek-Jędrzejczyk, *Gdańsk University of Technology, Poland*

Development of a circuit design for a capacitive pressure sensor, applied in walking robot foot

Konstantin Krestovnikov, *Russian Academy of Sciences, Russia*
Anton Saveliev, *Russian Academy of Sciences, Russia*
Ekaterina Cherskikh, *Russian Academy of Sciences, Russia*

Advanced Manufacturing based on the Intelligent Floor

Javier Stillig, *University of Stuttgart, Germany*
Nejila Parspour, *University of Stuttgart, Germany*

Reduced order thermal models for electronic devices

Arturo Buscarino, *University of Catania, Italian National Research Council, Italy*
Luigi Fortuna, *University of Catania, Italian National Research Council, Italy*
Carlo Famoso, *University of Catania, Italy*

Erle-copter Simulation using ROS and Gazebo

Krishneel Kumar, *The University of the South Pacific Suva, Fiji*
Sheikh Izzal Azid, *The University of the South Pacific Suva, Fiji*
Adriano Fagiolini, *University of Palermo, Italy*
Maurizio Cirrincione, *The University of the South Pacific Suva, Fiji*

TRACK 3 - SMART HEALTHCARE

Session 3.1

Services, Applications and Solutions to Challenging Problems in Smart Healthcare

Chairs: Andreas Panayides, *University of Cyprus, Cyprus*
Carmelina Ruggiero, *University of Genova, Italy*

INVITED - Evaluating the effectiveness of the "Individual Assistance Plan" for Italian chronic patients

Anna Alloni, *Biomeris s.r.l., Italy*
Daniele Santonastaso, *DSP Solutions, Italy*
Marco Villa, *ATS Valpadana, Italy*
Matteo Gabetta, *Biomeris s.r.l., Italy*
Mauro Bucalo, *Biomeris s.r.l., Italy*
Silvana Quaglini, *University of Pavia, Italy*

Robotic Systems in Current Clinical Practice

Sotiris Avgousti, *Cyprus University of Technology, Cyprus*
Eftychios G. Christoforou, *University of Cyprus, Cyprus*
Andreas S. Panayides, *University of Cyprus, Cyprus*
Panicos Masouras, *Cyprus University of Technology, Cyprus*
Pierre Vieyres, *Universite d'Orleans, France*
Constantinos S. Pattichis, *University of Cyprus, Cyprus*

Robotic arm assisted surgery in orthopaedics: a Health Technology Assessment evaluation in Liguria Region

Alessandro Sparacino, *University of Genoa, Italy*
Mauro Giacomini, *University of Genoa, Italy*
Gabriella Paoli, *Azienda Ligure Sanitaria, A.Li.Sa., Italy*
Laura Paleari, *Azienda Ligure Sanitaria, A.Li.Sa., Italy*
Gaetano Stefano Scillieri, *University of Genoa, Italy*

Remote Center of Motion and Synchronized Rotation for a Motorized Surgical Table

Alessandro Cristoforetti, *University of Trento, Italy*
Francesco Tessarolo, *University of Trento, Italy*
Marta Rigoni, *University of Trento, Italy*
Giandomenico Nollo, *University of Trento, Italy*

A Double per Priority Queue Dynamic Wavelength and Bandwidth Allocation Algorithm in Healthcare Applications Service

Anastasios Valkanis, *Aristotle University of Thessaloniki, Greece*
Petros Nicopolitidis, *Aristotle University of Thessaloniki, Greece*
George Papadimitriou, *Aristotle University of Thessaloniki, Greece*
Dimitrios Kallergis, *University of Piraeus, Greece*
Christos Douligeris, *University of Piraeus, Greece*
Panagiotis Bamidis, *Aristotle University of Thessaloniki, Greece*

The Importance of Data Synchronization in Multiboard Acquisition Systems

Giuseppe Coviello, *University of Bari, Italy*
Gianfranco Avitabile, *University of Bari, Italy*
Antonello Florio, *University of Bari, Italy*

Session 3.2
Big Data Integration and Personalised Medicine in Smart Health Care
Chairs: Themis Exarchos, *Ionian University, Corfu, Greece*
Luca Faes, *University of Palermo, Italy*

INVITED - Personalized Detection of Explosive Cough Events in Patients With Pulmonary Disease

Bruno M. Rocha, *Univ. Coimbra, Portugal*
Diogo Pessoa, *Univ. Coimbra, Portugal*
Alda Marques, *Univ. Aveiro, Portugal*
Paulo Carvalho, *Univ. Coimbra, Portugal*
Rui Pedro Paiva, *Univ. Coimbra, Portugal*

The quality concerns in health care Big Data

Andrea Molinari, *University of Trento, Italy*
Giandomenico Nollo, *University of Trento, Italy*

Low invasive multisensor acquisition system for real-time monitoring of cardiovascular and respiratory parameters

Riccardo Pernice, *University of Palermo, Italy*
Antonino Parisi, *University of Palermo, Italy*
Saverio Guarino, *University of Palermo, Italy*
Giorgio Fallica, *STMicrolectronics, Italy*
Vincenzo Vinciguerra, *STMicrolectronics, Italy*
Giuseppe Ferla, *STMicrolectronics, Italy*
Luca Faes, *University of Palermo, Italy*
Alessandro Busacca, *University of Palermo, Italy*

Patient-specific Fluid Dynamical Evaluation of Hypoplastic Left Heart Syndrome Surgical Treatment

Giuseppe D'Avenio, *Istituto Superiore di Sanità Rome, Italy*
Aurelio Secinaro, *Bambino Gesù Children's Hospital, Italy*
Antonio Amodeo, *Bambino Gesù Children's Hospital, Italy*
Mauro Grigioni, *Istituto Superiore di Sanità Rome, Italy*

Prediction of Cardiovascular Complications in Diabetes from Pharmacy Administrative Claims

Enrico Longato, *University of Padova, Italy*
Gian Paolo Fadini, *University of Padova, Italy*
Giovanni Sparacino, *University of Padova, Italy*
Lorenzo Gubian, *Azienda Zero Regione Veneto, Italy*
Barbara Di Camillo, *University of Padova, Italy*

Heart left ventricle segmentation in ultrasound images using deep learning

Tijana Sustersic, *University of Kragujevac, (BioIRC), Serbia*
Milos Anic, *University of Kragujevac, (BioIRC), Serbia*
Nenad Filipovic, *University of Kragujevac, (BioIRC), Serbia*

Session 3.3

Neural and Cognitive Engineering: Methods and Technological Solutions

Chairs: Anna Maria Bianchi, *Politecnico di Milano, Italy*
Kleanthis Neokleous, *RISE Research Center on Interactive Media and Emerging Technologies, University of Cyprus, Cyprus*

EEG monitoring during software development

Alessandra Calcagno, *(DEIB) Politecnico di Milano, Italy*
Stefania Coelli, *(DEIB) Politecnico di Milano, Italy*
Ricardo Couceiro, *(CISUC) Universidade de Coimbra, Portugal*
João Durães, *(CISUC) Universidade de Coimbra, Portugal*
Caterina Amendola, *Politecnico di Milano, Italy*
Ileana Pirovano, *Politecnico di Milano, Italy*
Rebecca Re, *Politecnico di Milano, Italy*
Anna Maria Bianchi, *(DEIB) Politecnico di Milano, Italy*

Physiological responses related to pleasant and unpleasant sounds

Corinna Vitale, *Politecnico di Milano, Italy*
Paola De Stefano, *Politecnico di Milano, Italy*
Riccardo Lolatto, *Politecnico di Milano, Italy*
Anna Maria Bianchi, *Politecnico di Milano, Italy*

Design and Implementation of Steady State Visual Evoked Potential Based Brain Computer Interface Video Game

Elifsu Filiz, *Istanbul Bilgi University, Galatasaray University, Turkey*
Reis Burak Arslan, *Galatasaray University, Turkey*

CogAR: an augmented reality App to improve quality of life of the people with cognitive impairment

Mirko Rossi, *Sapienza University of Rome, Italy*
Giuseppe D'Avenio, *Istituto Superiore di Sanità, Italy*
Sandra Morelli, *Istituto Superiore di Sanità, Italy*
Mauro Grigioni, *Istituto Superiore di Sanità, Italy*

Neonatal Seizures Detection using Stationary Wavelet Transform and Deep Neural Networks: Preliminary Results

Lorenzo Frassineti, *University of Florence, University of Siena, Italy*
Daniele Ermini, *University of Florence, Italy*
Rachele Fabbri, *University of Florence, Italy*
Claudia Manfredi, *University of Florence, Italy*

Technical Solution for Burnout, the Modern Age Health Issue

Simona Riurean, *University of Petrosani, Romania*
Monica Leba, *University of Petrosani, Romania*
Andreea Ionica, *University of Petrosani, Romania*
Yonis Nassar, *University of Petrosani, Romania*

Session 3.4
Advances in Medical Informatics for HealthCare Applications
Chairs: Efthyvoulos Kyriacou, *Frederick University, Cyprus*
Silvana Quaglini, *University of Pavia, Italy*

eEmergency System to Support Emergency call Evaluation and Ambulance dispatch Procedures

Efthyvoulos Kyriacou, *Frederick University, Cyprus*
Riana Constantinou, *Ambulance Department State Health Services Organisation Ministry of Health, Cyprus*
Chris Kronis, *Frederick University, Cyprus*
George Hadjichristofi, *European University, Cyprus*
Constantinos Pattichis, *University of Cyprus, Cyprus*

A Novel Algorithm for the Design of Ketogenic Meals

Giordano Lanzola, *University of Pavia, Italy*
Federica Pellegrino, *University of Pavia, Italy*
Cinzia Ferraris, *University of Pavia, Italy*
Silvana Quaglini, *University of Pavia, Italy*

Co-creation of Virtual Reality Re-usable Learning objectives of 360º video scenarios for a Clinical Skills course

Eirini C. Schiza, *RISE, Cyprus*
Marios Hadjiaros, *RISE, Cyprus*
Maria Matsangidou, *RISE, Cyprus*
Fotos Frangoudes, *RISE, Cyprus*
Kleanthis Neocleous, *RISE, Cyprus*
Evangelia Gkougkoudi, *University of Cyprus, Cyprus*
Stathis Konstantinidis, *University of Nottingham, United Kingdom*
Constantinos S. Pattichis, *RISE, University of Cyprus, Cyprus*

Proposal of an Architecture to support High Quality Automatic Data Collection in the context of Multi-Centric Studies

Sara Mora, *DIBRIS University of Genoa, Italy*
Elena Lazarova, *DIBRIS University of Genoa, Italy*
Mauro Giacomini, *DIBRIS University of Genoa, Italy*

Molecular docking of ursolic acid and Staphylococcus aureus ATPase for antibacterial therapy

Norbert Maggi, *University of Genoa, Italy*
Anna Maria Schito, *University of Genoa, Italy*
Valeria Iobbi, *University of Genoa, Italy*
Angela Bisio, *University of Genoa, Italy*
Carmelina Ruggiero, *University of Genoa, Italy*
Mauro Giacomini, *University of Genoa, Italy*

A Nested U-Net Approach for Brain Tumour Segmentation

Neil Micallef, *University of Malta, Malta*
Dylan Seychell, *University of Malta, Malta*
Claude Julien Bajada, *University of Malta, Malta*

An Efficacious MRI Sparse Recovery Method Based on Differential Under-Sampling and k-Space Interpolation

Henry Kiragu, *University of Nairobi, Kenya*
Elijah Mwangi, *University of Nairobi, Kenya*
George Kamucha, *University of Nairobi, Kenya*

Session 3.5

Biotechnologies: Advanced Devices and Sensors

Chairs: Almir Badnjević, *Faculty of Engineering and Natural Sciences, International Burch University Sarajevo, Bosnia and Herzegovina*
Steffen Leonhardt, *RWTH Aachen University, Germany*

KEYNOTE - Developing and application of electronic noses in health care

Andreas Voss, *Ernst-Abbe-Hochschule, Jena, Germany*
Read more HERE

Silicon dosimeters based on Floating Gate Sensor: design, implementation and characterization

Umberto Gatti, *RedCat Devices, Italy*
Cristiano Calligaro, *RedCat Devices, Italy*
Aldo Parlato, *BlackCat Beyond srl, Italy*
Elio Tomarchio, *University of Palermo, Italy*
Evgeny Pikhay, *TowerJazz, Israel*
Yakov Roizin, *TowerJazz, Israel*

Fogging effect correction of Gafchromic HD-V2 film response for its use in high-dose radiotherapy

Cristiano Calligaro, *RedCat Devices, Italy*
Aldo Parlato, *BlackCat Beyond srl, Italy*
Elio Tomarchio, *University of Palermo, Italy*

A Highly-Configurable Full-Field Stimulus Source for Electroretinography

Giulia Crocioni, *Politecnico di Milano, Italy, University of Illinois at Chicago, USA*
Giambattista Gruosso, *Politecnico di Milano, Italy*
John Hetling, *University of Illinois at Chicago, USA*

Study on ANN based Upper Limb Exoskeleton

Marius Risteiu, *University of Petrosani, Romania*
Monica Leba, *University of Petrosani, Romania*
Olimpiu Stoicuta, *University of Petrosani, Romania*
Andreea Ionica, *University of Petrosani, Romania*

Ascorbic Acid determination using linear sweep voltammetry on flexible electrode modified with gold nanoparticles and reduced graphene oxide

Francesca Mazzara, *University of Palermo, Italy*
Bernardo Patella, *University of Palermo, Italy*
Giuseppe Aiello, *University of Palermo, Italy*
Carmelo Sunseri, *University of Palermo, Italy*
Rosalinda Inguanta, *University of Palermo, Italy*

Session 3.6

Bio-electromagnetic Modelling

Chairs: Paolo Ravazzani, *Institute of Electronics, Information and Telecommunications, CNR, Milano, Italy*
Elisa Francomano, *University of Palermo, Italy*

Analysis of ionic channel currents under nsPEFsstimulation by a circuital model of an excitable cell

Patrizia Lamberti, *University of Salerno, Italy*
Vincenzo Tucci, *University of Salerno, Italy*
Olga Zeni, *IREA, CNR, Italy*
Stefania Romeo, *IREA, CNR, Italy*

Mathematical modelling of nuclear medicine data

Michele Piana, *University of Genova, Italy*
Giacomo Caviglia, *University of Genova, Italy*
Sara Sommariva, *University of Genova, Italy*

Localization of neural activity from neuromagnetic data using varying-support sources

Cristina Campi, *Università degli Studi di Padova, Italy*

Numerical modelling of temperature increase induced by transcutaneous Spinal Direct Current Stimulation (tsDC)

Serena Fiocchi, *IEIIT, CNR, Italy*
Marta Bonato, *IEIIT, CNR, Politecnico di Milano, Italy*
Emma Chiaramello, *IEIIT, CNR, Italy*
Silvia Gallucci, *IEIIT, CNR, Italy*
Gabriella Tognola, *IEIIT, CNR, Italy*

Paolo Ravazzani, *IEIIT, CNR, Italy*
Marta Parazzini, *IEIIT, CNR, Italy*

Stochastic Dosimetry applied on a low frequency Near-Field Source Scenario

Marta Bonato, *IEIIT, CNR, Politecnico di Milano, Italy*
Emma Chiaramello, *IEIIT, CNR, Italy*
Serena Fiocchi, *IEIIT, CNR, Italy*
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Laura Dossi, *IEIIT, CNR, Italy*
Gabriella Tognola, *IEIIT, CNR, Italy*
Paolo Ravazzani, *IEIIT, CNR, Italy*
Marta Parazzini, *IEIIT, CNR, Italy*

Fake Nodes approximation for Magnetic Particle Imaging

Stefano De Marchi, *Università di Padova, Italy*
Wolfgang Erb, *Università di Padova, Italy*
Elisa Francomano, *Università di Palermo, Italy*
Francesco Marchetti, *Università di Padova, Italy*
Emma Perracchione, *Università di Genova, Italy*
Davide Poggiali, *Università di Padova, Italy*

An advanced numerical treatment of EM absorption in human tissue

Guido Ala, *Università di Palermo, Italy*
Elisa Francomano, *Università di Palermo, Italy*
Monica Millunzi, *Università di Palermo, Italy*
Marta Paliaga, *Università di Palermo, Italy*

TRACK 4 - SMART GRIDS

Session 4.1
Smart and sustainable islands
Chairs: Enrico De Tuglie, *Politecnico di Bari, Italy*
Marina Bonomolo, *University of Palermo, Italy*

Discrete Event Controllers for Grids' Lines

Ciufudean Calin, *Stefan cel Mare University, Romania*
Buzduga Corneliu, *Stefan cel Mare University, Romania*

Space charge accumulation in undersea HVDC cables as function of heat exchange conditions at the boundaries – water-air interface

Giuseppe Rizzo, *L.E.PR.E. HV Laboratory University of Palermo, Italy*
Pietro Romano, *L.E.PR.E. HV Laboratory University of Palermo, Italy*
Antonino Imburgia, *L.E.PR.E. HV Laboratory University of Palermo, Italy*
Fabio Viola, *L.E.PR.E. HV Laboratory University of Palermo, Italy*
Giuseppe Schettino, *L.E.PR.E. HV Laboratory University of Palermo, Italy*
Graziella Giglia, *L.E.PR.E. HV Laboratory University of Palermo, Italy*
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Flexibility Services in a Mediterranean Small Island to Minimize Costs and Emissions Related to Electricity Production from Fossil Fuels

Domenico Curto, *University of Palermo, Italy*
Vincenzo Franzitta, *University of Palermo, Italy*
Sonia Longo, *University of Palermo, Italy*
Francesco Montana, *University of Palermo, Italy*
Eleonora Riva Sanseverino, *University of Palermo, Italy*
Enrico Telaretti, *Università degli Studi di Palermo, Italy*

Experimental results on the economic management of a smart microgrid

Alessia Cagnano, *Polytechnic University of Bari, Italy*
Enrico De Tuglie, *Polytechnic University of Bari, Italy*
Francesco Marcone, *Polytechnic University of Bari, Italy*
Giuseppe Porro, *Polytechnic University of Bari, Italy*
Desire Dauphin Rasolomampionona, *Warsaw University of Technology, Poland*
Mariusz Klos, *Warsaw University of Technology, Poland*
Salvatore Favuzza, *University of Palermo, Italy*
Gaetano Zizzo, *University of Palermo, Italy*

Optimal management of Islanded Distribution Networks including Multi-Energy Storage Units

Andrea Cervi, *Interdepartmental Centre Giorgio Levi Cases, Italy*
Massimiliano Coppo, *University of Padova, Italy*
Marco Agostini, *Interdepartmental Centre Giorgio Levi Cases, Italy*
Roberto Turri, *University of Padova, Italy*

A DC-Link Voltage Control Strategy for Fast Frequency Response Support

James Amankwah Adu, *University of Bologna, Italy*
Fabio Napolitano, *University of Bologna, Italy*
Carlo Alberto Nucci, *University of Bologna, Italy*
Juan Diego Rios Penaloza, *University of Bologna, Italy*
Fabio Tossani, *University of Bologna, Italy*

Sizing and operation of a residential PV-battery system: Rule-Based and real time vs optimization and perfect foresight

Elena Sedano Ruiz, *Universidad de Malaga, Spain*
Jesus Huete Cubillo, *Universidad de Malaga, Spain*
Jorge de la Vega Rodrıguez, *Universidad de Malaga, Spain*
Sebastian Martın, *Universidad de Malaga, Spain*

Session 4.2
Net zero energy systems
Chairs: Giorgio Graditi, *ENEA, Italy*
Georgios Christoforidis, *Western University of Macedonia, Greece*

KEYNOTE - Cyber Security and Big Data Issues for Smart Grid Systems

Seref Sagiroglu, *Gazi University, Turkey*

Read more HERE

Rotor Speed Fluctuation Analysis for Rapid De-Loading of Variable Speed Wind Turbines

Fan Xinkai, *University of Pisa, Italy, Xi'an Jiaotong University, China*
Emanuele Crisostomi, *University of Pisa, Italy*
Baohui Zhang, *Xi'an Jiaotong University, China*
Dimitri Thomopulos, *University of Pisa, Italy*

Comparing indoor performances of a building equipped with four different roof configurations in 65 Italian sites.

Laura Cirrincione, *University of Palermo, Italy*
Maria La Gennusa, *University of Palermo, Italy*
Giorgia Peri, *University of Palermo, Italy*
Gianfranco Rizzo, *University of Palermo, Italy*
Gianluca Scaccianoce, *University of Palermo, Italy*

Passive components for reducing environmental impacts of buildings:analysis of an experimental green roof

Laura Cirrincione, *University of Palermo, Italy*
Maria La Gennusa, *University of Palermo, Italy*
Concettina Marino, *"Mediterranea" University of Reggio Calabria, Italy*
Antonino Nucara, *"Mediterranea" University of Reggio Calabria, Italy*
Antonino Marvuglia, *Luxembourg Institute of Science and Technology (LIST), Luxembourg*
Giorgia Peri, *University of Palermo, Italy*

Retrofitting existing buildings by means of innovative envelope components: low-impacting new assemblies

Laura Cirrincione, *University of Palermo, Italy*
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Giorgia Peri, *University of Palermo, Italy*
Gianfranco Rizzo, *University of Palermo, Italy*
Gianluca Scaccianoce, *University of Palermo, Italy*

Session 4.3

The Mediterranean Energy Hub

Chairs: Tuan-Quoc Tran, *CEA-INES, France*
Jaser A. Sa'ed, *Birzeit University, Palestine*

Fault detection based on ROCOV and ROCOC for multi-terminal HVDC systems

María José Pérez Molina, *University of the Basque Country UPV/EHU, Spain*
Dunixe Marene Larruskain Escobal, *University of the Basque Country UPV/EHU, Spain*
Pablo Eguia Lopez, *University of the Basque Country UPV/EHU, Spain*
Victor Valverde Santiago, *University of the Basque Country UPV/EHU, Spain*

A Smart Sensing Method for Real Time Monitoring of Low Voltage Series Arc Fault

Guido Ala, *Università degli Studi di Palermo, Italy*
Giovanni Artale, *Università degli Studi di Palermo, Italy*
Antonio Cataliotti, *Università degli Studi di Palermo, Italy*
Valentina Cosentino, *Università degli Studi di Palermo, Italy*
Claudio Fontana, *Università degli Studi di Palermo, Italy*
Pietro Romano, *Università degli Studi di Palermo, Italy*
Fabio Viola, *Università degli Studi di Palermo, Italy*

Wind Power Production based on DFIG: Modeling and Control by ADRC

Abdeslam Jaballaafou, *Ibn Tofail University Kenitra, Morocco*
Abdessalam Ait Madi, *Ibn Tofail University Kenitra, Morocco*
Adnane Addaim, *Ibn Tofail University Kenitra, Morocco*
Abdessamad Intidam, *Ibn Tofail University Kenitra, Morocco*

Dependability Analysis of a Digital Excitation Control System

Andrea Vicenzutti, *University of Trieste, Italy*
Massimiliano Chiandone, *University of Trieste, Italy*
Giorgio Sulligoi, *University of Trieste, Italy*

A co-simulation approach for validating agent-based distributed algorithms in smart grid

Minh-Tri Le, *Univ Grenoble Alpes, France*
Tung-Lam Nguyen, *Univ. Grenoble Alpes, CNRS, France*
Quoc-Tuan Tran, *Univ Grenoble Alpes, France*

Yvon Besanger, *Univ. Grenoble Alpes, CNRS, France*
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Oil & Gas Project: Achieve Power Flexibility Improving Innovation, Integration and Sustainability

Stefano Bertazzi, *Raffineria di Milazzo, Italy*
Riccardo Martini, *Advanced Services Leader, Italy*
Fabio Corgiolu, *Terna Rete Italia, Italy*
Gianfrancesco Licandro, *Raffineria di Milazzo, Italy*
Maurizio Soglio, *ABB Power Grids Italy, Italy*
Antonio Limone, *Terna Rete Italia, Italy*
Francesco Saitta, *Raffineria di Milazzo, Italy*
Marco Ghisio, *ABB Milan, Italy*
Vincze Jeno, *GE Global Services, Hungary*
Alessandro Di Paola, *Termica Milazzo, Italy*

Session 4.4 - PART I

Demand response and prosumers' aggregation

Chairs: Diego Arnone, *Engineering S.p.A. - Italy*
Francesco Grasso, *University of Firenze, Italy*

INVITED - Contribution of smart prosumers to the grid reliability

Diego Arnone, *Engineering I.I. S.p.A., Italy*

Dynamic Coalitions of Prosumers in Virtual Power Plants for Energy Trading and Profit Optimization

Giuseppe Raveduto, *Engineering Ingegneria Informatica Spa, Italy*
Vincenzo Croce, *Engineering Ingegneria Informatica Spa, Italy*
Marcel Antal, *Technical University of Cluj-Napoca, Computer Science, Romania*
Claudia Pop, *Technical University of Cluj-Napoca, Romania*
Ionut Anghel, *Technical University of Cluj-Napoca, Romania*
Tudor Cioara, *Technical University of Cluj-Napoca, Romania*

Implementation of a Management System for Prosumer Energy Storage Scheduling in Smart Grids

Giovanni Artale, *Università di Palermo, Italy*
Giuseppe Caravello, *Unversity of Palermo, Italy*
Antonio Cataliotti, *Università degli Studi di Palermo, Italy*
Valentina Cosentino, *University of Palermo, Italy*
Salvatore Guaiana, *Università di Palermo, Italy*
Dario Di Cara, *National Research Council, Italy*
Nicola Panzavecchia, *National Research Council, Italy*
Giovanni Tinè, *National Research Council, Italy*
Vincenzo Antonucci, *National Council of Research (CNR), Italy*
Davide Aloisio, *National Council of Research (CNR), Italy*
Giovanni Brunaccini, *National Research Council (CNR), Italy*
Marco Ferraro, *National Council of Research (CNR), Italy*
Francesco Sergi, *National Council of Research (CNR), Italy*

Ensemble learning with time-series clustering for aggregated short-term load forecasting

Petar Sarajcev, *University of Split, Croatia*
Damir Jakus, *University of Split, Croatia*
Josip Vasilj, *University of Split, Croatia*

Unsupervised learning procedure for NILM applications

Gilles Jacobs, *Ecole Polytechnique de Bruxelles, Universite Libre de Bruxelles, Belgium*
Pierre Henneaux, *Ecole Polytechnique de Bruxelles, Universite Libre de Bruxelles, Belgium*

DEMAND Project: An algorithm for the assessment of the prosumers' flexibility

Michele Cacioppo, *University of Palermo, Italy*
Salvatore Favuzza, *University of Palermo, Italy*
Mariano Ippolito, *University of Palermo, Italy*
Rossano Musca, *University of Palermo, Italy*
Eleonora Riva Sanseverino, *University of Palermo, Italy*
Enrico Telaretti, *University of Palermo, Italy*
Gaetano Zizzo, *University of Palermo, Italy*
Diego Arnone, *Engineering SPA, Italy*
Marzia Mammina, *Engineering SPA, Italy*

Investigation of autoregressive forecasting models for market electricity price

Anna Shikhina, *National Research University "MPEI" Moscow, Russia*
Alexei Kochengin, *National Research University "MPEI" Moscow, Russia*
George Chrysostomou, *Frederick University Cyprus*
Vladimir Shikhin, *National Research University "MPEI" Moscow, Russia*

Session 4.4 - PART II

Demand response and prosumers' aggregation

Chairs: Diego Arnone, *Engineering S.p.A. - Italy*
Francesco Grasso, *University of Firenze, Italy*

Blockchain-based DR logic: a trade-off between system operator's and customer's needs

Pierluigi Gallo, *University of Palermo, Italy*
Sonia Longo, *University of Palermo, Italy*
Francesco Montana, *University of Palermo, Italy*
Eleonora Riva Sanseverino, *University of Palermo, Italy*
Giuseppe Sciume, *University of Palermo, Italy*

A Comprehensive Comparison of Resonant Topologies for Magnetic Wireless Power Transfer

Fabio Corti, *University of Florence, Italy*
Libero Paolucci, *University of Florence, Italy*
Alberto Reatti, *University of Florence, Italy*
Francesco Grasso, *University of Florence, Italy*
Luca Pugi, *University of Florence, Italy*
Niccolo Tesi, *University of Florence, Italy*
Emanuele Grasso, *Saarland University, Germany*
Matthias Nienhaus, *Saarland University, Germany*

A methodology for evaluating the flexibility potential of domestic air conditioning systems

Guido Ala, *University of Palermo, Italy*
Alessandra Di Gangi, *University of Palermo, Italy*

Gaetano Zizzo, *University of Palermo, Italy*

Influence of Transformer Rating on Power Quality Indices in Low Voltage Residential Networks

Pablo Rodrıguez-Pajaron, *Universidad Politecnica de Madrid, Spain*
Araceli Hernandez, *Universidad Politecnica de Madrid, Spain*
Jovica V. Milanovic, *The University of Manchester, UK*

Optimal Scheduling of a Virtual Power Plant with Demand Response in Short-Term Electricity Market

Homa Rashidizadeh-Kermani, *University of Birjand, Iran*
Miadreza Shafie-khah, *University of Vaasa, Finland*
Gerardo J. Osório, *C-MAST, University of Beira, Portugal*
João P. S. Catalão, *University of Porto and INESC TEC,Portugal*

Optimal Planning of CHP-based Microgrids Considering DERs and Demand Response Programs

Saeid Qaeini, *Shahid Beheshti University, Iran*
Mehrdad S. Nazar, *Shahid Beheshti University, Iran*
Miadreza Shafie-khah, *University of Vaasa, Finland*
Gerardo J. Osório, *C-MAST, University of Beira, Portugal*
João P. S. Catalão, *University of Porto, INESC TEC, Portugal*

Session 4.5 - Special Technical Session
Italian Divertor Tokamak Test Facility
Chair: Pietro Zito, *ENEA, Italy*

INVITED - Status and main technological challenges of the EU DEMO nuclear fusion reactor. Research activity at the University of Palermo

Pietro A. Di Maio, *University of Palermo, Italy*
Ilenia Catanzaro, *University of Palermo, Italy*
Pierluigi Chiovaro, *University of Palermo, Italy*
Ruggero Forte, *University of Palermo, Italy*
Ivo Moscato, *University of Palermo, Italy*
Andrea Quartararo, *University of Palermo, Italy*
Eugenio Vallone, *University of Palermo, Italy*

Advanced Image-Processing for the Estimation of Pitch Angle for Runaway Electrons in Tokamaks

Concetta Barcellona, *DIEEI, University of Catania, Italy*
Maide Bucolo, *DIEEI, University of Catania, Italy*
Giovanna Stella, *DIEEI, University of Catania, Italy*
Arturo Buscarino, *DIEEI, University of Catania, Italy*
Luigi Fortuna, *DIEEI, University of Catania, Italy*
Giuseppe Mazzitelli, *ENEA, Italy*
Basilio Esposito, *ENEA, Italy*

Conceptual Design and Modeling of the Toroidal Field Coils Circuit of DTT

Pietro Zito, *ENEA, Italy*
Giordano Tomassetti, *ENEA, Italy*
Giuseppe Messina, *ENEA, Italy*
Luigi Morici, *ENEA, Italy*
Chiarasole Fiamozzi Zignani, *ENEA, Italy*
Alessandro Lampasi, *ENEA, Italy*
Guido Ala, *University of Palermo, Italy*
Gaetano Zizzo, *University of Palermo, Italy*
Carmelo Riccardo Lopes, *University of Palermo, Italy*

Conceptual Design and Modeling of Fast Discharge Unit for Quench Protection of Superconducting Toroidal Field Magnets of DTT

Carmelo Riccardo Lopes, *University of Palermo, Italy*
Pietro Zito, *ENEA, Italy*
Alessandro Lampasi, *ENEA, Italy*
Guido Ala, *University of Palermo, Italy*
Gaetano Zizzo, *University of Palermo, Italy*
Eleonora Riva Sanseverino, *University of Palermo, Italy*

The Heating & Current Drive System of Divertor Tokamak Test (DTT)

Gustavo Granucci, *CNR, Italy*
GianLuca Ravera, *ENEA, Italy*
Alessandro Bruschi, *CNR, Italy*
Silvio Ceccuzzi, *CNR, Italy*
Piero Agostinetti, *Consorzio RFX, Italy*
Saul Garavaglia, *CNR, Italy*
Afra Romano, *ENEA, Italy*
Alberto Ferro, *Consorzio RFX, Italy*

Poloidal Power Supply System of the Divertor Tokamak Test (DTT) Facility

Alessandro Lampasi, *ENEA, Italy*
Alessandro Cocchi, *University of Rome Sapienza, Italy*
Roberto Romano, *ENEA, Italy*
Pietro Zito, *ENEA, Italy*

DTT's Role, Characteristics & Design Status

Gian Mario Polli, *ENEA, Italy*
Giuseppe Di Gironimo, *University of Naples Federico II and Consorzio CREATE, Italy*
Giuseppe Ramogida, *ENEA, Italy*
Raffaele Albanese , *University of Naples Federico II and Consorzio CREATE, Italy*
Aldo Di Zenobio, *ENEA, Italy*
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Gustavo Granucci, *CNR, Italy*
Alexander Rydzy, *ENEA, Italy*
Piero Martin, *University of Padua and Consorzio RFX., Italy*
Paolo Innocente, *Consorzio RFX. CNR, Italy*
Sandro Sandri, *ENEA, Italy*
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Marco Valisa, *Consorzio RFX. CNR, Italy*
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Rosaria Villari, *ENEA, Italy*