

# Automotive 2018 Technical Programme

Politecnico di Milano - Bovisa Campus

**Monday, July 9, 2018**

## **9,30-11,00 Opening**

Chair: Federico Cheli - *Politecnico di Milano*

Giovanni Lozza - *Preside Scuola d'Ingegneria e dell'Informazione - Politecnico di Milano*

Debora Stefani - *Presidente Generale AEIT*

Luigi Calligarich - *Presidente IMAPS*

Marco Granelli - *Assessore alla Mobilità e all'Ambiente - Comune di Milano*

Diego Andreis - *Presidente Gruppo Meccatronici - Assolombarda*

## **11,00 Keynote Speech**

**Autonomous systems and digital twins - a peek into the future**

R. Saracco - *IEEE Future Directions*

## **11,30-13,00 Plenary session I - Automotive industry perspectives and new business models: technological, regulatory and social drivers**

Session Chair: Pierantonio Palermo - *Journalist*

### **Keynote Speech**

**Urban mobility: facing the challenge**

L. Andreone - *FCA-CRF - Working Group "Road" Leader - Cluster Trasporti Italia*

### **Panelists**

F. Galliano - *General Motors*

P. Matteucci - *Nissan*

G. Mauri - *RSE*

F. Frattini - *Politecnico di Milano*

A. Bosio - *Samsung*

**13,00-14,00 Lunch Break**

## 14,00 A1 Powertrain I

ROOM A

Chair: Antonio Imbruglia - *AEIT*

### A1.1 Invited

#### European scenario of electric vehicles

P. Menga - *CEI-CIVES*

### A1.2 Invited

#### New challenges for memories operating in powertrain

A. Troia - *Micron*

### A1.3 Feasible Optimal Control Policies for Hybrid Electric Vehicles

M. Bersani, N. Robuschi, F. Braghin, F. Cheli - *Politecnico di Milano*

### A1.4 A New Hybrid Hysteresis Reluctance Disc Type Motor; design, Prototyping, and Analysis

H. Mizani, A. Darabi, S. Omrani - *Shahrood University of Technology, Iran*

### A1.5 Performance Comparison of Multilevel Inverters for E-Transportation

V. Patel, C. Buccella, A. M. Saif, M. Tinari, C. Cecati - *University of L'Aquila*

## 14,00 B1 Batteries

ROOM B

Chair: Nerino Penazzi - *Politecnico di Torino*

### B1.1 Invited

#### Solid state batteries: a transition to enable post lithium ion technologies

J. Amici - *Politecnico di Torino*

### B1.2 Invited

#### Lithium Batteries from the cradle to the cradle through the grave, FAAM-Lithops (Seri Group) commitment

F. Vitali - *Lithops FAAM*

### B1.3 Invited

#### Lithium ion cell design and manufacturing technology for electro-mobility: the European route

S. Saguatti - *Manz*

### B1.4 Dynamic Generation of Recommendations for EV Battery Health

M. Eider, A. Berl - *Deggendorf Institute of Technology, Germany*

### B1.5 Lithium-ion batteries for electric vehicles: A review on aging models for vehicle-to-grid services

G. Marchegiani - *Electro Power Systems*

15,45-16,15 Coffee break

## 16,15 A2 Assisted and Autonomous Driving I

ROOM A

Chair: Andrea Penza - *AEIT*

### A2.1 Invited

#### Connected and autonomous vehicles: perspectives on the future of the Automobile

E. Mancin - *IBM*

## **A2.2 Invited**

### **LIDAR Sensor System**

J. Kernhof - *Integrated Device Technology Dresden*

## **A2.3 Invited**

### **Safety assurance standardization & mass deployment of autonomous vehicles**

M. Duncan - *STMicroelectronics*

## **A2.4 A Model Predictive Controller for Minimum Time Cornering**

M. Malmir, M. Baur, L. Bascetta - *Politecnico di Milano*

## **16,15 B2 Special Session IMAPS**

ROOM B

Chair: Luigi Calligarich - *IMAPS*

## **B2.1 Invited**

### **Automotive Megatrends and their impact on the components technologies**

P. Martino - *HIS Markit*

## **B2.2 Invited**

### **Automated Assembly and Testing of miniaturized LIDARs: can we learn from PICs?**

I. Piacentini - *FiconTec*

## **B2.3 Invited**

### **Expectations of High Reliability in Modern Automotives**

N. Sinnadurai - *Advanced Technology Transfer Associates*

## **B2.4 Invited**

### **Evaluation and prediction of lead-free solder joints reliability and robustness**

E. Galbiati - *Gestlab*, A. Vailati - *Magneti Marelli Lighting*

## **B2.5 Invited**

### **Smart testing for Automotive electronic devices**

Y. Mitani - *Advantest*

## **Tuesday, July 10, 2018**

## **9,00 A3 Mobility in Smart Cities I**

ROOM A

Chair: Marco Barra Caracciolo - *Ferrovie Nord Milano*

## **A3.1 Invited**

### **Risultati su valutazione di un mezzo pubblico ibrido su rete urbana ASF Como**

A. Polacchini - *Arriva*

## **A3.2 Invited**

### **The TEINVEIN project of Regione Lombardia**

F. Braghin - *Politecnico di Milano*; R. Casoni - *Modis Italia*; S. Perna - *Ro Technology*

## **A3.3 Invited**

### **From e- to smart mobility: the challenge of designing successful business models**

D. Chiaroni - *Politecnico di Milano*

## 9,00 B3 Car Pooling

ROOM B

Chair: Alberto Colorni - *Consorzio Poliedra, Politecnico di Milano*

### **B3.1 Carpooling: facts and new trends**

C. Bresciani, F. Costa, A. Luè - *Consorzio Poliedra - Politecnico di Milano*; A. Colorni, L. Studer - *Politecnico di Milano*

### **B3.2 Invited**

#### **Rewarding car-pooling: the Public Administration incentives**

V. Sevino - *Amat Milano*

### **B3.3 Invited**

#### **Car-pooling best practices**

A. Moglia - *Be-pooler*, G. Albertengo - *Jo-Job*

### **B3.4 Invited**

#### **New trends in car-pooling: the I-Share Life project**

E. Tromellini - *FNM*, L. Pascucci - *EVAI*

**10,45-11,15 Coffee break**

## **11,15-12,45 Plenary session II - Powertrain and energy management**

Session Chair: Pierantonio Palerma - *Journalist*

### **Keynote Speech**

#### **Smart components for the energy management in electric vehicles**

F. Castelli Dezza - *Politecnico di Milano*

### **Panelists**

M. Ferrara - *STMicroelectronics*

A. Troia - *Micron*

R. Bez - *LFoundry*

S. Panetta - *Comoli Ferrari*

W. Granig - *Infineon*

**12,45-13,45 Lunch Break**

## **13,45 A4 Energy Infrastructures I**

ROOM A

Chair: Giuseppe Gattavari - *AEIT*

### **A4.1 Invited**

#### **e-mobility: a great opportunity for energy system impacted by the transition toward the renewable decentralized production**

F. Caleno - *ENEL*

### **A4.2 Invited**

#### **Electric mobility and the electric system: opportunities and threats to keep well in mind in designing the mobility of the future**

L. Marchisio - *TERNA*

### **A4.3 Invited**

#### **Electric mobility: economic aspects and critical points, batteries, charging systems, impact on the electricity system**

G. Mauri - *RSE*

## **13,45 B4 Assisted and Autonomous Driving II**

ROOM B

Chair: Francesco Vatalaro - *AEIT*

### **B4.1 Collaborative automotive community for real time, open road friction identification and information sharing for mobile App ADAS. Potential advantages when integrating with OEM**

E. Leo, C. Maroni, G. Morandin, M. Pezzola - *Soluzioni Ingegneria*

### **B4.2 Support of Safety Services through Vehicular Communications: The Intersection Collision Avoidance Use Case**

G. Avino, M. Malinverno, C. E. Casetti, C. F. Chiasserini, F. Malandrino, M. Rapelli - *Politecnico di Torino*; G. Zennaro - *Centro Ricerche Fiat*

### **B4.3 Modeling and Analysis of 802.11p Physical Layer for V2X Connected Transport Systems Considering Harsh Operating Conditions and HW Device Performance**

S. Saponara, A. Gagliardi - *University of Pisa*

### **B4.4 Highway Chauffeur: State of the art and future evaluations - Implementation scenarios and impact assessment**

L. Studer, S. Agriesti, P. Gandini, G. Marchionni, M. Ponti - *Politecnico di Milano*; C. Bresciani - *Consorzio Poliedra - Politecnico di Milano*

### **B4.5 Exploitation of road signalling for localization refinement of autonomous vehicles**

L. D'Orazio - *Centro Ricerche Fiat*; N. Conci, F. Stoffella - *University of Trento*

### **B4.6 Invited**

#### **Advanced EMC test solutions for automotive security**

I. Soliani - *Soliani EMC*

**15,30-16,00 Coffee break**

## **16,00 A5 5G for Automotive**

ROOM A

Chair: Roberto Castelli - *AEIT*

### **A5.1 Invited**

#### **5G enabling technologies for V2X services**

F. Vatalaro - *University of Rome Tor Vergata*

### **A5.2 Invited**

#### **Enabling automotive on 5G platforms**

P. Marchese - *TIM*

### **A5.3 Invited**

#### **Vodafone 5G trial in the field - Milan metropolitan area's official experimentation**

S. Baggioni - *Vodafone*

### **A5.4 Invited**

#### **European initiatives, alliances and projects**

G. Parladori - *SM Optics*

## 16,00 B5 Energy Infrastructures II

ROOM B

Chair: Giancarlo Storti Gajani - *Politecnico di Milano*

### **B5.1 Charging Strategies For Electric Vehicles With Vehicle To Grid Implementation For Photovoltaic Dispatchability**

M. Brenna, F. Foiadelli, A. Soccini, L. Volpi - *Politecnico di Milano*

### **B5.2 A Modular Boost Converter with Low Switch Stress and High Conversion Ratio for Automotive Applications**

L. Colalongo, G. Duina, A. Richelli, Z. Kovacs-Vajna - *University of Brescia*

### **B5.3 Monte Carlo Procedure to Evaluate the E-mobility Impact on the Electric Distribution Grid**

M. Mirbagheri, M. Merlo, D. Falabretti, M. Delfanti, M. Moncecchi, F. Bovera - *Politecnico di Milano*; M. Fiori - *ASSEM*

### **B5.4 ISO 15118 as the Enabler of Vehicle-to-Grid Applications**

M. Mültin - *V2G Clarity, Germany*

### **B5.5 Invited**

### **Insulation monitoring for the safety of DC charging stations: a comparison between IEC/EN and CHAdeMO**

C. Gariboldi - *Bender Italia*

## 16,00 C5 Exhibitor Showcase I

ROOM C

Chair: Chiara Bresciani - *Consorzio Poliedra, Politecnico di Milano*

### **C5.1 Eldor**

### **C5.2 Würth Elektronik**

### **C5.3 Experis ManpowerGroup**

### **C5.4 CST**

### **C5.5 STMicroelectronics**

# Wednesday, July 11, 2018

## 9,00 A6 Powertrain II

ROOM A

Chair: Francesco Braghin - *Politecnico di Milano*

### **A6.1 Invited**

### **Car electrification: trend and silicon carbide value proposition**

S. Buonomo - *STMicroelectronics*

### **A6.2 Slot and Pole Ratio of Permanent Magnet Synchronous Motor for Cogging Torque and Torque Ripple Performance**

IWei Lan - *Mechanical and Mechatronics System Research Labs & Industrial Technology Research Institute, Taiwan*; Hsiang-Wei Ho - *National Taiwan University, Taiwan*

### **A6.3 Autonomous Steer Actuation for an urban Quadricycle**

M. Vignati, D. Tarsitano, M. Bersani, F. Cheli - *Politecnico di Milano*

### **A6.4 Carbon fiber-reinforced chassis equipped with four-wheel torque vectoring and steering system**

M. De Santis, S. Agnelli, M. Uras, R. Panciroli, O. Giannini - *University Cusano, Rome*;  
G. Bella - *University of Rome Tor Vergata*

## **9,00 B6 Smart Systems**

ROOM B

Chair: Livio Baldi - *AEIT*

### **B6.1 Invited**

#### **Smart optical systems for automotive**

R. Bez - *LFoundry*

### **B6.2 A LIDAR System with SiPM and MEMS Mirror**

G. Adamo, L. Mistretta, P. Livieri, A. Busacca - *University of Palermo*

### **B6.3 A Security Analysis and Evaluation Model on Distributed Autonomous Robotic Systems**

Xin He, Changbin Xue, Kexin Lin - *National Space Science Center, CAS, P.R. China*;  
Qing Zhou - *National Space Science Center, CAS, Beijing Institute of Technology, P.R. China*

### **B6.4 Exploiting Posit Arithmetic for Deep Neural Networks in Autonomous Driving Applications**

M. Cococcioni, S. Saponara - *University of Pisa*; E. Ruffaldi - *MMI*

### **B6.5 The SiC Automotive Challenge-WInSiC4AP: Wide Band Gap Innovative SiC for Advanced Power**

A. Imbruglia - *STMicroelectronics*

## **9,00 C6 Exhibitor Showcase II**

ROOM C

Chair: Giorgio Parladori - *AEIT*

### **C6.1 National Instruments**

### **C6.2 Coilcraft**

### **C6.3 Electron Mec**

### **C6.4 SCAME**

**10,45-11,15 Coffee break**

## **11,15-13,15 Plenary session III - Assisted and autonomous driving: technology, ethical, legal and social aspects**

Session Chair: Viola Schiaffonati - *Politecnico di Milano*

### **Keynote Speech**

#### **Ethical and Legal Issues of Autonomous Driving**

R. Zallone - *Studio Zallone*

## Keynote Speech

### Ethical policies for assisted and autonomous driving

G. Tamburrini - *University Federico II, Naples*

## Panelists

G. Tamburrini - *University Federico II, Naples*

R. Zallone - *Studio Zallone*

M. Melis - *General Motors*

D. Colella - *Studio Orsingher Ortu*

A. Vizzarri - *University of Rome Tor Vergata*

## 13,15-14,15 Lunch Break

## 14,15 A7 Assisted and Autonomous Driving III

ROOM A

Chair: Giambattista Gruosso - *Politecnico di Milano*

### A7.1 Towards the New Concept of Smart Roads: Regulatory Framework and Emerging Projects Overview

M. Longo, S. Franzò, V.M. Manfredi Latilla - *Politecnico di Milano*; S. Bracco - *University of Genoa*

### A7.2 Firefly algorithm-based nonlinear MPC trajectory planner for autonomous driving

G. Inghilterra, S. Arrigoni, F. Braghin, F. Cheli - *Politecnico di Milano*

### A7.3 Hardware-in-the-Loop Test Case Specification for Verification of Software Safety Requirements in the context of ISO 26262

Chi Seng Lee, Yen-Hsiang Huang - *Industrial Technology Research Institute, Taiwan*

### A7.4 Cybersecurity of Connected Autonomous Vehicles

G. Burzio, G. Faranda Cordella - *Drivesec*; M. Colajanni, M. Marchetti, D. Stabili - *University of Modena and Reggio Emilia*

### A7.5 Challenges and Mitigation of Cyber Threat in Automated Vehicle: An Integrated Approach

A. Al Mamun - *Qatar University*

## 14,15 B7 Powertrain III

ROOM B

Chair: Carlo Cecati - *University of L'Aquila*

### B7.1 A study over Hybrid Electric Vehicles role in vehicle concept design

N. Holjevac, F. Cheli, M. Gobbi - *Politecnico di Milano*

### B7.2 Statistical Modeling of Integrated Sensors for Automotive Applications

W. Granig, S. Aoudjit - *Infineon Technologies Austria AG, Austria*; L.M. Faller, H. Zangl - *Alpen-Adria-Universität Klagenfurt, Austria*

### B7.3 Simulation of the Subnanosecond Runaway Electron Source for Low-Dose Industrial Radiography

V. Kozhevnikov, A. Kozyrev, A. Kokovin - *Tomsk State University, Russia*; N. Semeniuk, V. Tarasenko, E. Baksht, M. Lomaev, A. Burachenko, D. Sorokin, D. Beloplotov - *Institute of High Current Electronics, Russia*



**B7.4 A New Two Separate Rotor Axial Flux Permanent Magnet Motor; Design, Analysis and Performance Comparison**

S. Omrani, A. Darabi, H. Mizani - *Shahrood University of Technology, Iran*

**B7.5 Feasibility Proposal for Heavy Duty Farm Tractor**

M. Longo, M. Brenna; F. Foadelli, C. Leone, D. Zaninelli - *Politecnico di Milano*

**B7.6 A simulation-driven methodology for battery electric vehicles concept design**

N. Holjevac, F. Cheli, M. Gobbi - *Politecnico di Milano*

**B7.7 A Low-Cost Secondary-Side Controlled Electric Vehicle Wireless Charging System using a Full-Active Rectifier**

F. Corti, M. Pierini, R. Barbieri, A. Reatti, L. Berzi - *University of Florence*; A. Nepote, P. De La Pierre - *Magneti Marelli*

**14,15 C7 Mobility in Smart Cities II and Quality**

ROOM C

Chair: Alessandro Vizzarri - *AEIT*

**C7.1 Invited**

**RESOLVE: smart solutions for smart mobility**

O. Di Tanna - *Piaggio*

**C7.2 Analysis of Electrical Vehicle behavior from real world data: a V2I Architecture**

L. Bascetta, G. Gruosso, G. Storti Gajani - *Politecnico di Milano*

**C7.3 Well-to-Wheel driving cycle simulations for freight transportation: battery and hydrogen fuel cell electric vehicles**

G. Guandalini, S. Campanari - *Politecnico di Milano*

**C7.4 IMULE: A Prototype System Based on AGV for Baggage Handling inside Airports**

M. Celidonio, E. Fionda, F. Matera - *FUB*; D. Di Zenobio - *Vrije Universiteit Brussel* - *INDI*; C. Gualtieri, M. Prezioso - *Ud'Anet*

**C7.5 Invited**

**An evidence of trend and evolution in the validation of automotive products**

A. Milazzo - *CSI - IMQ Group*

**16,15 Conclusions**

ROOM A