



IESES 2020

IEEE 2nd International Conference
on Industrial Electronics
for Sustainable Energy Systems

PROGRAMME 1-3 SEPTEMBER 2020 - CAGLIARI, SARDINIA - ITALY

IESES



Università degli Studi di Cagliari



UNIVERSITÀ DI PISA



MESSAGE FROM THE CONFERENCE CHAIR

Dear Colleagues and Friends,
on behalf of the IESES 2020 organization, I would like to welcome you to the 2nd Industrial Electronics for Sustainable Energy Systems (IESES) conference held in Cagliari, Sardinia-Italy, September 1-3, 2020. The conference, sponsored by IEEE Industrial Electronic Society, is jointly organized by the universities of Cagliari and Pisa.

As you know, we have all been (and still are) facing tough times due to the Covid-19 outbreak worldwide. Many events have been cancelled or postponed.

We have done all our best to overcome difficulties and offer a safe and interesting conference where reinforcing our scientific relationships and starting new ones. Unfortunately, due to the uncertain pandemic situation in several countries, we cannot welcome many colleagues we are close to. To keep together our scientific community and overcome the physical barriers created by Covid-19 outbreak the IEEE Industrial Electronic Society has steered the development of hybrid conference in order to guarantee the attendance of all the authors during the IESES conference. For this reason, the authors that cannot attend the conference due to Covid-19 safety limitation will present their paper during the conference virtually, live answering to the questions coming from the audience by web.

The conference will offer a rich technical program including cutting-edge keynote lectures, oral presentation sessions, the

Women in IES workshop and the Industry forum. IESES 2020 aims at providing an open, inspiring and friendly environment to share ideas, innovative solutions and research results related to sustainable energy systems. The conference will feature both industrial-driven and application-oriented sessions. We will bring together practicing engineers, researchers and other professionals for interactive and multidisciplinary discussions on the latest advances in various industrial electronics technologies, such as energy storage and conversion, power electronics, power systems, electric transportation and embedded systems.

I am sure you will also appreciate Cagliari and its mix of history and natural beauties. Our city offers monuments, old beautiful palaces, Roman ruins, museums filled with prehistoric artefacts, centuries-old churches. All around, beautiful sandy beaches with limpid blue waters and wonderful naturalistic parks.

Finally, let me thank the scientific committee members for their effort to compose such a high-quality technical program, the organizing committee members for their hard work and dedication and, of course, all attendees for being here and make this event possible.

I hope you will enjoy the conference and your stay in Sardinia.

Beni benius a totus!

Prof. Alfonso Damiano

COMMITTEES

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Prof. Nihal Kularatna
University of Waikato, New Zealand

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*Indian Institute of Technology,
India*

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Saman Korjani
University of Cagliari, Italy

Andrea Salimbeni
University of Cagliari, Italy

TRACK LIST AND CHAIRS / SPECIAL SESSION

TECHNICAL TRACKS

TT1 Energy Storage Devices

Bharat Balagopal
North Carolina State University, USA

Roberto Di Rienzo
University of Pisa, Italy

Walter Zamboni
Università degli Studi di Salerno, Italy

TT2 Power Converters

Sergio Vazquez
University of Seville, Spain

Mauro Di Monaco
*Università degli Studi di Cassino
e del Lazio Meridionale, Italy*

Thomas Strasser
AIT, Austria

TT3 Renewable Energy Systems

Daniel Gladwin
University of Sheffield, United Kingdom

Giampaolo Buticchi
University of Nottingham Ningbo, China

Ramon Blasco-Gimenez
Technical University of Valencia, Spain

TT4 Microgrids

Hao Ma
Zhejiang University, China

Emilio Ghiani
University of Cagliari, Italy

Hector Beltran
Universitat Jaume I, Spain

TT5 Resilience for Energy Systems

Craig Rieger
Idaho National Laboratory, USA

Ali Sari
*Claude Bernard University
Lyon 1, France*

Valeriy Vyatkin
Lulea University of Technology, Sweden

TT6 Transport Electrification

Gianmarco Pellegrino
Politecnico di Torino, Italy

Fei Gao
*University of Technology
of Belfort-Montbéliard (UTBM), France*

Xiaosong Hu
Chongqing University, China

TT7 IoT for Sustainable Energy Systems

Virginia Pilloni
University of Cagliari, Italy

Stamatis Karnouskos
SAP Research, Germany

Lucia Lo Bello
University of Catania, Italy

TT8 Smart Buildings

Carlo Vallati
University of Pisa, Italy

Jan Haase
Universität zu Lübeck, Germany

Huazhen Fang
University of Kansas, USA

SPECIAL SESSION

SS2 Advanced Semiconductor Devices for Battery Energy Storage

Francesco Iannuzzo,
Aalborg University, Denmark

Salvatore Musumeci,
Politecnico di Torino, Italy

Filippo Chimento,
ABB, Italy

PROGRAMME AT A GLANCE

	TUESDAY, SEPT 1		WEDNESDAY, SEPT 2			THURSDAY, SEPT 3	
TIMETABLE	ROOM CASTELLO	ROOM STAMPACE	ROOM CASTELLO	ROOM STAMPACE	ROOM VILLANOVA	ROOM CASTELLO	ROOM STAMPACE
09:00	9:00/9:30 Opening Ceremony						
09:30	9:30/10:30 Keynote Speech <i>How the electro-mobility will reshape the concept of passenger vehicles, Francesco Mastroandrea</i>		9:30/11:30 Oral Session: TT3 Renewable Energy Systems	9:30/11:30 Oral Session: TT1 Energy Storage Devices	9:30/11:30 Workshop Women in IES	9:30/10:30 Keynote Speech <i>Power Electronics Based on Wide-bandgap Semiconductors: Opportunities and Challenges, Prof. Giuseppe Iannaccone</i>	
10:00							
10:30	Coffee break					Coffee break	
11:00	11:00/13:00 Oral Session: TT1 Energy Storage Devices	11:00/13:00 Oral Session: TT4 Microgrids				11:00/13:00 Oral Session: TT6 Transport Electrification	11:00/13:00 Oral Session: SS2 Advanced Semiconductor Devices for Battery Energy Storage
11:30			Coffee break				
12:00			12:00/13:00 Industry Forum (Typhoon)				
13:00	Lunch		Lunch			Lunch	
14:00						14:00/15:00 Workshop (Sardegna Ricerche)	
14:30	14:30/15:30 Industry Forum (Regal Grid)		14:30/15:30 Keynote Speech <i>Resilient Networked Microgrids Energy Management System, Prof. Mo-Yuen Chow</i>			15:00/15:30 Closing Ceremony	
15:00							
15:30	Coffee break		Coffee break			Coffee break	
16:00	16:00/18:00 Oral Session: TT2 Power Converters	16:00/18:00 Oral Session: TT7 IoT for Sustainable Energy Systems TT8 Smart Buildings	16:00/18:00 Oral Session: TT2 Power Converters	16:00/18:00 Oral Session: TT3 Renewable Energy Systems TT5 Resilience for Energy Systems		16:30/18:30 Technical tour to the Sardegna Ricerche facilities (to be confirmed)	
16:30							
18:00	19:00 Welcome Reception		20:30 Social Dinner				

SCIENTIFIC PROGRAMME

TUESDAY SEPT 1 ROOM CASTELLO

9:00 Opening Ceremony

9:30 Keynote Speech

/10:30 **How the Electro-mobility will Reshape the Concept of Passenger Vehicles**
Francesco Mastroandrea, AVL srl, Italy

10:30 Coffee break

11:00 Oral Session:

/13:00 **TT1 Energy Storage Devices**

11:00 **ND-001252 Machine Learning Approaches in Battery Management Systems: State of the Art: Remaining Useful Life and Fault Detection**

Mr. Reza Rouhi Ardeshiri, University of Michigan-Shanghai Jiao Tong University Joint Institute, Shanghai Jiao Tong University, China

Dr. Bharat Balagopal, North Carolina State University, USA

Mr. Amro Alsabbagh, University of Michigan-Shanghai Jiao Tong University Joint Institute, Shanghai Jiao Tong University, China

Prof. Chengbin Ma, University of Michigan-Shanghai Jiao Tong University Joint Institute, Shanghai Jiao Tong University, China

Prof. Mo-Yuen Chow, North Carolina State University, USA

11:20 **ND-001228 A Battery Residual Capacity Indicator Based on the Battery Internal Resistance: an Experimental Study**

Mr. Antonio Guarino, DIEM, Università degli Studi di Salerno, Italy

Prof. Walter Zamboni, DIEM, Università degli Studi di Salerno, Italy

Prof. Eric Monmasson, SATIE, Université de Cergy-Pontoise, France

11:40 **ND-001236 Empirical Law for Lithium-ion Batteries State of Charge Estimation for EV Applications**

Mr. Hamza El Jebbari, LUSAC Laboratory, University of Caen Normandy, France

Dr. Raffaele Petrone, LUSAC Laboratory, University of Caen Normandy, France

Prof. Hamid Gualous, LUSAC Laboratory, University of Caen Normandy, France

Prof. Rachid Outbib, LSIS Laboratory, University of Aix-Marseille, France

12:00 **ND-001856 Experimental Analysis of Capacity Degradation in Lithium-ion Battery Cells with Different Rest Times**

Mr. Brian Ospina Agudelo, UNISA-UCP, Italy

Prof. Alessandro Massi Pavan, UNITS, Italy

Prof. Walter Zamboni, UNISA, Italy

Prof. Rebecca Todd, The University of Manchester, Great Britain (UK)

Prof. Andrew Forsyth, The University of Manchester, Great Britain (UK)

Prof. Eric Monmasson, UCP, France

Prof. Giovanni Spagnuolo, UNISA, Italy

12:20 **ND-000221 Online Data-based Cell State Estimation of a Lithium-ion Battery**

Mr. Alexander Fill, Daimler AG, Germany

Mr. Arber Avdyli, Daimler AG, Germany

Prof. Kai Peter Birke, Universität Stuttgart, Germany

12:40 **ND-001937 A Novel Most Significant Cell Methodology in a Battery Pack with Serial Cell Connection**

Mr. Cong-Sheng Huang, North Carolina State University, USA

Mr. Zheyuan Cheng, North Carolina State University, USA

Dr. Bharat Balagopal, North Carolina State University, USA

Prof. Mo-Yuen Chow, North Carolina State University, USA

13:00 Lunch

14:30 **Industry Forum** (Regal Grid)

15:30 Coffee break

TUESDAY SEPT 1

ROOM CASTELLO

16:00 Oral Session:
/18:00 TT2 Power Converters

16:00 ND-000396 An Improved DTC Strategy for a Doubly Fed Induction Generator Using an Artificial Neural Network Controller

Dr. Ibrahim Yaichi, *Djillali Liabes University, Algeria*
Dr. Abdelhafid Semmah, *Djillali Liabes University, Algeria*
Prof. Wira Patrice, *University of Haute Alsace, France*

16:20 ND-001929 Selective Harmonics Elimination for Nine Level Inverter Based on Linear System Solution

Prof. Carlo Cecati, *University of L'Aquila, Italy*
Prof. Concettina Buccella, *University of L'Aquila, Italy*
Prof. Maria Gabriella Cimatorini, *University of L'Aquila, Italy*

16:40 ND-000205 Master-slave with Droop Control for MTDC Grids

Mr. Hadi Alyami, *College of Technology in Tabuk, Saudi Arabia*

17:00 ND-000019 Design of a 35 kW Power Equipment for Energy Harvesting in the Aeronautic Context

Dr. Hassan Cheaito, *France*
Prof. Bruno Allard, *France*
Prof. Guy Clerc, *France*
Mr. Joris Pallier, *France*

Mr. Pascal Pommier-Petit, *France*
Mr. Paul Albouy, *France*

17:20 ND-001279 Analysis of the Impact of the Operating Parameters on the Variation of the Dynamic On-state Resistance of Gan Power Devices

Dr. Giuseppe Mauromicale, *University of Catania, Italy*
Dr. Santi A. Rizzo, *University of Catania, Italy*
Prof. Nunzio Salerno, *University of Catania, Italy*
Dr. Giovanni Susinni, *University of Catania, Italy*
Prof. Angelo Raciti, *IMM - Consiglio Nazionale delle Ricerche, Italy*
Dr. Filadelfo Fusillo, *STMicroelectronics, Italy*
Dr. Agatino Palermo, *STMicroelectronics, Italy*
Dr. Rosario Scollo, *STMicroelectronics, Italy*

17:40 ND-001694 Simulation of Thyristor-controlled Reactor Using Susceptance-to-firing Angle Conversion with Regression Models

Mr. Vadim I. Zakutsky, *Moscow Power Engineering Institute, Russian Federation*
Prof. Qiuwei Wu, *Technical University of Denmark, Denmark*
Prof. Magomed G. Gadzhiev, *Moscow Power Engineering Institute, Russian Federation*

19:00 Welcome reception

TUESDAY SEPT 1

ROOM STAMPACE

11:00 Oral Session:
/13:00 TT4 Microgrids

11:00 ND-001317 Scalability and Replicability Analysis of an Island Microgrid Concept

Ms. Barbara Herndler, *AIT, Austria*

11:20 ND-002429 LV Customers Modeling Impact on Microgrid Optimal Management

Prof. Fabrizio Pilo, *University of Cagliari, Italy*
Dr. Giuditta Pisano, *University of Cagliari, Italy*
Dr. Simona Ruggeri, *University of Cagliari, Italy*
Mr. Matteo Troncia, *University of Cagliari, Italy*

11:40 ND-001902 An Augmented Bayesian Reputation Metric for Trustworthiness Evaluation in Consensus-based Distributed Microgrid Energy Management Systems with Energy Storage

Mr. Zheyuan Cheng, *North Carolina State University, USA*
Prof. Mo-Yuen Chow, *North Carolina State University, USA*

12:00 ND-002194 A Policy for Efficient Utilization of a Shared Energy Back-up System

Prof. Mohamed Abdelati, *Jug, Palestine*
Prof. Georg Frey, *Saarland University, Germany*

12:20 ND-002275 A Technoeconomical Evaluation of a Hybrid AC/DC Microgrid - The University of Cyprus Nanogrid

Mr. Chrysanthos Charalambous, *University of Cyprus/FOSS, Cyprus*
Dr. Christina N. Papadimitriou, *University of Cyprus/FOSS, Cyprus*
Dr. Alexis Polycarpou, *Frederick University, Cyprus*
Dr. Venizelos Efthymiou, *University of Cyprus/FOSS, Cyprus*

12:40 ND-000027 On the Design of Grid-side Inverter Voltage Controllers

Mr. Bernhard Hammer, *Technische Universität Darmstadt, Germany*
Dr. Eric Lenz, *Technische Universität Darmstadt, Germany*
Prof. Ulrich Konigorski, *Technische Universität Darmstadt, Germany*

13:00 Lunch

16:00 Oral Session:
/18:00 TT7 IoT for Sustainable Energy Systems
TT8 Smart Buildings

16:00 ND-000418 Impact of Regional Redispatching Cooperation and Involvement of Distributed Electricity Prosumers

Mr. Milan Vukasovic, *Austrian Power Grid, Austria*

TUESDAY SEPT 1

ROOM STAMPACE

Ms. Iva Mihajlovic Vlajsavljevic, *Electricity Coordinating Center Ltd., Serbia*

Mr. Dusan Vlajsavljevic, *Electricity Coordinating Center Ltd., Serbia*

Mr. Lucian Moldovanu, *SAP, Romania*

Mr. Zoran Vujasinovic, *Electricity Coordinating Center Ltd., Serbia*

Mr. Viorel Marcu, *SAP, Romania*

16:20 ND-000566 Non-Intrusive Load Disaggregation Via a Fully Convolutional Neural Network: Improving the Accuracy on Unseen Household

Dr. Luca Massidda, *CRS4, Italy*

Dr. Marino Marrocu, *CRS4, Italy*

Mr. Simone Manca, *CRS4, Italy*

16:40 ND-002097 Designing Nearly Zero Energy Buildings: a Recommendation Tool for Optimal Sizing of Renewable Energy Source Systems

Mr. Fabio Casu, *University of Cagliari, Italy*

Dr. Saman Korjani, *University of Cagliari, Italy*

Dr. Virginia Pilloni, *University of Cagliari, Italy*

Dr. Alessandro Serpi, *University of Cagliari, Italy*

Prof. Alfonso Damiano, *University of Cagliari, Italy*

Prof. Daniele Giusto, *University of Cagliari, Italy*

17:00 ND-000515 Evaluation of Energy-saving Control Method for Multi Source District Heating and Cooling System

Mr. Michiki Nakano, *Hitach, Ltd., Japan*

Dr. Takashi Fukumoto, *Hitachi Ltd., Japan*

Prof. Norihisa Komoda, *Code Solutions Co. Ltd., Japan*

17:20 ND-000647 Towards an Occupancy Count Functionality for Smart Buildings - An Industrial Perspective

Dr. Christian Groß, *ABB Corporate Research, Germany*

Mr. Reuben Borrison, *ABB Corporate Research, Germany*

Dr. Johannes Schmitt, *ABB Corporate Research, Germany*

Dr. Markus Aleksy, *ABB Corporate Research, Germany*

17:40 ND-001996 Optimal Control of Domestic Storage Via MPC: the Impact of the Prediction of User Habits, including Power Market and Battery Degradation

Dr. Matteo Manganelli, *University of Parma, Italy*

Mr. Vishal Undre, *University of Parma, Italy*

Prof. Alessandro Soldati, *University of Parma, Italy*

19:00 Welcome reception

WEDNESDAY SEPT 2

ROOM CASTELLO

9:30 Oral Session:

/11:30 TT3 Renewable Energy Systems

9:30 ND-000035 Real-Time Experimental Assessment of a New MPPT Algorithm Based on the Direct Detection of the Short-circuit Current for a PV System

Mr. Claude Bertin Nzoundja Fapi, *University of Ngaoundere, Cameroon*

Prof. Patrice Wira, *University of Haute Alsace, France*

Prof. Martin Kamta, *University of Ngaoundere, Cameroon*

9:50 ND-000655 Loss Modulated Direct Power Control for Single-phase Grid Connected Multisource Fed Photovoltaic System

Mr. Satish Ramaiah, *Indian Institute of Technology Madras, India*

Dr. N Lakshminarasamma, *Indian Institute of Technology Madras, India*

Prof. Mahesh Kumar Mishra, *Indian Institute of Technology Madras, India*

10:10 ND-000213 Supercapacitor Assisted Hybrid DC-DC Converter for Applications Powered by Renewable Energy Sources

Mr. Thilanga Ariyaratna, *The University of Waikato, New Zealand*

Prof. Nihal Kularatna, *The University of Waikato, New Zealand*
Prof. D. Alistair Steyn-Ross, *The University of Waikato New Zealand*

10:30 ND-000426 Experimental verification of Supercapacitor Assisted Sub Module Inverter (SCASMI)

Mr. Nalin Bandara, *Auckland University of Technology, New Zealand*

Dr. Kosala Gunawardane, *Auckland University of Technology, New Zealand*

Prof. Nihal Kularatna, *The University of Waikato Hamilton, New Zealand*

10:50 ND-001848 Techno-economic Comparison of Biomass Combustion and Anaerobic Digestion Systems for Hybridization of CSP Plants

Dr. Mario Petrollese, *University of Cagliari, Italy*

Mr. Joseph Oyekale, *University of Cagliari, Italy*

Prof. Giorgio Cau, *University of Cagliari, Italy*

Prof. Daniele Cocco, *University of Cagliari, Italy*

11:10 ND-001953 Assessment of a Hydrogen Production, Storage and Utilization System in a Demonstrative Microgrid

Dr. Fabio Serra, *Piattaforma Energie Rinnovabili Sardegna Ricerche, Italy*

WEDNESDAY SEPT 2

ROOM CASTELLO

Dr. Marialaura Lucariello, *Piattaforma Energie Rinnovabili Sardegna Ricerche, Italy*
Dr. Mario Petrollese, *University of Cagliari, Italy*
Prof. Giorgio Cau, *University of Cagliari, Italy*

11:30 Coffee break

12:00 Industry Forum (Typhoon)

1. EV Real-time Simulation: Grid-to-vehicle, Vehicle-to-grid, and UPS Mode

Presenter: Dusan Kostic

2. Enabling Industrial Energy Storage Controllers for Microgrid System-level Studies

Presenter: Simisa Simic

13:00 Lunch

14:30 Keynote Speech

/15:30 Resilient Networked Microgrids Energy Management System

Prof. Mo-Yuen Chow, *North Carolina State University, USA*

15:30 Coffee break

16:00 Oral Session:

/18:00 TT2 Power Converters

16:00 ND-001864 Performance Comparative Assessment of Grid-connected Power Converters Control Strategies

Mr. Giacomo Piero Schiapparelli, *University of Genoa, Italy*

Dr. Fabio D'Agostino, *University of Genoa, Italy*

Prof. Stefano Massucco, *University of Genoa, Italy*

Prof. Federico Silvestro, *University of Genoa, Italy*

Prof. Mario Paolone, *Ecole Polytechnique Fédérale de Lausanne, Switzerland*

16:20 ND-002356 Experimental Validation of Maximum Constant Boost Control and Switching Frequency Optimal for Three-phase Quasi-Z-source Converters

Dr. Giuseppe Schettino, *University of Palermo, Italy*

Prof. Rosario Miceli, *University of Palermo, Italy*

Prof. Renato Rizzo, *University of Naples Federico II, Italy*

Prof. Fabio Viola, *University of Palermo, Italy*

Dr. Filippo Pellitteri, *University of Palermo, Italy*

16:40 ND-001961 Parallel Operation of Voltage Source Converters without Filter Inductors: Control of the Circulating Current

Prof. Alessandro Soldati, *University of Parma, Italy*

Mr. Vishal Undre, *University of Parma, Italy*

Prof. Carlo Conconi, *University of Parma, Italy*

Prof. Basim A. Alsayid, *Palestine Technical University, Palestine*

Prof. Muhammad H. Dradi, *Palestine Technical University, Palestine*

17:00 ND-001104 A Robust Compensation Method for Megahertz Wireless Power Transfer Based on Rectifier Input Impedance Analysis

Dr. Huan Zhang, *Shanghai Jiao Tong University, China*

Dr. Yaoxia Shao, *Shanghai Jiao Tong University, China*

Dr. Ming Liu, *Princeton University, USA*

Prof. Chengbin Ma, *Shanghai Jiao Tong University, China*

17:20 ND-001805 Current Pulse Generation Methods for Li-ion Battery Chargers

Mr. Francesco Lo Franco, *University of Bologna, Italy*

Dr. Mattia Ricco, *University of Bologna, Italy*

Mr. Riccardo Mandrioli, *University of Bologna, Italy*

Mr. Aleksandr Viatkin, *University of Bologna, Italy*

Prof. Gabriele Grandi, *University of Bologna, Italy*

17:40 ND-002364 Modeling the Load Equivalent Resistance of a Series-series Inductive-coupled Resonant Wireless Power Transfer System

Mr. Andrea Carloni, *University of Pisa, Italy*

Prof. Federico Baronti, *University of Pisa, Italy*

Dr. Roberto Di Rienzo, *University of Pisa, Italy*

Prof. Roberto Roncella, *University of Pisa, Italy*

Prof. Roberto Saletti, *University of Pisa, Italy*

20:30 Social dinner

Bus transfer will be provided from conference venue at 19:45.

WEDNESDAY SEPT 2

ROOM STAMPACE

9:30 Oral Session: /11:30 TT1 Energy Storage Devices

9:30 **ND-001341 Battery Management System with Testing Protocols for Kw-Class Vanadium Redox Flow Batteries**
Mr. Andrea Trovò, *Università degli Studi di Padova, Italy*
Prof. Massimo Guarnieri, *Università degli Studi di Padova, Italy*

9:50 **ND-000604 Reduction of Battery-Aging of a Hybrid Lithium-Ion and Vanadium-Redox-Flow Storage System in a Microgrid Application**
Mr. Simon Resch, *Friedrich-Alexander University Erlangen-Nürnberg (FAU), Germany*
Prof. Matthias Luther, *Friedrich-Alexander University Erlangen-Nürnberg (FAU), Germany*

10:10 **ND-001031 Experimental Analysis of Efficiencies of a Large Scale Energy Storage System**
Mr. Seiya Mori, *University of Sheffield, United Kingdom*
Dr. Matthew J. Smith, *University of Sheffield, United Kingdom*
Dr. Daniel T. Gladwin, *University of Sheffield, United Kingdom*
Prof. David A. Stone, *University of Sheffield, United Kingdom*

10:30 **ND-002208 A Smart Energy Management System of a Highly-Integrated Battery-Ultracapacitor System**
Dr. Andrea Salimbeni, *University of Cagliari, Italy*

Dr. Mario Porru, *University of Cagliari, Italy*
Prof. Alfonso Damiano, *University of Cagliari, Italy*
Dr. Alessandro Serpi, *University of Cagliari, Italy*

10:50 **ND-002399 Passive Balancing Algorithm for Charge Equalization of Series Connected Battery Cells**
Dr. Roberto Di Rienzo, *University of Pisa, Italy*
Dr. Marco Zeni, *University of Pisa, Italy*
Prof. Federico Baronti, *University of Pisa, Italy*
Prof. Roberto Roncella, *University of Pisa, Italy*
Prof. Roberto Saletti, *University of Pisa, Italy*

11:10 **ND-002089 Heuristic Approach for the Characterization of Thermal Transient in Batteries**
Dr. Pasquale De Falco, *University of Naples Parthenope, Italy*
Dr. Luigi Pio Di Noia, *University of Naples Federico II, Italy*
Prof. Andrea Del Pizzo, *University of Naples Federico II, Italy*
Prof. Renato Rizzo, *University of Naples Federico II, Italy*

11:30 **Coffee break**

13:00 **Lunch**

16:00 Oral Session:
/18:00 TT3 Renewable Energy Systems
TT5 Resilience for Energy Systems

16:00 **ND-001538 Battery Energy Storage based Approach for Grid Voltage Regulation in Renewable Rich Distribution Networks**
Mr. Vimukthi Gamage, *University of Moratuwa, Sri Lanka*
Mr. Nishan Withana, *University of Moratuwa, Sri Lanka*
Mr. Channa Silva, *University of Moratuwa, Sri Lanka*
Dr. Rasara Samarasinghe, *University of Moratuwa, Sri Lanka*

16:20 **ND-001023 Design and Economic Assessment of a RES-based Microgrid for an Energy Community**
Prof. Alfonso Damiano, *University of Cagliari, Italy*
Dr. Efsio A. Scano, *Sardegna Ricerche, Italy*
Dr. Alberto Varone, *CRS4, Italy*

16:40 **ND-000493 A Genetic Algorithm Approach for Sizing Integrated PV-BESS Systems for Prosumers**
Dr. Saman Korjani, *University of Cagliari, Italy*
Dr. Alessandro Serpi, *University of Cagliari, Italy*
Prof. Alfonso Damiano, *University of Cagliari, Italy*

17:00 **ND-002054 A Random-weighted Privacy-preserving Distributed Algorithm for Energy Management in Microgrid with Energy Storage Devices**
Mr. Feng Ye, *Southeast University, China*
Mr. Zheyuan Cheng, *North Carolina State University, USA*
Prof. Xianghui Cao, *Southeast University, China*

Prof. Mo-Yuen Chow, *North Carolina State University, USA*

17:20 **ND-001783 Aggregated Demand Analysis and Forecasting Methodology for the Iberian Electricity Market**
Mr. Jorge Segarra-Tamarit, *Universitat Jaume I, Spain*
Dr. Emilio Perez, *Universitat Jaume I, Spain*
Dr. Enrique Belenguer, *Universitat Jaume I, Spain*
Mr. Javier Cardo-Miota, *Universitat Jaume I, Spain*
Dr. Hector Beltran, *Universitat Jaume I, Spain*

17:40 **ND-000957 Permeance Based Model for the Coupled-Inductor Utilized in the Supercapacitor Assisted Surge Absorber (SCASA) and Its Experimental Validation**
Mr. Sadeeshvara Silva Thotabaddadurage, *University of Waikato, New Zealand*
Prof. Nihal Kularatna, *University of Waikato, New Zealand*
Prof. D. Alistair Steyn-Ross, *University of Waikato, New Zealand*

20:30 **Social dinner**
Bus transfer will be provided from conference venue at 19:45.



WEDNESDAY SEPT 2

ROOM VILLANOVA

9:30 Workshop /11:30 Women in IES

Organizers: Prof. Lucia Lo Bello, University of Catania, Italy
Prof. Concettina Buccella, University of L'Aquila, Italy

The Women in IES Initiative

Prof. Lucia Lo Bello, University of Catania, Italy

Fundamental Frequency Modulation Techniques for Multilevel Inverters

Prof. Concettina Buccella, University of L'Aquila, Italy

My Experience as a Researcher in Automatic Control

Prof. Carla Seatzu, University of Cagliari, Italy

On Promoting Gender Balance in Engineering

Prof. Mariagrazia Dotoli, Polytechnic of Bari, Italy

Interweaving Different Expertise in Doing Research, a Women-working-on-microgrids Approach

Prof. Norma Anglani, University of Pavia, Italy

11:30 Coffee break

THURSDAY SEPT 3

ROOM CASTELLO

9:30 Keynote Speech **Power Electronics Based on Wide-bandgap Semiconductors: Opportunities and Challenges** Prof. Giuseppe Iannaccone, University of Pisa, Italy

10:30 Coffee break

11:00 Oral Session: /13:00 TT6 Transport Electrification

11:00 ND-000582 Real-time Multi-Objective Energy Management for Fuel Cell Hybrid Electric Vehicles

Mr. Yang Zhou, FEMTO-ST (UMR CNRS 6174), FCLAB (FR CNRS 3539), Univ. Bourgogne Franche-Comté, UTBM, France
Prof. Alexandre Ravey, FEMTO-ST (UMR CNRS 6174), FCLAB (FR CNRS 3539), Univ. Bourgogne Franche-Comté, UTBM, France
Prof. Marie-Cécile Pera, FEMTO-ST (UMR CNRS 6174), FCLAB (FR CNRS 3539), Univ. Bourgogne Franche-Comté, UTBM, France

11:20 ND-002437 Thermal Analysis of Battery Cables for Electric Vehicles Prof. Luigi Pio Di Noia, University of Naples Federico II, Italy Prof. Renato Rizzo, University of Naples Federico II, Italy

11:40 ND-001899 Hybrid-electric Solutions for the Propulsion of a Luxury Sailing Yacht

Prof. Vittorio Bucci, University of Trieste, Italy
Prof. Francesco Mauro, University of Trieste, Italy
Prof. Andrea Vicenzutti, University of Trieste, Italy
Prof. Daniele Bosich, University of Trieste, Italy
Prof. Giorgio Sulligoi, University of Trieste, Italy

12:00 ND-002402 FPGA Accelerator for Battery Management Systems in Safety Critical Applications

Dr. Alessandro Verani, University of Pisa, Italy
Mr. Giulio Fieramosca, University of Pisa, Italy
Dr. Antonio Colicelli, University of Pisa, Italy
Dr. Roberto Di Rienzo, University of Pisa, Italy
Prof. Roberto Saletti, University of Pisa, Italy
Prof. Roberto Roncella, University of Pisa, Italy
Dr. Vincent Lorentz, Fraunhofer Institute IISB, Germany
Dr. Radu Schwarz, Fraunhofer Institute IISB, Germany
Prof. Federico Baronti, University of Pisa, Italy

12:20 ND-001015 Influence of Rotor Pole Number on Performance of Novel Slot Permanent Magnet Machines with Complementary Rotors Dr. Qingsong Wang, Coventry University, United Kingdom Prof. Petar Igic, Coventry University, United Kingdom Dr. Shuangxia Niu, The Hong Kong

THURSDAY SEPT 3

ROOM CASTELLO

Polytechnic University, Hong Kong
Prof. Junnian Wang, Jilin University, China

12:40 ND-001201 A New Dual-PM Excited Doubly Salient Machine for Traction Applications

Dr. Qingsong Wang, Coventry University, United Kingdom
Prof. Petar Igic, Coventry University, United Kingdom
Dr. Shuangxia Niu, Hong Kong Polytechnic University, Hong Kong
Prof. Junnian Wang, Jilin University, China

13:00 Lunch

14:00 Workshop
(Sardegna Ricerche)

15:00 Closing Ceremony

15:30 Coffee break

16:30 Technical tour to the Sardegna Ricerche facilities
(to be confirmed).

THURSDAY SEPT 3

ROOM STAMPACE

11:00 Oral Session:
/13:00 SS2 Advanced Semiconductor Devices for Battery Energy Storage

11:00 ND-000876 Modeling Techniques and Virtual Prototyping of Silicon Carbide MOSFET Power Modules

Dr. Gaetano Bazzano, STMicroelectronics, Italy
Dr. Daniela Cavallaro, STMicroelectronics, Italy
Dr. Alessandra Raffa, STMicroelectronics, Italy
Dr. Filippo Di Giovanni, STMicroelectronics, Italy
Dr. Alessandra Manzitto, STMicroelectronics, Italy
Dr. Alessandra Cascio, STMicroelectronics, Italy

11:20 ND-001333 Comparison Between Innovative TO-247 IGBT Copacked with SIC Diode and SIC MOSFET in Bidirectional Boost Converter

Dr. Santi A. Rizzo, University of Catania, Italy
Prof. Giacomo Scelba, University of Catania, Italy
Dr. Giovanni Susinni, University of Catania, Italy
Dr. Domenico Paternostro, STMicroelectronics, Italy
Dr. Rosario Scollo, STMicroelectronics, Italy

11:40 ND-001384 Statistical Electrothermal Simulation for Lifetime Prediction of Parallel SIC MOSFETs and Modules

Mr. Alessandro Borghese, University of Naples Federico II, Italy

Dr. Michele Riccio, University of Naples Federico II, Italy
Prof. Alberto Castellazzi, Kyoto University of Advanced Science (KUAS), Japan
Dr. Luca Maresca, University of Naples Federico II, Italy
Prof. Giovanni Breglio, University of Naples Federico II, Italy
Prof. Andrea Irace, University of Naples Federico II, Italy

12:00 ND-000671 Electrical Characterization of Gate Oxide Current in a Silicon Power MOS Subjected to Uniaxial Mechanical Stress

Dr. Lorenzo M. Selgi, STMicroelectronics, Italy
Dr. Antonella Sciuto, CNR-IMM HQ, Italy
Dr. Michele Calabretta, STMicroelectronics, Italy
Dr. Alessandro Sitta, STMicroelectronics, Italy
Dr. Giuseppe D'Arrigo, CNR-IMM HQ, Italy

12:20 ND-001791 Trench-Gate MOSFET Application as Active Fuse in Low Voltage Battery Management System

Dr. Salvatore Musumeci, Politecnico di Torino, Italy
Mr. Filippo Scrimizzi, STMicroelectronics, Italy
Mr. Giuseppe Longo, STMicroelectronics, Italy
Mr. Carmelo Mistretta, STMicroelectronics, Italy
Ms. Daniela Cavallaro, STMicroelectronics, Italy

12:40 ND-002313 Preliminary Test on a Cascode Switch

for High-Frequency Applications

Dr. Filippo Pellitteri, University of Palermo, Italy
Mr. Vincenzo Castiglia, University of Palermo, Italy
Prof. Antonino Oscar Di Tommaso, University of Palermo, Italy
Prof. Rosario Miceli, University of Palermo, Italy
Prof. Luigi Schirone, University of Rome La Sapienza, Italy
Prof. Giorgio Vassallo, University of Palermo, Italy

13:00 Lunch

15:30 Coffee break

16:30 Technical tour to the Sardegna Ricerche facilities
(to be confirmed).

INFORMATION

SOCIAL EVENTS

WELCOME COCKTAIL RECEPTION

The welcome cocktail reception will take place on **Tuesday September 1** at 19:00 at the conference venue. Admittance will be limited to badge holders.

SOCIAL DINNER

The social dinner will be held on **Wednesday September 2** at the Convento San Giuseppe, via Paracelso, Cagliari.
Bus shuttle service will be provided (departure from the conference venue at 19:45).

CONFERENCE INFORMATION

THE CONFERENCE VENUE

The conference will be held at the Hotel Regina Margherita - viale Regina Margherita, 44.

CONFERENCE ROOMS AND AREAS

Room Castello (underground floor), Room Stampace (ground floor), Room Villanova (ground floor), Secretariat desk, sponsors' display tables and catering area will be located in the hotel lobby.

INSTRUCTIONS FOR PRESENTERS

Speakers are required to be in the meeting room at least 10 minutes before their session begins. Sessions are tightly scheduled, the allotted time (15 minutes for presentation + 3 minutes for discussion) must be strictly observed. Each conference room will be equipped with computers. Presentations on USB stick must be loaded in advance (e.g. during breaks) on the conference room laptops. For further information, presenters are required to apply to session chairs or conference staff at the session meeting rooms. For organizational reasons, use of personal laptops for presentations is discouraged.

REGISTRATION

Pre-registered participants can collect their conference kit and personal name badge at the Organizing Secretariat desk located in the lobby of the congress venue as of Tuesday September 1, 08:00 a.m.

BADGES

All delegates and exhibitors are kindly requested to always wear their name badge. Entrance to meeting rooms will be limited to regularly enrolled participants.

LANGUAGE

Official language will be English.
No simultaneous translation will be provided.

WOMEN IN IES WORKSHOP

(Wednesday September 2, 2020 - Room Villanova)

The IES WiE Workshop will be a venue to foster joint R&D activities between women engaged in research activities, in companies and in academy. The Workshop, that is supported by the Industrial Electronics Society, targets women engineers, from industry and academia, and female students (MD, PhD) working in the fields covered by IES. The Workshop programme will offer a series of keynote speeches by prominent female scientists and professionals and a panel discussion with open forum (see the scientific programme at pag. 18).

POST-CONFERENCE TECHNICAL TOUR

A technical tour to the Sardegna Ricerche facilities, the regional agency for innovation, is scheduled on Thursday September 3

GENERAL INFORMATION

in the afternoon.

Participation (free-of-charge) will be limited to a maximum of 15 people.

Participation requests will be accepted on a first-come-first-served basis. For organizational and safety reasons, this event is still to be confirmed.

Notification of tour confirmation will be given to interested attendees as soon as possible (at latest on the conference opening day).

CURRENCY

Euro is the national currency. Automatic cash dispenser and bank exchanges are plentiful.

Most hotels, restaurants and shops accept the usual credit cards.

BANKS

The nearest bank with cash dispenser is the Banco di Sardegna located in Via Roma 25.

POST OFFICE

The nearest post office is located in via Francesco Fara, 11. Opening times, from Monday to Friday: from 8:30 to 14:00.

TOURIST INFORMATION

Tourist Office

Town Hall, via Roma 145 - 09124 Cagliari

From Monday to Sunday: 9.00 a.m. - 8.00 p.m

Tourist Info

(+39) 070 6778173

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COVID-19 MAIN RULES AT THE CONFERENCE VENUE



The safety of attendees is the conference main priority.

The conference will take place according to national and local guidelines and WHO recommendations to mitigate the infectious risk. All attendees are kindly required to carefully respect the safety measures. For more information please see the conference information sheet on Covid guidelines or apply to the conference secretariat desk.

- A self-declaration (absence of Covid-19 symptoms, contact with confirmed cases) will be required. A specific form to be filled in and signed will be available onsite.
- Entrance will not be allowed if you have a temperature of over 37,5° (if you have a fever please do not come to the conference venue).
- Always wear a face mask during the meeting both in the rooms or the hotel common areas.
- Avoid contact and keep at least one meter apart from other people.
- Wash your hand regularly with soap and water or use he gels from the dispensers which will be available at the conference venue.
- Make sure you stick to the routes and follow the signs (respect your distance floor sign when queuing).
- Safety measures (e.g. social distancing, masks) will always be taken in case of bus transfer and social events.

Liability

Registered conference participants agree that neither the Organizing Committee nor the conference Secretariat are liable or assume any responsibility for damage or injuries to persons or property during the conference. Participants are advised to arrange for their own health, travel and personal insurances. The conference organization does not cover individuals against cancellation of bookings, theft or damage to belongings.

Disclaimer

All best endeavours will be made to present the conference programme as published. However, the conference Organizing Committee and the Secretariat reserve the right to alter or cancel, without prior notice, any arrangements, timetables, plans or other items relating directly or indirectly to the conference, for any cause beyond our reasonable control. The conference Organizing Committee and the Secretariat are not liable for any loss or inconvenience caused as a result of such alteration.

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Inside cover

Photo credit: Stefano Marrocu

Edit: Marco Cabiddu

Graphic Design Marco Cabiddu



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