Thursday, December 3

Opening, Welcome, and CAAMC Awards Ceremony

Session Code: VEP800
Room Jin Jue

SAE and CNAICO will welcome the attendees to the SAE 2015 Vehicle Electronics and Connected Vehicle Forum. In addition, CAAMC will honor a number of industry experts during a special ceremony at the VEPT event.

Thursday, December 3

The Justification for Electrification

Session Code: VEP900
Room Jin Jue

Salient representatives from industry and government will address the current status and future outlook of the vehicle electrification market. Consumer demands, regulatory changes, economics, and technology advances are a number of factors to be discussed.

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<tr>
<td>9:30 a.m.</td>
<td>ORAL ONLY</td>
<td>Shape the Future for Auto Electrification</td>
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It is well known that the transportation sector has a significant impact on the global environment, especially climate change. Electric vehicles offer a cleaner alternative to vehicles powered by traditional internal combustion engines. The Chinese government is providing a positive environment to boost NEV development.

Charon Morgan, General Motors LLC
IOT is radically changing every industry including Automotive. The modern day connected smartphone on wheels has functionality on par with any consumer device. Auto manufacturers whose traditional role was to sell cars have transitioned into full scale mobility solution providers relying heavily on the connectivity aspect. Ranging from entertainment to safety to security to aftersales, the connected car is providing value to multiple players in the ecosystem, including customers, OEMs and dealers. OEMs like Tesla have used connectivity to impact a very important challenge around electric vehicles adoption, addressing the range anxiety factor through a variety of useful contextual connected services. This presentation will focus on the following:

- What are the key trends, growth drivers and future outlook for electric vehicles in the different automotive markets? What use cases and applications are driving the future growth of the connected car market?
- Which OEMs are leading from a connected car strategy perspective? How does this differ between volume and premium OEMs?
- With the expectation of virtually 100% connected cars in the US by 2020, what business models are OEMs employing to successfully monetize this connectivity?
- Case studies of successful connected car programs, EV strategies and comparative analysis of activities of leading OEMs in both these markets.
- Comparative analysis of the key vendors and solution providers to this market.

Lisa Whalen, Frost & Sullivan

Thursday, December 3

Electric Motor and Controls Advancement, Part 1

Session Code: VEP100
Room Jin Jue Session Time: 11:20

Optimizing the performance of the electric drivetrain requires the latest electric motor technology, control algorithms and system modeling.

Organizers - James Sherman, SAE International

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Development Trends of Propulsion E-motor and Power Electronics for New Energy Vehicles

Under the pressure of air pollution and fuel economy, pure and hybrid electric vehicles (HEV/EVs) are treated as the dominant candidates for environmental friendly and energy saving as well as user accepting future vehicles. The energy conversion and energy transferring is bidirectional through e-motors in HEV/EVs, compared to unidirectional energy flowing in conventional engine and transmission. HEV/EV development in China and beyond analyzed.

William Cai, Jing-Jin Electric

Promote the upgrading of marketing to looking forward the Chinese Intelligent Manufacturing

The essence of “Chinese manufacturing 2025” is to transform the existing manufacturing process by using the Information Technology, to promote the product manufacturing process by information and to make the personalized customization come true. In order to achieve this goal, enterprises should take full advantage of all methods to collecting, sorting out and analyzing customer information such as E-commerce, mobile Internet, cloud computing and Big Data analytics. Meanwhile new challenges may arise in the traditional marketing management mode. It is imperative to transform and upgrade the enterprise marketing management mode.

Huazhu Guo

System Design Based on ISO2662 to Improve Reliability and Safety

As new energy technologies rapidly move forward, so do NEV control and propel technologies headed by battery, motor and electronic control, etc. Not only costs are required to be lower, experts are also expected to create higher reliability and safety for new energy technologies. This higher requirement is specially mirrored in the unprecedented attention paid to fault diagnosis and treatment specified by ISO2662 and the ever richer technological reserve. ISO2662 proposes a variety of referable solutions for redundancy design and fault diagnosis in kinds of complicated control environment, covering a variety of life-cycle development activities regarding concept development, system design, and hardware/software design. ISO2662 also covers guarantee measures for development processes and safety technologies. This presentation will discuss how to analyze the risk of new energy power train, concept design and system design based on ISO2662 to improve the reliability and safety of new energy power train.

Dong Hao, TUV
Electric motors are continuing to develop driving towards hybrid electric and full electric vehicles

Electric motors and power electronics are becoming the workhorse of the automotive industry. With the increase in electrification from stop/start technology through to full battery electric vehicles (BEVs) the development of eMachine and power electronic technologies is essential. The overwhelming choice of traction machine in the passenger car market is permanent magnet synchronous machines (PMSMs) although with the volatility in rare-earth material costs at the start of the decade much research has been undertaken on the development of PM-free designs. This presentation will look at the impact of such an approach on the sizing of the eMachine and also the power electronics and if, through judicious sizing considering the emerging WLTP drive cycle, machine designs will change in future vehicles.

Dr. Will Drury, Ricardo

Thursday, December 3

Battery Management

Session Code: VEP200
Room Jin Jue
Session Time: 14:30

The battery is the key enabler for all electric drivetrain. Maintaining the performance of the battery is a complex process. This session will look at various algorithms and implementations aimed at solving the problems associated with multi-level battery systems.

Organizers - James Sherman, SAE International

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ORAL ONLY

System design of BMS for vehicle electrification from Preh Joyson

New energy vehicle (NEV) is a new transportation worldwide and the market of this industry is growing fast in the past few years. New Energy Vehicle introduced high voltage system. The high voltage related design and its feature becomes a new challenge for the whole automobile industry. This change leads market requirement of a reliable BMS design. In this area, BMS does not only monitor, protect and balance the battery system but also controls the power circuits and charge/discharge the battery system. BMS is a key component of powertrain and all these functions are safety related. Therefore, designing a high-quality BMS is essential for automotive industry. Modular design and its related technology has the advantages of easier assembling, less wire harness, more reliability, higher reusability and robustness, and these features are all make the BMS more safety. This presentation explores the following topics in details:

- BMS system design and in-vehicle application
- BMS modular design, technology and systematic overview
- Benefit of BMS modular design and its improvement
- Next generation technology and challenges

Michael Bischoff, Preh Joyson
### ORAL ONLY  
**Battery Pack Thermal System Design Using 3D Simulation**

Developing battery pack thermal systems using physical tests is challenging because many potential thermal designs need to be considered and batteries must perform over a broad range of temperatures and states of charge. Additionally, the heat rejection in a pack is both a function of the duty cycle the pack and the temperature of the pack. Physically testing to optimize pack thermal performance can be difficult because of the transient nature of battery usage and the need to precondition a battery prior to a test. For example, after a discharge test, several hours may be required to charge and cool a pack before conducting another test. The variability of battery behavior combined with a slow testing cycle makes tuning and optimization difficult to achieve using bench and vehicle tests.

*Heinz Friz; Edward Tate, Exa Corporation*

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**Thursday, December 3**

**Electric/Electrified Powertrain Technologies**

**Session Code:** VEP300  
**Room Jin Jue**  
**Session Time:** 16:00  
**Organizers:** James Sherman, SAE International

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<td>4:00 p.m.</td>
<td>ORAL ONLY</td>
<td><strong>Three Paths to the Car of Future</strong></td>
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<td>The world is changing, and same is mobility. Base on this future vision of mobility, the Bosch Business sector of Mobility (BBM) concludes the 3 most promising technical trends are Electrification, Automated Driving and Connectivity.</td>
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<td><em>Luming Liu, Bosch China Investment Co., Ltd.</em></td>
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<td>4:30 p.m.</td>
<td>ORAL ONLY</td>
<td><strong>Electric Traction: Roadway to a New Energy Economy: Observations from California’s new-energy experiments</strong></td>
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<td>The continuing electrification of powertrains is driving automotive architectures toward electrical power distribution grids, specifically modern nanogrids. This transformation is being driven in part by traction motors capable of regenerative braking and partly by the inclusion of the large storage battery into the powertrain domain. The power grid model consists of generation, transmission, and distribution components, as well as grid-scale storage, and all have automotive analogs and hold the potential of more broadly shared technologies and components. This paper will examine some pitfalls that have become apparent with the emergence of modern hybrid and plug-in vehicles (including PHEV and EV), and some potential lessons from 100 years of utility power production. It will also examine some extrapolations and potential benefits from the looming synergistic unification of these previously unrelated power technologies.</td>
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<td><em>Donald J. Christian, Resurgen Renewables</em></td>
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Automakers continue to offer an impressive array of highly sophisticated vehicular technologies that help improve cars’ active safety, provide driving and parking assistance, and getting us closer to the age of always-connected and autonomous cars that will reduce crash fatalities, ease traffic congestion and reduce pollution.

James Sherman, SAE International

As the electrification of powertrains has increased in popularity, there has been a greater need to increase efficiency during the testing and development stages. The testing methodology for electrification is different than a typical internal combustion engine application. For example, the inverter cannot be compared to a typical internal combustion engine component because it does not exist in an IC engine. One challenge is to have a unique test cell for inverter testing. Currently, most inverter developers use three test methods to prepare the inverter for production: 1) Test the controls and the CAN communication using a Low Voltage Hardware In The Loop. 2) Perform the system calibrations where it is a combo of a vehicle and dynamometer testing and development. 3) Do fault insertions testing in the vehicle. Ideally, these three methods would be combined in a single test cell.

Elie Naim, WSU/AVL

Continental Business Unit Hybrid Electric Vehicle has developed a new generation of electric drivetrain, aiming for high versatility based on a component platform concept. The new drivetrain “EMR Gen3” uses key components of power electronics from actual series production. Combined with a new, customizable motor and gearbox the system can satisfy a wide range of customer requirements.

Mario Koch

This year, the Millennial Generation will surpass Baby Boomer as the U.S.’s largest living generation. Consumers living the always-connected lifestyle expect continuous access to personalized information and services delivered to their mobile device, independent of the car they happen to be driving.

Joseph Barkai
Impact of Connection and Automation on Electrified Vehicles Energy Consumption

Connectivity and automation are increasingly being developed for cars and trucks, aiming to provide better safety and better driving experience. As these technology mature and reach higher adoption rates, they will also have an impact on the energy consumption: connected and automated vehicles (CAVs) may drive more smoothly, stop less and move at faster speeds, thanks to overall improvements to traffic flows. These potential impacts are not well studied and their study tend to focus solely on conventional engine-powered cars, leaving on the side electrified vehicles such as hybrid electric vehicles (HEVs) and battery electric vehicles (BEVs).

Aymeric P. Rousseau, Argonne National Laboratory

ADAS Solutions

ADAS is evolving from passive to active, comfort to safety, invisible to visible, informative to assertive. As car manufacturers are facing new technical, legal and commercial hurdles when designing for advanced safety systems. This session will cover the latest ADAS product and solutions, including both radar and vision solutions, which will help car manufactures move toward an open road for autonomous vehicles.

Dr. Xi Yunxia, Freescale

Smart Transportation

Session Code: VEP700

Room Jin Jue

Organizers - James Sherman, SAE International

Smart Engineering Solutions for Smart Transportation

The development of smart transportation systems will require the use of smarter engineering solutions. What capabilities do engineers need to face the challenges of today? How can we design for safety and security? How can we find efficiency and quality through strategic reuse? When and how should the products be tested? How can we leverage data to gain insight and take action? What, if any, benefits will strategic adoption of IoT bring? How can the complexity be managed? These and other challenges of engineering the transportation systems of tomorrow will be explored.

William J. Bolander, IBM Rational Software

The 3rd Pillar of Autonomous Public Transportation

Autonomous cars technology is already here. Sensors and analysis chips are ready, Google autonomous cars passed the one million miles with only 11 accidents, all of them due to human driver errors. First few US states already adopted new regulations to allow the usage of autonomous cars.

Yossi Aloni, Optibus
Advanced active safety and driver-assisting technologies, and, eventually, autonomous driving, rely on sophisticated software to make critical driving decisions. Understanding and managing cybersecurity risks in vehicle software will be critical for the auto industry and the motoring public.

Friday, December 4

**Cyber Security**

**Session Code:** VEP600  
**Room Jin Yue**  
**Session Time:** 13:15

Organizers - James Sherman, SAE International

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<tr>
<td>1:15 p.m.</td>
<td>ORAL ONLY</td>
<td>System Security and Integrity for the Connected and Automated Vehicle</td>
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<td>1:50 p.m.</td>
<td>ORAL ONLY</td>
<td>Secure OTA Software Management For Automotive</td>
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<td>2:25 p.m.</td>
<td>ORAL ONLY</td>
<td>Automotive Cybersecurity: A U.S. Government Regulatory Perspective</td>
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Friday, December 4

**Workforce Development**

**Session Code:** VEP500  
**Room Jin Jue**  
**Session Time:** 15:15
Connected vehicles are becoming mainstream at an accelerated pace. The advanced engineering and complex software and electronics in these vehicles pose a significant challenge to the entire workforce. In this session, you will learn about the ramification of connected vehicle technologies and how to prepare and train your labor force for the impending challenges.

**Organizers**

James Sherman, SAE International

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| 3:30 p.m. | ORAL ONLY | **Connected Vehicle Workforce ¿ What does the future hold?**  
Connected vehicle is painting our technology and infrastructure landscape daily in the news. Learn about what the connected vehicle is, why it¿s important to prepare the workforce, and more importantly how to train your team.  
Katherine Robertson, Mobile Comply |
| 4:50 p.m. | ORAL ONLY | **Closing Remarks**  
Joseph Barkai |