

# COMVEC™

## Technical Session Schedule

As of **September 25, 19:40:07 PM**

**Tuesday, September 19**

### Chassis Committee: Verification & Validation

Session Code CV200

Room Schaumburg EF Session 10:30 a.m.

While the automotive industry has been improving vehicles' performance (mobility, energy efficiency, etc.), sustainability now becomes another challenge, which needs all involved parties to reevaluate everything from design, engineering, manufacturing and shipping processes, all the way to how vehicles operate, being serviced and dealt with at the end of its lifecycle.

This session will be focusing on the verification & validation process and their impact on vehicle performance and sustainability. Below are the fundamental questions to be addressed during the panel discussion:

- What key factors should be considered for vehicle performance development?
- What key factors should be considered for vehicle sustainability?
- What is the recommended V&V process to balance the vehicle performance and its sustainability? Learn more about the Participants

Moderators - Xiaobo Yang, Oshkosh Corporation

Panelists - Nicholas Gaul, RAMDO Solutions; Alice M. Popescu, Deere & Company; Jillian Steffek, Oshkosh Corporation; Alexander Williams, Nevada Automotive Test Center;

**Tuesday, September 19**

### Chassis Committee: Challenges to Off-Highway Autonomy

Session Code CV201

Room Schaumburg EF Session 1:30 p.m.

Autonomous vehicle operation is a major focus in our society offering huge savings in human effort, improvement in equipment utilization and increased productivity. These opportunities parallel the success of automation in industry. Significant progress has been achieved in advancing autonomous operation of off-highway vehicles. In this session, speakers will review the challenges encountered and the innovations implemented to overcome them. They will discuss the challenges remaining to further expand autonomous operation in the off-highway environment. The path to increased proliferation in current applications such as agriculture and mining will be discussed as well as the growth trajectory in additional applications such as drayage and yard tractors. Learn more about the Participants

Moderators - Nicholas Gaul, RAMDO Solutions

Panelists - Scott A. Bradley, Michigan Technological Univ.; Arnold Free, Traxara Robotics Inc.; Joseph Liefer, John Deere;

**Tuesday, September 19**

### Chassis Committee: Simulation-based Product Development

Session Code CV202

Room Schaumburg EF Session 3:30 p.m.

The automotive industry is constantly facing increased competition and demands for faster time-to-market, higher performance and reliability, reduced product development risk, and cost-effective design of their products. The traditional build-test-redesign-retest cycle is too expensive and time consuming to meet demands. This has led to the push for a simulation-based product development process, also known as virtual product development. This process relies on using simulation models, validating, improving them, using them to assess product reliability, optimizing products for improved performance & reliability while reducing costs, and reusing models as building blocks when designing the next generation products. This session will discuss how a simulation-based product development process can be implemented and utilized. Learn more about the Participants

Moderators - Nicholas Gaul, RAMDO Solutions

Panelists - Tony Bromwell, Hexagon; Somnath Ghorad, Nikola Motors; Steve Sass, John Deere Dubuque Works; Behrooz Shahidi, Ford Motor Company; Xiaobo Yang, Oshkosh Corporation;

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## Technical Session Schedule

As of **September 25, 19:40:08 PM**

**Tuesday, September 19**

### Opening Keynote - Jill Sanchez

Session Code CV900

Room Schaumburg East Session 9:00 a.m.

Learn more about the Keynote

Keynote Speakers Jill K. Sanchez, Deere & Company

**Tuesday, September 19**

### Sustainability for Mobility Executive Track: Renewable & Low Carbon Fuels - OEM Point of Views

Session Code CV800

Room Schaumburg East Session 10:30 a.m.

This panel is focused on system level solutions for developing future commercial vehicle powertrains using renewable and low carbon fuel and various levels of hybridization. Life cycle analysis will include well-to-wheels, tank-to-wheels and the economics associated. Consideration will be given to the total carbon emitted to the environment by making the fuels and then using the fuels in vehicles. The GHG emitted to make the fuels (diesel, hydrogen, natural gas, bio-fuels, others, etc.) can vary based on manufacturing processes. For example, hydrogen can be produced using many processes including coal, natural gas, wind, solar, etc. all of which have a different GHG footprints. Moving to the vehicle side, system level solutions are needed to enable fuel efficient vehicles while minimizing the GHG emissions. Hybridization can play a role for maximizing efficiency and minimizing emissions, as will full electric vehicles. The mix of solutions including ICE, hybrids, fuel cells, and BEVs will be discussed. Session 1 is focused on OEMs as they consider trade-offs for various system level solutions while addressing the well-to-wheels, tank-to-wheels and ability to meet future emission regulations and Environmental Social and Governance (ESG) goals. Session 2 is focused on producing the fuels and making them readily available to commercial vehicle consumers. The combination of both sessions will provide a broad view for maximizing vehicle efficiency while understanding the total impact from each solution. SPONSORED BY DAIMLER Learn more about the Participants

Moderators - Jacquelyn Birdsall, Toyota

Panelists - Wole Akinoyemi, Cummins; Admir Kreso, Daimler Corp.; Navtej Singh, Navistar Inc.; Chris Walters, IVECO;

**Tuesday, September 19**

### Sustainability for Mobility Executive Track: Renewable & Low Carbon Fuels / Hydrogen

Session Code CV801

Room Schaumburg East Session 1:30 p.m.

This panel is focused on system level solutions for developing future commercial vehicle powertrains using renewable and low carbon fuel and various levels of hybridization. Life cycle analysis will include well-to-wheels, tank-to-wheels and the economics associated. Consideration will be given to the total carbon emitted to the environment by making the fuels and then using the fuels in vehicles. The GHG emitted to make the fuels (diesel, hydrogen, natural gas, bio-fuels, others, etc.) can vary based on manufacturing processes. For example, hydrogen can be produced using many processes including coal, natural gas, wind, solar, etc. all of which have a different GHG footprints. Moving to the vehicle side, system level solutions are needed to enable fuel efficient vehicles while minimizing the GHG emissions. Hybridization can play a role for maximizing efficiency and minimizing emissions, as will full electric vehicles. The mix of solutions including ICE, hybrids, fuel cells, and BEVs will be discussed. Session 1 is focused on OEMs as they consider trade-offs for various system level solutions while addressing the well-to-wheels, tank-to-wheels and ability to meet future emission regulations and Environmental Social and Governance (ESG) goals. Session 2 is focused on producing the fuels and making them readily available to commercial vehicle consumers. The combination of both sessions will provide a broad view for maximizing vehicle efficiency while understanding the total impact from each solution. SPONSORED BY DAIMLER Learn more about the Participants

Moderators - James McCarthy, Eaton Corporation

Panelists - Andreas Broda, MAN Traton; Mircea Gradu, Ballard Power Systems Inc.; Eric J. Guter, Air Products; Young Suk Jo, AMOGY Inc.; Michael Traver, Aramco Research Center;

# COMVEC™

## Technical Session Schedule

As of September 25, 19:40:08 PM

Tuesday, September 19

### Sustainability for Mobility Executive Track: Electrification and Carbon Neutrality

Session Code CV802

Room Schaumburg East Session 3:30 p.m.

Electrification is being adopted in automotive and transportation industry as one of the pathways for carbon neutrality. The solutions range from internal combustion engine hybridization to all electric drivelines powered by batteries and fuel cells. The challenges are numerous, while for Battery Electric Vehicles (BEV) charging infrastructure, grid capacity, raw material availability, battery fast charging and its thermal management are some of the key barriers, for Fuel Cells Electric Vehicle (FCEV) its hydrogen extraction, distribution, and cost among other factors. However, at the same time government infrastructure spending, policy incentives, advancements in battery technology, smart and micro grids are lowering some of these barriers. In this session, you will hear from cross-industry experts on the challenges and opportunities with electrification to achieve carbon neutrality and outlook with advancements in battery technologies, smart/micro grids, and other critical infrastructure. SPONSORED BY DAIMLER Learn more about the Participants

Moderators - Daniel Williams, ZF

Panelists - Linda Gaines, Argonne National Laboratory; Andreas Keuper, Robert Bosch LLC; Hillary Leach, Growth Platforms for USG; Anthony Sutton, Navistar Inc.;

Tuesday, September 19

### Total Vehicle: Reliability, Diagnostics & Prognostics for Critical Vehicle Electronic Systems

Session Code CV400

Room Schaumburg GH Session 10:30 a.m.

On board diagnostics have been around for a long time and are well understood and standardized. Huge amounts of diagnostic data have piled up over the years. Many variants and dimensions must be supported. Fortunately, the data are machine readable. This presentation provides an overview of the evolution of big data techniques to promote prognostic development and shows some case studies for the next generation of prognostics development including autonomous vehicles, with a variety of panelists from many different areas.

Sponsored by Ricardo  
Learn more about the Participants

Moderators - Mark Pope, DG Technologies

Panelists - Andreas Hege, RA Consulting GMBH; Steven Holland, VHM Innovations LLC; Peter Subke, Softing Automotive Electronics;

Tuesday, September 19

### Total Vehicle: Emerging Energy Solutions Infrastructure Planning, Development and Deployment

Session Code CV403

Room Schaumburg GH Session 1:30 p.m.

The market's willingness to adopt new hydrogen and electrified commercial vehicle powertrains depends on a number of variables. Deploying a strong energy infrastructure to support the broad use of these powertrains is one important dependency. Identifying the best locations and deployment phases, well to pump carbon footprints, existing energy capacity headroom against future needs, siting constraints, end user costs, and many other issues are all obstacles to this adoption. In order to successfully deploy this new energy infrastructure, this panel will discuss and examine market trends, technological constraints, demand signals, uncertainties, and a number of other crucial factors.

Sponsored by Ricardo  
Learn more about the Participants

Moderators - Vivek Sujjan, Oak Ridge National Laboratory

Panelists - Ted Barnes, Gas Technology Institute; Inalvis Alvarez Fernandez, EPRI Company; Mark Smith, US Department of Energy; Ryan Kelly Wyman Stanton, Tennessee Valley Authority;

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## Technical Session Schedule

As of **September 25, 19:40:09 PM**

**Tuesday, September 19**

### Total Vehicle: Software/Hardware/Model in the Loop - Test Strategies

Session Code CV401

Room Schaumburg GH Session 3:30 p.m.

As automation and connectivity continues to grow in the automotive space, engineering needs a testing strategy that allows for quickly and accurately testing software prior to it reaching production. Hardware in the loop, software in the loop, and model in the loop testing strategies empowers engineering to test early, test often, adapt to inevitable changes, and produce more robust software while shortening the overall development time to get products to market faster. This session will dive into the particulars of those testing methodologies to discuss best practices and highlight pitfalls to avoid when loop testing.

Sponsored by Ricardo

[Learn more about the Panelists](#)

Moderators - Daniella Seekatz, Cummins Inc.

Panelists - Jace Allen, dSPACE Inc.; Paul Bromnick, AVL; Nishantha Randunu, DISTek Integration Inc.; Mark Sahlin, Vermeer Corporation;

**Tuesday, September 19**

### Powertrain Committee: Electrified Commercial Vehicle Charging Strategies

Session Code CV300

Room Schaumburg West Session 10:30 a.m.

Electrification of heavy-duty and commercial vehicles has been an increasing focus of recent research and development efforts, to enable decarbonization of the transportation sector. Despite increased system efficiencies, replenishment of the onboard energy storage is a key hurdle that can determine the eventual adoption and success of commercial vehicle electrification. The interaction between vehicle charging and the grid also needs to be accounted for, especially in the context of high-power vehicle charging. This panel brings together experts from various facets of the commercial vehicle electrification industry, to discuss on various strategies for energy replenishment in ECVs, including but not limited to, stationary fast charging, pantograph-based 'opportunity charging', stationary- and dynamic- wireless charging, battery swapping, electric power takeoff and intelligent charging via vehicle-to-grid optimization. SPONSORED BY NAVISTAR [Learn more about the Participants](#)

Moderators - Theodore Bohn, Argonne National Lab.

Panelists - James Chase, Caterpillar Inc.; Dan Farrington, Navistar Inc.; Andrew Meintz, National Renewable Energy Laboratory; David Schaller, NACFE;

**Tuesday, September 19**

### Powertrain Committee: Simulation-based Powertrain Product Development

Session Code CV301

Room Schaumburg West Session 1:30 p.m.

As the Commercial Vehicle Segment moves towards decarbonization at a rapid pace, businesses are limited in human and capital resources available for each phase of the powertrain development process. There has been considerable research investment employed by OEMs and suppliers in the development of the next generation of advanced powertrain and propulsion technologies, namely combustion of alternative fuels such as hydrogen and low carbon fuels, hybrid electric powertrains, battery electric propulsion, and fuel cell propulsion. While experimental testing will be one of the approaches executed to develop and validate such technologies, testing alone cannot help us achieve the goal of getting there due to the expensive nature of testing arising from instrumentation equipment costs, as well as the limitations of using experimental techniques to understand fundamental physical and chemical phenomena behind such technologies. As a result, it is necessary to use simulation tools and processes for modeling powertrain and propulsion systems to evaluate their performance, reliability and durability as a complement to experimental testing and to shorten the product development cycle. Simulation tools and processes that utilize well-calibrated and scientifically sound plant models can accurately predict powertrain & propulsion system behavior, which in turn can help with more efficient test & validation planning and therefore reduce production and market introduction costs of new powertrain & propulsion technologies. In some cases, they can be used in conjunction with Artificial Intelligence (AI) and Machine Learning (ML) techniques to create entirely new product development processes. SPONSORED BY NAVISTAR [Learn more about the Participants](#)

Moderators - Anand Nageswaran Bharath, Cummins Inc.

Panelists - Naveen Manuel, KPIT Technologies, Ltd.; Yuanjiang Pei, Aramco Research Center; Anand Shrikant Puranik, Cummins Inc.; Nishant Singh, MathWorks Inc.; Thomas Waldron, SuperTurbo Technologies Inc.;

# COMVEC™

## Technical Session Schedule

As of **September 25,** **19:40:09 PM**

**Tuesday, September 19**

### Powertrain Committee: Path to Zero Emissions

Session Code CV302

Room Schaumburg West Session 3:30 p.m.

Addressing the effects of the Climate Change due to human activities is a key initiative of both the public and private sectors worldwide. Transportation constitutes over 16% of the global greenhouse gas emissions footprint. To fight Climate Change, institutions across the transportation sectors, have developed internal sustainability goals and holistic objectives to address Scope 1, 2 and 3 emissions, with glidepaths to carbon neutral or carbon negative solutions. This panel (representing critical organizations of the research, development, deployment, operations and end-use value chain) will explore the Path to Zero Carbon emissions of commercial vehicle markets, through technologies including alternative and net zero carbon fuels, hybridization, battery and fuel cell electric systems, and supporting eco-systems. SPONSORED BY NAVISTAR Learn more about the Participants

Moderators - Vivek Sujan, Oak Ridge National Laboratory

Panelists - Alexander Freitag, Robert Bosch LLC; Ameya Joshi, Corning Inc.; Maarten Meijer, PACCAR Inc.; Hank Murphy, Walmart;

**Wednesday, September 20**

### Chassis Committee: Role of Driving Simulators in ADAS Development

Session Code CV203

Room Schaumburg EF Session 9:00 a.m.

Advanced Driver Assistance System (ADAS) features have been increasingly important in the safety and comfort of drivers, and are the foundational elements of autonomous driving capabilities. The sensing and interpretation of scenarios, and actuation of braking, steering or other collision avoidance actions are designed and developed using complex specifications and validation protocols.

As vehicle manufacturers look to reduce on-road prototype testing, the integration and testing of these systems is moving to a simulated environment, assisted by the use various types of driving simulators. This session will present the opportunities to utilize advanced driving simulators in the development of ADAS systems for commercial vehicles, the challenges of meeting industry expectations and the infrastructure necessary to achieve meaningful results. Learn more about the Participants

Moderators - Benjamin Duprey, IPG Automotive USA Inc.

Panelists - Daniel V. McGehee, Driving Safety Research Institute and National Advanced Driving Simulator, University of Iowa; Amrut A. Patki, Bendix Commercial Vehicle Systems LLC; Sam Poirier, Potential Motors Inc.;

**Wednesday, September 20**

### Adapting Braking and Steering for Medium and Heavy Duty EVs and AVs

Session Code CV500

Room Schaumburg EF Session 11:00 a.m.

The new frontier for innovation is here for electric and automated vehicles. Commercial vehicle manufacturers are adapting to new and changing technologies for braking in medium and heavy duty vehicles, EVs and AVs. The Brake and Advance Driver Assistance Systems Steering Committee has created two new task forces to address electro-mechanical braking and electronic steering performance requirements for medium and heavy duty vehicles, EVs and AVs. This panel of government, research and industry experts will present and discuss their research, findings, and insight regarding braking and steering technologies. The panel will explore approaches to managing commercial medium and heavy trucks, tractors and buses braking and steering systems when installed on EVs and AVs. Learn more about the Participants

Moderators - Dave Engelbert, Haldex

Panelists - Aaron Greenwood, NHTSA; Wolfgang Hahn, ZF CV Systems North America LLC; Thomas Hayes, Bendix Commercial Vehicle Systems LLC; Loren Stowe, VTTI;

# COMVEC™

## Technical Session Schedule

As of **September 25,** **19:40:09 PM**

**Wednesday, September 20**

### Electrical / Electronic System Standards for the New Frontier of Innovation

Session Code CV501

Room Schaumburg EF Session 1:30 p.m.

The new frontier of EVs and ADs is generating several new electrical / electronic systems on medium and heavy duty commercial vehicles. This session will present and discuss some of the areas where the Electrical / Electronic Steering Committee work is focus on developing new standards and overhauling existing standards to support the new frontier for innovation of electronic systems for medium and heavy commercial vehicles. Learn more about the Participants

Moderators - Dave Engelbert, Haldex

Panelists - Travis Breitreutz, Caterpillar; Timothy Daniel Dunn, Tectran Mfg Inc.; Daniel William Forthoffer, Phillips Ind.; James Pohl;

**Wednesday, September 20**

### Buckendale Breakfast & Lecture: Building a Sustainable Future Through New Perspectives, More Science, and Disruptive Surprises

Session Code CV905

Room Schaumburg East Session 7:30 a.m.

Annual Buckendale breakfast, followed by a lecture by Robert Wagner. Learn more about the Participants

Keynote Speakers Robert Wagner, Oak Ridge National Laboratory (ORNL)

**Wednesday, September 20**

### Digital & Software Innovation Executive Track: Connectivity

Session Code CV700

Room Schaumburg East Session 9:00 a.m.

Connectivity provides a major shift in the commercial vehicle sector for both on and off highway vehicles. It enables many critical services and provides fleet and business owners with immediate and continuous access to the health, location, and performance of their vehicles. As data, analytics, and machine learning continue to mature, companies will be able to avoid unplanned downtime and operate more efficiently, saving them time and money. This panel will discuss connected vehicle datasets for engineering, operators, and fleet managers and reflect on the questions: Is there such a thing as too much connected data? What are the key challenges in the connectivity in all segments? How should we think differently about onboard diagnostic and performance signals? Sponsored by VicOne Learn more about the Participants

Moderators - Gregg Garrett, CGS Advisors

Panelists - Bharat Addala, Daimler Truck North America LLC; Marcela Bernardi, Cummins Emission Solutions; Vincent Pesch, Navistar Inc.; Jonathan Spendlove, John Deere & Co.;

**Wednesday, September 20**

### Digital & Software Innovation Executive Track: Perpetually Upgradeable Machines

Session Code CV701

Room Schaumburg East Session 11:00 a.m.

Embedded software is starting to define much of the characteristics of today's truck and bus as well as off-road machines. Upgradeable apps are making their way onto our vehicles and machines thanks to connectivity and HMI systems. With cloud computing and next generation mobile processors, software will open new possibility that extends machine capabilities, implements embedded AI, and leverages digital twin running in the cloud alongside the machine, among others. As we prepare for this future, what are the first set of services that we can expect to come online? How should an engineering organization evolve its work force and their processes to deliver these services? What are the lessons that the commercial vehicle community can learn from the passenger vehicle industry? This panel session will bring together practitioners from commercial vehicle industries, academia, and government to discuss this future of perpetually upgradable machines. Sponsored by VicOne Learn more about the Participants

# COMVEC™

## Technical Session Schedule

As of **September 25,** **19:40:10 PM**

Moderators - Lisa Farrell, Cummins Inc.

Panelists - Anupam Gangopadhyay, Navistar Inc.; Dan Halliday, CNH Industrial; Ashwathanarayana Kikkeri, KPIT;

### Wednesday, September 20

#### Digital & Software Innovation Executive Track: Data

Session Code CV702

Room Schaumburg East Session 1:30 p.m.

With the first generation of data driven initiatives having been implemented, the industry is still grappling with what their ultimate strategy should look like. Questions that still need answers are around consolidation and ownership of the platform and the ability to share data across the ecosystem, without compromising on IP. Additionally, questions on who captures the value and what each player in the ecosystem should and shouldn't do. The panel also deliberates on implications of developments with new sensor technologies and AI in providing better prognostics and product quality improvement. Sponsored by VicOne Learn more about the Participants

Moderators - Satish Kumar, KPIT Technologies, Ltd.

Panelists - James G. Katter, Caterpillar Inc.; Melissa Neuendorf, John Deere; Andreas Wendel, Kodiak Robotics; Chris Whitney, Monarch Tractor;

### Wednesday, September 20

#### Innovation, Exploration, Disruption, and the Next Big Thing Executive Roundtable

Session Code CV901

Room Schaumburg East Session 3:30 p.m.

Leading companies often wrestle with evolving customer needs, rapid industry change, and an increasingly competitive landscape. Hear industry and innovation leaders talk about exciting trends around innovation and technology and what's on the top of their minds for using innovation to solve customer pain points and remain relevant in the commercial vehicle sector. SPONSORED BY KUBOTA Learn more about the Panelists

Moderators - Alan Berger, ABCG

Panelists - Jenny Elfsberg, Vinnova; Michele Kaiser, Deere & Company; Andre Marquis, Univ. of California-Berkeley; M. Brett McMickell, Kubota; Estella Woo, Robert Bosch LLC;

### Wednesday, September 20

#### Total Vehicle: Operational Opportunities and Gaps with Advanced/New Commercial Vehicle Technologies

Session Code CV402

Room Schaumburg GH Session 9:00 a.m.

Emerging and advanced commercial vehicle technologies, including electrification, hydrogen, automation, connectivity, safety and performance systems, present unique challenges and opportunities as these systems move into real-world operations. While significant work continues on all fronts from vehicle technology to infrastructure readiness, this panel will focus on the unique operational issues that emerge when advanced commercial vehicle technologies is introduced at scale. This future state will need to address ongoing vehicle operations while enhancing the safety records of commercial freight transport. Experts here will discuss the process of technology functions and limits, market opportunities, tractor-trailer inspections, failure mode management, supporting systems and procedures, and other concerns. Sponsored by Ricardo Learn more about the Participants

Moderators - Vivek Sujjan, Oak Ridge National Laboratory

Panelists - Arun Chickmenahalli, Ryder System Inc.; Veda Prakash N. Galigekere, Oak Ridge National Laboratory; Perry T. (P. T. ) Jones, Oak Ridge National Laboratory; Ann Rundle, ACT Research Co. LLC;

# COMVEC™

## Technical Session Schedule

As of September 25, 19:40:10 PM

Wednesday, September 20

### Aerodynamics & Thermal Management Panel

Session Code CV100

Room Schaumburg GH Session 11:00 a.m.

This session will cover latest advancements in the commercial vehicle aerodynamics applications. Topics will include latest Research initiatives such as DOE Supertruck II, Advanced Thermal Management applications covering ICE and hybrid powertrains, state-of-art studies related to Computational Fluid Dynamics (CFD) and Testing methods, and experimental and modeling advancements in battery cooling, splash and spray reduction and aerodynamics induced noise and vibration. Learn more about the Participants

Moderators - Rohit Saha, Cummins Inc.

Panelists - Julie Hawkins, US EPA; Jeff Smith, Peterbilt; Scott Temple, Kenworth Truck Co.;

Wednesday, September 20

### Powertrain Committee: Boosting Systems, Filtration, & Balance of Plant for HD Fuel Cells

Session Code CV305

Room Schaumburg GH Session 1:30 p.m.

Successful development of fuel cell system balance of plant (BOP) components specifically designed for heavy-duty vehicle drive cycles is critical if overall fuel cell system cost, durability, and performance goals are to be achieved. Air filtration and adsorption are required for inlet air contaminants to stay below the max allowable concentration for the fuel cell stack. NOx, SOx, NH3 and other pollutants exist in ambient concentrations sufficient to poison fuel cell stacks. Air filters featuring adsorptive and/or catalytic gas separation are necessary to remove potential cathode poisons. Air management components (e.g., compressors/expanders) are the major cost contributor to the fuel cell system, and the largest contributor to system BOP cost. Compressors specifically designed for heavy-duty fuel cell applications are needed to minimize parasitic power consumption while meeting packaging and cost requirements. Higher pressure operation at the cathode enables increased power density. Improvements to BOP component durability will increase the system reliability and decrease maintenance cost. Improvements to BOP component efficiency will decrease parasitic power required, thereby decreasing fuel use and reducing stack oversizing. SPONSORED BY NAVISTAR Learn more about the Participants

Moderators - Alexander Taylor, Bmts Technology US Corporation

Time	Paper No.	Title
1:30 p.m.	ORAL ONLY	Heavy-Duty On-Highway Fuel Cell Challenges  Tejas Kshatriya, KPIT Technologies, Ltd.
2:00 p.m.	ORAL ONLY	Air Filtration Systems, Including Adsorption and Catalysts, for Fuel Cells  Matt Zerilli, MANN+HUMMEL USA Inc.
2:30 p.m.	ORAL ONLY	Comparison of Efficient Boosting Technologies for Fuel Cell Applications  Nisar Al-Hasan, BMTS Technology



# COMVEC™

## Technical Session Schedule

As of **September 25,** **19:40:11 PM**

**Wednesday, September 20**

### Powertrain Committee: Lithium-ion Battery Failure Physics, Current Countermeasures and Opportunities for Improved Outcome in Heavy-duty Off-highway Applications

Session Code CV303

Room Schaumburg West Session 9:00 a.m.

This session will familiarize participants with the incidence level and physics of battery failure, and the hazards of cell venting gases, particulates, and ejecta. Attendees will also learn of methods of detecting cell venting as well as passive and active countermeasures and cell venting management in large format battery arrays. SPONSORED BY NAVISTAR Learn more about the Participants

Moderators - Brian Engle, Amphenol

Panelists - Adam Dendrinis, AVL North America Inc.; Helmut Kastler, Kreisel Electric; Anudeep Mallarapu, National Renewable Energy Laboratory; Matthew Paiss, Pacific Northwest National Labs;

**Wednesday, September 20**

### Powertrain Committee: IC Engine, Aftertreatment, Hybrids

Session Code CV304

Room Schaumburg West Session 11:00 a.m.

Future regulatory targets for the Conventional ICE Powertrain Systems present a great deal of challenges to achieve lower greenhouse gas (GHG) emissions concurrent with lower tailpipe (TP) NOx emissions. Both On-Hwy and Off-HWY Industry must play a pivotal role in resolving the challenges needed to establish ultra-low NOx, extended durability, and warrant requirements for the heavy-duty diesel applications. As CARB is pushing toward stringent 0.05/0.02g/hp-hr NOx emission standards by 2024/2027, advances in the diesel engine technologies to allow the low flow cycle emissions is needed along with updates in the Aftertreatment and Emission system technologies. This panel will review the advances in the future of Powertrain Systems from Engine, Sensors/Actuators, Aftertreatment, Diagnostic and Alternative fuels perspective to address the Ultra-Low NOx and durability concerns, OEM's investment strategy to meet stringent emission is key toward achieving the cleaner environment with sustainable energy resources. This discussion will address the following topics: Advances in the Powertrain System Integration approaches / Engine technologies, Key approaches and architectures configuration with Aftertreatment Systems, 2024/2027+Low load Cycle and Cold FTP Emission challenges, Challenges in meeting the On-Board Diagnostic Monitors, and the Role of the Alternative Fuels such as Hydrogen ICE et al. in achieving the Low NOx/GHG. SPONSORED BY NAVISTAR Learn more about the Participants

Moderators - Chris Bitsis, Southwest Research Institute

Panelists - Ameya Joshi, Corning Inc.; Michael Noonan, Navistar Inc.; Christopher Sharp, Southwest Research Institute; Timothy Shipp, Cummins Inc.;

**Wednesday, September 20**

### Powertrain Committee: The Future of Off-highway Powertrain and Vehicle Development

Session Code CV306

Room Schaumburg West Session 1:30 p.m.

As the automotive industry finds itself at a crossroads on powertrain and propulsion options to meet future emissions regulations, the demanding duty cycles of off-highway vehicles (agricultural, industrial, marine and rail) make it challenging to develop a silver bullet powertrain solution that provides sufficient power while staying within emissions limits. Powertrain and propulsion diversification is therefore critical to meet the future industry needs, which requires that the industry continue to improve conventional Diesel powertrain technology in parallel with development of alternative powertrain technologies such as fuel cells and batteries and alternative low-carbon and zero-carbon fueled engines such as natural gas, propane and hydrogen engines. In addition, the need for automation will influence what kind of powertrain and propulsion technology would seamlessly integrate with vehicle systems for optimal system performance. This session will feature a diverse panel of speakers focusing on various powertrain and vehicle technologies tailored to off-highway applications. Speakers will cover a wide range of topics including conventional Diesel engine development, alternative fueled engines, vehicle electrification and off-highway automation. SPONSORED BY NAVISTAR Learn more about the Panelists

Moderators - Thomas Howell, AVL Mobility Tech. Inc.

Panelists - Chad Allan Baker, National Renewable Energy Laboratory; Travis Davis, John Deere Intelligent Solutions; Dheeraj Gosala, German Aerospace Center DLR; Ron Hale, Cummins Inc.; Arshan Khan, CNH Industrial;

# COMVEC™

## Technical Session Schedule

As of **September 25, 19:40:11 PM**

**Thursday, September 21**

### Powertrain Committee: Graduate Student Powertrain Research

Session Code CV307

Room Schaumburg East Session 7:30 a.m.

The SAE COMVEC Powertrain Committee provides a unique opportunity for graduate students from leading universities in the U.S. to showcase their research to industry experts. The panelists present keynote style, concise and clear, summaries of their Master's and PhD research. Attendees, regardless of technical familiarity with the topics, will leave with an appreciation for the importance of the research, current achievements and future trends in powertrains for future commercial vehicles. This year's panelists will present on hybrid powertrains for last mile delivery vehicles, wireless vehicle charging, machine learning in engine controls and improving HD SI engines fuel consumption with water injection. SPONSORED BY NAVISTAR Learn more about the Participants

Organizers - Kevin Duffy, Caterpillar Inc.; Dheeraj Gosala; Kenneth J. Kelly, National Renewable Energy Laboratory; Russell Truemner, SYSTEMS RESEARCH ENGINEERING LLC

Moderators - Satvik Khuntia, PACCAR Technical Center

Panelists - King Longdon Ankobea-Ansah; Dheeraj Etta, Cornell Univ.; Siddharth Gopujkar, Michigan Technological University; Ankur Shiledar, Center For Automotive Research OSU;

**Thursday, September 21**

### Smart Engineering for Sustainability Executive Roundtable

Session Code CV902

Room Schaumburg East Session 9:00 a.m.

The achievement of a carbon-neutral economy requires more than just a focus on technologies for zero emissions from in-use products. It also requires a keen focus on the direct and indirect CO2 impacts associated with the overall product life cycle of the new technologies, including the product design, manufacturing and supply chain processes. Learn from executives of key commercial vehicle industry companies on how these areas are being addressed as part of their overall sustainability plans. SPONSORED BY CUMMINS Learn more about the Participants

Moderators - Mehdi Ahmadian, Virginia Tech.

Panelists - Rakesh Aneja, Daimler Trucks North America LLC; Timothy Frazier, Cummins Inc.; Don Hillebrand, Department of Energy; Rob Zemenchik, CNH Industrial;

**Thursday, September 21**

### Smart Engineering Executive Track: Materials/Corrosion Mitigation and Next Gen Motors

Session Code CV903

Room Schaumburg East Session 10:30 a.m.

A sustainable future is going to require engineering advancements across a multitude of engineering domains. Everything from materials to software will need to be considered and it will have to be approached with an eye on systems engineering to ensure that the vehicles and equipment of tomorrow will be sustainable. Learn from engineering leaders of key commercial vehicle and equipment industry companies on how these challenges are being addressed as part of their engineering innovation. Learn more about the Participants

Moderators - Jena Holtberg-Benge, AGCO

Panelists - Andrew Bodratti, Alkegen; Rebecca Ciez, Purdue Univ.; David A. Fulton, Borg Warner; Mary Kokosa, Allison Transmission Inc.;