AUTOMOTIVE

VIRTUAL Conference

AEIT 1897

ELECTRIC CAR
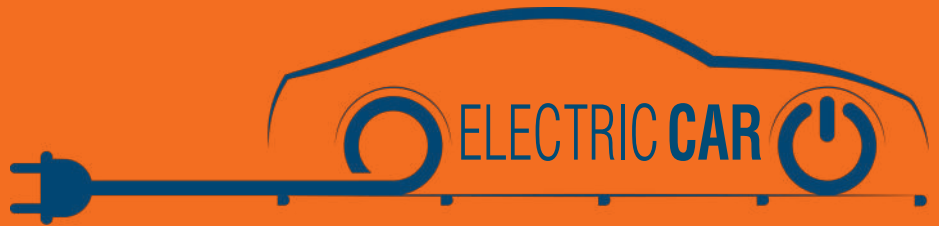
Virtual Conference
18–20, November 2020

Organized by

AEIT 1897

2020

International Conference of Electrical and Electronic Technologies for Automotive

Satellite event

AEIT AUTOMOTIVE 2020 Conference will be held on November, 18-20 to host regular papers in several areas of the multiform automotive and e-mobility fields. In light of the escalating spread of the Coronavirus (Covid-19) around the world, **AEIT AUTOMOTIVE** is a virtual conference: technical sessions will be virtually held and speakers and attendants will be worldwide connected. The 5th AEIT International Conference of Electrical and Electronic Technologies for Automotive (**AEIT AUTOMOTIVE 2020**) aims to be a solid reference of the technical community to present and discuss the most recent results of scientific and technological research for the automotive industry, with particular emphasis to applications and new trends. The Conference covers all aspects of electrical vehicles, connected autonomous cars, special vehicles, and e-mobility.

AEIT AUTOMOTIVE 2020 will bring together the Electrical and Electronic specialists, Mechanical and Systems

SiCE-2020 Silicon Carbide in Europe 2020
A joint international workshop of the EU projects Challenge, Reaction and WInSiC4AP

3C CHALLENGE exploring 3C SiC

REACTION

WInSiC4AP

HORIZON 2020

ECSEL Joint Undertaking
Electronic Components and Systems for European Leadership

IPCEI on Microelectronics

Engineers, and the Information and Communication Technology specialists.

Scientific Sessions Key tracks are:
1. **Hybrid and electric powertrains**
2. **Energy infrastructures, fuel cells, and batteries**
3. **Advanced driver assistance systems and autonomous driving, safety and connectivity**
4. **Mobility, smart cities, energy grid, and communication networks**
5. **Power Electronics, Active and Passive Components**

Arranged Special Sessions are:
SS1. ICT for Advanced Driver Assistance Systems
SS2. Learning and Signal Processing Techniques for Electric Vehicle's Interaction and Management
SS3. Technological progresses and innovations in Electric Vehicles Optimized for Extended Life, Improved Value and increased Efficiency: the European vision

AUTOMOTIVE 2020 will host a satellite event SiCE 2020 (Silicon Carbide in Europe, http://sice- 2020.imm.cnr.it/) that will address advances in both basic research, as well as SiC devices and applications in the field of

power electronics. In particular, the aim of SICE-2020 is to debate the latest achievements in SiC wafers growth, devices processing and applications, and to analyze their impact on the goals of the industry towards the development and commercialization of devices, modules and production equipment for several applications (automotive, railways transportation, avionics, renewable energies, etc.).

SiCE-2020 is located in the framework of three running European projects on SiC (Challenge, Reaction, and WInSiC4AP) and within the IPCEI spirit. This unique feature will enable the interaction of different communities, working on complementary aspects of SiC technology, thus being an efficient driving force for the further development of SiC research in Europe.

The **AUTOMOTIVE 2020** program includes: four speeches, two panels, a tutorial, and about 100 technical presentations including the satellite event SiCE-2020

in cooperation with

iMAPS
International Microelectronics And Packaging Society
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PROGRAM

Wednesday, November 18

09:00-09:20 *Opening Session*
Chair: Angelo Raciti - *AEIT Automotive 2020 General Chair*
Welcome Statements
Debora Stefani - *AEIT General President*
Angelo Raciti - *AEIT Automotive 2020 General Chair*
Authorities

09:20-10:40 **09:20 -** *Keynote Speech 1* **Hydrogen technologies for Automotive**
Marcello Baricco - *University of Turin, Italy*

10:00 - *Keynote Speech 2* **STMicroelectronics SiC power technology: market, history and applications, high performance features and advantages of silicon carbide technology**
Antonio Imbruglia and Salvatore Cascino - *STMicroelectronics, Italy*

10:40-11:40 **Technical Session 1 - Power Converters for Automotive Applications**
Chair: Giuseppe Gattavari - *AEIT, AMES, Italy*
TS01_p01 Advanced Silicon MOSFETs Evaluation in Auxiliary DC-DC Converters for HEV/ EV Applications
Salvatore Musumeci (Politecnico di Torino, Italy); Santi Agatino Rizzo (University of Catania, Italy); Filippo Scrimizzi, Filadelfo Fusillo and Giuseppe Longo (STMicroelectronics, Italy)
TS01_p02 High Frequency Operation of SuperJunction MOSFET enhanced with Kelvin Source Pin
Mario Cacciato, Santi Agatino Rizzo, Giuseppe Scarcella and Giacomo Scelba (University of Catania, Italy); Domenico Nardo, Rosario Scollo, Alfio Scuto and Giuseppe Sorrentino (STMicroelectronics, Italy); Mattia Alessio Rizzo (Development Engineering Automation, Italy);
TS01_p03 High Precision Uni-polar DC Power Converter with Sextupole Magnet of Storage Ring in Taiwan Light Source
Yongseng Wong (NSRRC Taiwan, Taiwan)
TS01_p04 Design and Modeling of an Interleaving Boost Converter with Quasi-Saturated Inductors for Electric Vehicles
Daniele Scirè and Giuseppe Lullo (University of Palermo, Italy); Gianpaolo Vitale (CNR-ICAR, Italy)

11:40-13:00 **Technical Session 2 - Advanced and Wide Band Gap device applications in automotive**
Chair: Vito Monopoli - *Politecnico di Bari, Italy*
TS02_p01 Trench-Gate MOSFETs in 48V Platform for Mild Hybrid Electric Vehicle Applications
Salvatore Musumeci, Alberto Tenconi and Michele Pastorelli (Politecnico di Torino, Italy); Filippo Scrimizzi, Giuseppe Longo and Carmelo Mistretta (STMicroelectronics, Italy)

TS02_p02 Study of behavior of p-gate in Power GaN under positive voltage

Maurizio Moschetti, Cristina Miccoli, Patrick Fiorenza, Giuseppe Greco, Fabrizio Roccaforte, Santo Reina, Antonino Parisi and Ferdinando Iucolano (STMicroelectronics, Italy)

TS02_p03 Compact design of DCDC converter with new STi2Gan solution

Romeo Letor, Filippo Scrimizzi, Ferdinando Iucolano, Maurizio Moschetti and Giuseppe Longo (STMicroelectronics, Italy)

TS02_p04 From T-CAD simulations to large signal model for GaN RF device

Cristina Miccoli, Viviana Cerantonio, Marcello Giuffrida and Ferdinando Iucolano (STMicroelectronics, Italy); Alessandro Chini (University of Modena and Reggio Emilia, Italy)

TS02_p05 Simulation of parasitic effects on Silicon Carbide devices for automotive electric traction

Filippo Pellitteri, Massimo Caruso, Rosario Miceli, Dario Benigno, Salvatore Stivala, Alessandro Busacca (University of Palermo, Italy); Vincenzo Vinciguerra, Angelo Alberto Messina, Alessandra Raffa (STMicroelectronics, Italy)

TS02_p06 Switching capacitors transformerless bidirectional DC-DC converter

Christian Puccio, Filippo Pellitteri, Massimo Caruso and Rosario Miceli (University of Palermo, Italy)

Interval

14:30-15:30   **Technical Session 3 - Silicon Carbide Automotive Applications**

Chair: Salvatore Musumeci - *Politecnico di Torino, Italy*

TS03_p01 Overvoltage and Ringing in a State-of-the-art SiC MOSFET Power Module for Traction Inverters

Antonio Fallico, Santi Agatino Rizzo and Angelo Raciti (University of Catania, Italy); Fabio Mandrile and Salvatore Musumeci (Politecnico di Torino, Italy); Luigi Abbatelli and Elena Venuti (STMicroelectronics, Italy)

TS03_p02 Performance Assessment of an Automotive-grade TO-247 IGBT copacked with SiC diode in a bidirectional buck converter

Luigi Abbatelli, Domenico Paternostro (STMicroelectronics, Italy); Mario Cacciato, Santi Agatino Rizzo, Giuseppe Scarcella and Giacomo Scelba (University of Catania, Italy)

TS03_p03 High efficiency Bidirectional SiC-based Power Converter for V2G/V2H applications in a nano/microgrid scenario

Giuseppe Aiello, Francesco Gennaro and Antonio Imbruglia (STMicroelectronics, Italy); Mario Cacciato (University of Catania, Italy)

TS03_p04 The "first and euRopEAn siC eighT Inches pilOt liNe": a project, called REACTION, that will boost key SiC Technologies upgrading (developments) in Europe, unleashing Applications in the Automotive Power Electronics Sector

Angelo Messina, Antonio Imbruglia, Michele Calabretta and Vincenzo Vinciguerra (STMicroelectronics, Italy); Alessandro Sitta (STMicroelectronics & University of Catania, Italy); Calin Moise, Marius Enachescu (University Politehnica of Bucharest, Romania); Fabrizio Roccaforte (CNR-IMM, Italy)

15:30-16:15

Technical Session 4 - **Charging systems for automotive applications**

Chair: Roberto Petrella - *University of Udine, Italy*

TS04_p01 Advanced Techniques for Powering Wireless Sensor Nodes through Energy Harvesting and Wireless Power Transfer

Roberto La Rosa (STMicroelectronics, Italy); Mario Costanza, Patrizia Livreri (University of Palermo, Italy)

TS04_p02 Modulation Strategy Assessment for 3-Level Unidirectional Rectifiers in Electric Vehicle Ultra-Fast Charging Applications

Davide Cittanti and Radu Bojoi (Politecnico di Torino, Italy) (student contest)

TS04_p03 Iterative Design of a 60 kW All-Si Modular LLC Converter for Electric Vehicle Ultra-Fast Charging

Davide Cittanti, Enrico Vico, Matteo Gregorio, Fabio Mandrile and Radu Bojoi (Politecnico di Torino, Italy) (student contest)

16:15-18:00

Panel I - ECSEL for Automotive: Lighthouse projects

Chair: Livio Baldi - *AEIT-AMES, Italy*

Project "PRYSTINE" - G. Dimitrakopoulos - *Infineon-Harokopio University, Greece*
Project "Madein4" - I. Englard - *Applied Materials, Israel*
Project "EnableS3" - A. Leitner - *AVL, Austria*
Project "3CCar" - P. Perlo - *I-FEVS, Italy*
Project "AUTODRIVE" - J. Rainer - *Infineon, Germany*

PRYSTINE - Programmable Systems for Intelligence in Automobiles (https://prystine.eu/)
Madein4 - Metrology Advances for Digitized ECS industry 4.0 (https://www.semi.org/eu/MADEin4)
EnableS3 - European Initiative to Enable Validation for Highly Automated Safe and Secure Systems (https://enable-s3.eu/)
3CCar - Integrated Components for Complexity Control in affordable electrified cars (https://3ccar.eu/)
AUTODRIVE - Advancing fail-aware, fail-safe, and fail-operational electronic components, systems, and architectures for fully automated driving to make future mobility safer, affordable, and end-user acceptable (https://autodrive-project.eu/)

18:00-19:00

Technical Session 5 - **Modeling, simulations of power train structures**

Chair: Silvio Vaschetto - *Politecnico di Torino, Italy*

TS05_p01 A Multi Battery EREV: an Innovative Structure to Improve Flexibility and Performances
Sergio C. Brofferio (Politecnico di Milano, Italy); Ernesto Marazzi (Siae Microelettronica, Italy)

TS05_p02 Assessing Lightweight Layouts for a Parallel Hybrid Electric Vehicle Driveline
Matteo Spano, Pier Giuseppe Anselma, Giovanni Belingardi, Daniela Misul and Ezio Spessa (Politecnico di Torino, Italy)

TS05_p03 48V Electric Vehicle Powertrain Optimal Model-based Design Methodology
Kazusa Yamamoto (Valeo, France); Matthieu Ponchant and Franck Sellier (Siemens Industry Software, France); Tommaso Favilli, Luca Pugi and Lorenzo Berzi (University of Florence, Italy)

TS05_p04 Test cycle simulation of an electric car with regenerative braking
Roberta Di Fonso and Carlo Cecati (University of L'Aquila, Italy) (student contest)

TS05_p05 Supercapacitor Assisted Hybrid Electric Vehicle Powertrain and Power Selection using Fuzzy Rule-Based Algorithm
Brayden Noh (Independent Researcher, USA)

Thursday, November 19

09:00-09:40 *Keynote Speech 3* - **Automotive Megatrends: Today's cars are shifting to new all-round mobility services**

Alfio Russo - *STMicroelectronics, Italy*

09:50-10:30 *Keynote Speech 4* - **New challenges in SiC epitaxial growth and in processing for power devices and new applications**

Francesco La Via - *CNR-IMM, Italy*

PARALLEL SESSIONS

11:00-13:00 **Room I** **Technical Sessions 6** **Thermal management and life-cycle of batteries**

Chair: Alfonso Damiano - *University of Cagliari, Italy*

TS06_p01 **A Holistic Approach on Improving a Liquid Cooled Battery Module**

Marcel Nöller, Robert Renz, Martin Eisele and Katharina Bause (Karlsruhe Institute of Technology (KIT) Germany)

TS06_p02 **Aluminum Heat Sink Assisted Air-Cooling Thermal Management System for High Current Applications in Electric Vehicles**

Hamidreza Behi (Vrije Universiteit Brussel, Belgium); Joris Jaguemont, Foad Heidari Gandoman, Sahar Khaleghi, Joeri Van Mierlo and Maitane Berecibar (Vrije Universiteit Brussel, Belgium); Danial Karimi (Vrije Universiteit Brussel & Flanders Make, Belgium)

TS06_p03 **Simplified Electro-Thermal Model For Lithium Cells Based On Experimental Tests**

Claudio Scarpelli, Michele Barbieri, Massimo Ceraolo, Giovanni Lutzemberger (University of Pisa, Italy); Tommaso Pesso and Monica Giovannucci (Toyota Material Handling Manufacturing Italy, Italy)

TS06_p04 **Electrothermal Battery Pack Model for Automotive Application: Design and Validation**

Alessandro Rizzello, Santo Scavuzzo, Alessandro Ferraris, Andrea Airale (BEOND, Italy); Massimiliana Carello (Politecnico di Torino, Italy)

TS06_p05 **Optimal Life-Cycle Costs of Batteries for Different Electric Cars**

Alberto Bocca (Politecnico di Torino, Italy); Donkyu Baek (Chungbuk National University, South Korea)

Interval

14:30-15:30 **Room I** **Technical Session 7** **New Mobility enablers**

Chairs: Pierpaolo Marchese - *AEIT-AICT* and Andrea Penza - *AEIT-AICT*

TS07_p01 **Opportunity fast-charging of e-buses: a preliminary study for the city of Savona**

Federica Foiadelli, Carola Leone and Michela Longo (Politecnico di Milano, Italy); Stefano Bracco, Federico Delfino and Giorgio Piazza (University of Genoa, Italy))

TS07_p02 **Urban Drive Simulation of a Li-Ion battery/SC Supplied EV by an Integrated Model**

Mauro Andriollo and Andrea Tortella (University of Padova, Italy)

TS07_p03 **Decision Making Optimization for Job Offloading in Vehicular Edge Computing Networks**

Giovanni Schembra and Christian Grasso (University of Catania, Italy)

TS07_p04 **Syncing a Smart City within an Evolutionary Dynamical Cooperative Environment**

Barbara Attanasio, Aurelio La Corte and Marialisa Scatà (University of Catania, Italy)

15:30-17:00 | **Room I** Technical Sessions 8 **Smart Mobility in smart Cities**

Chairs: Pierpaolo Marchese - *AEIT-AICT, Italy* and Andrea Penza - *AEIT-AICT, Italy*

TS08_p01 Automotive in "The Stack": a cross sectional view of the field, from Earth, through Platforms to nonhuman Users
Giorgio Pizzi (Ministry of Infrastructure and Transport, Italy)

TS08_p02 Human daily activity behavioural clustering from Time Use Survey
Andrea Bellagarda, Edoardo Patti, Enrico Macii and Lorenzo Bottaccioli (Politecnico di Torino, Italy)

TS08_p03 An I2V communication network for driver assistance in public transport
Mattia Bersani, Guanqi Ding, Simone Mentasti, Stefano Arrigoni, Michele Vignati, Edoardo Sabbioni, Davide Tarsitano and Federico Cheli (Politecnico di Milano, Italy)

TS08_p04 Techniques for improving localization applications running on low-cost IoT devices
Evelina Forno, Enrico Macii and Gianvito Urgese (Politecnico di Torino, Italy); Simone Moio and Michael Schenatti (Tierra, Italy);

TS08_p05 Performance assessment of the IEEE 802.1Qch in an automotive scenario
Luca Leonardi, Lucia Lo Bello and Gaetano Patti (University of Catania, Italy)

TS08_p06 Artificial Intelligence vs Autonomous Cars vs General Data Protection Regulation
Raffaele Zallone (Studio Legale Zallone, Italy)

17:30-19:00 | **Panel II - Automotive Hydrogen in Italy**

Chair: Marcello Baricco - *University of Turin - FCH JU and H2IT, Turin, Italy*

Toyota Hydrogen Technology - Andrea Saccone - *General Manager Communication & External Affairs Toyota Motor Italia, Italy*

Hydrogen - an appealing value proposition for a sustainable mobility - Roberto Golisano - *PUNCH Torino (formerly General Motors Global Propulsion Systems), Turin, Italy*

Hydrogen in Italy and Piedmont - Davide Damosso - *Director - Environment Park CLEVER Cluster and H2IT, Turin, Italy*

10:30-12:30 | **Room II** **SICE-2020** **Session I "Materials"**

Chair: Fabrizio Roccaforte - *CNR-IMM, Italy*

S01_p01 Overview of Project "CHALLENGE" (3C-SiC Hetero-epitaxiALLy grown on silicon compliancE substrates and 3C-SiC substrates for sustaiNable wide-band-Gap powEr devices)
Francesco La Via (CNR-IMM, Italy)

S01_p02 Silicon Carbide Improvements from LPE
Danilo Crippa (LPE, Italy)

S01_p03 Epitaxial Growth on Low Off-axis and On-axis SiC Substrates
Peder Bergman (Linköping University, Sweden)

S01_p04 Hetero-epitaxy of 3C-SiC/Si on deeply patterned substrates
Roberto Bergamaschini (Università di Milano Bicocca, Italy)

S01_p05 The process of hetero-epitaxy of 3C-SiC/Si: new developments
Marcin Zielinski (NOVASiC, France)

S01_p06 The bulk growth of 3C-SiC: different approaches
Peter Wellmann (University of Erlanghen, Germany)

S01_p07 Interaction of APBs and SFs: experiments and simulations
Massimo Zimbone (CNR-IMM, Italy)
S01_p08 Scanning probe microscopy for silicon carbide technology
Filippo Giannazzo (CNR-IMM, Italy)

Interval

14:30-16:30 | **Room II SICE-2020 Session II "Devices and processing"**

Chair: Susanna Reggiani - *University of Bologna - IUNET, Italy*

S02_p01 Overview of Project "WInSiC4AP" (Wide Bandgap Innovative SiC for Advanced Power)
Leoluca Liggio (Distretto Tecnologico Micro e Nano Sistemi, Catania, Italy); Antonio Imbruglia (STMicroelectronics, Italy)
S02_p02 Processing and first results of 3C-SiC devices
Mike Jennings (University of Swansea, UK)
S02_p03 Laser annealing for Ohmic contact in 4H-SiC devices
Clément Berger (University of Tours - GREMAN, France)
S02_p04 Study of annealing processes for electrical activation of p and n-type doping implantation on 4H-SiC
Monia Spera (CNR-IMM, Italy)
S02_p05 Estimation of Activation and Compensation Ratios in Al+ Ion Implanted 4H-SiC Layers: comparison of two methodologies
Roberta Nipoti (CNR-IMM, Italy)
S02_p06 Current conduction mechanism in forward and reverse biased WC Schottky contact on 4H-SiC
Marilena Vivona (CNR-IMM, Italy)
S02_p07 Preliminary Evaluation of V_{TH} and R_{ON} Drifts in SiC devices
Marcello Cioni (University of Modena and Reggio Emilia, Italy)
S02_p08 3C-SiC MOSFET structure and oxide reliability
Fan Li (University of Warwick, United Kingdom)

16:30-18:30 | **Room II SICE-2020 Session III "Reliability and Applications"**

Chair: Antonio Imbruglia, Angelo Messina - *STMicroelectronics, Italy*

S03_p01 Overview of Project "REACTION" (first and euRopEAn siC eighT Inches pilOt line)
Angelo Messina (STMicroelectronics, Italy)
S03_p02 Reliability issues in 4H-SiC MOSFETs: impact of oxide traps and threading dislocations
Patrick Fiorenza (CNR-IMM, Italy)
S03_p03 Reliability assessment trough mathematical model of SIC MOSFET
Salvatore Patanè (University of Messina, Italy)
S03_p04 Simulation of thermal effects in 4H-SiC MOSFETs
Daniela Cavallaro (STMicroelectronics, Italy)
S03_p05 Experimental tests and EMI characterization on a SiC switching device
Filippo Pellitteri (University of Palermo, Italy)
S03_p06 Electrothermal Circuit Model of SiC Power MOSFET Based on Neural Network
Ales Chvala (SUT, Bratislava, Slovakia)
S03_p07 SiC Based 15kW DC-DC Converter Development as an outcome of the first and euRopEAn siC eigTh Inches pilOt line - the ECSEL-JU
Tomasz Bieniek (IET, Poland)
S03_p08 Recent advances in packaging technology for SiC power devices
Jacques Favre (APSI3D, France)

Friday, November 20

09:00-10:00 **Tutorial - Circuit solutions for improving power conversion efficiency through the use of wide bandgap technologies**

Filippo Di Giovanni - *STMicroelectronics, Italy*

10:00-11:00 **Technical Session 9 - Advanced driver assistance systems and autonomous driving, safety and connectivity: environmental perception**

Chair: Francesco Braghin - *Politecnico di Milano, Italy*

TS09_p01 LiDAR - stereo camera fusion for accurate depth estimation

Hafeez Husain Cholakkal, Simone Mentasti, Mattia Bersani, Stefano Arrigoni, Matteo Matteucci and Federico Cheli (Politecnico di Milano, Italy)

TS09_p02 LiDAR point-cloud processing based on projection methods: a comparison

Guidong Yang and Yafei Wang (Shanghai Jiao Tong University, China); Simone Mentasti, Mattia Bersani, Francesco Braghin and Federico Cheli (Politecnico di Milano, Italy)

TS09_p03 Design and optimization of silicon-integrated inductive components for automotive radar applications in K- and W-bands

Simone Spataro and Egidio Ragonese (University of Catania, Italy)

TS09_p04 Innovative Saliency based Deep Driving Scene Understanding System for Automatic Safety Assessment in Next-Generation Cars

Francesco Rundo (STMicroelectronics, Italy); Sabrina Conoci (University of Messina, Italy); Sebastiano Battiato, Francesca Trenta and Concetto Spampinato (University of Catania, Italy)

11:00-12:00 **Technical Session 10 - Advanced driver assistance systems and autonomous driving, safety and connectivity: user acceptance**

Chair: Martin Duncan - *STMicroelectronics, Italy*

TS10_p01 User requirements for autonomous vehicles - a comparative analysis of expert and non-expert-based approach

Aleksandra Rodak, Mikołaj Kruszewski and Małgorzata Pędzierska (Motor Transport Institute, Poland); Samantha Jamson (University of Leeds, United Kingdom)

TS10_p02 A flexible virtual environment for autonomous driving agent-human interaction testing

Giorgio M. Grasso and Giovanni D'Italia (University of Messina, Italy); Sebastiano Battiato (University of Catania, Italy)

TS10_p03 Deep Bio-Sensing Embedded System for a Robust Car-Driving Safety Assessment

Francesco Rundo (STMicroelectronics, Italy); Sabrina Conoci (University of Messina, Italy); Concetto Spampinato, Francesca Trenta and Sebastiano Battiato (University of Catania, Italy)

TS10_p04 Advanced 1D Temporal Deep Dilated Convolutional Embedded Perceptual System for Fast Car-Driver Drowsiness Monitoring

Francesco Rundo (STMicroelectronics, Italy); Concetto Spampinato, Sebastiano Battiato and Francesca Trenta (University of Catania, Italy); Sabrina Conoci (University of Messina, Italy)

12:00-13:00 **Technical Session 11 - Advanced driver assistance systems and autonomous driving, safety and connectivity: motion planning**

Chair: Romeo Giuliano - *Università di Roma "Guglielmo Marconi", Italy*

TS11_p01 Multi-State End-to-End Learning for Autonomous Vehicle Lateral Control

Simone Mentasti, Mattia Bersani, Matteo Matteucci and Federico Cheli (Politecnico di Milano, Italy)

TS11_p02 A local trajectory planning and control method for autonomous vehicles based on the RRT algorithm

Stefano Feraco, Sara Luciani, Angelo Bonfitto, Nicola Amati and Andrea Tonoli (Politecnico di Torino, Italy)

TS11_p03 Energy-Efficient Coordinated Electric Truck-Drone Hybrid Delivery Service Planning

Donkyu Baek (Chungbuk National University, South Korea); Naehyuck Chang (KAIST, South Korea); Yukai Chen, Enrico Macii and Massimo Poncino (Politecnico di Torino, Italy)

TS11_p04 Four-Wheel Vehicle Driving by using a Spatio-Temporal Characterization of the P300 Brain Potential

Giovanni Mezzina and Daniela De Venuto (Politecnico di Bari, Italy)

Interval

14:30-15:15 **Technical Session 12 - Advanced driver assistance systems and autonomous driving, safety and connectivity: social impact**

Chair: Francesca Fallucchi - *Università di Roma "Guglielmo Marconi", Italy*

TS12_p01 WebAssembly: Paving the Way Towards a Unified and Distributed Intra-Vehicle Computing- and Data-Acquisition-Platform?

Fabian Scheidl (BMW Group, Germany & Technische Universität Wien, Austria)

TS12_p02 Bringing Trust to Autonomous Mobility

Pavlos Kosmidis (Charitinis Sakkada 5 & Catalink Limited, Cyprus); Konstantinos Demestichas (Catalink Limited, Cyprus); Konstantinos Avgerinakis (Catalink Limited, Greece); Eleni Trouva (INTRASOFT International, Greece); Stefano Bianchi and Alessandro Barisone (Algowatt, Italy); Konstantinos Risvas and Konstantinos Moustakas (University of Patras, Greece); Aleksandra Rodak, Mikołaj Kruszewski and Małgorzata Pędzierska (Motor Transport Institute, Poland)

TS12_p03 Why Europe does not need revolutionary rules for automated vehicles

Alejandro Zornoza (Universidad Carlos III de Madrid, Spain) (student contest)

15:15-16:15 **Technical Session 13 - ICT for Advanced Driver Assistance Systems I (*Special Session*)**

Chairs: Giovanni Cancellieri - *Università Politecnica delle Marche, Italy* and Andrea Penza - *AEIT -AICT, Italy*

TS13_p01 Benchmarking of Computer Vision Algorithms for Driver Monitoring on Automotive-grade Devices

Sebastiano Battiato, Roberto Leotta, Alessandro Ortis and Francesca Trenta (University of Catania, Italy); Sabrina Conoci and Francesco Rundo (STMicroelectronics, Italy)

TS13_p02 V2X Communication Technologies and Service Requirements for Connected and Autonomous Driving

Elena Cinque, Francesco Valentini, Arianna Persia and Sandro Chiocchio (Radiolabs Consortium, Italy); Fortunato Santucci and Marco Pratesi (University of L'Aquila, Italy)

TS13_p03 **Toward the Integration of ADAS Capabilities in V2X Communications for Cooperative Driving**

Barbara M. Masini and Alberto Zanella (CNR - IEIIT, Italy); Gianni Pasolini, Alessandro Bazzi, Flavio Zabini and Oreste Andrisano (University of Bologna, Italy); Mirko Mirabella (Neptune Systems Engineering, Italy); Paolo Toppan (Wireless for Business, Italy)

TS13_p04 **Why Is Network Reselection an Issue for Cross-Border Vehicular Applications?**

Marco Centenaro (Athonet & University of Padova, Italy); Riccardo Fedrizzi (Fondazione Bruno Kessler, Italy); Lorenzo Vangelista (University of Padova, Italy)

16:15-17:00 **Technical Session 14** - **ICT for Advanced Driver Assistance Systems II** *(Special Session)*

Chairs: Franco Mazzenga - *Università di Roma Tor Vergata* and Andrea Penza - *AEIT, AICT*

TS14_p01 **Data transmission in automotive applications and security/safety requirements**

Giovanni Cancellieri and Massimo Battaglioni (Università Politecnica delle Marche, Italy)

TS14_p02 **On the Role of Explainable Machine Learning for Secure Smart Vehicles**

Michele Scalas and Giorgio Giacinto (University of Cagliari, Italy)

TS14_p03 **Differentiated Protection in 5G Vehicular Networks**

Elisabetta Amato (University of Bologna, Italy); Federico Tonini (Chalmers University of Technology, Sweden); Carla Raffaelli (University of Bologna, Italy)

17:00-17:30 **Technical Session 15** - **Machine-Learning and Signal Processing Techniques for Electric Vehicle's Interaction and Management** *(Special Session)*

Chair: Emanuele Principi - *Università Politecnica delle Marche, Italy*

TS15_p01 **Sparse Approximation of LS-SVM for LPV-ARX Model Identification: Application to a Powertrain Subsystem**

Luca Cavanini (Industrial Systems and Control, Italy); Francesco Ferracuti, Sauro Longhi, Enrico Marchegiani and Andrea Monteriù (Università Politecnica delle Marche, Italy)

TS15_p02 **Review on Electric Vehicles Exterior Noise Generation and Evaluation**

Alessandro Terenzi, Susanna Spinsante and Stefania Cecchi (Università Politecnica delle Marche, Italy)

17:30-18:30 **Technical Session 16** - **Technological Progresses and Innovations in Electric Vehicles Optimized for Extended Life, Improved Value and Increased Efficiency: the European Vision** *(Special Session)*

Chair: Mariapia Martino - *Politecnico di Torino, Italy*

TS16_p01 **Hair Pin motors: possible impregnation and encapsulation techniques, materials and variables to be considered**

Annkathrin Steinacker and Nils Bergemann (ELANTAS Europe, Germany); Piero Braghero, Fabio Campanini, Nicola Cuminetti, Janosc De Buck and Mattia Ferraris (ELANTAS Europe, Italy)

TS16_p02 **Frequency Analysis and Comparison of LCCL and CLLC Compensations for Capacitive Wireless Power Transfer**

Fabio Corti and Alberto Reatti (University of Florence, Italy); Salvatore Musumeci (Politecnico di Torino, Italy)

TS16_p03 **Design of a High-Speed Electric Propulsion System for Electric Vehicles**

Andrea Floris, Mario Porru, Alfonso Damiano and Alessandro Serpi (University of Cagliari, Italy)

TS16_p04 **Advanced Functionally Integrated E-Axle for A-Segment Electric Vehicles**

Mariapia Martino, Paolo Pescetto and Gianmario Pellegrino (Politecnico di Torino, Italy)

18:30-18:40 **Conference Closure**