



# CONFERENCE PROGRAM

*(PRELIMINARY)*



 **IEEE** International Electric Vehicle Conference

Florence, Italy - December 16-19, 2014



# Venue@Florence\_Congress\_Center: **Piazza Adua 1, Florence**



## **ARRIVING BY PLANE**

The international airport 'Amerigo Vespucci', is located in the north-west suburban area of Florence. There are many airlines arriving there and connecting the city to some of the most important European airports. The airport is only 4 km from the city centre, which can be easily reached by taxi or with the Ataf/Sita 'Vola in Bus' shuttle service (around 15/20 minutes), connecting the airport to the main central railway station of Santa Maria Novella.

At the airport you can also find the main car rental agencies.

Info: Florence Airport Company: Tel. +39.055.30615 +39.055.30615

[www.aeroporto.firenze.it](http://www.aeroporto.firenze.it)

The international airport of Pisa is located 80 Km from the city centre of Florence and is connected to the Tuscan capital by train (every hour) and Terravision bus (full flight coverage with 18 return journeys). For information about timetables and fares visit [www.terravision.eu](http://www.terravision.eu)

Info: Pisa International Airport: Tel. +39.050.849300

[www.pisa-airport.com](http://www.pisa-airport.com)

After the upgrading of the railway line "Freccia Rossa" between Florence and Bologna in just 35 minutes, also Bologna airport is a stop of easy access to Florence.

Info: Bologna International Airport: Tel. +39.051.6479615

[www.bologna-airport.it](http://www.bologna-airport.it)



## **ARRIVING BY TRAIN**


The main central railway station of Santa Maria Novella (one of the most important railway junctions as well as an interchange point of the Florence public transportation) is located just a few steps (2 minutes on foot) from the main entrance of the congress-exhibition area and from the main reception of Firenze Fiera, located on the ground floor of Palazzo degli Affari.

Info: [www.trenitalia.it](http://www.trenitalia.it)



## **ARRIVING BY CAR**

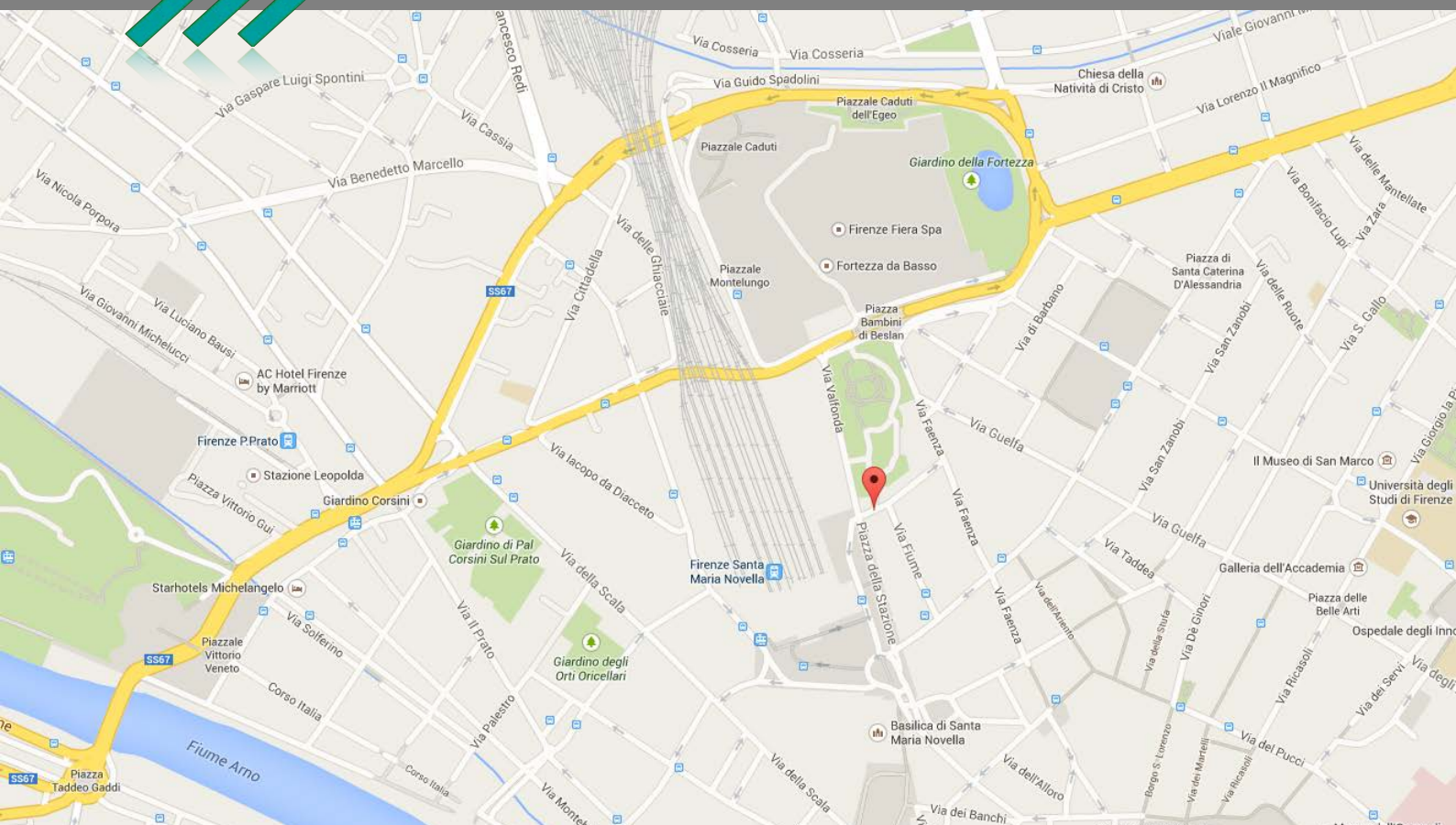
Florence is well connected to the main Italian cities through an efficient motorway network, which allows an easy access to the city centre, where the congress and exhibition centre is located.

 [Download the map how to reach our venues](#)

Info: [www.autostrade.it](http://www.autostrade.it)



# Venue@Florence\_Congress\_Center: Piazza Adua 1, Florence



**Fortezza da Basso: Basilica (Dec.17)**  
Social dinner

**Palazzo dei Congressi (Dec.16-17-18-19)**  
Opening, keynote, technical, poster sessions, workshops, tutorials, exhibition, coffee breaks

**Palazzo dei Congressi (Dec.17-18-19)**  
Lunches

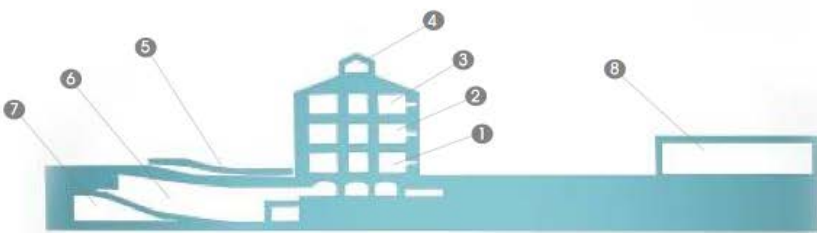
Venue@Florence\_Congress\_Center: **Piazza Adua 1, Florence**



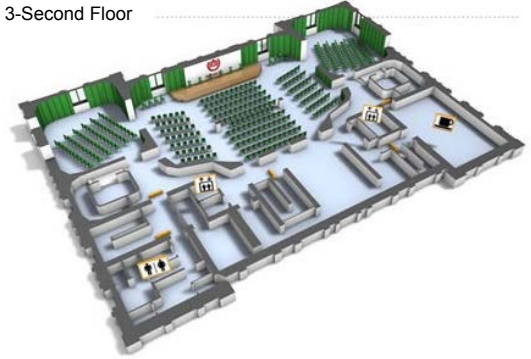
**AUDITORIUM** (indoor)  
**PASSI PERDUTI** (indoor)  
**ANFITEATRO** (outdoor)



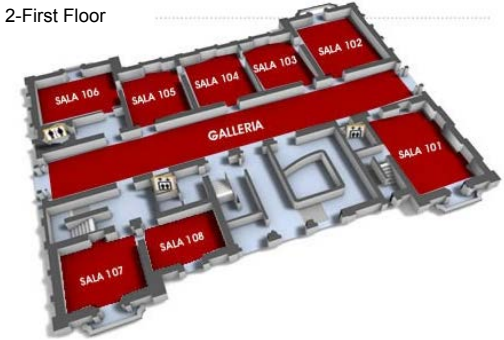
- 1 - VILLA VITTORIA PIANO TERRA - GROUND FLOOR
- 2 - VILLA VITTORIA PIANO PRIMO - FIRST FLOOR
- 3 - VILLA VITTORIA PIANO SECONDO - SECOND FLOOR
- 4 - VILLA VITTORIA BELVEDERE
- 5 - ANFITEATRO - AMPHITHEATRE
- 6 - AUDITORIUM
- 7 - PASSI PERDUTI
- 8 - LIMONAIA



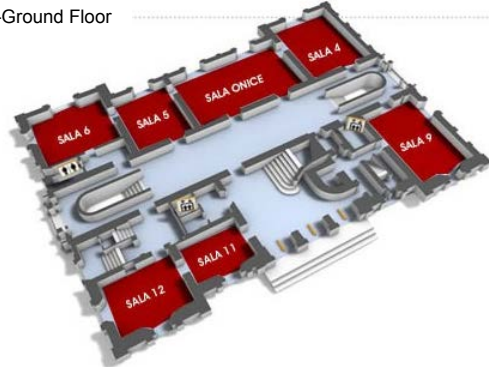
3-Second Floor



2-First Floor



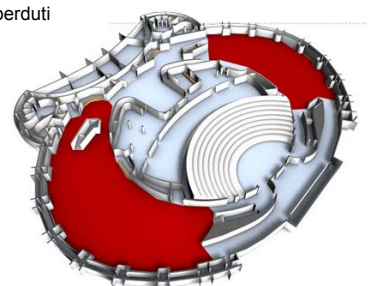
1-Ground Floor



6-Auditorium



7-Passi perduti



# Program\_overview\_December 16, 2014



## Tutorials

Room 4 @ Palazzo dei Congressi

2:30 p.m. **TUTORIAL 1**  
 6:30 p.m. Advanced Electric Energy Storage Systems and Smart Fast Charging for Future Electric Mass Transit Applications

Room 9 @ Palazzo dei Congressi

1:00 p.m. **TUTORIAL 2.A**  
 3:30 p.m. Fuel Cell Technology for Automotive applications

4:00 p.m. **TUTORIAL 2.B**  
 6:30 p.m. Wireless Power Transfer Technology for Electric Vehicle Applications

# Program\_overview\_December 17, 2014



## Opening&Keynote Sessions

8:30 a.m. 10:30 a.m.	Auditorium @ Palazzo dei Congressi <b>Opening session</b> IEVC General Chair, IEVC General Co-Chair, President of ANAE, President of ITIC, President of IEEE, Norway General Secretariat, Italian Minister (t.b.c.)
10:30 a.m. 11:00 a.m.	Passi Perduti @ Palazzo dei Congressi <b>Coffee break</b>
11:00 a.m. 1:00 p.m.	Auditorium @ Palazzo dei Congressi <b>Keynote Session 1.1: EV's worldwide</b> <ul style="list-style-type: none"> <li>• Myounggho Sunwoo - President of WEVA</li> <li>• Joeri de Ridder - President of AVERE</li> <li>• President of EDTA (t.b.c.)</li> <li>• C.C. Chan (University of Hong Kong)</li> </ul>
1:00 p.m. 2:00 p.m.	First floor @ Palazzo degli Affari <b>Lunch</b>
2:00 p.m. 4:00 p.m.	Auditorium @ Palazzo dei Congressi <b>Keynote Session 1.2:</b> <ul style="list-style-type: none"> <li>• Peter Van Manen (McLaren)</li> <li>• Julian Weber (BMW)</li> <li>• Jae Seung Lee (Toyota)</li> </ul>
4:00 p.m. 4:30 p.m.	Passi Perduti @ Palazzo dei Congressi <b>Coffee break</b>
4:30 p.m. 6:30 p.m.	Auditorium @ Palazzo dei Congressi <b>Keynote Session 1.3:</b> Markus Seidel (BMW Motorrad) Isbrand Ho (BYD) Gernot Spiegelberg (Siemens)
4:30 p.m. 6:30 p.m.	Passi Perduti @ Palazzo dei Congressi <b>VIP tour and aperitive @ IEVC Exhibition and CarShow areas</b>
8:30 p.m. 10:30 p.m.	Basilica @ Fortezza da Basso <b>SOCIAL DINNER</b>

Passi perduti @ Palazzo\_Congressi - Open\_area&Limonaia  
**Exhibition and car-show**



# Program\_overview\_December 18, 2014



## Keynotes, Technical, Poster/Dialogue Sessions, Workshops

8:30 a.m. 10:30 a.m.	Auditorium @ Palazzo dei Congressi							
	<b>Keynote Session 2.1: ICT and standardization</b> Kal Gyimesi (IBM Software Group) Ashok Moghe (Cisco) Jose Fernandez Garcia (European Commission) Jost Bernasch (Virtual Vehicle, Austria)							
11:00 a.m. 1:30 p.m.	Auditorium @ Palazzo dei Congressi		Sala Verde @ Palazzo dei Congressi			Sala Onice @ Palazzo dei Congressi		
	<b>W2.1 - Clean Cities Workshop</b>		<b>W2.2 - Inductive Power Transfer Standardization workshop</b>			<b>W2.3 - Energy storage workshop</b>		
1:30 p.m. 2:30 p.m.	First Floor @ Palazzo degli Affari							
	<b>Lunch</b>							
2:30 p.m. 4:30 p.m.	Auditorium @ Palazzo dei Congressi	Sala Verde @ Palazzo dei Congressi	Sala Onice @ Palazzo dei Congressi	Room4 @ Palazzo dei Congressi	Room9 @ Palazzo dei Congressi	Room101 @ Palazzo dei Congressi	Room104 @ Palazzo dei Congressi	
	<b>TS 2.1</b> SPECIAL SESSION - Present and future high power energy storage technologies for electric and hybrid vehicles: supercapacitors and	<b>TS 2.2</b> SPECIAL SESSION - High power, low cost electrical drivetrain	<b>TS 2.3</b> Power grid opportunities and EV infrastructure support	<b>TS 2.4</b> Wireless charging, conductive charging and superfast charging	<b>TS 2.5</b> EV standards, policy, education, market, supply chain and manufacturing	<b>TS 2.6</b> EV systems modeling, simulation and testing	<b>TS 2.7</b> SPECIAL SESSION - Driver information systems enhanced with connected vehicle technologies	
4:30 p.m. 5:30 p.m.	Auditorium @ Palazzo dei Congressi							
	<b>Special keynotes at Auditorium</b>							
5:30 p.m. 6:30 p.m.	<b>PANEL AND DIALOGUE SESSIONS</b> - Ballatoio @ Palazzo dei Congressi							
	<b>PD 2.1</b> SEV system architecture concepts and components	<b>PD 2.2</b> EV mobility, ecodriving, fuel cell vehicles, hybrids, plug-ins, energy production	<b>PD 2.3</b> EV systems modeling, simulation and testing	<b>PD 2.4</b> EV communications, in-vehicle network, connected vehicles, autonomous vehicles, platooning	<b>PD 2.5</b> EV standards, policy, education, market, supply chain and manufacturing			

# Program\_overview\_December 19, 2014



## Keynotes, Technical, Poster/Dialogue Sessions, Workshops

8:30 a.m. 10:30 a.m.	Auditorium @ Palazzo dei Congressi							
	<b>Keynote Session 2.1: ICT and standardization</b>							
	Grzegorz Ombach (Qualcomm) Giovanni Gaviani (Magneti Marelli) Konrad Woronowicz (Bombardier) Björn Pfeifer (Schaeffler)							
1:30 p.m. 2:30 p.m.	Auditorium @ Palazzo dei Congressi							
	<b>Open Day and Test drive presentation</b>							
11:00 a.m. 1:30 p.m.	Auditorium @ Palazzo dei Congressi	Sala Verde @ Palazzo dei Congressi	Sala Onice @ Palazzo dei Congressi	Room4 @ Palazzo dei Congressi	Room9 @ Palazzo dei Congressi	Room101 @ Palazzo dei Congressi		
	<b>W3.1 - EV's components Standardization workshop</b>	<b>W3.1 - Europe meets IEVC workshop</b>	<b>TS 3.1</b> EV mobility, eodriving, fuel cell vehicles, hybrids, plug-ins, energy production	<b>TS 3.2</b> SS Advances in wireless charging of electric vehicles	<b>TS 3.3</b> EV power electronics and motor drives	<b>TS 3.4</b> Electric Energy Storage Systems for Transportation Electrification		
1:30 p.m. 2:30 p.m.	First Floor @ Palazzo degli Affari							
	<b>Lunch</b>							
2:30 p.m. 5:00 p.m.	Auditorium @ Palazzo dei Congressi	Sala Verde @ Palazzo dei Congressi	Sala Onice @ Palazzo dei Congressi	Room4 @ Palazzo dei Congressi	Room9 @ Palazzo dei Congressi	Room101 @ Palazzo dei Congressi	Room104 @ Palazzo dei Congressi	Room202 @ Palazzo dei Congressi
	<b>TS 3.5</b> SPECIAL SESSION Integration of Electric Vehicles into Smart Grids	<b>TS 3.6</b> SS: Technologies for advanced management of battery and supercap energy storage systems in Evs	<b>TS 3.7</b> SS Advances in wireless charging of electric vehicles	<b>TS 3.8</b> SS: Simulation ,management and performance analysis in hybrid and electric vehicles	<b>TS 3.9</b> SS: Electric Vehicles Charging Infrastructures and Grid Integration	<b>TS 3.10</b> SS: Energy efficiency optimization and robust control of PMSM	<b>TS 3.11</b> SS: Unconventional electrical machines for electric vehicles	
5:00 p.m. 5:30 p.m.	Auditorium @ Palazzo dei Congressi							
	<b>Coffee break</b>							
5:30 p.m. 6:30 p.m.	<b>PANEL AND DIALOGUE SESSIONS</b> - Ballatoio @ Palazzo dei Congressi							
	<b>PD 3.1</b> Power grid opportunities and EV infrastructure support	<b>PD 3.1</b> EV power electronics and motor drives	<b>PD 3.1</b> Wireless charging, conductive charging and superfast charging					
8:00 p.m. 8:30 p.m.	<b>Social Event at Palazzo Vecchio: "arrivederci" cocktail and IEVC2015 presentation</b>							

Passi perduti @ Palazzo\_Congressi - Open\_area&Limonata

**Exhibition**

**CAR-SHOW OPEN DAY AND TEST DRIVE**



# TUTORIALS December 16, 2014



## About the IEVC2014 tutorials

IEVC tutorials present the state of the art and future trends for wireless charging, fuel cells technologies, and advanced electric Energy Storage Systems /Smart Fast Charging for Future Electric Mass Transit Applications.

The IEVC 2014 tutorial session is aimed at young researchers, PhD's, students, practitioners. The tutorials will be held at Palazzo dei Congressi – Florence Congress Centre, Florence. Registration for Tutorial Session is available through the IEVC Registration site: [www.ievc2014.org](http://www.ievc2014.org)

**Date: Tuesday December 16**

**Tutorial 1: 2:30 pm - 6:30 pm**

**Tutorial 2.A 1:30 pm-3:30 pm**

**Tutorial 2.B 4:00 pm-6:30 pm**

**TUTORIAL 1** *time 2:30 p.m. -6:30 p.m.*

## Advanced Electric Energy Storage Systems and Smart Fast Charging for Future Electric Mass Transit Applications

**Sheldon Williamson**, Concordia University



Associate Professor- Concordia University, Montreal Power Electronics & Energy Research (PEER) Group. Senior Member of IEEE & Distinguished Lecturer (DL)- IEEE Vehicular Technology Society, NSERC Canada Research Chair in Transportation Electrification & Electric Energy Storage Systems University of Ontario-Institute of Technology, Oshawa, Ontario 2006-14. Technical Program Chair IEEE IECON 2012, IEEE VPPC 2011, IEEE EPEC

2009 Associate Editor IEEE Transactions on Industrial Electronics, IEEE Transactions on Power Electronics, IEEE Transactions on Transportation Electrification, & IEEE Journal of Emerging & Selected Topics in Power Electronics Research-electric drive trains for EV, HEV, PHEV, & fuel cell vehicles, modeling, analysis, design, & control of power electronic converters & motor drives for land, sea, air, & space vehicles, power electronic interface & control of renewable energy systems.

## CONTENTS

Enhancing the life of Lithium-ion (Li-ion) battery packs has been the topic of much interest in the automotive industry. On-board cell-equalization problem of Li-ion batteries will be highlighted in this tutorial. This is a very important topic in the context of EV battery energy storage cost and life/

state-of-charge, SOC/state-of-health, SOH monitoring. Li-ion batteries, although popularly proposed, have been highly uneconomic for EV energy storage, overshooting cost requirements by a large margin. They provide a good solution for EV and PHEV applications, but main issues include: cycle life, calendar life, energy density, power density, and lately, safety. These issues can be addressed successfully by using a simple practical approach: a power electronics cell voltage equalizer. The purpose of the second part of this tutorial is to demonstrate the role of power electronics intensive battery management solutions to reach the cost breakpoint of a PHEV/EV. The design and implementation of both inductor-based as well as switched capacitor DC/DC converters for Li-ion battery cell-equalization will be discussed. Finally, the design of a novel DC/DC resonant converter for voltage equalization of EV/PHEV Li-ion battery cells will also be presented.

Tutorial will look at storage and off-board fast charging solutions for future all-electric mass transit applications, such as electric buses, trucks, trains, and trams. In addition, the tutorial will also introduce the concept of fast charging stations and smart on-board energy management for ultracapacitor (UC) powered electric traction.

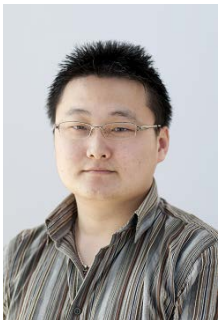
Tutorial will also depict the proposed possibility of completely eliminating the need for powering electric railway traction systems from overhead or wayside power conductor rails. The usage of wireless/inductive power transfer (IPT) will be described for mass transit applications, such as electric city trams, buses, and trains, solely powered by UCs. The tutorial will present a wireless DC fast charging system that can be installed only at major bus stops, tram stops, or train stations, to achieve charging of on-board UCs in less than 2 minutes. The tutorial will present the sizing/layout of the UC bank (series/parallel modules) and its distinct DC/DC 2-quadrant converter (for regenerative braking and acceleration), as well as the design the power electronic wireless off-board fast charging infrastructure. The tutorial will finally describe the design of the on-board power electronic UC cell voltage/power-management system. This smart and novel on-board DC/DC power electronic energy management converter will help equalize and balance the UC cell voltages

# TUTORIALS December 16, 2014



## **TUTORIAL 2.A** *time 1:00 p.m. -3:30 p.m.* **Fuel Cell Technology for Automotive applications**

**Fei Gao**, University of Technology of Belfort-Montbéliard



Associate Professor-University of Technology of Belfort-Montbéliard, Head of Energy Production Division-Energy and Environment Department, University of Technology of Belfort-Montbéliard, Secretary of Technical Committee on Automotive Technology (TCAT) IEEE Industrial Electronics Society (IEEE-IES), Associate Editor-IEEE Transactions on Transportation Electrification, Editor-IEEE Transportation Electrification Newsletter, Chairman of "Fuel cell modeling and

Experimentation axis"- French FC LAB Research Federation (FR CNRS 3539), Research-Fuel cells applications in transportation including multi-physics modeling and real time applications

### **CONTENTS**

The fuel cell is a potential candidate for energy storage and conversion in our future energy mix. Indeed, a fuel cell is able to directly convert the chemical energy stored in fuel (e.g. hydrogen) into electricity, without undergoing different intermediary conversion steps. Among the different fuel cell types, the proton exchange membrane (PEM) fuel cell has shown great potential in automotive applications, due to its low operating temperature, solid-state electrolyte, and compactness. Many experts consider the PEM fuel cells to be one of the potential embarked energy candidates for terrestrial transportation.

This eLearning course will mainly focus on the proton exchange membrane (PEM) fuel cell technology which has been used specially in automotive applications. The PEM fuel cell fundamentals, such as its physics, structure, power characteristics, efficiency, will be presented and discussed. The fuel cell system with its key ancillary components, such as air compressor, hydrogen tank, power converter, will also be introduced. Different powertrain configurations with fuel cells in automotive applications will be discussed and shown with real examples around the world. An emphasis on the fuel cell economic aspects and a short introduction to hydrogen economy will be given at last.

## **TUTORIAL 2.B** *time 4:00 p.m. - 6:30 p.m.* **Wireless Power Transfer Technology for Electric Vehicle Applications**

**Chris Mi**, University of Michigan



Professor-University of Michigan, Dearborn, Director- US DOE funded GATE Center for Electric Drive Transportation, Fellow of IEEE & Distinguished Lecturer (DL)- IEEE Vehicular Technology Society, General Co-Chair- IEEE Workshop on Wireless Power Transfer, Technical Chair- IEEE International Electrical Vehicle Conference 2014, Florence Italy, Editor- IEEE Journal of Emerging and Selected Topics in Power Electronics – Special

Issue on WPT, Research-EV and HEV topics including tutorials and seminars for the Society of Automotive Engineers (SAE), the IEEE, workshops sponsored by the National Science Foundation (NSF), and the National Society of Professional Engineers

### **CONTENTS**

Electric vehicles and plug-in hybrid electric vehicles (PEVs) have attracted worldwide attentions because their capabilities to displace petroleum usage and improve energy and environment sustainability. One of the key constraints for the mass market penetration of PEVs is the inconvenience and safety concerns associated with charging. Wireless charging using Wireless Power Transfer (WPT) Technology, as an alternative to conductive charging or battery-swapping, can provide the convenience and safety requirements. Recently, EV battery wireless chargers have been realized at large power levels (>50kW) with reasonable sizes, distance in excess of 200 mm, DC-to-battery efficiency of 96.5%, and a misalignment of up to 600 mm, using magnetic-resonance technology. This breakthrough will have strong impact on PEVs and a variety of other applications, including consumer electronics, home appliances, medical implant devices, and some industry applications. This tutorial focuses on the key technical challenges of WPT, including coil design, system analysis using analytical methods, simulations of the WTP system; resonant topologies suitable for various applications, and power electronics topologies associated with WPT.

# Opening&Keynotes\_December 17, 2014



## OPENING SESSION

*\_AUDITORIUM@Palazzo\_Congressi\_time 8:30 a.m. -10:30 a.m.*



**GIUSEPPE TOMASSO**  
University of Cassino  
and South Lazio  
IEVC2014 General Chair



**JOACHIM TAIBER**  
Clemson University  
IEVC2014 General Co-  
chair, IEVC platform Chair



**JOHN-RAGNAR  
AARSET**  
State Secretary - Ministry  
of Transportation and  
Communication - Norway

**JOHN HOPKINS**  
ITIC- John Hopkins,  
Executive Director



**CIRO ATTAIANESE**  
ANAE - President

**ITALIAN MINISTER**  
to be confirmed

**COFFEE BREAK** *\_PASSI\_PERDUTI@Palazzo\_Congressi\_time 10:30 a.m. -11:00 a.m.*

## KEYNOTE SESSION 1.1: A WORLDWIDE OVERVIEW

*\_AUDITORIUM@Palazzo\_Congressi\_time 11:00 a.m. -1:00 p.m.*



**MYOUNGHO  
SUNWOO**  
President of WEVA:  
World Electric Vehicle  
Association



**JOERI DE RIDDER**  
President of AVERE - -  
Association for Battery,  
Hybrid and Fuel Cell  
Electric Vehicles

**PRESIDENT OF EDTA**  
TO BE CONFIRMED



**C.C. CHAN**  
Honk Kong University  
Founder of WEVA

# Opening&Keynotes\_December 17, 2014



**LUNCH** *\_FIRST\_FLOOR@Palazzo\_Affari\_time 1:00 p.m. - 2:00 p.m.*

## KEYNOTE SESSION 1.2: OEM'S

*\_AUDITORIUM@Palazzo\_Congressi\_time 2:00 p.m. -4:00 p.m.*



**PETER VAN MANEN**  
**McLaren**  
Vice President of  
McLaren Applied  
Technologies



**JULIAN WEBER**  
**BMW**  
Head of Innovation  
Projects E-Mobility



**JAE SEUNG LEE**  
**Toyota**  
Research Manager at  
Toyota Research  
Institute of North  
American

**COFFEE BREAK** *\_PASSI\_PERDUTI@Palazzo\_Congressi\_time 4:00 p.m. - 4:30 a.m.*

## KEYNOTE SESSION 1.3: MOBILITY

*\_AUDITORIUM@Palazzo\_Congressi\_time 4:30 p.m. -6:30 p.m.*



**GERNOT  
SPIEGELBERG**  
**Siemens**  
Vice President  
Corporate Technology



**ISBRAND HO**  
**BYD**  
Senior Director



**MARCUS SEIDEL**  
**BMW Motorrad**  
Head of Project Electric  
Mobility BMW Motorrad

## VIP TOUR@EXHIBITION

*\_PASSI\_PERDUTI@Palazzo\_Congressi\_time 6:30 p.m. - 7:30 a.m.*

**SOCIAL DINNER** *\_BASILICA@Fortezza\_da\_Basso\_time 8:30 p.m. -10:30 p.m.*

# IEEE - IEVC2014

IEEE - INTERNATIONAL ELECTRIC VEHICLE  
CONFERENCE

[info@ievc2014.org](mailto:info@ievc2014.org)  
[www.ievc2014.org](http://www.ievc2014.org)