WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:21 PM

Tuesday, April 16

High Efficiency IC Engines Concepts

Session Code PFL170

Room 140 A Session 1:30 p.m.

This session focuses on technologies that have to potential for improving the efficiency of internal combustion engines such as advanced combustion, cooled EGR boosting, ignition and direct injection technologies, pressure boosting, intelligent combustion, thermal management, fully variable valvetrains, alternative or modified engine cycles, Variable Compression Ratio, and other new and developing technologies. Papers focused on waste heat recovery are located in sessions HX102 or HX103.

Organizers - Giacomo Belgiorno, PUNCH Torino SpA; Luca Marchitto, STEMS-CNR; David Roth, Roth Engine Science LLC; Yu Zhang, Cummins

Time	Paper No.	Title
1:30 p.m.	2024-01-2089	The New Toyota 2.4L L4 Turbo Engine with 8AT and 1-Motor Hybrid Electric Powertrains for Midsize Pick-up Trucks Motoshiro Endo, Alistair Bridge, Akihiro Ikeda, Koichi Miyamoto, Terufumi Miyazaki, Fuminori Hosoda, Toyota Motor Corporation; Craig Herring, James J. Wallace, Mu Hu, Toyota Motor North America
2:00 p.m.	2024-01-2094	Next Generation High Efficiency Boosted Engine Concept Michael H. Shelby, Ford Motor Company; Mark E. Case, FEV North America, Inc.; Lynn A. Chesney, Ford Motor Company
2:30 p.m.	2024-01-2095	Development of the New V6 Twin-Turbocharged Engine for Flagship SUV Sho TAKAHASHI, Shuji KOJIMA, Yuya HAKAMADA, Takahiro YOSHIDA, Seiji KATSUMA, NISSAN AUTOMOTIVE TECHNOLOGY CO., LTD.
3:00 p.m.	2024-01-2087	Hydrogen Engine Testing with SuperTurbo Compared to Simulation Jared Brin, Thomas Waldron, SuperTurbo Technologies Inc.
3:30 p.m.	2024-01-2092	Evolution of Light-duty Gasoline Compression Ignition (LD-GCI) for High Efficiency and US Tier3- Bin30 Emissions Mark Sellnau, Christopher Whitney, Ashish Shah, Rafael Sari, William Klemm, David Cleary, Aramco Research Center
4:00 p.m.	2024-01-2093	Combustion Development and Efficiency Improvement for Hybrid Engines Zheng Xu, Jie Qiu, ZiQing Zhang, Chuanhui Cheng, YaJun Zhang, Yang Yang, Yingzhen Wang, Yuan Lu, Zhou Zhou, XiaoYang Li, SAIC Motor Corporation Limited
4:30 p.m.	ORAL ONLY	Further Assessment of Direct Injection of Supercritical Water into SI Engines as a Strategy for Heat Recovery and Emissions Reductions Roberto Ianniello, Carlo Beatrice, Gabriele Di Blasio, Maurizio Lazzaro, Michele Pipicelli, Consiglio Nazionale Delle Ricerche; Enzo Galloni, Davide Lanni, Universita di Cassino

Planned by General Powertrain Development / Energy and Propulsion Activity

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:22 PM

Tuesday, April 16

0-D and 1-D Modeling and Numerics - Part 1 of 2

Session Code PFL110

Room 140 B Session 9:30 a.m.

Separate sub-sessions cover zero-dimensional, one-dimensional, and quasi-dimensional models for simulation of SI and CI engines with respect to: engine breathing, boosting, and acoustics; SI combustion and emissions; CI combustion and emissions; fundamentals of engine thermodynamics; numerical modeling of gas dynamics; thermal management; mechanical and lubrication systems; system level models for controls; system level models for vehicle fuel economy and emissions predictions.

Organizers - Federico Millo, Politecnico di Torino; Angelo Onorati, Politecnico di Milano

Time	Paper No.	Title
9:30 a.m.	2024-01-2081	Numerical Study of an EGR Dilution in a Pre-Chamber Spark Ignited Engine Fuelled by Natural Gas Viktor Dilber, Josip Krajnovic, Sara Ugrini, Momir Sjeric, Rudolf Tomic, Darko Kozarac, University of Zagreb
10:00 a.m.	2024-01-2083	Development of a 0D/1D Model System for the Cycle-to-Cycle Variation of High Tumble Spark Ignition Engines Ye Feng, IFS, University of Stuttgart; Niklas Mirsch, TME, RWTH Aachen University; Daniel Ismail Mir, André Casal Kulzer, IFS, University of Stuttgart; Michael Grill, FKFS; Fabian Steeger, Michael Blomberg, Stefan Pischinger, TME, RWTH Aachen University
10:30 a.m.	ORAL ONLY	Simulation of Combustion and Emission Characteristics from a Methanol Spark-Ignition Direct-Injection Single Cylinder Engine with a 1D/0D model Stefania Esposito, University of Bath; Enrica Malfi, University of Naples; Dominik Golc, RWTH Aachen University; Vincenzo De Bellis, University of Naples; Joachim Beeckmann, Heinz Pitsch, RWTH Aachen University
11:00 a.m.	ORAL ONLY	Experimental and numerical study of a direct-injected hydrogen engine under lean and ultra-lean operations Marco Antonelli, University of Pisa; Fabio Berni, University of Modena and Reggio Emilia; Fabio Bozza, University di Napoli Federico II; Stefano Frigo, UNIVERSITA' DI PISA; Marco Piras, University di Napoli Federico II; Stefano Sfriso, Universita di Modena e Reggio Emilia; Luigi Teodosio, University di Napoli Federico II

Planned by General Powertrain Development / Energy and Propulsion Activity

Tuesday, April 16

0-D and 1-D Modeling and Numerics - Part 2 of 2

Session Code PFL110

Room 140 B Session 1:30 p.m.

Separate sub-sessions cover zero-dimensional, one-dimensional, and quasi-dimensional models for simulation of SI and CI engines with respect to: engine breathing, boosting, and acoustics; SI combustion and emissions; CI combustion and emissions; fundamentals of engine thermodynamics; numerical modeling of gas dynamics; thermal management; mechanical and lubrication systems; system level models for controls; system level models for vehicle fuel economy and emissions predictions.

Organizers - Federico Millo, Politecnico di Torino; Angelo Onorati, Politecnico di Milano

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Technical Session Schedule

As of March 13, 2024 19:40:22 PM

Time	Paper No.	Title
1:30 p.m.	2024-01-2086	A novel quasi-dimensional model for transient mixing prediction in two-phase multicomponent sprays under flash-boiling conditions Peter Weigand, Jonas Oswald, Mohd Farhan Bin Mohd Izahar, Georgios Bikas, Technische Hochschule Nuernberg
2:00 p.m.	2024-01-2084	A Three-Way Catalyst model for a bio-methane Heavy-Duty engine: characterization at different lambda Dario Di Maio, Chiara Guido, Pierpaolo Napolitano, Carlo Beatrice, CNR - STEMS
2:30 p.m.	2024-01-2085	Development and Validation of a Reduced Chemical Kinetic Mechanism of Dimethyl Carbonate and Ethylene Carbonate Kuiwen Zhang, Karthik Puduppakkam, Anthony Shelburn, ANSYS Inc.

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Tuesday, April 16

SI Ignition - Part 1 of 3

Session Code PFL215

Room 140 C Session 9:30 a.m.

This session focuses on the SI combustion ignition process and advanced ignition systems. Papers cover both 4-stroke and 2-stroke engines characterized by 1) ignition by an external energy source that serves to control combustion phasing, and 2) a combustion rate that is limited by flame propagation. This specific section focuses on conventional spark plug ignition systems.

Organizers - Xin Yu, Aramco Research Center; William Attard, Stellantis; Richard Davis, Michigan Technological Univ.; Simona Merola, CNR Stems; Siddharth Gopujkar, Michigan Technological University; Alessandro D'Adamo, Universita di Modena e Reggio Emilia

Chairperson - Richard Davis, Michigan Technological University; Xin Yu, Aramco Research Center; William Attard, Stellantis

Time	Paper No.	Title
9:30 a.m.	2024-01-2100	Effects of Spark Plug Operating Conditions on Electrode Erosion and Surface Deformation Corey Tambasco, Matthew Hall, Ron Matthews, University of Texas-Austin
10:00 a.m.	2024-01-2103	Simulation Study of Cathode Spot Formation on Spark Plug Electrodes Leading to Electrode Erosion Delong Li, Corey Tambasco, Matthew Hall, Ron Matthews, University of Texas-Austin
10:30 a.m.	2024-01-2106	Performance of Spark Current Boost System on a Production Engine under Lean-Burn Conditions Xiao Yu, Simon Leblanc, Linyan Wang, Ming Zheng, University of Windsor
11:00 a.m.	2024-01-2107	Simulation Study of Sparked-Spray Induced Combustion at Ultra-Lean Conditions in a GDI Engine Minglong Li, Tongji University; Quan Long, Shanghai Motor Vehicle Inspection Center; Wangchao Yu, Tongji University; Zongjie Hu, Tongji Universtiy; Yong Yin, Dongfeng Commercial Vehicle Co., Ltd.; Xiongjie Qin, Liguang Li, Tongji University

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:22 PM

Planned by Engine Combustion / Energy and Propulsion Activity

Tuesday, April 16

SI Ignition - Part 2 of 3

Session Code PFL215

Room 140 C Session 1:30 p.m.

This session focuses on the SI combustion ignition process and advanced ignition systems. Papers cover both 4-stroke and 2-stroke engines characterized by 1) ignition by an external energy source that serves to control combustion phasing, and 2) a combustion rate that is limited by flame propagation. This specific section focuses on prechamber ignition systems.

Organizers - Xin Yu, Aramco Research Center; William Attard, Stellantis; Richard Davis, Michigan Technological Univ.; Simona Merola, CNR Stems; Siddharth Gopujkar, Michigan Technological University; Alessandro D'Adamo, Universita di Modena e Reggio Emilia

Chairperson - Richard Davis, Michigan Technological University; Xin Yu, Aramco Research Center

Time	Paper No.	Title
1:30 p.m.	2024-01-2101	Optical Investigation of Lean Combustion Characteristics of Non-Uniform Distributed Orifice Passive Pre-Chamber on a High Compression Ratio GDI Engine Yuanzhi Tang, Diming Lou, Liang Fang, Tongji University; Benzheng Fan, Xijiang Wu, Zhiyu Wang, SAIC Motor Corporation Ltd.; Yunhua Zhang, Piqiang Tan, Zhiyuan Hu, Tongji University
2:00 p.m.	2024-01-2102	CFD Modeling of Conventional and Pre-Chamber Ignition of a High-Performance Naturally Aspirated Engine Alessandro Nodi, Lorenzo Sforza, Tommaso Lucchini, Angelo Onorati, Politecnico di Milano; Marco Buttitta, Luca Marmorini, Marmotors s.r.l.
2:30 p.m.	2024-01-2108	Combustion and HC&PN Emission Characteristics at First Cycle Starting of Gasoline Engine under Lean Burn Based on Active Pre-Chamber Xinke Miao, Renhe Liu, Zhiheng Zhang, Jun Deng, Liguang Li, Tongji University; Wei Hong, Ningbo Geely Royal Engine Components Ltd.
3:00 p.m.		BREAK
3:30 p.m.	ORAL ONLY	Turbulent Jet Ignition of Jet Fuel in a Rapid Compression Machine Grace Trombley, Elisa Toulson, Michigan State University; Tonghun Lee, University of Illinois; Kenneth Kim, Eric Mayhew, Chol-Bum Kweon, Army Research Laboratory
4:00 p.m.	ORAL ONLY	Ignition and Combustion Dynamics in an Optical Pre-chamber within an Optical Rapid Compression and Expansion Machine Akash Dhotre, Sayan Biswas, University Of Minnesota Twin Cities

Planned by Engine Combustion / Energy and Propulsion Activity

Tuesday, April 16

Fundamentals of H2 and Gaseous Fuel Combustion - Part 1 of 2

Session Code PFL271

Room 140 D Session 9:30 a.m.

This session focuses on fundamental modelling and experimental studies of H2, natural gas, and ammonia combustion in engines. Topics covered include direct and indirect fuel injection, ignition systems, combustion, and emissions.

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Technical Session Schedule

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Organizers - Ezio Mancaruso, STEMS - CNR; Gordon McTaggart-Cowan, Simon Fraser University; Ashish Shah, Aramco - Detroit Research Center; Haiwen Ge, Zhejiang Laboratory; James Turner, KAUST; Oivind Andersson, Lund University

Time	Paper No.	Title
9:30 a.m.	2024-01-2112	Numerical study on the design of a passive prechamber on a heavy-duty hydrogen combustion engine Ralph Maas, Eindhoven University of Technology; Cemil Bekdemir, TNO; Bart Somers, Eindhoven University of Technology
10:00 a.m.	2024-01-2115	Combustion Chamber Development for Flat Firedeck Heavy-Duty Natural Gas Engines Kevin Hoag, Christopher Wray, Timothy J. Callahan, Qilong Lu, Ian Gilbert, Zainal Abidin, Southwest Research Institute
10:30 a.m.	ORAL ONLY	CFD Modeling of Prechamber Enabled Mixing-Controlled Combustion (PC-MCC) and Spark Ignition Combustion Modes in Heavy-Duty Natural Gas Engines: Impact on Methane and NOx Emissions Osama Nsaif, Adam Dempsey, Marquette University
11:00 a.m.	ORAL ONLY	Extending the EGR dilution limits of a pre-chamber ignited, heavy-duty, natural-gas engine under stoichiometric conditions using a nanosecond pulse discharge plasma igniter – An optical study Akash Dhotre, University Of Minnesota Twin Cities; Rajavasanth Rajasegar, Sandia National Laboratories; Sayan Biswas, University Of Minnesota Twin Cities; Ales Srna, Sandia National Laboratories

Planned by Engine Combustion / Energy and Propulsion Activity

Tuesday, April 16

Fundamentals of H2 and Gaseous Fuel Combustion - Part 2 of 2

Session Code PFL271

Room 140 D Session 1:30 p.m.

This session focuses on fuel injection, combustion, controls, performance and emissions of SI engines fueled with gaseous fuels such as methane, natural gas (NG), biogas, producer gas, coke oven gas, hydrogen, or hydrogen-NG blends. Papers on Diesel-NG or diesel-hydrogen dual-fuel engines will also be accepted in this session.

Organizers - Ezio Mancaruso, STEMS - CNR; Gordon McTaggart-Cowan, Simon Fraser University; Ashish Shah, Aramco - Detroit Research Center; Haiwen Ge, Zhejiang Laboratory; James Turner, KAUST; Oivind Andersson, Lund University

Time	Paper No.	Title
1:30 p.m.	2024-01-2118	Numerical Simulation of Ammonia-Hydrogen Engine Using Low-Pressure Direct Injection (LP-DI) Xiaoting Xu, Wei Wang, Yunliang Qi, Zhi Wang, Tsinghua University; Haijiao Min, Fangwei Li, Yong Yin, Zhi Li, Dongfeng Commercial Vehicle Technical Center
2:00 p.m.	2024-01-2116	Comparison of the Predictive Capabilities of Chemical Kinetic Models for Hydrogen Combustion Applications Aleksandar Ribnishki, Cameron Charles, Stefania Esposito, Sam Akehurst, Hao Yuan, University of Bath

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Time	Paper No.	Title
2:30 p.m.	ORAL ONLY	Laminar Burning Velocities of Hydrogen/Air Mixtures Diluted with Actual Combustion Residuals for Clean Energy Production Ahmed Barain, Elisa Toulson, Michigan State University
3:00 p.m.		BREAK
3:30 p.m.	2024-01-2117	Effect of In-Cylinder Flow Motion on Fuel-Air Mixture Formation in a Medium-Duty DI-SI H2 Engine: An Experimentally Supported CFD Study João Mota Ferreira, Richard Oung, Fabrice Foucher, Université d'Orléans
4:00 p.m.	ORAL ONLY	Direct-Injection Hydrogen Combustion under Leaner Mixture Conditions in a Heavy-Duty Optical Engine Niraj Panthi, Priybrat Sharma, Andres Felipe Garzon Alzate, KAUST; Abdullah AlRamadan, Emre Cenker, Saudi Aramco; Gaetano Magnotti, KAUST
4:30 p.m.	ORAL ONLY	The influence of engine swirl on mixture homogeneity in a DI hydrogen-fueled, heavy-duty optical engine Taesong Lee, Rajavasanth Rajasegar, Ales Srna, Sandia National Laboratories

Planned by Engine Combustion / Energy and Propulsion Activity

Tuesday, April 16

Material Characterization, Modeling

Session Code M225

Room 140 E Session 9:30 a.m.

Organizers - Ke An, Oak Ridge National Laboratory; Hamid Jahed, University of Waterloo; Yi Liu, Qigui Wang, General Motors LLC; Xijia Wu, National Research Council Canada

Time	Paper No.	Title
9:30 a.m.	2024-01-2281	Data-Driven Battery Lifetime Model Calibration and Analysis for an Electric Vehicle Battery's Durability Performance Youngchul Lim, Hyundai & Kia Corporation; Zachary Edel, Ethan Marker, ThermoAnalytics Inc.; Sanghyeok Joung, Oh Hyun Kwon, Hyundai & Kia Corporation
10:00 a.m.	2024-01-2426	Sequence Training and Data Shuffling to Enhance the Accuracy of Recurrent Neural Network Based Battery Voltage Models Junran Chen, Phillip Kollmeyer, McMaster University; Satyam Panchal, Yasaman Masoudi, Oliver Gross, Stellantis NV; Ali Emadi, McMaster University
10:30 a.m.	2024-01-2427	Non-Destructive Parameterization of Lithium-Ion Batteries via Machine Learning with Simulated EIS Data Pasha Alidadi, Anton Emil Kaspar Schlösser, Technische Universität Berlin; Farhad Salek, Oxford Brookes University
11:00 a.m.	ORAL ONLY	A new micromechanics-based full-field numerical framework to simulate the effect of dynamic recrystallization of HCP metals.

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Time	Paper No.	Title
		Kaan Inal, University of Waterloo
11:30 a.m.	ORAL ONLY	Physics-based modeling and machine learning for battery optimization and management
		Wei Lu, University of Michigan

Tuesday, April 16

Driveline Controls

Session Code PFL640

Room 140 E Session 1:30 p.m.

This session features papers on electrified transmission and driveline system controls. This includes regenerative braking, algorithms design and controls, state estimation, mathematical modeling, and system integration controls.

Organizers - Gang Chen; Hussein Dourra, Magna Global IT Canada; Dongxu Li, Paul Otanez, General Motors LLC; Darrell Robinette, Michigan Technological University; Zhe Xie, Stellantis NV

Time	Paper No.	Title
1:30 p.m.	2024-01-2139	A Linear Quadratic Integral Approach to the Profiling of Engine Speed for Synchronization
		Cristian Rostiti, Nadirsh Patel, Ameya Basutkar, FCA US LLC; Abdulquadri Banuso, FCA Canada Inc
2:00 p.m.	ORAL ONLY	Development of hierarchical model predictive control based on future driving environment of the electrified vehicle
		MINSEOK SONG, Hyundai motor company
2:30 p.m.	2024-01-2141	Powertrain Control via Model Predictive Rollout Scheme
		Jannik Arend, Mohamed Ayeb, Sergej Veller, Universitaet Kassel
3:00 p.m.		BREAK
3:30 p.m.	2024-01-2142	Proactive Battery Energy Management using Navigation Information
		Cristian Rostiti, FCA US LLC
4:00 p.m.	2024-01-2143	Optimum Shifting of Hybrid and Battery Electric Powertrain Systems with Motors Before and After a Transmission
		Zachary Tuller, Nadirsh Patel, McKenzie Walsh, FCA US LLC
4:30 p.m.	2024-01-2144	Active Damping Control & Architecture within a Hybrid Supervisor Control Structure
		Nadirsh Patel, Cristian Rostiti, McKenzie Walsh, FCA US LLC

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Planned by Electrified and Conventional Transmission and Driveline Com / Energy and Propulsion

Tuesday, April 16

Driveline Modeling

Session Code PFL680

Room 140 F Session 9:30 a.m.

This session features papers focusing on electrified transmission and driveline modeling, including topics related to hardware, software, and system integration.

Organizers - Pradeep Attibele, Stellantis; Dongxu Li, General Motors LLC; Darrell Robinette, Michigan Technological University

Time	Paper No.	Title
9:30 a.m.	2024-01-2148	Implementing Ordinary Differential Equation Solvers in Rust Programming Language for Modeling Vehicle Powertrain Systems Robin Steuteville, Chad Baker, National Renewable Energy Laboratory
10:00 a.m.	2024-01-2149	Impact of Driving Cycles on the Range Performance of Battery Electric Vehicle Amol Shivaji Jagtap, Tata Motors
10:30 a.m.	2024-01-2151	Frequency Response Method for Setting Bearing Preload: Analytical Model for Multi-Row Tapered Roller Bearings David Gruzwalski, James Mynderse, Lawrence Technological University
11:00 a.m.	2024-01-2152	A numerical Methodology for Induction Motor Control: Lookup Tables Generation and Steady-State Performance Analysis Elia Grano, Politecnico di Torino; Tomas Lazek, Brno University of Technology; Massimiliana Carello, Politecnico di Torino

Planned by Electrified and Conventional Transmission and Driveline Com / Energy and Propulsion

Tuesday, April 16

Driveline Components / Subsystems

Session Code PFL670

Room 140 F Session 1:30 p.m.

This session features papers on the full array of transmission and driveline related components

Organizers - Joel Gunderson, Chunhao Lee, General Motors LLC; Thomas Wellmann, FEV

Time	Paper No.	Title
1:30 p.m.	2024-01-2439	A 3-D CFD Investigation of Ball Bearing Weir Geometries and Design Considerations for Lubrication Chinmoy K. Mohapatra, Simerics Inc.; Jeff Schlautman, General Motors LLC; Ashutosh Pandey, Chengjie Wang, Chiranth Srinivasan, Simerics Inc.

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Time	Paper No.	Title
2:00 p.m.	2024-01-2440	Optimized Tapered Roller Bearing Power Loss Equals Deep Groove Ball Bearings in Real-World Electric Vehicle Intermediate Shaft Tests John W. Feltman, Timken World Headquarters
2:30 p.m.	2024-01-2437	Multiphase Flow in Roller/Ball Bearings Ashutosh Pandey, Simerics Inc.; Mingyuan Tao, Isuzu Technical Center of America Inc.; Bo Yang, Yuchuan Liu, Ran Wu, Anand Shandilya, General Motors LLC; Chengjie Wang, Simerics Inc.
3:00 p.m.	2024-01-2441	Improve the Durability and Maintenance Feasibility of the Universal Joint Based on the Original Half-Shaft Foundation Hengyu Zhang, Li He, Miaoqi Xiao, Wuhan University of Technology

Planned by Electrified and Conventional Transmission and Driveline Com / Energy and Propulsion

Tuesday, April 16

Advanced Fuel Cell Vehicle Applications - Part 1 of 3

Session Code PFL720

Room 140 G Session 9:30 a.m.

This session covers advancements in PEM fuel cell applications in vehicles including, but not limited to: advanced materials for cell or stack components, balance of plant (BOP) components, stack or system design, control strategies, modeling, testing, diagnostics and lifetime monitoring, hydrogen safety, durability, economics/cost reduction, and system integration/optimization. These topics can be addressed at the cell, stack, system or vehicle levels. A special focus on durability of stack and BOP components is also planned and topics covering accelerated tests and operating strategies to improve durability are encouraged.

Organizers - Ashok Kumar, Cummins Inc.; Santhosh Gundlapally, Gamma Technologies LLC; Simona Silvia Merola, CNR Stems; Matthew G. Kubesh, Southwest Research Institute; Rafael Sari, Aramco Research Center; Kalyan Bagga, AMKAL Consulting LLC; Saeed Siavoshani, Eaton

Time	Paper No.	Title
9:30 a.m.	2024-01-2186	Application of a CFD Methodology for the Design of PEM Fuel Cell at the Channel Scale Margherita Bulgarini, Augusto Della Torre, Gianluca Montenegro, Andrea Baricci, Amedeo Grimaldi, Riccardo Mereu, Luca Marocco, Politecnico di Milano; Aldo Collaku, Laura Savoldi, Politecnico di Torino
10:00 a.m.	2024-01-2180	The Effects of Cathode Channel Side Blockage on Enhanced Performance of a Proton Exchange Membrane Fuel Cell Yang Zheng, Wuhan University of Technology
10:30 a.m.	ORAL ONLY	Highly Durable Hydrogen Fuel Cell for Automotives: Flow Field Design and Power Distribution Analysis Hangil Ko, Hyundai Motor Company
11:00 a.m.	2024-01-2181	Influence of Microstructure on CFD Simulation of Water Removal in a PEM FC Channel Christian Antetomaso, Simona Silvia Merola, Adrian Irimescu, Bianca Maria Vaglieco, CNR Stems; Elio Jannelli, University of Parthenope - Italy

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Time	Paper No.	Title
11:30 a.m.	2024-01-2183	Performance Evaluation of an Eco-Driving Controller for Fuel Cell Electric Trucks in Real-World Driving Conditions Matteo Spano, Politecnico di Torino; Ankur Shiledar, Center for Automotive Research; Shobhit Gupta, General Motors LLC; Manfredi Villani, Center for Automotive Research; Daniela Misul, Politecnico di Torino; Marcello Canova, Giorgio Rizzoni, Center for Automotive Research

Planned by Hybrid and Electric Propulsions Committee / Energy and Propulsion Activity

Tuesday, April 16

Advanced Fuel Cell Vehicle Applications - Part 2 of 3

Session Code PFL720

Room 140 G Session 1:30 p.m.

This session covers advancements in PEM fuel cell applications in vehicles including, but not limited to: advanced materials for cell or stack components, balance of plant (BOP) components, stack or system design, control strategies, modeling, testing, diagnostics and lifetime monitoring, hydrogen safety, durability, economics/cost reduction, and system integration/optimization. These topics can be addressed at the cell, stack, system or vehicle levels. A special focus on durability of stack and BOP components is also planned and topics covering accelerated tests and operating strategies to improve durability are encouraged.

Organizers - Ashok Kumar, Cummins Inc.; Santhosh Gundlapally, Gamma Technologies LLC; Simona Silvia Merola, CNR Stems; Matthew G. Kubesh, Southwest Research Institute; Rafael Sari, Aramco Research Center; Kalyan Bagga, AMKAL Consulting LLC; Saeed Siavoshani, Eaton

Time	Paper No.	Title
1:30 p.m.	ORAL ONLY	Simulation-Based Optimization of Fuel Cell and Battery Sizing for Fuel Cell Electric Vehicles Romain Nicolas, Siemens Digital Industries Software
2:00 p.m.	2024-01-2178	Optimization of BEV and FCEV Storage Design Based on Automated Packaging and Vehicle Simulation Andreas Viehmann, Niklas Nauck, Arved Esser, Michael Schramm, EDAG Engineering GmbH
2:30 p.m.	2024-01-2188	Fuel Cell Hybrid Electric Vehicle: Validated Fuel Cell and Battery Pack Model to Enhance Reliability in Performance Predictions Lorenzo Bartolucci, Edoardo Cennamo, Stefano Cordiner, Marco Donnini, Federico Grattarola, Vincenzo Mulone, Tor Vergata University of Rome
3:00 p.m.		BREAK
3:30 p.m.	2024-01-2187	Fuel Cell Hybrid Electric Vehicle: An Integrated Approach for Sub-Optimal Controller in Real-Time Application Lorenzo Bartolucci, Edoardo Cennamo, Stefano Cordiner, Marco Donnini, Federico Grattarola, Vincenzo Mulone, Tor Vergata University of Rome
4:00 p.m.	2024-01-2176	Investigating Route Gradient and Thermal Demand on Hydrogen Fuel Cell Electric Bus Energy Consumption Conor O'Boyle, Luke Aubrey William Blades, Teresa McGrath, Juliana Early, Queen's University Belfast; Andrew Harris, Wrightbus
4:30 p.m.	ORAL ONLY	Development of an Energy Management System to Maximize Fuel Cell Operating Life

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Time	Paper No.	Title
		Afanasie Vinogradov, Federico Millo, Luciano Rolando, Luca Pulvirenti, Politecnico di Torino

Planned by Hybrid and Electric Propulsions Committee / Energy and Propulsion Activity

Tuesday, April 16

Transmission Systems/ Drive Unit

Session Code PFL610

Room 141 Session 9:30 a.m.

This session features papers on the automotive transmissions of different types. It includes development of new transmission concepts, transmission enhancements and the advancement of the state of the art of transmission system design & integration with the objective of improving the transmission efficiency, NVH, durability and shift pleaseability.

Organizers - Pradeep Attibele, Stellantis; Hong Jiang, Ford Motor Company; Berthold Martin, FCA US LLC; Azadeh Narimissa, General Motors LLC; Darrell Robinette, Michigan Technological University

Time	Paper No.	Title
9:30 a.m.	2024-01-2636	Design of a Dual-Motor Powertrain with Magnetorheological Planetary Transmission for Electric Vehicles
		Lei Deng, Jin Zhao, University of Wollongong; Donghong Ning, Ocean University of China; Pak Wong, Jing Zhao, University of Macau; Weihua Li, University of Wollongong
10:00 a.m.	2024-01-2638	Innovating Mobility: The Design of an Efficient EV Multi-Speed Transmission
		Sandeep Saini, Keith Rodrigues, Vitesco Technologies USA LLC; John Jennings, Dustin Finn, Amsted Automotive
10:30 a.m.	2024-01-2637	A 3-D Computational Fluid Dynamics Modeling of the Churning Loss and Oil Pattern in a Single-Stage Gearbox
		Yawei Chen, Chinmoy K. Mohapatra, Haiyang Gao, Simerics Inc.
11:00 a.m.	2024-01-2635	A 3-D CFD Study of the Lubricating Oil Flow Path in a Hybrid Vehicle Transmission System
		Chinmoy K. Mohapatra, Simerics, Inc.; Jeff Schlautman, Zhe Liu, General Motors LLC; Gowtham Raj, Haiyang Gao, Simerics, Inc.

Planned by Electrified and Conventional Transmission and Driveline Com / Energy and Propulsion

Tuesday, April 16

AWD/4WD/Driveline Components

Session Code PFL620

Room 141 Session 11:30 a.m.

This session will present papers on innovative designs, analysis and models of conventional and electric driveline components. This includes AWD / 4WD units, drive shafts, axles, front & rear drive modules, electric drive units and axle disconnect systems.

Organizers - John Collins, Mark Levine, FCA US LLC; Darrell Robinette, Michigan Technological University; Bangalore Lingaraj Yashwanth, American Axle & Manufacturing

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:24 PM

Time	Paper No.	Title
11:30 a.m.	2024-01-2886	Automotive Intermediate Shaft Design & Bearing Selection for Switched Reluctance Motors George Maher Alfi Fares, Adam Gleeson, Lucas Rajotte, McMaster Automotive Resource Centre (MARC)
3:00 p.m.		BREAK

Planned by Electrified and Conventional Transmission and Driveline Com / Energy and Propulsion

Tuesday, April 16

Panel Discussion: Hydrogen Fuel Utilisation, Challenges and Opportunities

Session Code PFL399

Room 141 Session 1:30 p.m.

As we transition to a low carbon future, several routes are available. This talk focuses on a green, zero carbon fuel, hydrogen. Currently, there is limited at scale deployment with hydrogen as a mobility fuel. This panel aims to provide a range of expert insights into the future utilisation of hydrogen, both opportunities and challenges, encompassing fuel cell vehicles FCV, hydrogen internal combustion engines H2ICE and fuel distribution.

Learn more about the Panel Participants

Organizers - Richard Butcher, BP Castrol; Timothy Newcomb, Lubrizol Corp.; Derek Splitter, Oak Ridge National Laboratory

Moderators - Richard Butcher, BP Castrol; Timothy Newcomb, Lubrizol Corp.; Derek Splitter, Oak Ridge National Laboratory

Panelists - Richard Pearson, BP Co. PLC; Joseph Spakowski, Phinia North America; Vivek Sujan, Oak Ridge National Laboratory; Robert Wimmer, Toyota Motor Corp.;

Planned by Fuels and Lubricants / Energy and Propulsion Activity

Tuesday, April 16

Panel Discussion: Low Carbon Liquid Fuels and Decarbonizing Transportation: Opportunities and Challenges

Session Code PFL398

Room 141 Session 3:30 p.m.

Substantial decarbonization of the on-road transportation sector cannot occur without a significant contribution from Internal Combustion Engine Vehicles (ICEV). Low carbon liquid fuels provide the ability to reduce carbon emissions from the legacy fleet and future ICEVs with little or no change to existing fuel infrastructure. These fuels exist today, can be produced globally and are currently being demonstrated on U.S. roads. Additionally, they complement current vehicle electrification efforts by further lowering the carbon footprint of hybrid and plug-in hybrid vehicles. The challenge is bringing the fuels to market quickly, at scale and at a competitive price.

Learn more about the Panel Participants

Organizers - Robert Wimmer, Toyota Motor Corp.

Moderators - John Eichberger, Transportation Energy Institute

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:25 PM

Planned by Fuels and Lubricants / Energy and Propulsion Activity

Tuesday, April 16

Advanced Battery Technologies - Part 1 of 4

Session Code PFL730

Room 142 A Session 9:30 a.m.

This session provides a forum for both theory-oriented and application-oriented manuscripts that address state-of-art battery technologies at the cell, array, pack or vehicle levels. Typical domains encompass, but not limited to the battery component, chemistries, modeling, simulations, testing, diagnosis, prognosis, safety, reliability, durability, battery economics/cost reduction, battery charging, battery thermal management, battery management systems and controls and system integration/optimization.

Organizers - Anita Chaudhari, Ford Motor Company; Matilde D'Arpino, Ohio State University; Yi Ding, TARDEC; Santhosh Gundlapally, Gamma Technologies LLC; Xianke Lin, Ontario Tech. University; Yasaman Masoudi, Stellantis; James Miller, Argonne National Laboratory; Francesco Porpora; Prashanth Ramesh, The Ohio State University; Gene Saltzberg; Saeed Siavoshani, Eaton; Di Zhu, Ford Motor Company

Time	Paper No.	Title
9:30 a.m.	2024-01-2192	Revealing the Impact of Mechanical Pressure on Lithium-Ion Pouch Cell Formation and the Evolution of Pressure During the Formation Process Wentao Xu, Jiangong Zhu, Jie Zhang, Yiqun Jin, Xiuwu Wang, Xuezhe Wei, Haifeng Dai, Tongji University
10:00 a.m.	2024-01-2194	Parameterization of an Electrochemical Battery Model Using Impedance Spectroscopy in a Wide Range of Frequency Chao Chen, Johann Wurzenberger, AVL LIST GmbH
10:30 a.m.	2024-01-2196	Stress Generation in Large Pouch Cells Under Cycling and Abuse Conditions Andre Swarts, Swapnil Suryakant Salvi, Travis Holmgreen, Southwest Research Institute
11:00 a.m.	2024-01-2197	C-STAR™ Protection Miao Yu, Jun Hu, Feng Zhu, Sobhan T. Nazari, Sajan Elengikal, John Makrygiannis, Jimmy Zhang, Yu-Wei Wang, Cleveland-Cliffs Inc.; Dawn Stubleski, Isaac Luther, TWB Company
11:30 a.m.	2024-01-2199	Modeling of Vent Gas Composition during Battery Thermal Runaway Deivanayagam Hariharan, Santhosh Gundlapally, Gamma Technologies LLC

Planned by Hybrid and Electric Propulsions Committee / Energy and Propulsion Activity

Tuesday, April 16

Military Ground Vehicles

Session Code MIL400

Room 142 A Session 1:30 p.m.

This session serves as a forum to address the unique challenges, current gaps, and emerging technologies related to the design, development, and manufacturing of military ground vehicles. Specific topics include the use of digital engineering tools and methodologies, propulsion and mobility analyses, and autonomous vehicle technology.

Organizers - David Gorsich, Vamshi Korivi, Michael Tess, US Army GVSC

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:25 PM

Time	Paper No.	Title
1:30 p.m.	2024-01-2659	Terrain Streaming for Real-Time Vehicle Dynamics Mark Brudnak, US Army DEVCOM GVSC
2:00 p.m.	2024-01-2662	Optimal Use Cases for Electric and Hybrid Tactical Vehicles Bridget Konopa, Mark Miller, Luke Revnew, John Muraco, Logan Mayfield, Maxwell Rutledge, Matthew Crocker, Vikram Mittal, United States Military Academy
2:30 p.m.	2024-01-2661	VISION: Vehicle Infrared Signature Aware Off-Road Navigation Yashodeep Lonari, Jeffrey Naber, Michigan Technological University; Vamshi Korivi, US Army; Nathan Tison, US Army CCDC GVSC; Peter Rynes, ThermoAnalytics Inc.; Ruan Yeefeng, US Army CCDC GVSC
3:00 p.m.		BREAK
3:30 p.m.	2024-01-2660	Effects of Framing on Tradespace Exploration Decision-Making for Vehicle Design Meredith Sutton, Cameron Turner, Clemson University; Gregory Hartman, US Army GVSC; David Gorsich, US Army Futures Command; Annette Skowronska, US Army GVSC
4:00 p.m.	2024-01-2658	Analysis of Geo-Location Data to Understand Power and Energy Requirements for Main Battle Tanks Mihir Patel, United States Army; Vikram Mittal, United States Military Academy
4:30 p.m.	ORAL ONLY	Improved Efficiency with Additively Manufactured RF Microwave Waveguides for Military & Defense Radar Applications Laila Salman, Ansys Canada, Ltd.

Tuesday, April 16

Advanced Hybrid and Electric Vehicle Powertrains - Part 1 of 5

Session Code PFL710

Room 142 B Session 9:30 a.m.

This session covers new production and near-production electric & hybrid propulsion architectures, testing, analysis and new concepts.

Organizers - Norman Bucknor, General Motors LLC; Michael Duoba, US Dept. of Energy; Vivek Kumar, Ford Motor Company; Darryl S. Taylor, Dana; Di Zhu, Ford Motor Company; Saeed Siavoshani, Eaton

Time	Paper No.	Title
9:30 a.m.	ORAL ONLY	Eliminating the High Voltage Pre-Charge with existing hardware in BEV Patrick Kowalyk, Vicor Corporation

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:25 PM

Time	Paper No.	Title
10:00 a.m.	~~2024-01-2173~~	Functional Safety for Electric Vehicle Switching and Protection Technology
	ORAL ONLY	
		Kevin A. Calzada, Gregory J. Stout, Eaton
10:30 a.m.	ORAL ONLY	The Uncertain Future of Aftermarket Loads in A 48V World
		David McChesney, Vicor Corporation
11:00 a.m.	2024-01-2165	Cool System, Lasting Power - an Outstanding E-Powertrain Meets MX Dirt Track
		Thomas Arnold, Matthias Krause, Jan Böhme, Mirko Leesch, IAV GmbH; David Palazzolo, Holger Gentgen, IAV Automotive Engineering Inc.
11:30 a.m.	2024-01-2168	V2X Communication Protocols for Discharging an EV: A Review
		Apoorva Roy, Jason Siegel, University of Michigan; Piyush Bhagdikar, Stanislav Gankov, Sandesh Rao, Southwest Research Institute

Planned by Hybrid and Electric Propulsions Committee / Energy and Propulsion Activity

Tuesday, April 16

Advanced Hybrid and Electric Vehicle Powertrains - Part 2 of 5

Session Code PFL710

Room 142 B Session 1:30 p.m.

This session covers new production and near-production electric & hybrid propulsion architectures, testing, analysis and new concepts.

Organizers - Norman Bucknor, General Motors LLC; Michael Duoba, US Dept. of Energy; Vivek Kumar, Ford Motor Company; Darryl S. Taylor, Dana; Di Zhu, Ford Motor Company; Saeed Siavoshani, Eaton

Time	Paper No.	Title
1:30 p.m.	2024-01-2153	Simple Hybrid Electric Vehicle Operating and Fuel Consumption Model
		Patrick Phlips, Ford Motor Company - Retired
2:00 p.m.	2024-01-2169	Development of the new 2.0L Plug-in Hybrid System for PRIUS
		Makoto Tomita, Ryosuke Shibata, Yota Mizuno, Hideki Maeda, Kenji Murasato, Amane Shimura, Toshiaki Takayama, Takashi Nakado, Toyota Motor Corporation; Yoshiki Tomita, DENSO CORPORATION
2:30 p.m.	2024-01-2157	Consideration of belt losses of a Belt-Starter Generator(BSG)/front-end accessory drive electric machine in an optimal torque control problem of a Hybrid Supervisory Controller
		Stefan Senft, FEV; Nadirsh Patel, FCA US LLC

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:25 PM

Time	Paper No.	Title
3:00 p.m.		BREAK
3:30 p.m.	2024-01-2155	On the Need for Revisions of Utility Factor Curves for Plug-In Hybrids in the US Karim Hamza, Kenneth Laberteaux, Toyota Motor North America
4:00 p.m.	2024-01-2170	A Study on Overcoming Unavailable Backward Driving and a New Fail-Safe Strategy for R-Gearless (P)HEV System Jeongwon Rho, Chilseong Park, Taejin Kim, Yonghyun Kim, Eui Sun Hong, Daero Park, Hyundai Motor Company
4:30 p.m.	2024-01-2161	Decarbonizing Light Vehicles with Hydrous Ethanol: Performance Analysis of a Range-Extended PHEV Using Experimental and Simulation Techniques Fábio Jairo Dias, Pedro Lacava, Instituto Tecnologico de Aeronautica; Pedro Curto, Universidad de la República; Alexander Penaranda, CAAR Pesquisa e Engenharia; Santiago Martinez, Universidad de la República; Frederico Weissinger, AVL South America; Andre Martelli, CAAR Pesquisa e Engenharia; Leila Santos, Instituto Tecnológico de Aeronáutica

Planned by Hybrid and Electric Propulsions Committee / Energy and Propulsion Activity

Tuesday, April 16

Electric Motor & Power Electronics - Part 1 of 4

Session Code PFL740

Room 142 C Session 9:30 a.m.

Power electronics and electric motors are essential for improving vehicle efficiency through drivetrain electrification. Technologies that support high efficiency, high power density, and low cost motors and power modules are required for the success of vehicle electrification. (For Chargers and Charging Electronics Architecture/Design see AE600)

Organizers - Yilun Luo; Darrell Robinette, Michigan Technological University; Saeed Siavoshani, Eaton; Darryl S. Taylor, Dana; Di Zhu, Ford Motor Company

Time	Paper No.	Title
9:30 a.m.	2024-01-2239	Magnetically Oriented Core Lamination Manufactured from Non-Oriented Electrical Steel Sheets Youliang He, Damir Sebesta, Maciej Podlesny, Natural Resources Canada
10:00 a.m.	2024-01-2203	Analytical Model for Evaluating Unbalanced Electromagnetic Forces in Switched Reluctance Hub Motors under Air-Gap Eccentricity Zhaoxue Deng, Tianji Ma, Chongqing Jiaotong University
10:30 a.m.	2024-01-2204	Optimal PWM Schemes in Would Rotor Synchronous Machines and IPM Synchronous Machines for Maximum System Efficiency: A Comparative Study Cong Ma, Joseph Tyckowski, BorgWarner Inc.

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:25 PM

Time	Paper No.	Title
11:00 a.m.	2024-01-2205	Electric motor noise reduction with stator mounted NVH insert ring
		Song He, Xuan Tran, Gregory Naismith, Isaac Du, General Motors LLC; Pavan Kumar Patruni, Dhanasekar Baladhandapani, Tata Consultancy Services
11:30 a.m.	2024-01-2206	Development of New Motor for Electric Vehicles
		Ken Jozaki, Ryosuke Shibata, Hiroshi Hoshina, Toyota Motor Corporation

Planned by Hybrid and Electric Propulsions Committee / Energy and Propulsion Activity

Tuesday, April 16

Electric Motor & Power Electronics - Part 2 of 4

Session Code PFL740

Room 142 C Session 1:30 p.m.

Power electronics and electric motors are essential for improving vehicle efficiency through drivetrain electrification. Technologies that support high efficiency, high power density, and low cost motors and power modules are required for the success of vehicle electrification. (For Chargers and Charging Electronics Architecture/Design see AE600)

Organizers - Yilun Luo; Darrell Robinette, Michigan Technological University; Saeed Siavoshani, Eaton; Darryl S. Taylor, Dana; Di Zhu, Ford Motor Company

Time	Paper No.	Title
1:30 p.m.	2024-01-2209	Traction Drives Electronic Torque Sensor
		Viktor Smolin, South Ural State University; Sergey Gladyshev, University of Michigan-Dearborn; Valentina Goon, South Ural State University
2:00 p.m.	2024-01-2211	Development of Robust Traction Power Inverter Residing in Integrated Power Electronics for Ultium Electric Vehicles
		Arash Nassiri Bavili, Korobi Basher, Sung Chung, Khorshed Alam, General Motors LLC; Jung-Gi Lee, Hong Goo Choi, Jin-young Ko, LGM; Mohammad Anwar, General Motors LLC
2:30 p.m.	2024-01-2210	Differential Flatness-Based Control of Switched Reluctance Motors
		Yasaman Niazi, McMaster Automotive Research Centre (MARC); Azadeh Gholaminejad, Diego Fernando Valencia Garcia, McMaster University; Sumedh Dhale, McMaster Automotive Research Centre (MARC); Babak Nahid-Mobarakeh, McMaster University
3:00 p.m.		BREAK
3:30 p.m.	2024-01-2212	An Adaptive Flux-weakening Strategy Considering High-speed Operation of Dual Three-phase PM Machine for Electric Vehicles
		Xudong Wang, Fengyang Sun, Wesam Taha, Subarni Pradhan, Babak Nahid-Mobarakeh, Ali Emadi, McMaster University; Mustafa Mohamadian, Diego Fernando Valencia Garcia, Stellantis NV
4:00 p.m.	2024-01-2207	Research on Insulation Resistance Monitoring and Electrical Performance Evaluation into Permanent Magnet Synchronous Motor Considering Humidity and Heat Factors

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:25 PM

Time	Paper No.	Title
		Wei Zhang, Zizhen Qiu, Zhiguo Kong, Xin Huang, Fang Wang, CATARC New Energy Vehicle Test Center
4:30 p.m.	2024-01-2208	3D CFD Modeling of an Electric Motor to Predict Spin Losses at Different Temperatures
		Abhishek Ballani, Simerics Inc.; Jeff Schlautman, General Motors LLC; Chiranth Srinivasan, Rayhan Ahmed, Simerics Inc.

Planned by Hybrid and Electric Propulsions Committee / Energy and Propulsion Activity

Tuesday, April 16

Software Defined Vehicle - Part 1 of 2

Session Code AE800

Room 250 A Session 9:30 a.m.

The session seeks to define what Is a Software-Defined Vehicle and how it is being applied by OEMs and Tier Suppliers. We are seeking manuscripts and presentations that address Software-Defined Vehicle in the application of any vehicle that manages its operations, adds functionality, and enables new features primarily or entirely through software. Additional discussion being sought include how Software-Defined Vehicles are the next evolution of the automotive industry.

Organizers - Sumit Bhargava, Mahle Aftermarket Inc.; Mahendra Muli, Amazon Web Services; S.M. Nayeem Hasan, General Motor GM; Yu Liu, Toyota NA; Mark Miller, General Motors LLC; Mark Miller, General Motors

Chairperson - S.M. Nayeem Hasan, General Motor GM; Sumit Bhargava, Mahle Aftermarket Inc

Time	Paper No.	Title
9:30 a.m.	2024-01-2035	Vehicle E/E Architecture and Key Technologies Enabling Software-Defined Vehicle
		Shugang Jiang, JOYNEXT
10:00 a.m.	ORAL ONLY	Corporate Knowledge Reliance for Software-Defined Vehicles
		Murtada Hamzawy, Block Harbor Cybersecurity
10:30 a.m.	ORAL ONLY	Enabling software-defined vehicles through scalable centralized computer platforms
		Guilherme Marshall, Johannes Bauer, ARM
11:00 a.m.	ORAL ONLY	UI/UX Development for the Software-Defined Vehicle
		Patrick John Shelly, Qt Group

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:26 PM

Tuesday, April 16

Software Defined Vehicle - Part 2 of 2

Session Code AE800

Room 250 A Session 1:30 p.m.

The session seeks to define what Is a Software-Defined Vehicle and how it is being applied by OEMs and Tier Suppliers. We are seeking manuscripts and presentations that address Software-Defined Vehicle in the application of any vehicle that manages its operations, adds functionality, and enables new features primarily or entirely through software. Additional discussion being sought include how Software-Defined Vehicles are the next evolution of the automotive industry.

Organizers - Sumit Bhargava, Mahle Aftermarket Inc.; Mahendra Muli, Amazon Web Services; S.M. Nayeem Hasan, General Motor GM; Yu Liu, Toyota NA; Mark Miller, General Motors LLC; Mark Miller, General Motors

Chairperson - Mahendra Muli, Amazon Web Services; Mark Miller, General Motors LLC

Time	Paper No.	Title
1:30 p.m.	ORAL ONLY	Securing a Software-Defined Future Sara Walker, VicOne Inc.
2:30 p.m.	2024-01-2392	Multicast Transmission in DDS Based on the Client-Server Discovery Model Binqi Li, Yuan Zhu, Ke Lu, Xu Zhong, Tongji University; Zhipeng Sun, Nanchang Automotive Institute
3:00 p.m.	2024-01-2391	Digital Cockpit in the Era of the Software-Defined Vehicle Kyle Taylor, Hyundai America Technical Center

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Tuesday, April 16

Automotive Embedded Software and Systems: Hardware and Software - Part 2 of 2

Session Code AE200

Room 250 A Session 3:30 p.m.

This session is seeking submissions focusing on Design Optimization Techniques in Electronics, Model-Based Controls and Software Development, Verification and Validation of Embedded Software, Electronics Design – Processes, Optimization Techniques, Hardware Design, Systems Integration, Software / System Testing and Validation, Hardware Design Engineering and Development and Engine & Transmission Control. Abstracts featuring case studies, practical applications and Research and development project are requested.

Organizers - Sumanth Reddy Dadam, Ford Motor Company; Mahendra Muli, dSPACE Inc.; Prakash Peranandam, Scott Rush, General Motors LLC; Ramesh S, GM R&D Center; Kevin Sittner, Mitsubishi Motors R&D of America Inc.; Chirag Sonchal, John Deere India Pvt, Ltd.; Mark Steffka, University of Detroit Mercy

Time	Paper No.	Title
3:30 p.m.	2024-01-2051	Energy-Efficient and Context-Aware Computing in Software-Defined Vehicles for Advanced Driver Assistance Systems (ADAS) Aadi Kothari, Timothy Talty, Scott Huxtable, Haibo Zeng, Virginia Tech

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:26 PM

Time	Paper No.	Title
4:00 p.m.	ORAL ONLY	The Benefits of Virtualization for Automotive Deeply-Embedded Systems Pierre-Antoine Bernard, OpenSynergy GmbH
4:30 p.m.	ORAL ONLY	Navigating ASPICE SUP.9 Challenges for enhanced automotive product quality Benedict Nortey, Invensity Inc.

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Tuesday, April 16

ADAS and Autonomous Vehicle System: ADAS/AVS - Perception - Part 1 of 2

Session Code AE102

Room 250 B Session 9:30 a.m.

This session will focus on presentations from the session authors on the latest research on object detection and tracking methodologies for ADAS and AVS. The areas include detection of static (curbs, lanes, potholes) and dynamic objects in complex real-life scenarios and in difficult weather conditions, using camera, radar and LiDAR sensors. Advanced sensor fusion and Simultaneous Localization and Mapping (SLAM) techniques will also be discussed in this context.

Organizers - Jace Allen, dSPACE Inc.; Zachary Asher, Western Michigan Univ.; Yixin Chen, Stellantis; Amit Choudhury, Robert Bosch; Nick Goberville, Argonne National Laboratory; Libin Jia, Ford Motor Co., Ltd.; Hossam Almasri, GM; Venkateswara Raju Mudunuri, General Motors

Time	Paper No.	Title
9:30 a.m.	2024-01-2038	Advanced Driver Assistance System (ADAS) Performance Variability with Partial Overlap Targets Sean Scally, Marc Paradiso, Giacomo Koszegi, Casey Easter, Michelle Kuykendal, Exponent Inc.; Ross Alexander

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Technical Session Schedule

As of March 13, 2024 19:40:26 PM

Time	Paper No.	Title
10:00 a.m.	2024-01-2039	Assessing Resilience in Lane Detection Methods: Infrastructure-Based Sensors and Traditional Approaches for Autonomous Vehicles the updated abstract. Traditional autonomous vehicle perception subsystems that use on-board sensors have the drawbacks of high computational load and data duplication. An alternative that may alleviate this issue is the idea of infrastructure-based sensors that can provide high-quality information without the computational burden and data duplication. However, these technologies are still in the early stages of development and have not been extensively evaluated for lane detection system performance. Therefore, there is a lack of quantitative data on their performance relative to traditional perception methods, especially during hazardous scenarios, such as lane line occlusion, sensor failure, and environmental obstructions. We address this need by evaluating the influence of hazards on the resilience of three different lane detection methods in simulation: (1) traditional camera detection using a U-Net algorithm, (2) radar detections using infrastructure-based radar retro-reflectors (RRs), and (3) direct communication of lane line information using chip-enabled raised pavement markers (CERPMs). The performance of each of these methods is assessed using resilience engineering metrics by simulating the individual methods for each sensor technology's response to related hazards in the CARLA simulator. Using simulation techniques to replicate these methods and hazards acquires extensive datasets without lengthy time investments. Specifically, the resilience triangle was used to quantitatively measure the resilience of the lane detection system which provides unique insights into each of the three lane detection methods such as the infrastructure-based CERPMs and RRs had high resistance to hazards and were not as easily affected as the vision-based U-Net. But while U-Net was able to recover the quickest from the disruption as compared to the other two methods, it also had the most performance loss. Overall this study shows while infrastructure-based lane keeping technologies are still in early development they have high potential as alternatives to traditional ones. Pritesh Patil, Western Michigan University; Johan Fanas Rojas, Revision Autonomy; Parth Kadav, Sachin Sharma, Alexandra Masterson, Western Michigan University; Ross Wang, Ali Ekti, Liao DaHan, Oak Ridge National Laboratory; Nicolas Brown, Zachary Asher, Western Michigan University
10:30 a.m.	2024-01-2040	C-V2X LiDAR-Based Non-Line of Sight Object Detection and Localization for Valet Parking Applications Hamzeh Alzu'bi, FEV North America Inc.; Qusay Alrousan, David Obando, Pedro Rodriguez Zarazua, Tom Tasky, FEV North America Inc
11:00 a.m.	2024-01-2041	Road Information Fusion Perception Strategy Based on Adaptive Sampling of Trajectory and Drivable Area Kai Wei, Liangyao Yu, Feng xu, Tsinghua University

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:26 PM

Tuesday, April 16

ADAS and Autonomous Vehicle System: ADAS/AVS - Perception - Part 2 of 2

Session Code AE102

Room 250 B Session 1:30 p.m.

This session will focus on presentations from the session authors on the latest research on object detection and tracking methodologies for ADAS and AVS. The areas include detection of static (curbs, lanes, potholes) and dynamic objects in complex real-life scenarios and in difficult weather conditions, using camera, radar and LiDAR sensors. Advanced sensor fusion and Simultaneous Localization and Mapping (SLAM) techniques will also be discussed in this context.

Organizers - Jace Allen, dSPACE Inc.; Zachary Asher, Western Michigan Univ.; Yixin Chen, Stellantis; Amit Choudhury, Robert Bosch; Nick Goberville, Argonne National Laboratory; Libin Jia, Ford Motor Co., Ltd.; Hossam Almasri, GM; Venkateswara Raju Mudunuri, General Motors

Time	Paper No.	Title
1:30 p.m.	2024-01-2043	Sensor Fused Low Light Pedestrian Detection System with Transfer Learning Bharath kumar Thota, Karthik Somashekar, Jungme Park, Kettering University
2:00 p.m.	2024-01-2044	Engineering Requirements that Address Real World Hazards from Using High-Definition Maps, GNSS, and Weather Sensor Alexandra Masterson, Pritesh Patil, Nicolas Brown, Zachary Asher, Western Michigan University; Johan Fanas Rojas, Revision Autonomy; Amanda Siems-Anderson, Curtis Walker, National Center for Atmospheric Research; Aaron Rabinowitz, University of California
2:30 p.m.	2024-01-2042	Real World Use Case Evaluation of Radar Retro-reflectors for Autonomous Vehicle Lane Detection Application Nicolas Eric Brown, Pritesh Patil, Sachin Sharma, Parth Kadav, Western Michigan University; Johan Fanas Rojas, Revision Autonomy; Guan Yue Hong, Western Michigan University; Liao DaHan, Ali Ekti, Ross Wang, Oak Ridge National Laboratory; Rick Meyer, Zachary Asher, Western Michigan University

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Tuesday, April 16

Automotive Embedded Software and Systems: Hardware and Software - Part 1 of 2

Session Code AE200

Room 250 C Session 9:30 a.m.

This session is seeking submissions focusing on Design Optimization Techniques in Electronics, Model-Based Controls and Software Development, Verification and Validation of Embedded Software, Electronics Design – Processes, Optimization Techniques, Hardware Design, Systems Integration, Software / System Testing and Validation, Hardware Design Engineering and Development and Engine & Transmission Control. Abstracts featuring case studies, practical applications and Research and development project are requested.

Organizers - Sumanth Reddy Dadam, Ford Motor Company; Mahendra Muli, dSPACE Inc.; Prakash Peranandam, Scott Rush, General Motors LLC; Ramesh S, GM R&D Center; Kevin Sittner, Mitsubishi Motors R&D of America Inc.; Chirag Sonchal, John Deere India Pvt, Ltd.; Mark Steffka, University of Detroit Mercy

Time	Paper No.	Title
9:30 a.m.	2024-01-2047	Vehicle Control Development - Converting a Medium-Duty Commercial Truck into a Battery Electric Vehicle

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As of March 13, 2024 19:40:26 PM

Time	Paper No.	Title
		Xiaobing Liu, Chengyun Guo, Neeraj Rama, Frans Theunissen, Pete Olin, Gang Ling, Yang Pan, Sara Mohon, Keith Van Maanen, Wei Chen, BorgWarner Inc.
10:00 a.m.	2024-01-2048	A Structured Approach to the Development of a Logical Architecture for the Automotive Industry Garima Bhatia, Joseph Wirthlin, Qingmei Wu, Ford Motor Company
10:30 a.m.	2024-01-2049	Effective Application of Model-Based Software Engineering Technology to Automotive Embedded Software Max Kolesnikov, MKS Technology LLC
11:00 a.m.	2024-01-2050	Bridging the Design Gap: Next-Level Automation in Automotive Design with the IncQuery AUTOSAR-UML Bridge Géza Kulcsár, István Ráth, Balázs Grill, Ákos Horváth, IncQuery

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Tuesday, April 16

ADAS and Autonomous Vehicle System: Simulation and Testing - Part 1 of 4

Session Code AE106

Room 250 C Session 1:30 p.m.

This session focuses on simulation and testing methodologies for ADAS and automated driving systems. Development and testing these systems often relies on simulation and advance testing methodologies due to the complex operating environment

Organizers - Jace Allen, dSPACE Inc.; Yixin Chen, Stellantis; Amit Choudhury, Robert Bosch; Joseph D'Ambrosio, General Motors LLC; Benjamin Hager, dSPACE Inc.; Bin Li, Hyundai Mobis North America; Ramesh S, GM R&D Center; Mukund Chandrasekaran, General Motors; Peng Hang, Tongji University; Mukund Chandrasekaran, General Motors LLC

Time	Paper No.	Title
1:30 p.m.	2024-01-1978	The Effectiveness of Forward Collision Warning Systems in Detecting Real-World Passenger and Nonpassenger Vehicles Relative to a Surrogate Vehicle Target David Kidd, Insurance Institute for Highway Safety; Benoit Anctil, Dominique Charlebois, Transport Canada
2:00 p.m.	2024-01-1973	Test Vector Development for Verification and Validation of Heavy-Duty Autonomous Vehicle Operations Adam Siekmann, Brandon Miller, Vivek Sujan, Amy Moore, Oak Ridge National Laboratory
2:30 p.m.	2024-01-1975	Evaluating Vehicle Response Through Non-Traditional Pedestrian Automatic Emergency Braking Scenarios Meredith Bartholomew, Nicholas Helber, Gary Heydinger, Scott Zagorski, SEA Ltd
3:00 p.m.		BREAK

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:26 PM

Time	Paper No.	Title
3:30 p.m.	2024-01-1976	Closed Track Testing To Assess Prototype Level-3 Autonomous Vehicle Readiness for Public Road Deployment Lokamanya Rampilla, Cody Freistuhler, Sayali Karanjkar, Timothy Seitz, Transportation Research Center Inc; Punit Tulpule, Transportation Research Center Inc.
4:00 p.m.	2024-01-1966	A Systematic Approach for Creation of SOTIF's Unknown Unsafe Scenarios: An Optimization based Method Tajinder Singh, Edwin van Hassel, Akshay Sheorey, Mohsen Alirezaei, Siemens Digital Industries Software

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Tuesday, April 16

AI and Machine Learning - Part 1 of 4

Session Code AE500

Room 251 A Session 9:30 a.m.

This session focuses on real-world and theoretical methods and advanced algorithms in AI, machine learning and related technologies for both inside and outside the Vehicle. Abstracts are being sought on the state of the art in AI and identifying potential applications of AI-bases technologies in vehicle design, control systems, human/machine interface and automated operation, as well as smart mobility and infrastructure of the future.

Organizers - Arun Adiththan, Prakash Peranandam, General Motors LLC; Ramesh S, Ramesh S, GM R&D Center; Alok Warey, Ibrahim Haskara, General Motors LLC

Time	Paper No.	Title
9:30 a.m.	2024-01-2014	Insides to Trustworthy AI-Based Embedded Systems Romana Blazevic, Graz University of Technology; Omar Veledar; Georg Macher, Graz University of Technology
10:00 a.m.	2024-01-2015	A New U-Net Speech Enhancement Framework Based on Correlation Characteristics of Speech Lijun Zhang, Kaikun Pei, Wenbo Li, Dejian Meng, Yinzhi He, Tongji University
10:30 a.m.	2024-01-2020	Validation and Analysis of Driving Safety Assessment Metrics in Real-world Car-Following Scenarios with Aerial Videos Duo Lu, Sam Haines, Rider University; Varun Chandra Jammula, Prabin Kumar Rath, Hongbin Yu, Yezhou Yang, Arizona State University; Jeffrey Wishart, Science Foundation of Arizona
11:00 a.m.	2024-01-2021	A Target-Speech-Feature-Aware Module for U-Net Based Speech Enhancement Kaikun Pei, Lijun Zhang, Dejian Meng, Yinzhi He, Tongji University
11:30 a.m.	2024-01-2023	Ethics in the Driver's Seat: Unravelling the Ethical Dilemmas of AI in Autonomous Driving Ankit Wani, Deepa Kumari, Jyotsana Singh, FEV India Pvt, Ltd.

WCX SAE World Congress Experience

Technical Session Schedule

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Time	Paper No.	Title
3:00 p.m.		BREAK

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Tuesday, April 16

AI and Machine Learning - Part 2 of 4

Session Code AE500

Room 251 A Session 1:30 p.m.

This session focuses on real-world and theoretical methods and advanced algorithms in AI, machine learning and related technologies for both inside and outside the Vehicle. Abstracts are being sought on the state of the art in AI and identifying potential applications of AI-bases technologies in vehicle design, control systems, human/machine interface and automated operation, as well as smart mobility and infrastructure of the future.

Organizers - Arun Adiththan, Prakash Peranandam, General Motors LLC; Ramesh S, Ramesh S, GM R&D Center; Alok Warey, Ibrahim Haskara, General Motors LLC

Time	Paper No.	Title
1:30 p.m.	ORAL ONLY	A Study on the prediction of aerodynamic drag coefficient and server integration methodology with deep learning KyongRyol Yoon, Hyundai & Kia Corp.
2:00 p.m.	2024-01-2016	Predicting Vehicle Engine Performance: Assessment of Machine Learning Techniques and Data Imputation Juan Camilo Giraldo Delgado, Nursulu Kuzhagaliyeva, Inna Gorbatenko, KAUST; Mani Sarathy, King Abdullah University Science and Technology
2:30 p.m.	2024-01-2024	Temperature Accurate Prediction Method of Electric Drive Transmission Considering Spatio-Temporal Correlation Characteristics under High Speed and Heavy Load Working Conditions Peng Tang, Zhiguo Zhao, Haodi Li, Jianyu Yang, Tongji University
3:00 p.m.	2024-01-2013	Design Method for Integrating Trained Neural Nets with UML Masatoshi Arai, Marelli
3:30 p.m.	2024-01-2022	Data Driven Vehicle Dynamics System Identification Using Gaussian Processes Sumedh Sathe, Chinmay Samak, Tanmay Samak, Ajinkya Joglekar, Shyam Ranganathan, Venkat N Krovi, Clemson University

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:27 PM

Tuesday, April 16

Foundations of Automobile Electronics: Cybersecurity - Part 1 of 4

Session Code AE302

Room 251 B Session 9:30 a.m.

This session focuses on cybersecurity for cyber-physical vehicle systems. Topics include: ISO/SAE 21434 & UNECE WP.29 compliance; Gateway security requirements; DoIP vulnerability analysis using ML; Future of Mobility based on decade of securing vehicles; Art of engagement in auto cyber.

Organizers - John Krzeszewski, Eaton; Mert D. Pese, Clemson University; Mark Pope, Mark Monohon, DG Technologies; Christopher Lupini, ETAS; Vivek Venkatachalam, CNHi; Charles Wilson, Motional Inc

Chairperson - John Krzeszewski, Eaton

Time	Paper No.	Title
9:30 a.m.	ORAL ONLY	There and Back Again – Building a Cybersecurity Development Lifecycle from Scratch to Comply with ISO/SAE 21434 and UN R155/6 Charles Wilson, Motional Inc.
10:00 a.m.	2024-01-2806	Security Requirements for Vehicle Security Gateways Ben Gardiner, National Motor Freight Traffic Association Inc.; John Maag, Cummins; Ken Tindell, Canis Automotive Labs
10:30 a.m.	2024-01-2807	Vulnerability analysis of DoIP implementation based on model learning Feng Luo, Jiajia Wang, Zhihao Li, Tongji University; Xiaoxian Zhang, iSOFT Infrastructure Software Co., Ltd.
11:00 a.m.	ORAL ONLY	The Future of Mobility Only Exists if it's Cybersecure -- Insights from a Decade of Securing Vehicles Brandon Barry, Block Harbor Cybersecurity
11:30 a.m.	ORAL ONLY	The Subtle Art of Engagement in Automotive Cybersecurity Murtada Hamzawy, Block Harbor Cybersecurity

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Tuesday, April 16

Foundations of Automobile Electronics: Cybersecurity- Part 2 of 4

Session Code AE302

Room 251 B Session 1:30 p.m.

This session focuses on cybersecurity for cyber-physical vehicle systems. Topics include: Fuzzing CAN vs. Robot Operating System; Comparing open-source UDS implementations through fuzz testing; Vehicle cyber engineering (VCE) test bed with cybersecurity labs as a service (CLaaS); Building a Bluetooth lab for security testing and education; Applying concolic testing to the automotive domain; Zero trust architecture for automotive networks.

Organizers - John Krzeszewski, Eaton; Christopher Lupini, ETAS; Mark Monohon, DG Technologies; Mert D. Pese, Clemson University; Mark Pope, DG Technologies; Vivek Venkatachalam, CNHi; Charles Wilson, Motional Inc

Chairperson - John Krzeszewski, Eaton

WCX SAE World Congress Experience

Technical Session Schedule

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Time	Paper No.	Title
1:30 p.m.	2024-01-2795	Fuzzing CAN vs. ROS: An Analysis of Single-Component vs. Dual-Component Fuzzing of Automotive Systems Iwinosa Winifred Aideyan, Richard Brooks, Mert D. Pese, Clemson University
2:00 p.m.	2024-01-2799	Comparing Open-Source UDS Implementations Through Fuzz Testing Levent Çelik, Clemson University; John McShane, Eastern Michigan University; Christian Scott, Iwinosa Aideyan, Richard Brooks, Mert D. Pese, Clemson University
2:30 p.m.	2024-01-2796	Vehicle Cyber Engineering (VCE) Test Bed with Cyber Security Labs as a Service (CLaaS) Mark Zachos, DG Technologies; Pratik Satam, University Of Arizona; Rami Naama, DG Technologies
3:00 p.m.		BREAK
3:30 p.m.	ORAL ONLY	Building a better Bluetooth Lab for Security Testing and Education Mohammad Ghali, Car Hacking Village
4:00 p.m.	2024-01-2802	Applying Concolic Testing to the Automotive Domain Nico Vinzenz, Continental Engineering Services; Dennis Kengo Oka, Synopsys
4:30 p.m.	2024-01-2793	A Zero Trust Architecture for Automotive Networks Maggie E. Shipman, Nathan Millwater, Kyle Owens, Seth Smith, Southwest Research Institute

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Tuesday, April 16

Panel Discussion: Sustainable Interiors-Circularity and New Approaches to Textiles in the Auto Industry

Session Code SDP103

Room 251 C Session 9:30 a.m.

Among the many transformations occurring in the automotive industry is the shift in materials used in today’s vehicles. Plant-based composites are replacing leather and companies are finding new ways of integrating re-use into their designs. This panel of experts at the forefront of textiles will bring the most important innovations in materials and practices to the fore through spirited discussion.

Organizers - Frank Menchaca, SAE International

Moderators - Frank Menchaca, SAE International

WCX SAE World Congress Experience

Technical Session Schedule

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Tuesday, April 16

Panel Discussion: Virtual Validation Progress in the Interior Space

Session Code M311

Room 251 C Session 1:30 p.m.

This panel will discuss current trends and challenges in virtual validation for automotive interiors applications. Coverage will include emerging CAE tools, materials testing methods and data, and correlation studies, to support improved virtual validation of automotive safety, durability and comfort testing.

Learn more about the Panel Participants

Organizers - Henry Hojnacki, Woodbridge; John Berndtson, General Motors LLC; Santosh Kumar Sarang, Dupont; Ravi Thyagarajan, Texas A&M Univ.

Moderators - Stephen Pitrof, INTEVA PRODUCTS LLC

Panelists - Jameson Fee, Celanese; Rejeesh Rajan, Altair Engineering; Michael Domine, Yanfeng Automotive Interiors; Scott Grace, General Motors; Katherine Sebeck, CCDC Ground Vehicle Systems Center; Joe Formicola, GoEngineer;

Tuesday, April 16

Instrument Panels, Seats, and Interiors for EV, AV and ICE-V

Session Code M301

Room 251 C Session 3:30 p.m.

This session will feature technical presentations that will discuss new technology and industry insights in automotive interiors. Focus areas include materials, perceived quality, environmental concerns, manufacturing, safety, and durability.

Organizers - John Berndtson, General Motors LLC; stephen Pitrof, INTEVA PRODUCTS LLC; Santosh Kumar Sarang, DuPont Electronics and Industrial; Ravi Thyagarajan, Texas A&M Univ.; Henry Hojnacki, Woodbridge

Time	Paper No.	Title
3:30 p.m.	ORAL ONLY	Unique Silicone-Organic Synthetic Leather First to Combine Genuine Leather Qualities with Advanced Sustainability Todd Starke, Dow Chemical
4:00 p.m.	2024-01-2394	A Study on Optimizing Headlining Open-Structure for Face-to-Face Roof-Airbag Deployment Jiseob Park, Hyundai & Kia Corp.
4:30 p.m.	2024-01-2507	Unique curved based seat design for better ride comfort Manas Bhatnagar, Nishant Jain, Jyotiranjan Biswal, Ajay Sharma, VE Commercial Vehicles Ltd.

Planned by Polymers and Coatings Committee / Materials Engineering Activity

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:27 PM

Tuesday, April 16

ADAS and Autonomous Vehicle System: Fundamentals, and Driver Interface

Session Code AE101

Room 252 A Session 9:30 a.m.

This session addresses technical research related to ADAS and AVS driver interface/human factor, and cross-functional features such as architecture, performance evaluation and new technologies that are not covered by other AD or ADAS sessions.

Organizers - Yixin Chen, Stellantis; Amit Choudhury, Robert Bosch; Joseph D'Ambrosio, General Motors LLC; Sumanth Reddy Dadam, Ford Motor Company; Bin Li, Hyundai Mobis North America; Danyang Tian, Honda Research Institute USA Inc.; Chen Lv, Nanyang Technological University

Time	Paper No.	Title
9:30 a.m.	2024-01-2055	Approaches for Developing and Evaluating Emerging Partial Driving Automation System HMIs Yi G. Glaser, Raymond Kiefer, Daniel Glaser, Steven Landry, Susan Owen, General Motors LLC; Robert Llaneras, Virginia Polytechnic Institute and State University; David LeBlanc, Andrew Leslie, Carol Flannagan, University of Michigan
10:00 a.m.	ORAL ONLY	The history, current applications, and the future of Neuroscience and related technology in Autonomous driving Arlene Fang, MedTechX; Bin Li, Hyundai Mobis North America
10:30 a.m.	2024-01-2057	Expanding the Use of Vehicle Specific Power in Analysis of Platoon Performance John Bentley, Evan Stegner, David M. Bevly, Mark Hoffman, Auburn University

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Tuesday, April 16

Electrification: Chargers and Charging Electronics Architecture/Design - Part 1 of 2

Session Code AE600

Room 252 A Session 1:30 p.m.

As the industry has moved to Electrified Vehicles, the need for chargers and Charging Stations have increased in quantities almost exponentially. We are seeking papers and / or oral presentations that explore all the issues of charging, charging controls, Energy / Power Management, charger to vehicle communicate, charging architecture and charging components. Some of the Topics that could be included are: Vehicle to Grid, Conductive and Wireless Vehicle Charging, Vehicle Charging Standards, (example SAE J1772, SAE J2954J, ISO 15118), New/innovative solutions for the existing HV Vehicle Charging Level 1, Level 2 and DC Fast Charging (Level 3).

Organizers - Theodore Bohn, Argonne National Lab.; Ersin Ersoy; Gene Saltzberg, UD Mercy; Vincent Socci, National Instruments; Di Zhu, Ford Motor Company; Zhouquan Wu, Eaton

Time	Paper No.	Title
1:30 p.m.	2024-01-2028	Creation of the SAE J3400 North American Charging System Standard from Existing Specification to Technical Information Reference Document ASAP Theodore Bohn, Argonne National Laboratory

WCX SAE World Congress Experience

Technical Session Schedule

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Time	Paper No.	Title
2:00 p.m.	2024-01-2029	Analysis of Leakage Magnetic Field and Reducing Method in Bi-Directional Wireless Charging System of Electric Vehicle Seokhyeon Son, Seunghyun Han, Changhan Jun, Dongil Shin, Semin Woo, Myungjoon Park, Junho Park, Juhyun Shin, Daehyun Kwon, Hyundai Motor Group
2:30 p.m.	ORAL ONLY	Developing a standardized test procedure for vehicle charging rates Matthew Hortop, AVL Test Systems Inc.
3:00 p.m.	ORAL ONLY	EV Charger Availability Dashboard Prototype Jennifer Dingell, Booz Allen Hamilton
3:30 p.m.	2024-01-2027	Validation and Comparison of Alignment Methodologies for the SAE Wireless Power Transfer, J2954 Standard Jesse Schneider, ZEV Station; Ky Sealy, WiTricity Corporation; Mike Boettigheimer, Timo Laemmle, MAHLE Powertrain GmbH; Ivo Teerlinck, Toyota Motor Europe NV/SA; Maximilian Hollenbach, ifak eV; Bastian Rappholz, Siemens AG; Andreas Wendt, Electreon Wireless, Ltd.; Simon Joos, MAHLE Powertrain GmbH
4:00 p.m.	2024-01-2030	Vehicle to Load (V2L) scalable architecture with on-board Smart Power Panel technology Domenico Tavella, Joseph Tolkacz, Archana Kasture, Ashish Sarkar, Stellantis NV

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Tuesday, April 16

Panel Discussion: AI for Future Mobility: Opportunities, Challenges and the Road Ahead

Session Code AE113

Room 252 B Session 9:30 a.m.

Artificial Intelligence (AI) has become a game changer for future vehicles and mobility, challenging conventional methods and unlocking new possibilities. However, realizing the full benefits of AI-powered mobility still faces many fundamental challenges. This panel will discuss some of such challenges and the potential ways ahead. More specifically, we will cover the emerging “AI layer” for future vehicles and mobility applications, distributed learning for building future AI models for vehicles, quantity and quality of data needed for developing AI models, as well as validation and management of AI-based vehicle systems.

<a href="https://www.sae.org/servlets/techSession?REQUEST_TYPE=AUTHOR_BIO&saetkn=ERPTop4gdC&PROD_CD=24AE-0365
&PRESENTATION_TITLE=Learn+more+about+the+Panel+Participants&SCHED_NUM=" type="Reference">Learn more about the Panel Participants

Organizers - Jan-Mou Li, MWCOG; Wei Tong, GM R&D Center

Moderators - Tao Zhang, NIST

Panelists - Douglas BROOKS, Southwest Research Institute; Hoseinali Borhan, Cummins Inc.; Divya Garikapati, Woven By Toyota; Arpan Kusari, UMTRI; Chaitanya Shinde, GM Cruise LLC; Wei Tong, GM R&D Center;

WCX SAE World Congress Experience

Technical Session Schedule

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Tuesday, April 16

Systems Engineering for Automotive - Part 1 of 2

Session Code SS111

Room 252 B Session 1:30 p.m.

A Systems Engineering approach recognizes today's vehicle functionality emerges from interactions between sensors, communications, embedded software and physical components. This session seeks manuscripts and presentations on integrated design practices and Systems Engineering application across all facets of automotive including electronics, propulsion, body/chassis systems and safety systems required to navigate vehicle complexity and growing innovation while ensuring functional safety.

Organizers - Anne O'Neil, AOC Systems Consortium; Aleczander Jackson, Enola Technologies; Gary Rushton, General Motors LLC

Time	Paper No.	Title
1:30 p.m.	2024-01-2501	Scenario-Based Development and Meta-Level Design for Automotive Systems: An Explanatory Study Julian Knödler, Philip Muhl, Porsche AG; Eric Sax, Karlsruher Institute of Technology (KIT); Lutz Eckstein, RWTH Aachen University
2:00 p.m.	2024-01-2500	Front Zone Control Unit for Propulsion and Chassis Domains in a Zonal E/E Architecture – System Engineering approach to Architecture design Domenico Tavella, Ali Muhialdin, Enrico Garante, Alessandro Peciarolo, Stellantis NV
2:30 p.m.	2024-01-2499	An MBSE Methodology for Cross-Domain Vehicle Performance Development Organizers - Eric Krueger, General Motors LLC Ilsoo Jeong, Sunkil Yun, Hyundai Motor Company; Shashank Alai, Valentin Grange, Hwiseob Park, Siemens Industry Software; Sungho Kang, Hyundai Motor Company
3:00 p.m.		BREAK
3:30 p.m.	ORAL ONLY	Optimizing Product Development with Stronger Engineering Collaboration between OEMs and Suppliers Organizers - Eric Krueger, General Motors LLC Tristan Eggenberger, INVENSITY Inc.
4:00 p.m.	ORAL ONLY	A Development of a VTM (Vehicle Thermal Management) Model for Predicting the Driving Range and Energy Consumption of Electric Vehicles Jeehwan JEON, Dongkyu Lee, Taekyu Chang, Wonjun Sung, Kyoung Song, Hyundai Motor Company
4:30 p.m.	ORAL ONLY	Model-Based Systems Engineering Inna Costa Ruiz, Bosch

Planned by Body Engineering Committee / Automobile Body, Chassis, Safety, and Structures Activity

WCX SAE World Congress Experience

Technical Session Schedule

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Tuesday, April 16

Reliability and Robust Design in Automotive Engineering

Session Code IDM100

Room 258 Session 1:30 p.m.

This session focuses on reliability and robust design methods, good practices and applications, including among others uncertainty quantification, RBDO as well as accelerated reliability and durability testing.

Organizers - Zhen Hu, University of Michigan; An Li, Stellantis; Paul Lubinski, Thermo King Corp.; Zissimos Mourelatos, Vijitashwa Pandey, Oakland University

Chairperson - Paul Lubinski, Thermo King Corp

Time	Paper No.	Title
1:30 p.m.	2024-01-2422	High Dimensional Preference Learning: Topological Data Analysis Informed Sampling for Engineering Decision Making Calahan Mollan, Oakland University; Inga Morkvenaite-Vilkonciene, Vilnius Gediminas Technical University; Vijitashwa Pandey, Oakland University
2:00 p.m.	ORAL ONLY	A Simulation-based Fatigue Life Estimation Method for Nonlinear Systems Under Non-Gaussian Loads Onkar Mande, Zissimos Mourelatos, Dimitrios Papadimitriou, Santsoh Patil, Oakland University
2:30 p.m.	2024-01-2424	Validation of Powertrain Systems Based on Usage Space Analysis Considering Virtual Road Load Profiles Andreas Haspl, Michaela Unterweger, Jan Kuruc, Mirko Plettenberg, Uday Venkateswar Akasapu, AVL LIST GmbH
3:00 p.m.		BREAK
3:30 p.m.	2024-01-2423	Enhancing Vehicle Architecture Development: A Robust Approach to Predicting Ride and Handling Performance and Optimization through Reliability Analysis Jung Ji-In, Hyundai & Kia Corporation
4:00 p.m.	2024-01-2421	A Study on Reliability-Based Maximum Service Temperature Estimation of Plastic Automotive Parts Jee Young Youn, Min Gyun Chung, Hyo Sang Ahn, Hyundai Motor Company

Tuesday, April 16

Automotive Tribology

Session Code M214

Room 258 Session 1:30 p.m.

This technical session focuses on fundamental and applied research that lowers frictional energy losses and enhances reliability and durability of automotive components. The topics include, but not limited to engine and drivetrain tribology, seals, bearing and gear lubrication, materials tribology, surface engineering, lubricants and additives, computer-aided tribology, tribotesting, as well as friction, wear and lubrication fundamentals.

Organizers - Meng Li, Stellantis; David Schall, North Carolina A&T State Univ.; Rong Zhang, GM; Qian Zou, Oakland University

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Time	Paper No.	Title
1:30 p.m.	2024-01-2066	Combination of dissimilar overlay materials for engine bearing life extension Yuma Haneda, Kenta Kato, Erina Yasuda, Akira Nogami, Masaki Hayashi, Daido Metal Co., Ltd.
2:00 p.m.	2024-01-2067	Validation of a Two-Parameter Controlled Novel Tribometer for Analysing Durability of Piston Ring-Engine Cylinder Tribo-Pair Dimitry G. Sediako, Siddharth Banerjee, The University of British Columbia
2:30 p.m.	ORAL ONLY	Analysis of lubrication mechanism of a high precision reducer consisting a worm gear drive with complicated spatial surface interactions Yucheng Liu, South Dakota State Univ.

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Tuesday, April 16

ADAS and Autonomous Vehicle System: Driver Interface

Session Code AE105

Room 258 Session 3:30 p.m.

This session addresses driver interface, human factors and other technical areas that relates to driver/rider interaction, operation and impact related to ADAS and AVS Specific focus for 2024 will be on In-cabin monitoring. Topics to include driver monitoring (DMS), occupant monitoring (OMS) and using camera or radar to monitor the states/conditions of driver or occupants and provide the timely and useful feedback.

Organizers - Bin Li, Hyundai Mobis North America; Danyang Tian, Honda Research Institute USA Inc.; Hossam Almasri, GM; Chen Lv, Nanyang Technological University; Venkateswara Raju Mudunuri, General Motors

Time	Paper No.	Title
3:30 p.m.	2024-01-2396	Do Drivers Pay Attention During Highway-Based Automated Lane Changes While Operating Under Hands-Free Partially Automated Driving Systems? Robert Llaneras, Virginia Polytechnic Institute & State University; Daniel Glaser, Yi Glaser, General Motors Company
4:00 p.m.	2024-01-2397	Image-based Driver Status Monitoring System for Determining the Transfer of Dynamic Driving Tasks in Autonomous Vehicles Yi-Feng Su, Chih-Yuan Hsu, Yu-Chieh Wang, Chung-Yu Yeh, Automotive Research & Testing Center
4:30 p.m.	ORAL ONLY	Drivers' pedal behavior during takeover in semi-autonomous critical vehicle scenarios: the effect of age, sex, a startle-base warning, and a texting task. Valentina Graci, Bhagawath Thangavel, Children's Hospital of Philadelphia; Hassanatu Kamara, Drexel University; Madeline Griffith, Children's Hospital of Philadelphia

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:28 PM

Tuesday, April 16

Body Engineering and Design - Part 1 of 2

Session Code SS100

Room 259 Session 9:30 a.m.

Body Engineering & Desxign covers several important areas that are related to vehicle body, including its components such as instrument panel, steering column and wheel, seats, hood, decklid, transmission cross-member, hard mounted chassis, CRFM, etc. Topics included are: Novel concepts, Analysis, Design, Testing, Predictions of strength, stiffness, and fatigue life, welding methods, vehicle body quality, durability, reliability, safety, ride & handling, NVH, aerodynamics, mass reduction, as well as fuel economy.

Organizers - Mallikarjuna Bennur, General Motors LLC; Raghu Echempati, Kettering University; Ramakrishna Koganti, University Of North Texas; Vesna Savic, General Motors LLC

Time	Paper No.	Title
9:30 a.m.	ORAL ONLY	A study on the wear of dump truck bodies using Discrete Element Method Seunghun Ryu, Hyundai Motor Company; Jungkil Shim, Altair Engineering
10:00 a.m.	2024-01-2222	Development of a Light Weight Luggage Board Using the Sandwich Molding Method Hee Sang Park, Yeon Sim Yoon, Seung Kun Lee Sr, Seok Cheol Kim Sr, Hyundai Motor Company; Dong Han Lee, HanHwa Advanced Materials
10:30 a.m.	2024-01-2223	Optimization of Structural Rigidity of a Door Mounting Part Kyeongkuk Cho, JEWON Choi, Hyundai Motor Company
11:00 a.m.	2024-01-2227	A Study on the Development of Concept Models Using Higher-Order Beams Jin Hong Kim, Hyundai Motor Company; Dong Ki Lee, SVD inc; Gyu Sik Kim, Gang-Won Jang, Sejong University; Han Kil Kim, SVD inc
11:30 a.m.	ORAL ONLY	Axial Crush Performance of Aluminum Tubes with Facial Perforations Sanketh Ramachandra, Anindya Deb, Indian Institute of Science; Feng Zhu; Clifford Chou, Wayne State Univ

Planned by Body Engineering Committee / Automobile Body, Chassis, Safety, and Structures Activity

Tuesday, April 16

Body Engineering and Design - Part 2 of 2

Session Code SS100

Room 259 Session 1:30 p.m.

Body Engineering & Desxign covers several important areas that are related to vehicle body, including its components such as instrument panel, steering column and wheel, seats, hood, decklid, transmission cross-member, hard mounted chassis, CRFM, etc. Topics included are: Novel concepts, Analysis, Design, Testing, Predictions of strength, stiffness, and fatigue life, welding methods, vehicle body quality, durability, reliability, safety, ride & handling, NVH, aerodynamics, mass reduction, as well as fuel economy.

Organizers - Mallikarjuna Bennur, General Motors LLC; Raghu Echempati, Kettering University; Ramakrishna Koganti, University Of North Texas; Vesna Savic, General Motors LLC

Time	Paper No.	Title

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:28 PM

Time	Paper No.	Title
1:30 p.m.	2024-01-2225	Fully Retractable Easy Access Spare Wheel Carrier Mechanism for Commercial Vehicles. Devendra Bonde, VE Commercial Vehicles Ltd; Piyush Pradip Upkare, Volvo Eicher Commercial Vehicles; Rubal Verma, VE Commercial Vehicles Ltd
2:00 p.m.	2024-01-2221	Effect of Side Door Check Arm Profile on Side Door Closing Velocity Sharath Keshav T J, Veera Selvan, Siddharth Unadkat, Prasanna Balaji Subbaiyan, Venugopal Pandurangan, Balaramakrishna Nizampatnam, Mahindra & Mahindra, Ltd
2:30 p.m.	2024-01-2226	Parameters Affecting Torsional Stiffness of Vehicle Doors Vinay Kumar Goyal, Veera Selvan, Venugopal Pandurangan, Siddharth Unadkat, Neil Ricardo Almeida, Mahindra & Mahindra, Ltd

Planned by Body Engineering Committee / Automobile Body, Chassis, Safety, and Structures Activity

Tuesday, April 16

Design Optimization - Methods and Applications - Part 1 of 2

Session Code SS103

Room 259 Session 3:30 p.m.

Design Optimization Methods and Application session features papers on new and improved optimization techniques and on application of different optimization methods in component and vehicle design. Methods include deterministic and stochastic optimization techniques. Applications range from noise pressure optimization and vehicle dynamic response optimization to sub-system topology and shape and full vehicle gage and topology optimization.

Organizers - Mallikarjuna Bennur, Vesna Savic, General Motors LLC; Andres Tovar, Purdue University; Di Zhu, Ford Motor Company

Time	Paper No.	Title
3:30 p.m.	2024-01-2455	Optimization of Cold Start Performance of Diesel Engine Under Low Temperature and High Altitude Environment Liang Fang, Boyu Chen, Diming Lou, Kaiwen Xu, Piqiang Tan, Zhiyuan Hu, Yunhua Zhang, Tongji University; Lei Zhen, Weichai Power Co., Ltd.
4:00 p.m.	2024-01-2459	Frontal Crash Oriented Robust Optimization of the Electric Bus Body Frame Considering Tolerance Design Xiujian Yang, Beizhen Liu, Kunming University of Science & Technology

Planned by Automobile Body, Chassis, Safety, and Structures Activity / Ground Vehicle Advisory Group

Tuesday, April 16

Battery Safety Summit - Part 1 of 2

Session Code AE701

Room 260 Session 9:30 a.m.

With rapid penetration of battery energy storage systems in the mobility space (surface/aviation/aerospace), knowledge of the various aspects related to battery safety is critical. The purpose of this full day session is to communicate and share information and experience in battery safety related to transportation applications. Attendees will be provided background on EV/Battery related safety regulations, battery safety issues, latest research in the field of battery failure and mitigation technology, and feedback from real experiences dealing

with EV incidents from experts. The goal in providing this content is to develop and support uniform safe practices across industry and inform attendees about effective tools and processes to deal with safety issues and incidents.

Organizers - Brian Engle, Amphenol; Vinay Premnath, UL Research Institutes

Time	Paper No.	Title
9:30 a.m.	ORAL ONLY	Are aged cells more dangerous than fresh cells? Jun Xu, UNC Charlotte
10:00 a.m.	ORAL ONLY	Towards safer battery packs with highly modular, multi-functional venting units Michael Harenbrock, Shikhar Arora, Markus Hanselmann, Jürgen Kosicki, Martin Ploppa, Robert Zbiral, Mann+Hummel GmbH
10:30 a.m.	ORAL ONLY	Aerosol emission characteristics during Li-ion battery thermal runaway Liwen zhang, Peng Zhao, University of Tennessee Space Institute
11:00 a.m.	ORAL ONLY	Li-Ion Battery Fire Suppression .. TBD
11:30 a.m.	ORAL ONLY	Toxicity Concerns for Heavy Metal Exposures During A Fire Event .Christopher (Todd) Smith, ATF

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Tuesday, April 16

Battery Safety Summit - Part 2 of 2

Session Code AE701

Room 260 Session 1:30 p.m.

With rapid penetration of battery energy storage systems in the mobility space (surface/aviation/aerospace), knowledge of the various aspects related to battery safety is critical. The purpose of this full day session is to communicate and share information and experience in battery safety related to transportation applications. Attendees will be provided background on EV/Battery related safety regulations, battery safety issues, latest research in the field of battery failure and mitigation technology, and feedback from real experiences dealing with EV incidents from experts. The goal in providing this content is to develop and support uniform safe practices across industry and inform attendees about effective tools and processes to deal with safety issues and incidents.

Organizers - Brian Engle, Amphenol; Vinay Premnath, UL Research Institutes

Time	Paper No.	Title
1:30 p.m.	ORAL ONLY	Comparison of Battery Thermal Runaway Sensing Technologies and the Effects of Sensor Placement within a Battery Pack Chavonne Yee, John Jerred, Honeywell International

WCX SAE World Congress Experience

Technical Session Schedule

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Time	Paper No.	Title
2:00 p.m.	2024-01-2060	Deformation Analysis on In-Plane Loading of Prismatic Cell Zhiwei Sun, Pengfei Ying, Yunlong Qu, Yong Xia, Qing Zhou, Tsinghua University
2:30 p.m.	ORAL ONLY	We Didn't Start the Fire; but We Can Protect Against It Jacob Steinbrecher, Dow Performance Silicones
3:00 p.m.		BREAK
3:30 p.m.	ORAL ONLY	Electrochemical and thermal runaway behaviors of NMC 18650 Li-ion batteries with different degradation mechanisms Liwen zhang, Peng Zhao, University of Tennessee Space Institute
4:00 p.m.	2024-01-2063	Low-Temperature Aging Effect on Safety of Lithium-Ion Batteries Subjected to Intrusion: A Comparative Study of 18650 and Pouch Cells Christopher Spettmann, Jonghyeon Shin, Yunlong Qu, School of Vehicle and Mobility, Tsinghua; Yuanjie Liu, Beijing Jingwei Hirain Technologies Co.; Yong Xia, School of Vehicle and Mobility, Tsinghua
4:30 p.m.	ORAL ONLY	Regulatory Hurdles in making 2nd Life Applications Work Matthew Paiss, Pacific Northwest National Labs

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Tuesday, April 16

Fuel and Additive Effects on Engine Systems - Part 1 of 2

Session Code PFL310

Room 310 A Session 9:30 a.m.

Topics include the effects of fuel and additives on deposit formation, intake system cleanliness, friction, wear, corrosion, and elastomer compatibility. Also covered are effects of fuel specification on drivability, on evaporative emissions, and on the relationship between emissions and drive cycle.

Organizers - Thomas Briggs; Antonino La Rocca, University of Nottingham; Paul Richards; Toby Rockstroh, Shell Global Solutions (Deutschland); Cinzia Tornatore, Italian National Research Council

Time	Paper No.	Title
9:30 a.m.	2024-01-2119	Experimental Investigation of Pilot Injection Strategies to Aid Low Load Compression Ignition of Neat Methanol Magnus Svensson, Martin Tuner, Lund University; Sebastian Verhelst, Lund University/Ghent University
10:00 a.m.	2024-01-2120	Highway Exhaust Emissions of a Natural Gas-Diesel Dual-Fuel Heavy-Duty Truck Shouvik Dev, National Research Council Canada; Aidu Qi, Environment and Climate Change Canada; Andrew Anderson, Austin Dahlseide, Brett Smith, Simon-Alexandre Lussier, Hongsheng Guo, National Research Council Canada; Deborah Rosenblatt, Environment and Climate Change Canada

WCX SAE World Congress Experience

Technical Session Schedule

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Time	Paper No.	Title
10:30 a.m.	2024-01-2121	Demonstration of Low Criteria Pollutant and Greenhouse Gas Emissions: Synergizing Vehicle Emission Reduction Technology and Lower Carbon Fuels Michael Storch, Robert Bosch GmbH; Ripudaman Singh, Robert Bosch LLC; Sven Haubold, Robert Bosch GmbH; Alexander Voice, Aramco Americas
11:00 a.m.	2024-01-2122	Investigation of Combustion Characteristics of a Fuel Blend Consisting of Methanol and Ignition Improver, Compared to Diesel Fuel and Pure Methanol Magnus Svensson, Martin Tuner, Lund University; Sebastian Verhelst, Lund University/Ghent University
11:30 a.m.	2024-01-2125	Combustion Characteristics of Aluminum Oxide Nanoparticles-Diesel Blends in a Constant Volume Chamber Huangchang Ji; Timothy Lee; Zhiyu Zhao; Shengwei Chen

Planned by Fuels and Lubricants / Energy and Propulsion Activity

Tuesday, April 16

Fuel and Additive Effects on Engine Systems - Part 2 of 2

Session Code PFL310

Room 310 A Session 1:30 p.m.

Topics include the effects of fuel and additives on deposit formation, intake system cleanliness, friction, wear, corrosion, and elastomer compatibility. Also covered are effects of fuel specification on drivability, on evaporative emissions, and on the relationship between emissions and drive cycle.

Organizers - Thomas Briggs; Antonino La Rocca, University of Nottingham; Paul Richards; Toby Rockstroh, Shell Global Solutions (Deutschland); Cinzia Tornatore, Italian National Research Council

Time	Paper No.	Title
1:30 p.m.	2024-01-2127	Impact of Deposit Control Additives on Particulate Emissions and Fuel Consumption in Pre-used Vehicles with Gasoline Direct Injection Engines Benji Mitchell, Shell Global Solutions (UK); Jens Krueger-Venus, Shell Global Solutions (Deutschland); Jasprit Chahal, Ian Buttery, Rod Williams, Roger Cracknell, Luke Pery, Shell Global Solutions (UK); Allen Aradi, Shell Global Solutions (US) Inc.
2:00 p.m.	2024-01-2126	Light Duty engine performance characteristics with Dimethyl Ether and Propane William De Ojeda, Simon (Haibao) Wu, Wm International Engineering; King Ankobea-Ansah, Hafiz Ahmad Hassan, Carrie Hall, Illinois Institute of Technology
2:30 p.m.	ORAL ONLY	DME-Propane Ignition Delay Time Measurements at Heavy-Duty Mixing Controlled Compression Ignition Engine-Relevant Conditions Zuhayr Pasha Mohammed, University Of Central Florida; Kesly Lubin; Subith Vasu, Justin Urso, Ramees Khaleel Rahman, University Of Central Florida

Planned by Fuels and Lubricants / Energy and Propulsion Activity

WCX SAE World Congress Experience

Technical Session Schedule

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Tuesday, April 16

Panel Discussion: Year in Review on Emissions, Fuels, and Propulsion

Session Code PFL498

Room 310 B Session 9:30 a.m.

For nearly 25 years, there has been a must-see "Corning paper" presentation, pioneered by Dr. Tim Johnson in 2000, that provided a comprehensive overview of the current state of the art in emissions control. More recently, this effort was undertaken by Dr. Ameya Joshi, who expanded the scope to more broadly address the greenhouse gas and decarbonization goals. Recognizing the great value of a yearly wrap-up and the herculean effort required to include contributions of both the engine and fuel in reducing emissions, this year's presentation will be delivered by a panel of subject matter experts. This panel is a collaborative effort between the Mobile Source Emissions, Engine Combustion and Fuels & Lubricants Committees in the Energy & Propulsion Activity.

Learn more about the Panel Participants

Organizers - Christopher Depcik, Univ. of Kansas; David Foster; John Kasab, AVL Mobility Technologies Inc.; Josh Pihl, Oak Ridge National Laboratory; Ron Silver (retired); Andrea Strzelec, USCAR

Moderators - Ron Silver (retired); Andrea Strzelec, USCAR

Panelists - Ameya Joshi, Clearflame Engines Inc.; Addy Majewski, DieselNet; Paul Miles, Sandia; Josh Pihl, Oak Ridge National Laboratory; Christopher Sharp, Southwest Research Institute; James Szybist, Oak Ridge National Laboratory;

Tuesday, April 16

Gaseous Engine Emissions

Session Code PFL460

Room 310 B Session 1:30 p.m.

Organizers - Josh Pihl, Oak Ridge National Laboratory

Time	Paper No.	Title
1:30 p.m.	2024-01-2632	Methane Conversion in Stoichiometric Natural Gas Engine Exhaust Dimitrios Karamitros, Adjer Ibraimova, Konstantinos Konstantinidis, EMISIA SA; Grigorios Koltsakis, Aristotle University of Thessaloniki; Sungmu Choi, Jiho Cho, Hyundai Motor Group
2:00 p.m.	2024-01-2633	Sulfur Impact on Methane Steam Reforming over the Stoichiometric Natural Gas Three-Way Catalyst Mi-Young Kim, Karthik Venkata Dadi, Jian Gong, Krishna Kamasamudram, Cummins Inc.
2:30 p.m.	2024-01-2634	Reducing Emissions from Lean-Burn Hydrogen Combustion Engines Using a State-of-the-Art Oxidation Catalyst and a VWTi-Based SCR Catalyst: Potentials and Challenges Patrick Lott, Kathrin Schäfer, Olaf Deutschmann, Karlsruhe Institute of Technology (KIT); Manuel Werner, Philipp Weinmann, Lisa Zimmermann, Heike Toebben, Purem GmbH

Planned by Mobile Emissions Committee / Energy and Propulsion Activity

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:29 PM

Tuesday, April 16

Panel Discussion: Testing and Measurement Challenges and Innovations in Transitioning from Fossil to Carbon-Neutral Fuels

Session Code PFL499

Room 310 B Session 3:30 p.m.

The panels' goal is to explore the ongoing challenges in engine performance testing and mobile emission measurements during the transition from fossil to carbon-neutral fuels and fleet electrification. The panelists will discuss current limitations and emerging innovations in test methodology and equipment to measure near zero emissions from advanced engines powered by both petroleum and carbon-neutral fuels. Moreover, the panel will discuss measurement and control requirements regarding to non-exhaust emissions, including brake and tire wear, that continue to be a challenge regardless of powertrain configuration.

Learn more about the Panel Participants

Organizers - Svitlana Kroll, Southwest Research Institute; J. Felipe Rodriguez, International Council On Clean Transport; Michael Akard, Horiba, Ltd.; Mert Zorlu, Cummins Inc.; Mahmoud Yassine, FCA US LLC; Susumu Sato, Tokyo Institute of Technology

Chairperson - Svitlana Kroll, Southwest Research Institute

Moderators - Svitlana Kroll, Southwest Research Institute; Michael Akard, Horiba Ltd

Panelists - Charles Roberts, Southwest Research Institute; Joshua ISRAEL, Horiba Ltd; Erik Koehler, FEV North America Inc; Leonidas Ntziachristos, Aristotle University of Thessaloniki;

Planned by Mobile Emissions Committee / Energy and Propulsion Activity

Tuesday, April 16

Sustainable Development for Automotive Industry - Part 1 of 2

Session Code SDP100

Room 312 A/B Session 9:30 a.m.

This session focuses on sustainable development for automotive industry in the United States and other countries: Life-cycle Analysis; Vehicle Ownership Cost; Fuel Economy and Energy Saving; Vehicle Emission Containing; Use and End-of-Life; Circular Economy; Energy Policies; and Advances in Alternative Energy sources. New market focus will be on battery recycling.

Organizers - Seyed Ali Arefifar, Oakland University; Yi Ding, TARDEC; Shiqi(Shawn) Ou, South China University of Technology

Chairperson - Tarek Abdel-Salam, East Carolina University; Amanda Nummy, Hyundai & Kia Corp

Time	Paper No.	Title
9:30 a.m.	2024-01-2442	Life Cycle Assessment of a State-of-the-Art Diesel powered Engine and Preliminary Evaluation of its Conversion into a Novel Hydrogen powered Engine Gianfranco Malagrinò, Antonella Accardo, Trentalessandro Costantino, CARS, Politecnico Di Torino; Michele Pensato, Dumarey Automotive Italia S.p.A.; Ezio Spessa, CARS, Politecnico Di Torino
10:00 a.m.	2024-01-2443	Benefit from In-service Life Optimized for Minimum CO2 – Comparison of ICEVs, PHEVs, BEVs and H2Vs Harry C. Watson, University of Melbourne
10:30 a.m.	2024-01-2446	Powering Tomorrow's Light, Medium, and Heavy-Duty Vehicles: A Comprehensive Techno-Economic Examination of Emerging Powertrain Technologies Ehsan Sabri Islam, Daniela Nieto Prada, Ram Vijayagopal, Namdoo Kim, Paul Phillips, Michel Alhajjar, Charbel Mansour, Aymeric Rousseau, Argonne

WCX SAE World Congress Experience

Technical Session Schedule

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Time	Paper No.	Title
		National Laboratory
11:00 a.m.	ORAL ONLY	The policy driving forces of the China’s EV market, and the coping strategies of OEMs, past and future
		Qingyuan Song, Xudong Sun, Ning Ma, Fucheng Zhao, Geely
11:30 a.m.	ORAL ONLY	Effect of Design on Battery Costs and Life-Cycle Impacts of Electric Vehicles
		Rakesh Iyer, Jarod Kelly, Joseph Kubal, Shabbir Ahmad, Argonne National Laboratory
3:00 p.m.		BREAK

Planned by Sustainable Development Committee / Ground Vehicle Advisory Group

Tuesday, April 16

Sustainable Development for Automotive Industry - Part 2 of 2

Session Code SDP100

Room 312 A/B Session 1:30 p.m.

This session focuses on sustainable development for automotive industry in the United States and other countries: Life-cycle Analysis; Vehicle Ownership Cost; Fuel Economy and Energy Saving; Vehicle Emission Containing; Use and End-of-Life; Circular Economy; Energy Policies; and Advances in Alternative Energy sources. New market focus will be on battery recycling.

Organizers - Tarek Abdel-Salam, East Carolina University; Seyed Ali Arefifar, Oakland University; Yi Ding, TARDEC; Shiqi(Shawn) Ou, South China University of Technology; Amanda Nummy, Hyundai & Kia Corp

Time	Paper No.	Title
1:30 p.m.	ORAL ONLY	Benefits and Challenges of the Combined Electro-Thermo-Chemical Cycle
		David Diskin, Yonah Kuhr, Ido Yohai Ben-Hamo, Sabrina Spatari PhD, Leonid Tartakovsky, Technion Israel Inst. of Technology
2:00 p.m.	2024-01-2444	Emission Control on a Dual Model Hybrid Passenger Car to Meet China 6 Legislation
		Jian Chen, Xuhua Wang, Yi Liu, ActBlue Co., Ltd
2:30 p.m.	2024-01-2448	Energy-Optimal Allocation of a Heterogeneous Delivery Fleet in a Dynamic Network of Distribution and Fulfillment Centers
		Muhammad Waleed Khan, Manfredi Villani, Qadeer Ahmed, The Ohio State University
3:00 p.m.		BREAK
3:30 p.m.	2024-01-2447	Development and Application of Diagnosis Logic of Ion Exchange Filter Depletion
		Wook Il (Woogil) Jang, Hyundai & Kia Corporation; Seong-Mok Kim, Kyonggi University

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Technical Session Schedule

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Time	Paper No.	Title
4:00 p.m.	2024-01-2449	Advanced Biomass Conversion : Sustainable e-methanol production with enhanced CO2 utilization Renston Jake Fernandes, King Abdullah Univ of Science & Tech; Ducduy Nguyen, Norwegian Univ of Science and Technology; Mohammad Raghib Shakeel, James W.G. Turner, King Abdullah Univ of Science & Tech
4:30 p.m.	ORAL ONLY	Life Cycle Costing of a State-of-the-art Diesel oil powered Engine and Preliminary Evaluation of its Conversion into a Novel Hydrogen powered Engine Gianfranco Malagrinò, Antonella Accardo, Trentalessandro Costantino, Ezio Spessa, Politecnico di Torino; Michele Pensato, Cost Technology Assoc Inc

Planned by Sustainable Development Committee / Ground Vehicle Advisory Group

Tuesday, April 16

Intelligent Manufacturing / Industry 4.0 - Part 1 of 2

Session Code MFG200

Room 313 A/B Session 9:30 a.m.

This session focuses on AR/VR, collaborative robots, digital twin, robotics, artificial intelligence (AI)-including machine learning, big data-including predictive analytics, predictive/preventative maintenance, industrial internet of things (IIoT), virtual manufacturing, and other smart manufacturing technologies.

Organizers - RANDY Gu, Oakland University; Ramakrishna Koganti, University Of North Texas; Ali Ahmad Malik, Oakland University; Monika Minarcin, Accenture; Yu Teng, BAIC Motor Corporation, Ltd.

Chairperson - Monika Minarcin, Accenture

Time	Paper No.	Title
9:30 a.m.	2024-01-2053	A Manufacturing Performance Comparison of RSW and RFSSW Using a Digital Twin Organizers - Sangram Mazumder, N/A; Shreyash Patel, Univ. Of Petroleum Energy Studies Damon Gale, Yuri Hovanski, Brigham Young University; Jeremy Coyne, Kate Namola, Toyota Motor North America
10:00 a.m.	ORAL ONLY	Enterprise-driven Adaptive Augmented Reality Elijah Becerra, Brigham Young University
10:30 a.m.	ORAL ONLY	Integration of Offline Programming into paint shop simulations Akhilesh Kotian, Ravi Kanth Borra, Muraleekrishnan Menon, ESS Engineering Software Steyr
11:00 a.m.	ORAL ONLY	Intelligent Manufacturing / Industry 4.0 Alex Sammut, Lubrizol Corp.
11:30 a.m.	2024-01-2052	The Important Role of GD&T in Mechanical Drawing, Design and Manufacturing for Students of Engineering Institutes

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Time	Paper No.	Title
		Amr S.H.R. Ali, Akram M. S. Ali, South Europe College; Youssef W.R. Amin, Salah H. R. Ali, Pyramids Higher Institute for Engineering and Technology

Tuesday, April 16

Intelligent Manufacturing / Industry 4.0 - Part 2 of 2

Session Code MFG200

Room 313 A/B Session 1:30 p.m.

This session focuses on AR/VR, collaborative robots, digital twin, robotics, artificial intelligence (AI)-including machine learning, big data-including predictive analytics, predictive/preventative maintenance, industrial internet of things (IIoT), virtual manufacturing, and other smart manufacturing technologies.

Organizers - RANDY Gu, Oakland University; Ramakrishna Koganti, University Of North Texas; Ali Ahmad Malik, Oakland University; Monika Minarcin, Accenture; Yu Teng, BAIC Motor Corporation, Ltd.

Chairperson - Monika Minarcin, Accenture

Time	Paper No.	Title
1:30 p.m.	2024-01-2054	A Case Study of Planning and Analyzing the Implementation of an AGV System Using Discrete Event Simulation
		Mohsin Raza, Arne Bilberg, Dimitar-Delyan Ilev, University of Southern Denmark
2:00 p.m.	ORAL ONLY	Design and implementation of a proposed standard artifact for verification of XYZ milling machine tool
		Salah H. R. Ali, Ahmed Sobhy, National Institute for Standards, Egypt; Monir Koura, Ain shams University, Egypt
2:30 p.m.	ORAL ONLY	Strategic Interaction of Research and Education in the further Development of smart Production and Logistics using AI
		Christian-Andreas Schumann, Westsaechsische Hochschule Zwickau

Tuesday, April 16

Thermal Systems for Hybrid and Electric Vehicles - Part 1 of 2

Session Code HX100

Room 320 Session 9:30 a.m.

The purpose of this session is to share experiences and lessons learned to advance the technology in the field of thermal management of electric and hybrid vehicle systems. This session presents papers covering both testing and simulation of hybrid and electric vehicle thermal systems.

Organizers - Bashar AbdulNour, Kettering Univ.; Alaa El-Sharkawy, FCA US LLC; James Gebbie, Ford Motor Company; Edward Gerges, Dana Inc.; Sowmya Jayaraman, General Motors LLC; Kumar Srinivasan, Cadence Design Systems Inc.; Arpit Tiwari, Rivian Automotive; Srinivasa Vaddiraju, Zoox; Romain Nicolas, Siemens Digital Industries Software

Time	Paper No.	Title

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Time	Paper No.	Title
9:30 a.m.	2024-01-2399	A Study on the Combined Air Conditioning Condenser System for Ultra Fast Charging Time Reduction Seong-Bin Jeong, Hyundai
10:00 a.m.	2024-01-2402	Cradle-to-Grave Comparison on Emission Produced by EV and ICE Powertrains Albert J. Abraham, Kettering University
10:30 a.m.	2024-01-2403	Comprehensive Thermal Modeling and Analysis of a 2019 Nissan Leaf Plus for Enhanced Battery Electric Vehicle Performance Rabih Al Haddad, Mines Paris, CES - PSL; Charbel Mansour, Namdoo Kim, Jigu Seo, Argonne National Laboratory; Maroun Nemer, Mines Paris, CES - PSL
11:00 a.m.	2024-01-2404	Efficient Electric School Bus Operations: Simulation-based Auxiliary Load Analysis Muneebullah Nawaz, Khaled Alsharif, Athar Hanif, Qadeer Ahmed, The Ohio State University
11:30 a.m.	2024-01-2406	A Preliminary Study on the Evaporative Cooling System for FCEV Ui Joon PARK, Soon Beom Kwon, Kyung Jun Choi, Gil Woo Lee, Dong Seok Oh, Hyundai Motor Company

Tuesday, April 16

Thermal Systems for Hybrid and Electric Vehicles - Part 2 of 2

Session Code HX100

Room 320 Session 1:30 p.m.

The purpose of this session is to share experiences and lessons learned to advance the technology in the field of thermal management of electric and hybrid vehicle systems. This session presents papers covering both testing and simulation of hybrid and electric vehicle thermal systems.

Organizers - Bashar AbdulNour, Kettering Univ.; Alaa El-Sharkawy, FCA US LLC; James Gebbie, Ford Motor Company; Edward Gerges, Dana Inc.; Sowmya Jayaraman, General Motors LLC; Kumar Srinivasan, Cadence Design Systems Inc.; Arpit Tiwari, Rivian Automotive; Srinivasa Vaddiraju, Zoox; Romain Nicolas, Siemens Digital Industries Software

Time	Paper No.	Title
1:30 p.m.	2024-01-2408	Investigation of Fuel Economy Prediction Technology Considering Engine Thermal Flow for Hybrid Electric Vehicle, and Application to Vehicle Development Process Kenichiro Ogata, Keijiro Koide, Shunichi Kubota, Naoaki Takeda, Yusuke Suzuki, Go Toshizane, Honda Motor Co., Ltd.; Ryohei Sugamata, Mitsunobu Saito, Honda R&D Co., Ltd.
2:00 p.m.	ORAL ONLY	A Centralized Secondary Loop Coolant Control Module for Electric Vehicles Nicholas Jordan, Hella Corporate Center USA

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Time	Paper No.	Title
2:30 p.m.	2024-01-2405	Recent progress on mechanism of mechanical abuse-induced battery thermal runaway Wang Zhi Hao, Youhang Zhou, Xuan Tang, Xiangtan University
3:00 p.m.	2024-01-2407	Thermal Management System Test Bench for Electric Vehicle Technology Alex Wray, Loughborough University; Nilabza Dutta, Jaguar Land Rover; Kambiz Ebrahimi, Andrew Watson, Loughborough University

Tuesday, April 16

Automotive Lighting Technology

Session Code SS300

Room 321 Session 9:30 a.m.

These papers highlight the interaction of driver vision - which is itself characterized by complexity, flexibility, and high levels of performance—with ever more sophisticated vision technologies to support driver vision. In particular, LED technology continued to advance in the past year, leading to broader lighting applications. Topics covered include lighting design strategy, lighting thermal management, driver fields of view, and characteristics of camera/display systems.

Organizers - Joseph Jaklic, ams-OSRAM; John Sullivan, U of M

Chairperson - Joseph Jaklic

Time	Paper No.	Title
9:30 a.m.	2024-01-2232	Advanced Development of e-HMI Road Content Projection Headlamp Hyeong Seon Kim, Hyundai & Kia Corporation
10:00 a.m.	2024-01-2231	Virtual Simulation and Design Optimization of Bi-Functional Projector Headlamp for Nighttime Visibility of Overhead Signs Prashant Maruti Yadav, Prashant Yadav
10:30 a.m.	ORAL ONLY	Digital Matrix Light - More than HD Glare-Free High Beam The development of future headlights is moving from hardware-based design to software driven light function development. Different infrastructures and cultural mentalities lead to different lighting requirements for headlights where a single light distribution will not be able to cover the needs in all traffic situations. For this reason, digital light functionality is needed to enable new intelligent light distributions that fit to the occurring scenarios. Furthermore, Digital Matrix Light is a potential enabler for worldwide ADB functionality. This development of digital light functions drives the change from technology focused to user focused functionalities. This presentation shows the possibilities of Digital Matrix Light functions as well as their limitations. It also discusses the feasibility of glare-free high beam worldwide and how such systems perform in headlight rating systems.

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Time	Paper No.	Title
		Christian Hinterwaelder, Anil Erkan, Michael Kruppa, Audi AG
11:00 a.m.	2024-01-2230	Performance of Headlights Fitted with LED Replacement Bulbs
		John D. Bullough, Nicholas P. Skinner, Icahn School of Medicine
11:30 a.m.	2024-01-2229	Responses to Flashing Warning Lights and Colors of Service Vehicles
		John D. Bullough, Nicholas P. Skinner, Mark S. Rea, Icahn School of Medicine

Planned by Human Factors Committee / Automobile Body, Chassis, Safety, and Structures Activity

Tuesday, April 16

Powertrain Energy Management

Session Code HX500

Room 321 Session 1:30 p.m.

This session considers thermal-fluids modeling (zero-D, 1D, 3D CFD) and experimental presentations. Systems include combustion, lubrication, cooling, fuel, EGR, transmission etc. Components include pumps, fuel injectors, turbochargers, torque converters, gear box, bearings, valves, ports, manifolds, oil cooler, EGR cooler, after-treatment (SCR, DOC, DOF); battery cooling etc.

Organizers - Vivek Kumar, Ford Motor Company; Kevin Laboe, Stellantis; Raj Ranganathan, Simerics Inc.; Romain Nicolas, Siemens Digital Industries Software; Jeff Schlautman, General Motors LLC; Alaa El-Sharkawy, FCA US LLC

Time	Paper No.	Title
1:30 p.m.	2024-01-2415	INVESTIGATION ON FUEL ECONOMY BENEFITS BY LUBRICATION SYSTEM OPTIMIZATION FOR A HIGH PERFORMANCE 2.2 L DIESEL ENGINE
		Shrihari Kulkarni, Mahindra & Mahindra, Ltd.; Bharani Dharan R, Mahindra & Mahindra Ltd; M. Sasikumar, Mahindra Research Valley; Amit Kawatkar, Mahindra & Mahindra Ltd; S. Loganathan, Mahindra & Mahindra, Ltd.
2:00 p.m.	2024-01-2416	Thermal Management Development for a Dedicated Hybrid Engine
		Zheng Xu, QiWei Xia, Chao Peng, YanJun wang, SAIC Motor Corporation Limited
2:30 p.m.	ORAL ONLY	Evaluation of Under-hood thermal signatures in a Stage V Cabin tractor with EATS through CFD approach
		Rathish Maller

Tuesday, April 16

Automotive Thermal Systems and Components

Session Code HX1300

Room 321 Session 3:30 p.m.

Proper thermal management can significantly contribute to overall system energy efficiency. TMSS one of the key aspects of the vehicle development. It ensures that the temperatures in the underhood and underbody areas are in desired ranges, that thermal systems operate as designed, and that no component operation is at risk due to excessive temperatures. This session covers the design of thermal

components and systems and their vehicle integration.

Organizers - Ronald Semel, Ford Motor Company; Bing Shuttlewood, General Motors Corporation; Vivek Kumar, Ford Motor Company; Marc LeDuc, SAE-I; Zeng

Time	Paper No.	Title
3:30 p.m.	2024-01-2411	The Effects of the Oil Temperature Warm-Up on Engine Fuel Consumption Giammarco Di Giovine, Davide Di Battista, Roberto Cipollone, Università degli Studi dell'Aquila
4:00 p.m.	2024-01-2409	Computational Fluid Dynamics Simulations of Aerodynamic Performance of Low-Pressure Axial Fans with Upstream Blockage Debarshee Ghosh, Niklas Andersson, Chalmers Tekniska Hogskola; Sassan Etemad, Volvo Technology Corporation

Tuesday, April 16

Strategic Engagement: Showcasing University Innovations in the Mobility Sector

Session Code MSEC101

Room 330 A Session 9:30 a.m.

This strategic oral presentation session is exclusively tailored for students actively involved in SAE Collegiate Design Series (CDS) competitions or other university projects/competitions like Formula SAE, Baja SAE, SAE Aero Design, and SAE Clean Snowmobile Challenge. Students will have the opportunity to present their essential Cost, Design, or Business presentations (or similar project reports) to industry professionals attending WCX (World Congress Experience). The primary objective of this session is to provide a platform for students to gain exposure and engage with leading mobility companies. The session will highlight innovative solutions, foster industry-academia collaboration, and offer a unique networking opportunity for future career prospects.

Organizers - Jennifer Bastiaan, Gregory Davis, Kettering University

Chairperson - Jennifer Bastiaan, Gregory Davis, Kettering University

Time	Paper No.	Title
9:30 a.m.	2024-01-2075	Facilitating Project-Based Learning Through Application of Established Pedagogical Methods in the SAE AutoDrive Challenge Student Design Competition Mark H. Schmelzle, Logan Schexnaydre, Michigan Technological University; Nathan Spike, University of Wisconsin - Stout; Darrell Robinette, Jeremy Bos, Michigan Technological University
10:00 a.m.	2024-01-2078	Formula 1 Race Car Aerodynamics: Understanding Floor Flow Structures and Why It Is a Key Component in Modern Racing Amr Shaalan, Dimitris Assanis, Stony Brook University; Aditya Raman, Sameera Wijeyakulasuriya, Kelly Senecal, Convergent Science Inc.
10:30 a.m.	2024-01-2077	Design, Modeling, and Analysis of Heave and Roll Decoupled Suspension Geometry for a Formula Student Prototype Tanmay Panchal, Jennifer Bastiaan, Kettering University
11:00 a.m.	2024-01-2074	Design of Double Wishbone Baja SAE Suspension System Craig Altmann, Keanu Williams, Virginia Military Institute

WCX SAE World Congress Experience

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Tuesday, April 16

Composite Materials and Structures for EV and ICE Vehicle

Session Code M302

Room 330 A Session 1:30 p.m.

This section will provide a forum for engineers and researchers to share the latest developments on the design, manufacturing, characterization, and application of automotive composite materials and structures for next-generation vehicles. Specific topics of interest include but are not limited to: new paradigms of design and development of composite materials; new manufacturing processes of composite materials; novel experiments for characterization of composite materials and structures; damage, failure, and fatigue testing of composites; responses of composites subjected to extreme environments or loading conditions; practical designs of composite structures for all aspects of automotive applications.

Organizers - Somasekhar Bobba, SABIC; Y Charles Lu, Univ. of Kentucky; Sai Aditya Pradeep, University Of Delaware

Time	Paper No.	Title
1:30 p.m.	2024-01-2431	FRP Composite Battery Carriers for Commercial Vehicles Sanjay Srivastava, Shailesh Sonkusare, APPL Global InfoTech Pvt. Ltd.
2:00 p.m.	2024-01-2432	A Holistic Approach to Next-Generation Polymer Composite Pickup Bed Development and Prototyping Amanda Nummy, Hyundai & Kia Corp.
2:30 p.m.	2024-01-2433	POLYURETHANE FOAM COMPOSITES MODIFIED WITH GRAPHENE FOR ACOUSTIC APPLICATIONS: A BRIEF REVIEW Rodrigo Polkowski, TRL9 LAB Testing and Technical Analysis; Lidia Lazzari, Eduardo Kerche, Ricardo Albuquerque, Ford Motor Company Brazil
3:00 p.m.		BREAK
3:30 p.m.	2024-01-2434	Lightweight Composite Rear Under Run Protection Device (RUPD) For ILCV & MHCV Trucks Sanjay Srivastava, Shailesh Sonkusare, APPL Global InfoTech Pvt. Ltd.
4:00 p.m.	2024-01-2435	A Novel Approach for Mechanical Characterization of Angle-Ply Composite Laminates Sushree Tanaya, Anindya Deb, Indian Institute of Science
4:30 p.m.	ORAL ONLY	Silver-Based Low -Emissivity Coating Technology for Energy Saving Sustainable Automotive Windows Applications Laila Salman, Ansys Canada, Ltd.; Duane Mateychuk, Ansys

Planned by Polymers and Coatings Committee / Materials Engineering Activity

Tuesday, April 16

Vehicle NVH CAE Analysis & Testing - Part 1 of 4

Session Code M212

Room 330 B Session 9:30 a.m.

This session covers the forefront NVH development in electrical vehicle, ICE vehicle and autonomous vehicle - numerical methods along with test correlation and optimization for NVH issues of full vehicle and vehicle subsystems. All structural components, subsystems and complete systems found in automotive vehicles will be considered. Topics include noise control materials, structure NVH, vibro-acoustics,

wind noise and aeroacoustics, intake/exhaust noise and vehicle interior noise, sound quality etc.

Organizers - Farokh Kavarana, Nissan Technical Center NA; Pranab Saha, Kolano and Saha Engineers Inc.; Gavin Song, Ford Motor Company; Mark Stebbins, Wenlong Yang, General Motors LLC; Weiguo Zhang, Stellantis

Chairperson - Gavin Song, Ford Motor Company; Pranab Saha, Kolano and Saha Engineers Inc

Time	Paper No.	Title
9:30 a.m.	ORAL ONLY	Technical Keynote: EV NVH Challenges and Countermeasure Strategies: Now and Beyond Perry gu
10:30 a.m.	2024-01-2341	Identification of Important Issues and Driving Modes for Enhancing NVH Performance of Electric Vehicles Based on Comparative Analysis of User Experience with Conventional ICE Vehicles Shion Mise, Kenji Torii, Honda Motor Co., Ltd.; Philipp Sellerbeck, Stefan Hank, HEAD acoustics GmbH; Hidetaka Iwano, Honda Motor (China) Technology Co.,Ltd.; Takuya Nishikoji, Honda Motor Co., Ltd.
11:00 a.m.	2024-01-2350	Analysis and Improvement of the Cabin Low Frequency Noise Caused by Underbody Rear Cavity Airflow Oscillation in the Pure Electric Vehicle High Speed Cruise Long Shen, Smart Automobile Co., Ltd.; Jun Zhang, Perry Gu, Geely Automobile Research Institute
11:30 a.m.	2024-01-2335	Research on Design of Electric Vehicle Sound Synthesis Based on Frequency Shift Algorithm Shangbo Yu, Wuhan University of Technology; Liping Xie, Fuzhou University; Chihua Lu, Yushu Qian, Zhien Liu, Wuhan University of Technology; Du Songze, GAC R&D Center

Tuesday, April 16

Occupant Protection: Accident Reconstruction - Part 1 of 3

Session Code SS500

Room 330 B Session 1:30 p.m.

Presentations studying ADAS systems in modern automobiles. New methods for analyzing pedestrian collisions, tire forces in low speed collisions and roll-over incidents. Simulating motorcycle motion in PC Crash

Organizers - Christopher Armstrong, Armstrong Forensic Reconstruction Corp.; Alan Asay, Asay Engineering; Dean Beaumont, TRL; Jarrod Carter, Origin Forensics LLC; Edward Fatzinger, Momentum Engineering Corp.; Nathan Rose, Explico Engineering Co.

Time	Paper No.	Title
1:30 p.m.	2024-01-2478	An Evaluation of the Bosch Radar-Based Adaptive Cruise Control System on a 2022 Ducati Multistrada V4S Edward C. Fatzinger, William Gonzaga, YA Engineering Services
2:00 p.m.	2024-01-2471	Comparing the Forward Collision Warning Response of a 2020 Toyota Camry and 2020 Toyota RAV4

WCX SAE World Congress Experience

Technical Session Schedule

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Time	Paper No.	Title
		Shawn Harrington, Roberto Aguirre, Forensic Rock
2:30 p.m.	2024-01-2482	An Assessment of the Tesla Model 3's Forward Collision Warning and Automatic Emergency Braking Systems Against A Stationary Pedestrian Target
		Shawn Harrington, Sundar Raman Nagarajan, Forensic Rock; James Lau, Racelogic USA
3:30 p.m.	2024-01-2468	Integrating Machine Learning in Pedestrian Forensics: A Comprehensive Tool for Analysing Pedestrian Collisions
		Vadhiraj Shrinivas, Christophe Bastien, Huw Davies, Alireza Daneshkhah, Joseph Hardwicke, Coventry University; Clive Neal-Sturgess, University of Birmingham; Albi Lamaj, Coventry University
4:00 p.m.	2024-01-2479	Inclusion of Tire Forces into Low-Speed Bumper-to-Bumper Crash Reconstruction Simulation Models
		Matthew Brach, Jacob Stegemann, Emmanuel Jay Manuel, Nicholas Civitanova, Engineering Systems Inc.
4:30 p.m.	2024-01-2466	Rollover Protection Structure - Gouge and Scratch Analysis in Rollover Crashes
		Mark H. Warner, Collision Safety Engineering; Grant Swensen, Brigham Young University; Wyatt Y. Warner, Collision Safety Engineering

Tuesday, April 16

Welding, Joining, and Fastening

Session Code M216

Room 331 A/B/C Session 9:30 a.m.

Presentations related to welding and joining of similar or dissimilar materials of plastics, composites, aluminum, magnesium, titanium, and conventional and advanced high strength steels will be given. Papers related to friction stir (spot) welding, ultrasonic welding, resistance welding, arc welding, laser welding, brazing or soldering, riveting and bolting, and adhesive are planned as well. Papers related to strength, fracture and fatigue of welds, joints and fasteners have been invited.

Organizers - Catherine Amodeo, Ford Motor Company; Wei-Jen Lai, Ford Motor Co.; Pai-Chen Lin, National Chung Cheng University; Jwo Pan, University of Michigan

Time	Paper No.	Title
9:30 a.m.	2024-01-2070	Development of Mo-Free Ultra-High Strength 1.6-GPa Bolt with Delayed Fracture Resistance for Multi-Link Type Engine
		Daiki Sekine, Mitsushi Oyanagi, Takahiro Hamada, Takayoshi Furukawa, Nissan Motor Co., Ltd.; Yosuke Matsumoto, Kobe Steel, Ltd.; Shinji Kanoe, Saga Tekkohsho Co., Ltd.
10:00 a.m.	2024-01-2071	Resistance Rivet and Insert Welding - A Flexible Manufacturing Technique for the Aluminum/FRPs-Steel Multi-Material Body Structures
		Xiangfan Fang, Fan Zhang, Hongli Xu, University of Siegen
10:30 a.m.	2024-01-2069	Simulation of Self-Piercing Riveting Process in Aluminum Alloy 5754 Using Smoothed Particle Galerkin Method
		Jie Zou, Chongqing Jiaotong University; Li Huang, Nanjing Tech University; Bo Ren, Ansys Ltd.; Jingyi Zhang, JITRI; Yuxiang JI, Xi'an Jiaotong-Liverpool University; Tan Guobi, JITRI; Zhenfei Zhan, Chongqing Jiaotong University

WCX SAE World Congress Experience

Technical Session Schedule

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Time	Paper No.	Title
11:00 a.m.	2024-01-2072	The Hybrid Friction Surfacing Deposition Assisted Arc Welding (FsaAW) Approach for Dissimilar Steel/Al Joining of Automobile Structure Gautam Chudasama, Vivek Kalyankar, S. V. National Institute of Technology; Shiv Chauhan, Tata Motors Limited
11:30 a.m.	ORAL ONLY	Failure Analysis of Ultrasonic Welds in Lap-Shear Specimens of Copper Sheets Pai-Chen Lin, WEI-JYUN Wang, National Chung Cheng University

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Tuesday, April 16

Occupant Protection: Structural Crashworthiness and Occupant Safety

Session Code SS510

Room 331 A/B/C Session 1:30 p.m.

This session addresses aspects of occupant safety related to vehicle glass impact, lithium-ion battery crush loading, and development of a dynamic head envelope. NHTSA research into different FMVSS 205 test methods for tempered glass impact and the effect of ceramic paint area will be discussed. Physical testing and FE analysis of indentation crush loading of prismatic cell lithium-ion batteries will be explored. Finally, the development of an ergonomic dynamic head envelope will be presented.

Organizers - Saeed Barbat, Jamel Belwafa, Ford Motor Company; Harry Pearce, Exponent Inc.

Time	Paper No.	Title
1:30 p.m.	2024-01-2491	NHTSA’s Evaluation of Glazing Performance Tests Corinn Rains, NHTSA
2:00 p.m.	2024-01-2492	Simulation of Crush Behavior and Energy Absorption of Vehicle Li-Ion Battery Module with Prismatic Cells Feng Zhu, Krishna Logakannan, Johns Hopkins University; Sida Xu, David Sypeck, Embry-Riddle Aeronautical University
2:30 p.m.	2024-01-2646	Side Impact Characteristics in Modern Light Vehicles Chantal Parenteau, B. Nicholas Ault, Daniel Toomey, Design Research Engineering; Ram Krishnaswami, Ford Motor Company; Roger Burnett, Design Research Engineering
3:30 p.m.	2024-01-2510	Development of the IIHS side impact crashworthiness evaluation deformable barrier 2.0 dynamic test protocol Becky Mueller, Raul Arbelaez, Insurance Institute for Highway Safety; Eric Heitkamp, Christopher Mampe, Honda Motor Co Ltd

WCX SAE World Congress Experience

Technical Session Schedule

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Tuesday, April 16

Advances in Lightweight Materials

Session Code M102

Room 338 Session 9:30 a.m.

This session presents the latest developments in automotive applications of wrought products. The papers cover a wide range of the technical aspects including alloy development, lightweight design, multi-material usage for body structures, process development and simulation as well as performance optimization.

Organizers - Raghu Echempati, Kettering University; Jidong Kang, CanmetMATERIALS; Rahul Kulkarni, Novelis Corporation; Theresa E. MacFarlane, Novelis Global Reasearch & Tech. Ctr.; Jonathan Weiler, Meridian Lightweight Technologies; Peijun Xu, Ebco Inc.

Time	Paper No.	Title
9:30 a.m.	2024-01-2237	Enhancement of Physical and Mechanical Attributes of a Natural Fiber-Reinforced Composite for Engineering Applications M R Karthika, Anindya Deb, Indian Institute of Science; Madasamy Arockiasamy, Florida Atlantic University
10:00 a.m.	ORAL ONLY	A Close Look at Rate Sensitivity in Automotive Aluminium Alloys FADI Abu-Farha, FADI-AMT LLC
10:30 a.m.	ORAL ONLY	Improved Toughness of Lightweight Hollow Extrusions Using Hollow Section Internal Cooling Ala'aldin Alafaghani, Daniel Cooper, University of Michigan
3:00 p.m.		BREAK

Planned by Metallic Materials Committee / Materials Engineering Activity

Tuesday, April 16

Occupant Protection: Biomechanics

Session Code SS501

Room 338 Session 1:30 p.m.

The Biomechanics session presents new research on automotive occupant kinematics, human injury biomechanics, and human tolerance in an automotive environment. This includes new methodologies in the study of human injury, studies of human interaction with occupant protection systems, technological advances in physical and virtual anthropomorphic test devices, and other experimental, analytical and modeling studies on the biomechanics of human injury.

Organizers - Devon Albert, Virginia Tech; Elizabeth McNeil, NHTSA; Jacob Fisher, Exponent Inc.; Warren Hardy, Virginia Tech; Kerry Danelson, Wake Forest Univ. School of Medicine

Chairperson - Devon Albert, Virginia Tech; Elizabeth McNeil, NHTSA

Time	Paper No.	Title
1:30 p.m.	ORAL ONLY	Evaluating the Responses of the THOR and Hybrid III Small Female ATDs during Frontal Sled Tests David Boyle, Virginia Tech.; Andrew Kemper, Devon Albert, Warren Hardy, Virginia Tech

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:30 PM

Time	Paper No.	Title
2:00 p.m.	2024-01-2647	Comparison of the Responses of the Thorax and Pelvis of the GHBMC M50 -O Using Two Different Foam Materials in a High-Speed Rear Facing Frontal Impact Scenario
		Vikram Pradhan, Transportation Research Center Inc.; Rakshit Ramachandra, Transportation Research Center Inc; Yun Seok Kang, Ohio State University
2:30 p.m.	2024-01-2490	Dummy Positioning at Reclined Seating Position before Impact Testing
		Chongqing Liu, YanFeng International Technology Center; Zhenwen Wang, Humanetics Innovative Solutions Inc
3:00 p.m.		BREAK
3:30 p.m.	2024-01-2489	Occupant Kinematics During Chain-Collisions: Discrete vs Combined Collisions
		William R. Bussone, Reza Koiler, CBE Consultants Inc.; Jamie Benda, Nicholas Carney, Andres Geffard, Samantha Sam, Rowan University
4:00 p.m.	2024-01-2488	A Proposed Method for Determination of Distal Tibia Fracture Tolerance for Prediction of Ankle Injuries
		Junior Noss, John-Paul Donlon, Univ of Virginia; Jason Hallman, Toyota Motor North America Inc; Randolff Carpenter, Jason Forman, Univ of Virginia
4:30 p.m.	ORAL ONLY	Lumbar spine fracture progression and severity using high speed x-ray video
		Kerry Danelson, Wake Forest Univ School of Medicine; John Cavanaugh, Wayne State University (Retired); Warren Hardy, Virginia Tech.

Planned by Occupant Protection Committee / Automobile Body, Chassis, Safety, and Structures Activity

Tuesday, April 16

Vehicle Aerodynamics - Part 1 of 5

Session Code SS871

Room 353 Session 9:30 a.m.

Time	Paper No.	Title
9:30 a.m.	2024-01-2538	Wheel Air Drag Prediction Technique Using WAD Parameter
		Untae Kim, Gyeongmin Hwang, Shin Junsik, Jeongmin Han, Sangmyun Park, Sanghyun Park, Hyundai & Kia Corporation
10:00 a.m.	2024-01-2539	Aerodynamic analysis of ultra-efficient vehicle prototype: Effect of spoked wheels and different configurations
		David Andrés Galvis Chaves, Danny Illera-Perozo, Universidad de La Sabana; Luis Longas Lalinde, University Of Central Florida
10:30 a.m.	2024-01-2540	Analysis of Aerodynamic Characteristics of Fan-Type Wheels
		Yong-su Shin, Jungsoo Lee, Hyundai Motor Company

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:30 PM

Time	Paper No.	Title
11:00 a.m.	2024-01-2548	A Drag-Reduction Prediction Model for Truck Platoons Brian McAuliffe, National Research Council Canada
11:30 a.m.	2024-01-2549	Wind-Load and Surface-Pressure Measurements of the Aerodynamic Interactions of a Passenger Vehicle with Adjacent-Lane Vehicles Brian McAuliffe, Hali Barber, National Research Council Canada

Tuesday, April 16

Vehicle Aerodynamics - Part 2 of 5

Session Code SS871

Room 353 Session 1:30 p.m.

Time	Paper No.	Title
1:30 p.m.	2024-01-2523	Advancements in GPU-based LBM CFD Solver for Vehicle Aerodynamics: Enhancing Early Stage Development with Sliding Mesh Rotating Reference Frame Mehdi Mortazawy, Richard Shock, Dalon Work, Jonathan Jilesen, Mukul Rao, Dassault Systemes of America Corporation
2:00 p.m.	2024-01-2524	A Mechanical Energy Control Volume Approach Applied to CFD Simulations of Road Vehicles Paul Norman, Kevin Howard, Ford Motor Company
2:30 p.m.	2024-01-2525	Prediction of Aerodynamic Drag in SUVs with Different Specifications by Using Large-Eddy Simulations Hiroaki Nagaoka, Basmil Yenerdag, Kei Ambo, Honda Motor Co., Ltd.; David Philips, Christopher Ivey, Guillaume Brès, Sanjeeb Bose, Cadence Design Systems Inc
3:00 p.m.		BREAK
3:30 p.m.	2024-01-2526	CFD SIMULATION OF VISOR FOR CLEANING AV SENSORS Navvab Khajeh Hosseini D., Ford Automotive Company; Davide Basso, Siemens Digital Industries Software; Michael Schigelone, Venkatesh Krishnan, Burkhard Hupertz, Tao Jiang, Ford Motor Company
4:00 p.m.	2024-01-2527	Computational Study of a DrivAer Model by Using the Partially-Averaged Navier-Stokes Approach in combination with the Immersed Boundary Method Branislav Basara, Zoran Pavlovic, Sanjin Saric, AVL LIST GmbH
4:30 p.m.	2024-01-2529	Machine Learning for Road Vehicle Aerodynamics Simulation Vidyasagar Ananthan, Neil Ashton, Nate Chadwick, Mariano Lizarraga, Danielle Maddix, Satheesh Maheswaran, Pablo Hermoso Moreno, Parisa M. Shabestari, Sandeep Sovani, Shreyas Subramanian, Srinivas Tadepalli, Peter Yu, Amazon Web Services

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:30 PM

Tuesday, April 16

Applications of Advanced High-Strength Steels and Press Hardening for Automotive Structures

Session Code M104

Room 355 Session 9:30 a.m.

This session provides a forum for researchers and application engineers to disseminate the knowledge and information gained in the area of advanced high-strength and press-hardening steel development and applications in automotive structures, enabling light-weight and durable vehicles with improved safety.

Organizers - Constantin Chiriac, Ford Motor Co; Emmanuel De Moor, Colorado School of Mines; Brandon Hance, CBMM North America; Ming Shi, Jatinder Singh, General Motors LLC

Time	Paper No.	Title
9:30 a.m.	2024-01-2240	Comparison of Bake Hardening Effects on AHSSs and Extruded Aluminum Alloys Applied in BEV Reinforcement Structures Jun Hu, Cleveland-Cliffs Inc.; Yeting Sun, University Of Central Florida; Miao Yu, Yu-Wei Wang, Grant Thomas, Cleveland-Cliffs Inc.
10:00 a.m.	2024-01-2241	Effect of local ductility on crash performance of automotive structures considering press forming strain in advanced high strength steels Kentaro Sato, Tomohiro Sakaidani, Shinsuke Komine, Fangyi Wang, Tatsuya Nakagaito, JFE Steel Corporation
10:30 a.m.	2024-01-2242	The Effect of Microstructure on Edge Ductility in Single- and Multi-Phase Hot-Rolled AHSS Grades Olivia O'Keefe, Kip Findley, Colorado School of Mines; Arjan Rijkenberg, Tata Steel
11:00 a.m.	ORAL ONLY	Artificial Intelligence in HER Testing: Can we Increase the Robustness of Edge Crack Detection in Steels? Fadi Abu-Farha, FADI-AMT LLC
11:30 a.m.	ORAL ONLY	Material Characterization and Performance Evaluations of 1180 GEN3 Generation 3 (GEN3) steels have been used in many automotive components for lightweighting, cost savings and performance improvements. Recently, 1180 GEN3 has become available from global sheet steel suppliers and has been used by OEMs in safety cage and battery tray structural components. In this presentation, material characterizations of 1180 GEN3 are provided including basic material properties, bake hardenability, edge stretchability and formability and their unique features are also discussed. Challenges faced in spot weldability and improved formability performance would be also discussed. Ming Shi, GM

Planned by Metallic Materials Committee / Materials Engineering Activity

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:30 PM

Tuesday, April 16

Failure Analysis of Materials, Components, and Systems

Session Code M107

Room 355 Session 1:30 p.m.

The mobility industry is constantly challenged to provide customers with the ultimate in reliability and durability. As a result, when failures occur during testing or real-world service, it is essential to identify the root cause and take appropriate corrective action in a timely manner. This session will cover failure analysis methodology, fundamentals of failure mechanisms, non-destructive evaluation, fractography, material fatigue testing, fatigue life design for vehicles, material fracture criteria, damage and fracture characterization, fracture prediction in vehicle crash, material fracture behavior in high strain rates, etc., and creative problem-solving case examples of failure analysis and prevention.

Organizers - Peijun Xu, Ebco Inc.

Time	Paper No.	Title
2:00 p.m.	2024-01-2244	Construction of Life Prediction Process for Engine Parts by Using Real-World Driving Data and Simulation Models Kohei Tanaka, Kenta Yoshii, Katsuyuki Takahashi, Honda Motor Co., Ltd.
2:30 p.m.	2024-01-2246	A Study on Handling Steering Angle Sensor Failure on Redundancy-Based EPS Systems Sangwoo Jeong, Taegyun Kim, Daesung Kim, HL Mando
3:00 p.m.		BREAK
3:30 p.m.	2024-01-2247	Simulation Methodology for Failure Analysis of Catalytic Converter Mounting on Commercial Vehicles Bipin Gupta, Forvia Japan K.K.; Jiangong Li, Forvia China; Vinothkumar Singaravel, Forvia India
4:00 p.m.	2024-01-2248	A Study on a Prognostics and Health Management (PHM) Based on Fracture Mechanics Using Deep Learning Byungwoo Moon, SangWon Lee, DongJin Nam, Jeonghwan Kim, JaeWoong Bae, JeongMin Shin, Hyundai Motor Group

Planned by Metallic Materials Committee / Materials Engineering Activity

Tuesday, April 16

Fatigue Analysis and Design - Part 1 of 3

Session Code M200

Room 356 Session 9:30 a.m.

1 customer usage development 2 structural stress generation 3 fatigue of metallic material including new lightweight metals 4 fatigue of non-metallic materials 5 fatigue of joints and bearings 6 environmental effects on fatigue performance 7 effect of manufacturing processes on fatigue behavior 8 vibration fatigue 9 probabilistic fatigue 10 microstructure-mechanics based fatigue 11 machine learning 12 battery pack, electrical motor and BEV drivetrain fatigue and durability.

Organizers - Mingchao Guo, Stellantis; Yung-Li Lee, Stellantis Retired; Paul Lubinski, Thermo King Corp.; Gavin Song, Ford Motor Company; Xijia Wu, National Research Council Canada; Sean McKelvey, Stellantis; Hong Tae Kang, Univ of Michigan-Dearborn; Matteo Facchinetti, Stellantis; Jeong Hong, Thornton Tomasetti

Chairperson - Mingchao Guo, FCA US LLC; Hong Tae Kang, Univ of Michigan-Dearborn

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:30 PM

Time	Paper No.	Title
9:30 a.m.	2024-01-2253	Durability of elastomeric bushings computed from track-recorded multi-channel road load input William Mars, Endurica LLC; Kevin Barbash, Matthew Wieczorek, General Motors LLC; Scott Braddock, Joshua Goossens, Tenneco; Ethan Steiner, Endurica LLC
10:00 a.m.	2024-01-2250	Development of an Evaluation Method for Fretting Fatigue at the Mating Surface between a Cylinder Block and Main Bearing Cap with Temperature Fluctuations Yuki Otsuka, Honda Motor Co., Ltd.
10:30 a.m.	2024-01-2251	Analysis of Loads Applied to Wheels of Heavy Vehicles and Study on Loosening of Hub Bolts and Nuts Soichi Hareyama, Ken-ichi Manabe, Satoshi Kobayashi, Tokyo Metropolitan University
11:00 a.m.	2024-01-2249	Method for Root Bending Fatigue Life Prediction in Differential Gears and Validation with Hardware Tests Michael A. DeJack, AVL Mobility Technologies, Inc.; Richard Tichy, AVL List GmbH
11:30 a.m.	ORAL ONLY	Experimental Study on Static and Fatigue Performance of Flowform Joints Connecting Steel and Aluminum Components Mingchao Guo, FCA US LLC

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Tuesday, April 16

Human Factors in Driver Vision and Lighting

Session Code SS301

Room 356 Session 1:30 p.m.

Visual perception continues to be a critical aspect of overall driver performance. This session offers presentations highlighting new results relevant to visual perception, including how drivers negotiate intersections, how lighting parameters may affect the perception of flicker, how displays may be personalized, and how side markers may be made more reliable.

Organizers - Michael Flannagan, Univ of Michigan-Ann Arbor

Chairperson - Joseph Jaklic, ams-OSRAM

Time	Paper No.	Title
1:30 p.m.	2024-01-2462	What the Flicker is going on here? Temporal Light Modulation in Automotive Lighting Naomi Miller, Lia Irvin, Pacific Northwest National Laboratory
2:00 p.m.	2024-01-2464	System and Machine Learning Based Method for Smart E-Mirror Recommendation Asadullah Ansari, Harman International India Pvt, Ltd.; Karthik P.C., SRM Institute of Science & Technology; Sharath D H, Saheel Sikander, Harman International India Pvt Ltd; Vivke Chidambaram, SRM Institute of Science & Technology

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:30 PM

Planned by Human Factors Committee / Automobile Body, Chassis, Safety, and Structures Activity

Tuesday, April 16

Fatigue Analysis and Design - Part 2 of 3

Session Code M200

Room 356 Session 3:30 p.m.

1 customer usage development 2 structural stress generation 3 fatigue of metallic material including new lightweight metals 4 fatigue of non-metallic materials 5 fatigue of joints and bearings 6 environmental effects on fatigue performance 7 effect of manufacturing processes on fatigue behavior 8 vibration fatigue 9 probabilistic fatigue 10 microstructure-mechanics based fatigue 11 machine learning 12 battery pack, electrical motor and BEV drivetrain fatigue and durability.

Organizers - Mingchao Guo, Stellantis; Yung-Li Lee, Stellantis Retired; Paul Lubinski, Thermo King Corp.; Gavin Song, Ford Motor Company; Xijia Wu, National Research Council Canada; Sean McKelvey, Stellantis; Hong Tae Kang, Univ of Michigan-Dearborn; Matteo Facchinetti, Stellantis; Jeong Hong, Thornton Tomasetti

Chairperson - Gavin Song, Ford Motor Company; Jeong Hong, Thornton Tomasetti; Yung-Li Lee, Stellantis Retired

Time	Paper No.	Title
3:30 p.m.	ORAL ONLY	Technical Keynote: Fatigue Simulation, Verification, and Validation Andrew Halfpenny, HBM-nCode
4:00 p.m.	2024-01-2257	Fatigue Life Prediction of Arc Welded Steel Specimens under Multiaxial Loads Including Bead Shape Effects Dooyoung Kim, Ho Young Kong, Jaehong Park, Hyundai Motor Group
4:30 p.m.	ORAL ONLY	Unified weld fatigue design and evaluation procedure for high-frequency mechanical impact (HFMI) treated automotive welded structures Jeong Hong, Thornton Tomasetti

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Tuesday, April 16

Welcome and Keynote: AI and Automotive: Virtuous, Evil or Are We Just Paranoid?

Session Code LS101

Room Exhibit Hall Session 8:30 a.m.

Time	Paper No.	Title
8:30 a.m.	ORAL ONLY	AI and Automotive: Virtuous, Evil or Are We Just Paranoid? Avinash Balachandran, Toyota Research Institute

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:30 PM

Tuesday, April 16

Learning Lab - Day 1

Session Code LL100

Room Exhibit Hall Session ALL DAY

Time	Paper No.	Title
9:30 a.m.	ORAL ONLY	Production Ready: Introducing our Breakthrough Energy Efficient Software on a Chip technology for Defrost and Defog in EVs! Derrick Redding, Betterfrost
10:00 a.m.	ORAL ONLY	AutoDrive Challenge .. TBD
10:30 a.m.	ORAL ONLY	AutoDrive Challenge .. TBD
11:00 a.m.	ORAL ONLY	AutoDrive Challenge .. TBD
11:30 a.m.	ORAL ONLY	AutoDrive Challenge .. TBD
12:00 p.m.	ORAL ONLY	AutoDrive Challenge .. TBD
12:30 p.m.	ORAL ONLY	Converting High Voltage to SELV in your xEV Architecture with One Power Module Patrick Wadden, Vicor
1:00 p.m.	ORAL ONLY	Presentation .. TBD
1:30 p.m.	ORAL ONLY	BEV Innovation Opportunities for Traditional ICE Technologies - New Shift Systems for Improved Efficiency & Performance John Jennings, Amsted Automotive
2:00 p.m.	ORAL ONLY	GAMIC Finalist Presentations .. TBD

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:31 PM

Time	Paper No.	Title
2:30 p.m.	ORAL ONLY	GAMIC Finalist Presentations
		.. TBD
3:00 p.m.	ORAL ONLY	GAMIC Finalist Presentations
		.. TBD
3:30 p.m.	ORAL ONLY	GAMIC Finalist Presentations
		.. TBD
4:00 p.m.	ORAL ONLY	Presentation
		.. TBD, Focal Point Positioning
4:30 p.m.	ORAL ONLY	Presentation
		.. TBD, Keysight

Tuesday, April 16

How Will Technology Influence Vehicle Interior and Exterior Design

Session Code LS102

Room Exhibit Hall Session 10:00 a.m.

With the emergence of Autonomous Technology and Electric Propulsion vehicle, vehicle designers have a clean slate to redesign vehicles from both the interior and exterior perspective- or do they? What about the issue of legacy products, manufacturing supply chain or consumer acceptance. Are we forced to stay with the feel, fit and flavor of vehicles we have now or is technology and consumer acceptance making it possible to reimage the vehicle? What are the business implications for this reimaging and how do we regulate without hampering consumer's wants and needs? Learn more about the Panelists Sponsored by

Moderators - John McElroy, Blue Sky Productions

Panelists - Scott Krugger, Stellantis NV; Andrew C. Moir, Hyundai Design North America; Adam Rabinowitz, Calty Design Research Inc (Toyota); Paul Snyder, College for Creative Studies; Kurt Zielinski, American Honda Motor Co. Inc.;

Tuesday, April 16

The Future of Automotive and Mobility Companies: The Business Case for Sustainable Growth and Innovation

Session Code LS103

Room Exhibit Hall Session 1:00 p.m.

The New Automotive Mandate is moving from building not just great products, but new businesses and services. AutoMobility is one of the hottest industries with traditional automakers, as well as emerging players continually developing new technologies, products and processes to sustain growth and innovation. This session will highlight the business case for sustainable growth and innovation through design, brand democracy and problem solving by integrating Design Thinking and Social Thinking to innovatively package product and technology content with social and consumer context. Topics will include new age industrialization and modularization, vertical integration 2.0, integrated design and marketing, advanced technology, lean customization, personalization and innovative partnerships. Learn more about the Panelists Sponsored by

WCX SAE World Congress Experience

Technical Session Schedule

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Moderators - John Waraniak, Have Blue LLC

Panelists - Anirvan Coomer, GM Ventures; Anthony Lo, Ford Motor Co.; Kristen Tabar, Toyota Motor North America Inc.;

Tuesday, April 16

Getting to SAE Level 3: Persistent Challenges and Strategies Necessary for OEM's

Session Code LS104

Room Exhibit Hall Session 2:45 p.m.

In 2023, most major OEMs have achieved proficiency in L2 driver assistance systems. However, progressing from L2 to L3 marks a substantial transformation. Despite the technological readiness of the L3 tech stack, OEMs are not legally or liability-wise prepared. Whereas L2 denotes advanced driver support features, L3 initiates conditional autonomous driving, permitting the driver to advert their attention from the road once specific conditions are met. Consequently, when OEMs introduce L3 vehicles, they must anticipate the lability for accidents occurring while L3 systems are enabled. The panel will discuss the persistent challenges and strategies necessary for OEMs to build confidence to expedite and deploy their L3 and beyond initiatives. [HMI, Enhanced Sensor Technology, Cyber Security, ML/AI, Redundancy, HD-Maps, Certification – state by state] Learn more about the Panelists

Moderators - Steve Dellenback, Southwest Research Institute

Panelists - Daniel Bartz, Volkswagen Group Of America; Myra Blanco, Virginia Tech. Transportation Institute; Jennifer Dukarski, Butzel Long; Tom Tasky, FEV North America Inc.;

Tuesday, April 16

SAE EDGE™ Reports Knowledge Bar - Tuesday, April 16

Session Code KB100

Room SAE EDGE Reports Knowledge Bar Session 10:00 a.m.

Time	Paper No.	Title
10:00 a.m.	ORAL ONLY	Newcomers and Incumbents - 2 approaches to mobility engineering What are the differences between the traditional automotive companies and new mobility players; and even more importantly: who will win? Those are the questions that a new SAE EDGE Research Report tackles, to which the author will give a preview at the Knowledge Bar and engage with the audience in an open discussion. Sven Beiker, Stanford University
10:45 a.m.		Break
11:00 a.m.	ORAL ONLY	Transforming Integrated Vehicle Design: Systems Engineering Adoption CASE (Connected, Accessible, Autonomous, Shared/Subscription, Electric) vehicle technologies are changing vehicle functionality and compounding complexity. It’s time to mirror those innovations with a systemic shift to integrated design practices. We’ll explore signs of adoption in automotive and look at takeaways from other industries having made the Systems transition. Anne O'Neil, AOC Systems Consortium; Timothy Yerdon, Plymouth Technology Advisors
11:45 a.m.		Break

WCX SAE World Congress Experience

Technical Session Schedule

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Time	Paper No.	Title
1:00 p.m.	ORAL ONLY	Preparing Engineers for an Uncertain Future The market is volatile, and technology is changing rapidly. Professional can't ignore an undeniable fact—the future of engineering is uncertain. And engineers can't stand uncertainty! Whether you're ready to upskill yourself, upgrade your role, or create a career path, you won't want to miss this informative talk full of user-friendly career tips. Engineers Will Learn: - The one thing they can start doing today to build resilience against an uncertain future. - Creative ways to upskill and build upon current competencies in the work environment (employment not required!). - A flexible system to help them overcome career obstacles or failed plans. In this Knowledge Bar session, engineers will gain transformational strategies to help them work with an uncertain future, not against it! Gina A. Covarrubias, Deliberate Doing LLC
1:45 p.m.		Break
2:00 p.m.	ORAL ONLY	Bio-Fuels Camilo Abduch Adas, Be8-Energy
2:45 p.m.		Break
3:00 p.m.	ORAL ONLY	Wait, …What, Electric Vehicles Use Oils Too? Auke Faber, Mariam Shamszad, Lubrizol Corp.

Tuesday, April 16

Fire Safety [Written Only]

Session Code SS200

Room TBD Session

The fire safety session will focus on current developments in the fields of vehicle fire science, statistics, risks, assessment and mitigation. Papers addressing vehicle design, live-fire tests and fire investigation issues applicable to traditional, electric and alternatively fueled vehicles will be presented.

Organizers - Brad Galgoci, General Motors LLC; Michael Papageorge, Colwell Consulting LLC

Planned by Fire Safety Committee / Automobile Body, Chassis, Safety, and Structures Activity

WCX SAE World Congress Experience

Technical Session Schedule

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Wednesday, April 17

Powertrain Adaptation for Connectivity and Automation

Session Code PFL150

Room 140 A Session 9:30 a.m.

This session will cover technologies that use connectivity and automation to optimize vehicle dynamics and powertrain systems operations, with the goal of reducing energy consumption. Contributions may include vehicle dynamics and powertrain control technologies, implemented on single vehicles or across a cohort of cooperating vehicles, showing potential to significantly improve individual vehicle energy efficiency. Concepts and technologies supported by experimental studies are welcome.

Organizers - Marcello Canova, The Ohio State University; Bharatkumar Hegde, General Motors LLC; Scott Hotz, Southwest Research Institute

Time	Paper No.	Title
9:30 a.m.	2024-01-2082	Optimizing Urban Traffic Efficiency via Virtual Eco-Driving Featured by a Single Automated Vehicle Mehmet F. Ozkan, Shobhit Gupta, Stefano D'Alessandro, Ohio State University; Matteo Spano, Politecnico di Torino; Dennis Kibalama, Jacob Paugh, Marcello Canova, Stephanie Stockar, Ohio State University; Ronald A. Reese, Bryon Wasacz, Stellantis NV
10:00 a.m.	2024-01-2604	Electric vehicle battery health aware DC fast-charging recommendation system Bharatkumar Hegde, Ibrahim Haskara, General Motors LLC
10:30 a.m.	2024-01-2605	Eco-routing Algorithm for Energy Savings in Connected Vehicles using Commercial Navigation Information Shreshta Rajakumar Deshpande, Piyush Bhagdikar, Stanislav Gankov, Sankar Rengarajan, Jayant Sarlashkar, Scott Hotz, Shuvodeep Bhattacharjya, Southwest Research Institute
11:00 a.m.	2024-01-2606	Energy Savings Impact of Eco-Driving Control Based on Powertrain Characteristics in Connected and Automated Vehicles: On-Track Demonstrations Jongryeol Jeong, Argonne National Laboratory; Elangovan Kandaswamy, Ahammad Basha Dudekula, Michigan Technological University; Jihun Han, Dominik Karbowski, Argonne National Laboratory; Jeffrey Naber, Michigan Technological University
11:30 a.m.	2024-01-2607	Electric vehicle predictive thermal comfort management with solar load estimation Bharatkumar Hegde, Ibrahim Haskara, Shailendra Kaushik, ChenFang Chang, General Motors LLC

Planned by General Powertrain Development / Energy and Propulsion Activity

Wednesday, April 17

Multi-Dimensional Engine Modeling - Part 1 of 3

Session Code PFL120

Room 140 A Session 1:30 p.m.

The spectrum of papers solicited for this session reflect the truly multi-disciplinary nature of the field of Multi-Dimensional Engine Modeling. The session covers advances in the development and application of models and tools involved in multi-dimensional engine modeling. This includes advances in chemical kinetics, combustion and spray modeling, turbulence, heat transfer, mesh generation, and approaches targeting improved computational efficiency. Papers employing multi-dimensional modeling to gain a deeper understanding of processes related to turbulent transport, transient phenomena, and chemically reacting, two-phase flows are also encouraged.

Organizers - Hardo Barths, General Motors LLC; Anand Nageswaran Bharath, Cummins Inc.; Gianluca D'Errico,

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Politecnico di Milano; Stefano Fontanesi, Universita di Modena e Reggio Emilia; Haiwen Ge, Zhejiang Laboratory; Yuanjiang Pei, Aramco Americas

Time	Paper No.	Title
1:30 p.m.	ORAL ONLY	An Analysis-Led Combustion System Design for a Direct Injection Hydrogen Engine
		Le Zhao, Anqi Zhang, Rafael Lago, Yuanjiang Pei, Ji-Woong Park, Aramco Americas: Aramco Research Center; Sriram Popuri, Nick Bowen, Griffin matuszak, Cummins Inc
2:00 p.m.	ORAL ONLY	Numerical Analysis of the Hydrogen-Air Mixture Formation Process in a Small Displacement Direct-Injection Engine
		Andrea Scalambro, Federico Millo, Andrea Piano, Politecnico di Torino; Nicola Scinicariello, Wladimir Lodi, Kohler Engines; Avnish Dhongde, FEV Europe GmbH; Giuseppe Sammito, FEV Italia
2:30 p.m.	ORAL ONLY	Experimental and numerical analysis of hydrogen injection for mixture formation investigation in an internal combustion engine for heavy-duty applications
		Francesco Pucillo, Federico Millo, Andrea Piano, Politecnico di Torino; Alessandro Gallo, Luca Vargiu, FPT Industrial SpA
3:00 p.m.		BREAK
3:30 p.m.	2024-01-2685	Proposal and Validation of 3D-CFD Framework for Ultra-Lean Hydrogen Combustion in ICEs
		Stefano Sfriso, Fabio Berni, Sebastiano Breda, Stefano Fontanesi, Universita di Modena e Reggio Emilia; Caio Ramalho Leite, Pierre Brequigny, Fabrice Foucher, Universite d'Orleans
4:00 p.m.	2024-01-2687	Investigation of URANS CFD Methods for Supersonic Hydrogen Jets
		Kacper Oskar Kaczmarczyk, University Of Bath; Xinlei Liu, Hong G. Im, James W.G. Turner, King Abdullah University of Science and Technology; Hao Yuan, Sam Akehurst, Stefania Esposito, University Of Bath
4:30 p.m.	2024-01-2693	Numerical Analysis of Different Hydrogen Injector Characteristics in a Constant Volume Chamber
		Kevin Moreno Cabezas, Abdullah Zaihi, Xinlei Liu, Bassam Aljohani, Hao Wu, Moez Ben Houidi, William L. Roberts, Hong G. Im, King Abdullah University of Science and Technology

Planned by General Powertrain Development / Energy and Propulsion Activity

Wednesday, April 17

Control System Design, Calibration, and Optimization - Part 1 of 2

Session Code PFL130

Room 140 B Session 9:30 a.m.

This session focuses on powertrain control system design, calibration, and optimization. Examples of topics include control-oriented modeling, model based or machine learning driven calibration\control\estimation, diagnostic and prognostic, optimization of the powertrain system and subsystems such as engine, transmission, motor, battery etc.

Organizers - Yichao Guo, Stellantis NV; Zhe Wang, Ford Motor Company; Bin Xu, Univ. of Oklahoma

Time	Paper No.	Title

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Time	Paper No.	Title
9:30 a.m.	2024-01-2596	Consumer-Oriented Energy Use and Range Metrics for Battery Electric Vehicles C. Scott Sluder, Stacy C. Davis, Robert G. Boundy, Oak Ridge National Laboratory
10:00 a.m.	2024-01-2597	Technical Challenges with on Board Monitoring Sarah Funk, Janean Potter, Erika Pruski, General Motors LLC
10:30 a.m.	2024-01-2598	Benchmarking of Neural Network Methodologies for Piston Thermal Model Calibration Stephen Wright, Avinash Ravikumar, Laura Redmond, Chris McMahan, Benjamin Lawler, Clemson University; Matthew P. Castanier, Eric Gingrich, Michael Tess, US Army DEVCOM GVSC
11:00 a.m.	2024-01-2599	A Novel approach to define and validate market representative routes for IUPRm development in India. Prashant Sharma, Dilbagh Singh, Amit Kumar, Amit Gautam, Vikram Khanna, Maruti Suzuki India Limited
11:30 a.m.	2024-01-2601	Verification Method to Optimize Multiple Engine Functions in a Short Time Using Multi-Objective Design Exploration Yuki Sano, Suguru Fukuda, Kazuaki Watanabe, Honda Motor Co., Ltd.

Planned by General Powertrain Development / Energy and Propulsion Activity

Wednesday, April 17

Control System Design, Calibration, and Optimization - Part 2 of 2

Session Code PFL130

Room 140 B Session 1:30 p.m.

This session focuses on powertrain control system design, calibration, and optimization. Examples of topics include control-oriented modeling, model based or machine learning driven calibration\control\estimation, diagnostic and prognostic, optimization of the powertrain system and subsystems such as engine, transmission, motor, battery etc.

Organizers - Yichao Guo, Stellantis NV; Zhe Wang, Ford Motor Company; Bin Xu, Univ. of Oklahoma

Time	Paper No.	Title
1:30 p.m.	2024-01-2602	Powertrain Digital Twinning for Real-world Emissions Compliance Phil Roberts, Alex Mason, Aaron Headley, Luke Bates, Kunio Tabata, Steve Whelan, HORIBA MIRA Ltd.
2:00 p.m.	2024-01-2603	Optimization of the IC Engine Piston Skirt Design Via Neural Network Surrogate and Genetic Algorithms Xinlin Zhong, Tsung-Yu Yang, Tian Tian, Massachusetts Institute of Technology
2:30 p.m.	ORAL ONLY	Control Law for Fast, Non-Ringing Transients for Direct Injector Needle Actuators and Other Dynamic Systems (SAE Paper: 2024-01-5007) Charlie Bright, Quantum Control Works LC

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Technical Session Schedule

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Planned by General Powertrain Development / Energy and Propulsion Activity

Wednesday, April 17

Dual Fuel Combustion - Part 2 of 2

Session Code PFL260

Room 140 B Session 3:30 p.m.

This session focuses on combustion with multiple fuels, typically with one direct-injected fuel that is not fully premixed. Combustion phasing and duration may be mixing-controlled or kinetically-controlled. Papers describing experiments and test data, simulation results focused on applications, fuel/additive effects, and RCCI (Reactivity-Controlled Compression Ignition) are included. Part 2 is focused on papers describing ammonia dual-fuel combustion.

Organizers - Brian Kaul, Oak Ridge National Laboratory; Raul Payri, Universitat Politecnica de Valencia; Diego Bestel, Argonne National Laboratory; Gurneesh Jatana, US Dept of Energy; Adam Dempsey, Marquette University

Time	Paper No.	Title
3:30 p.m.	2024-01-2362	Optical diagnostic study on ammonia-diesel and ammonia-PODE dual fuel engines Jianshu Mao, Yixiao Zhang, Tsinghua University; Yue Ma, SMDERI; Xiao Ma, Zhi Wang, Zhenqian Wang, Shijin Shuai, Tsinghua University
4:00 p.m.	2024-01-2369	A study on combustion and emission characteristics of an ammonia-biodiesel dual-fuel engine Yi Liu, Kaiyuan Cai, Chen Qingchu, Qi Yunliang, Zhi Wang, Tsinghua University

Planned by Engine Combustion / Energy and Propulsion Activity

Wednesday, April 17

SI Ignition - Part 3 of 3

Session Code PFL215

Room 140 C Session 9:30 a.m.

This session focuses on the SI combustion ignition process and advanced ignition systems. Papers cover both 4-stroke and 2-stroke engines characterized by 1) ignition by an external energy source that serves to control combustion phasing, and 2) a combustion rate that is limited by flame propagation. This specific section focuses on prechamber ignition systems utilizing gaseous fuels.

Organizers - Xin Yu, Aramco Research Center; William Attard, Stellantis; Richard Davis, Michigan Technological Univ.; Simona Merola, CNR Stems; Siddharth Gopujkar, Michigan Technological University; Alessandro D'Adamo, Universita di Modena e Reggio Emilia

Chairperson - Simona Merola, CNR Stems; Xin Yu, Aramco Research Center

Time	Paper No.	Title
9:30 a.m.	2024-01-2099	Experimental Comparison of Spark and Jet Ignition Engine Operation with Ammonia/Hydrogen Co-Fuelling Ajith Ambalakatte, Alasdair Cairns, Sikai Geng, Amirata Varaei, Abdelrahman Hegab, University of Nottingham; Anthony Harrington, Jonathan Hall, Michael Bassett, Mahle Powertrain Ltd.
10:00 a.m.	2024-01-2104	Numerical Study on the Combustion Characteristics of an Ammonia/Hydrogen Engine with Active Prechamber Ignition

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Time	Paper No.	Title
		Zhe Ma, Chenxu Wang, Jun Deng, Quanbo Shang, Yongjian Tang, Tongji University; Haie Chen; Yi Huang, Tsinghua University; Liguang Li, Tongji University
10:30 a.m.	2024-01-2109	Combustion Characteristics of a Jet Ignition Ammonia-hydrogen Engine
		Yunliang Qi, Wei Wang, Zhi Wang, Tsinghua University
11:00 a.m.	ORAL ONLY	Non-thermal plasma-assisted pre-chamber ignition of methane/air for natural gas compressor station application
		Daipayan Sen, University of Minnesota; Sayan Biswas, University Of Minnesota Twin Cities
11:30 a.m.	ORAL ONLY	Experimental comparison of traditional spark plug and passive prechamber ignition systems for heavy duty natural gas engines - ranging from lean burn to stoichiometric
		John Richard Valla, Adam Dempsey, Marquette University

Planned by Engine Combustion / Energy and Propulsion Activity

Wednesday, April 17

Basic CI Combustion - Part 1 of 2

Session Code PFL221

Room 140 C Session 1:30 p.m.

Submissions in this session address compression ignition and mixing controlled combustion concepts. Injection strategies, combustion refinement, and the use of alternative fuels/blends utilizing these combustion strategies are also included.

Organizers - Mark Hoffman, Auburn Univ; Chad Koci, Caterpillar Inc; Giacomo Belgiorno, Punch Torino SpA; Antowan Zyada, General Motors

Time	Paper No.	Title
1:30 p.m.	2024-01-2701	Methanol Mixing-Controlled Compression Ignition with Ignition Enhancer for Off-Road Engine Operation
		Sanguk Lee, Dario Lopez Pintor, Sandia National Laboratories; Seokwon Cho, Mississippi State University
2:00 p.m.	2024-01-2834	Experimental Comparison of Different Cycle-Based Methodologies for the INDICATING in Hydrogen-Fueled Internal Combustion Engines
		Naqash Azeem, Parthenope University of Naples,CNR STEMS,PUNCH; Carlo Beatrice, CNR STEMS; Alberto Vassallo, Davide Gessaroli, Francesco Pesce, Punch Torino SpA; Roberto Golisano, Nicola Sacco, PUNCH Hydrocells
2:30 p.m.	2024-01-2702	Study of Dimethyl Ether Fuel Spray Characteristics and Injection Profile
		Binghao Cong, Simon Leblanc, Xiao Yu, Ming Zheng, University of Windsor
3:00 p.m.		BREAK

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Technical Session Schedule

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Time	Paper No.	Title
3:30 p.m.	ORAL ONLY	Exhaust Rebreathe as an Ignition Assistance Source for Ethanol in Mixing-Controlled Compression Ignition – Single Cylinder Experiments in a Heavy-Duty Diesel Engine Tyler Johnston, Adam Dempsey, Marquette University
4:00 p.m.	2024-01-2699	An Assessment of Performance of Compression Ignition Engine Fueled with Recycled Waste Engine Oil Waste Cooking Oil and Waste Plastic Oil as Fuel Prabakaran B, Hindustan Institute of Technology Science; Mohd Hafizil Mat Yasin, Politeknik Sultan Mizan Zainal Abidin
4:30 p.m.	ORAL ONLY	Study on heat loss reduction from a HD diesel engine with high compression ratio Fumihiro Kawaharazuka, Noboru Uchida, New ACE Institute Co., Ltd.

Planned by Engine Combustion / Energy and Propulsion Activity

Wednesday, April 17

Application of H2 and Gaseous Fuels to Engines - Part 1 of 2

Session Code PFL272

Room 140 D Session 9:30 a.m.

This session focuses on the application of H2 and natural gas to engine systems. Papers in the session investigate fuel injection, combustion, control systems, performance and emissions of gaseous-fueled engines.

Organizers - Ezio Mancaruso, STEMS - CNR; Gordon McTaggart-Cowan, Simon Fraser University; Ashish Shah, Aramco - Detroit Research Center; James Turner, KAUST; Haiwen Ge, Zhejiang Laboratory; Oivind Andersson, Lund University

Time	Paper No.	Title
9:30 a.m.	2024-01-2612	Effect of Port Water Injection on the Knock and Combustion Characteristics for an Argon Power Cycle Hydrogen Engine Yongjian Tang, Jun Deng, Kaien Xie, Shaoye Jin, Liguang Li, Tongji University
10:00 a.m.	2024-01-2614	Effect of Timing Strategy on Mixture Formation, Performance and Emission of Inlet Injection Hydrogen Engine Zhiyuan Hu, Li Yin, Yunhua Zhang, Diming Lou, Piqiang Tan, Tongji University; Dengcheng Liu
10:30 a.m.	2024-01-2613	Piston Geometries Impact on Spark-Ignition Light-Duty Hydrogen Engine Jean-Baptiste Masurier, Jean LOW-KAME, Richard Oung, Fabrice Foucher, UNIVERSITE D'ORLEANS
11:00 a.m.	2024-01-2611	Hydrogen Engine Insights: A Comprehensive Experimental Examination of Port Fuel Injection and Direct Injection Mohamed Mohamed, Kevin Longo, Hua Zhao, Brunel University; Jonathan Hall, Anthony Harrington, Mahle Powertrain Ltd

WCX SAE World Congress Experience

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Time	Paper No.	Title
11:30 a.m.	ORAL ONLY	Experimental investigation of the influence of injection timing on the combustion process in a hydrogen internal combustion engine for heavy-duty applications Francesco Pucillo, Federico Millo, Andrea Piano, Politecnico di Torino; Sergio Giordana, Nicola Rapetto, FPT Industrial SpA; Christoph Schuette, FPT Motorenforschung AG

Planned by Engine Combustion / Energy and Propulsion Activity

Wednesday, April 17

Application of H2 and Gaseous Fuels to Engines - Part 2 of 2

Session Code PFL272

Room 140 D Session 1:30 p.m.

This session focuses on fuel injection, combustion, controls, performance and emissions of SI engines fueled with gaseous fuels such as methane, natural gas (NG), biogas, producer gas, coke oven gas, hydrogen, or hydrogen-NG blends. Papers on Diesel-NG or diesel-hydrogen dual-fuel engines will also be accepted in this session.

Organizers - Ezio Mancaruso, STEMS - CNR; Gordon McTaggart-Cowan, Simon Fraser University; Ashish Shah, Aramco - Detroit Research Center; James Turner, KAUST; Haiwen Ge, Zhejiang Laboratory; Oivind Andersson, Lund University

Time	Paper No.	Title
1:30 p.m.	2024-01-2610	Development of a High Power, Low Emissions Heavy Duty Hydrogen Engine Michael Bunce, MAHLE Powertrain LLC; Bouzid Seba, Roberto Andreutti, Liebherr Machines Bulle SA; Ziming Yan, Nathan Peters, MAHLE Powertrain LLC
2:00 p.m.	2024-01-2609	Development of a Direct-Injection Heavy-Duty Hydrogen Engine Richard Osborne, John Hughes, Angela Loiudice, Richard Penning, Lukáš Valenta, Ricardo UK, Ltd.
2:30 p.m.	ORAL ONLY	Development of a Heavy-duty on-highway Class 8 H2 Internal Combustion Engine Robert Mitchell, Julian Wallace, Vickey Kalaskar, D. Ryan Williams, Southwest Research Institute
3:00 p.m.		BREAK
3:30 p.m.	2024-01-2113	Mixture Formation and Corresponding Knock Limits in a Hydrogen Direct Injection Engine Using Different Jet Forming Caps Manuel Bucherer, Marcel Reinbold, Thai An Bui, Heiko Kubach, Thomas Koch, Karlsruhe Institute of Technology
4:00 p.m.	2024-01-2114	Downsizing a Heavy-Duty Natural Gas Engine by Scaling the Air Handling System and Leveraging Phenomenological Combustion Model Navid Balazadeh, Simon Fraser University; Sandeep Munshi, Westport Fuel Systems Inc; Mahdi Shahbakhti, University of Alberta; Gordon McTaggart-Cowan, Simon Fraser University

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Time	Paper No.	Title
4:30 p.m.	ORAL ONLY	Reducing Methane Emissions from Lean-Burn Natural Gas Engines with Prechamber Enabled Mixing-Controlled Combustion – An Experimental Study John Ronsman, Adam Dempsey, Marquette University

Planned by Engine Combustion / Energy and Propulsion Activity

Wednesday, April 17

Fuel Injection and Sprays - Part 1 of 2

Session Code PFL320

Room 140 E Session 9:30 a.m.

This session is devoted to experimental and computational work in the area of fuel injection systems and sprays. Topics include: spray characterization, cavitation, multi-phase jet modeling, CFD models for spray processes, wall films and impingement, hydraulic circuit analysis, and dissolved gas effects. Studies of gasoline, diesel and alternative fuel sprays and fuel injection equipment are encouraged.

Organizers - Thomas Briggs; Alessandro Montanaro, STEMS - CNR

Time	Paper No.	Title
9:30 a.m.	2024-01-2620	Comprehensive assessment of gasoline spray robustness for different plume arrangements Heechang Oh, Hyundai Motor Company; Joonsik Hwang, Mississippi State University; Lyle Pickett, Sandia National Laboratories
10:00 a.m.	2024-01-2618	Effect of ambient pressure on ammonia sprays using a single hole injector Li Shen, Felix Leach, University of Oxford
10:30 a.m.	2024-01-2621	Constraint-based Modeling of Fuel-spray Boundary Flow Fields under Sub-cooled and Flash-boiling Conditions Ziming Zhou, UM-SJTU JI - Shanghai Jiao Tong University; Fengnian Zhao, Shanghai Jiao Tong University; David Hung, UM-SJTU JI - Shanghai Jiao Tong University; Qin Huang, Columbia University
11:00 a.m.	2024-01-2622	2D Diesel Spray Droplet Size Mapping Based on Planar Laser Induced Fluorescence and Mie-Scattering Technique Qiang Cheng, Aalto University; Viljam Grahn, Wartsila Finland Oy; Muhammad Akram, Aalto University; Jari Hyvonen, Wartsila Finland Oy; Ossi Kaario, Martti Larmi, Aalto University
11:30 a.m.	2024-01-2619	Numerical Analysis of Mixing of Bio-Hybrid Fuels in a Direct Injection Engine with a Pre-Chamber Ignition System Tim Wegmann, Matthias Meinke, Institute of Aerodynamics RWTH Aachen; Maximilian Fleischmann, Stefan Pischinger, TME, RWTH Aachen University; Wolfgang Schröder, Institute of Aerodynamics RWTH Aachen

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WCX SAE World Congress Experience

Technical Session Schedule

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Wednesday, April 17

Fuel Injection and Sprays - Part 2 of 2

Session Code PFL320

Room 140 E Session 1:30 p.m.

This session is devoted to experimental and computational work in the area of fuel injection systems and sprays. Topics include: spray characterization, cavitation, multi-phase jet modeling, CFD models for spray processes, wall films and impingement, hydraulic circuit analysis, and dissolved gas effects. Studies of gasoline, diesel and alternative fuel sprays and fuel injection equipment are encouraged.

Organizers - Thomas Briggs; Alessandro Montanaro, STEMS - CNR

Time	Paper No.	Title
1:30 p.m.	2024-01-2617	High-Pressure Hydrogen Jet Behavior: Flow Rate and Inner Morphology Investigation Alessandro Montanaro, Luigi Allocca, Giovanni Meccariello, STEMS - CNR
2:00 p.m.	2024-01-2616	Experimental and Numerical Momentum Flux Analysis of Jets from a Hydrogen Injector Lucio Postrioti, Manuel Martino, Universita degli Studi di Perugia; Stefano Fontanesi, Sebastiano Breda, Mauro Magnani, Universita di Modena e Reggio Emilia
2:30 p.m.	2024-01-2615	High Pressure Hydrogen Injector Sizing Using 1D/3D CFD Modeling for a Compression Ignition Single Cylinder Research Engine Ezio Mancaruso, Francesco Catapano, Salvatore Rossetti, STEMS - CNR; Giuseppe Anaclerio, Sergio Camporeale, Domenico Episcopo, Davide Laera, Marco Torresi, Politecnico di Bari
3:00 p.m.	2024-01-2623	Measurement of Hydrogen Jet Equivalence Ratio using Laser Induced Breakdown Spectroscopy Youngmin Ki, Jungho Justin Kim, KAIST; Seong-Young Lee, Michigan Technological University; Joonsik Hwang, Mississippi State University; Choongsik Bae, KAIST

Planned by Fuels and Lubricants / Energy and Propulsion Activity

Wednesday, April 17

Recent Developments in Propulsion Technologies for Ground Transportation - Part 1 of 2

Session Code PFL180

Room 140 F Session 9:30 a.m.

Technical presentation, review, and investigation on recent progress in general ground propulsion technologies, including powertrain technology roadmap, regulation review, product development and localization, off-road applications, new technology evaluation, decarbonization, and emission control. PFL 180 covers both conventional and alternative vehicle propulsion system technologies.

Organizers - Yichao Guo, Stellantis NV; Xin He, Aramco Americas; Wei Jing, American Axle & Manufacturing; Qilong Lu, Southwest Research Institute; Lu Qiu, Cummins Inc.; JIAN TANG, Michigan State University; Peng Zhao, University of Tennessee

Chairperson - Peng Zhao, University of Tennessee

Moderators - Peng Zhao, University of Tennessee

WCX SAE World Congress Experience

Technical Session Schedule

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Time	Paper No.	Title
9:30 a.m.	ORAL ONLY	Overview and Impacts of Recent EPA Regulatory Actions for the On-highway Light, Medium, and Heavy-Duty Vehicle Sectors William Charmley, US Environmental Protection Agency
10:00 a.m.	ORAL ONLY	Characteristics of Ammonia/Hydrogen Combustion and Emissions Liguang Li, Tongji University
10:30 a.m.	ORAL ONLY	Product Strategy for Destination Zero Suo Gaotao, Cummins East Asia Research & Develop Co.
11:00 a.m.	ORAL ONLY	Methanol Economy: Driving the World toward Carbon Neutralization Yuan Shen, Zhejiang Geely Holding Group
11:30 a.m.	ORAL ONLY	High-efficiency and Low-emission Large Bore Gas Engine Development Lingjin Wang, Qingxiang Xu, Weichai Power Co.Limited

Planned by General Powertrain Development / Energy and Propulsion Activity

Wednesday, April 17

Recent Developments in Propulsion Technologies for Ground Transportation - Part 2 of 2

Session Code PFL180

Room 140 F Session 1:30 p.m.

Technical presentation, review, and investigation on recent progress in general ground propulsion technologies, including powertrain technology roadmap, regulation review, product development and localization, off-road applications, new technology evaluation, decarbonization, and emission control. PFL 180 covers both conventional and alternative vehicle propulsion system technologies.

Organizers - Yichao Guo, Stellantis NV; Xin He, Aramco Americas; Wei Jing, American Axle & Manufacturing; Qilong Lu, Southwest Research Institute; Lu Qiu, Cummins Inc.; JIAN TANG, Michigan State University; Peng Zhao, University of Tennessee

Chairperson - Peng Zhao, University of Tennessee

Moderators - Peng Zhao, University of Tennessee

Time	Paper No.	Title
1:30 p.m.	2024-01-2656	The Development of a Zeolite-Based Cold-Start Catalyst (CSC) for China 6b Vehicles (Conventional & Hybrid) to Meet the Next Chinese Vehicle Emission Standard, Part II Lifeng Xu, Fucheng Zhao, Hong Wei, Pengfei Zhao, Jiajia Zhao, Geely Powertrain Research Institute; Lin Wang, Wangmu Qian, Menghan Qian, Ningbo Kesen Exhaust Gas Cleaner Manufacturing Co., Ltd.

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:31 PM

Time	Paper No.	Title
2:00 p.m.	ORAL ONLY	Navigating the Valley of Death: Challenges and Solutions in Advancing Next-Generation Batteries amid US Auto Electrification Yong Che, Enpower Greentech Inc.
2:30 p.m.	ORAL ONLY	Research on Compact Solid Oxide Fuel Cell Systems Ma Xiao, Tsinghua University
3:00 p.m.		BREAK
3:30 p.m.	2024-01-2565	RL_MPC: Reinforcement Learning Aided Model Predictive Controller for Autonomous Vehicle Lateral Control Muye Jia, Mingyuan Tao, Meng Xu, Peng Zhang, Jiayi Qiu, Gerald Bergsieker, Isuzu Technical Center of America Inc.; Jun Chen, Oakland University
4:00 p.m.	ORAL ONLY	Why Transport Decarbonization Requires Life cycle-based Regulations? Xingyu Xue, Aramco Asia
4:30 p.m.	ORAL ONLY	Cost and GHG Emissions Assessment of Green Hydrogen, Green Ammonia and Green Methanol Production in China Yang Fu, Tsinghua University

Planned by General Powertrain Development / Energy and Propulsion Activity

Wednesday, April 17

Advanced Fuel Cell Vehicle Applications - Part 3 of 3

Session Code PFL720

Room 140 G Session 9:30 a.m.

This session covers advancements in PEM fuel cell applications in vehicles including, but not limited to: advanced materials for cell or stack components, balance of plant (BOP) components, stack or system design, control strategies, modeling, testing, diagnostics and lifetime monitoring, hydrogen safety, durability, economics/cost reduction, and system integration/optimization. These topics can be addressed at the cell, stack, system or vehicle levels. A special focus on durability of stack and BOP components is also planned and topics covering accelerated tests and operating strategies to improve durability are encouraged.

Organizers - Ashok Kumar, Cummins Inc.; Santhosh Gundlapally, Gamma Technologies LLC; Simona Silvia Merola, CNR Stems; Matthew G. Kubesh, Southwest Research Institute; Rafael Sari, Aramco Research Center; Kalyan Bagga, AMKAL Consulting LLC; Saeed Siavoshani, Eaton

Time	Paper No.	Title
9:30 a.m.	2024-01-2177	Performance analysis of fuel cells for high altitude long flight multi-rotor drones Xing Huang, Ke Song, Lixin Huang, Yuqiang Feng, Zhaowei Wang, Tongji University
10:00 a.m.	2024-01-2184	Design and Optimization of a Centrifugal Compressor-Based Air Management System for HD Fuel Cell Applications Nathan Peters, Sai Pothuraju Subramanyam, Mike Bunce, MAHLE Powertrain LLC; Alexander Taylor, BMTS Technology US Corporation; Pavan Naik, Jens

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:31 PM

Time	Paper No.	Title
		Semmelroggen, Simon Nibler, BMTS Technology GmbH
10:30 a.m.	2024-01-2182	Fuel Cell Powertrain Power Management with Super Capacitor
		Prashant Sharma, Amar Penta, Mudit Garg, Supriyo Dey, Mridul Agrawal, FEV India Pvt Ltd.
11:00 a.m.	2024-01-2179	Modeling and Analysis of the Hydrogen Production via Steam Reforming of Ethanol, Methanol, and Methane Fuels
		Deivanayagam Hariharan, Harish Chhatija, Jonathan Brown, Santhosh Gundlapally, Gamma Technologies LLC

Planned by Hybrid and Electric Propulsions Committee / Energy and Propulsion Activity

Wednesday, April 17

Controls for Hybrids and Electric Powertrains - Part 1 of 3

Session Code PFL750

Room 140 G Session 1:30 p.m.

This session covers propulsion control processes related to achieving stringent market fuel economy, emissions, performance, reliability, and quality demands of hybrid and electric powertrains. Topics include the control, calibration, and diagnostics of the engine, powertrain, and supporting electromechanical subsystems related to energy management. (For Chargers and Charging Electronics Architecture/Design see AE600)

Organizers - Ji Li, University of Birmingham; Vinod Ravi, Wayne State University; Saeed Siavoshani, Eaton; Di Zhu, Ford Motor Company

Time	Paper No.	Title
1:30 p.m.	2024-01-2772	Implementation of Adaptive Equivalent Consumption Minimization Strategy
		Vicente Capito, Pranay Ketineni, Center for Automotive Research; Giorgio Rizzoni, Center For Automotive Research; Shawn Midlam-Mohler, Ohio State University
2:00 p.m.	2024-01-2773	Real-time Multi-layer Predictive Energy Management for a Plug-in Hybrid Vehicle based on Horizon and Navigation Data
		Xuewu Liu, Yunfei Deng, Jie Xiong, Xiaojun Wu, GAC Automotive R&D Center; Vivek Srivastava, Wang Pan, Joschka Schaub, FEV Europe GmbH; Paul Muthyala, RWTH Aachen University; Jianqiang Sun, FEV China Co., Ltd
2:30 p.m.	2024-01-2774	Improved Accuracy in Calculating of Isolation Resistance of xEV High-Voltage Systems
		Bingsen Wang, Miten Patel, Stellantis NV
3:00 p.m.		BREAK
3:30 p.m.	2024-01-2775	Route-Optimized Energy Usage For A Plug-in Hybrid Electric Vehicle Using Mode Blending
		Andrew Robare, Aman Poovalappil, Mojtaba Bahramgiri, Darrell Robinette, Jeffrey Naber, Bo Chen, Michigan Technological University

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Technical Session Schedule

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Time	Paper No.	Title
4:00 p.m.	2024-01-2776	Wheel & Axle Disconnect Controls on Hybrid Electric Powertrains Krishna Chaitanya Madireddy, Brandon Verhun, FCA US LLC; Chengyi Xu, FCA Canada Inc.; Hangxing Sha, Zachary Tuller, Nadirsh Patel, FCA US LLC
4:30 p.m.	2024-01-2778	Energy Based Hysteresis for Real-Time State Optimization in Hybrid Torque Controls Harshal Kudupley, Andryas Mawardi, Nadirsh Patel, FCA US LLC

Planned by Hybrid and Electric Propulsions Committee / Energy and Propulsion Activity

Wednesday, April 17

Panel Discussion: How to apply technical skills and knowledge from traditional (i.e., fossil fuels) engine development to the development of components and management systems for alternative fueled engines, batteries and fuel cells?

Session Code PFL599

Room 141 Session 9:30 a.m.

As the automotive industry is on the crossroads of a major transition from internal combustion engines to a wide variety of powertrain technologies, some questions on engineers' minds are: "What's in it for me?" and "How will I be part of the future of the field?". This panel aims to bring together experts in the automotive industry who have made or are making the transition from traditional fossil-fuel based IC engine development to the development of alternative novel powertrains such as alternative fueled (hydrogen, low carbon fuels) engines, batteries and fuel cells. Topics covered would be how engineers can apply the fundamental thermal and fluid science and other technical skills from their current roles to the development of new powertrain components and what opportunities they should look for in learning new skills as part of their individual development.

Learn more about the Panel Participants

Organizers - Anand Nageswaran Bharath, Cummins Inc.; Aaron Costall, Cranfield University; Eric Krivizky, Concepts NREC; Dan Richardson; Shakti Saurabh, Cummins Inc.

Moderators - Anand Nageswaran Bharath, Cummins Inc.

Wednesday, April 17

Panel Discussion: What does decarbonizing mobility mean in the Age of Everything?

Session Code PFL199

Room 141 Session 1:30 p.m.

The mobility industry remains in a state of flux – regulations that impact the timeline through 2035 are still being adjusted, materials sourcing is developing as a major area of geopolitical concern, and market acceptance of new technology vehicles varies widely by region. As we deal with all of these external factors, the industry is moving head rapidly with a broad portfolio of low or zero CO2 powertrain technologies: battery EV's, fuel cell EV's, e-fuels, hydrogen IC engines, renewable fuels, and hybrid electric vehicles. We might term this the Age of Everything, where it is not clear what technology, if any, will be the primary path forward.

Learn more about the Panel Participants

Organizers - Thomas Briggs, SwRI; Xin He, Aramco Americas; Angelo Onorati, Politecnico di Milano; David Roth, Roth Engine Science LLC

Moderators - Angelo Onorati, Politecnico di Milano

Panelists - Camilo Abduch Adas, Be8-Energy; Christian V. Beidl, Technical Univ. of Darmstadt; Chuanli Liu, General Motors Corporation; Steven Przesmitzki, USCAR;

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Technical Session Schedule

As of March 13, 2024 19:40:31 PM

Planned by General Powertrain Development / Energy and Propulsion Activity

Wednesday, April 17

Panel Discussion: Lubricating Greases for EVs: Current Perception and Future Requirements

Session Code PFL397

Room 141 Session 3:30 p.m.

E-mobility is rapidly evolving, driving changes in hardware that is influencing the technological development of future lubricants. Much has been published on the evolution of new generation powertrain lubricants for hybrid electric and electric vehicles, particularly for those architectures where the electric motor and lubricant are in contact. However, by comparison, the development of grease technology is underrepresented especially in the technical literature of EV lubricants. All automotive applications require lubricating grease, and many different types are employed on every vehicle. Electrified vehicles introduce new performance requirements. In this session, four panelists, representing different segments within the automotive industry, will provide their unique perspective on the current state of grease and the new challenges presented by electrified vehicles. A discussion prompted by audience questions will follow.

Learn more about the Panel Participants

Organizers - George S. Dodos, ELDON'S SA; Timothy Newcomb, Lubrizol Corp.

Moderators - George S. Dodos, ELDON'S SA

Panelists - Robert Dura, Lubrizol Corp.; Jörg Fahl, Volkswagen AG; Anuj Mistry, Fuchs Lubricants Co.;

Planned by Fuels and Lubricants / Energy and Propulsion Activity

Wednesday, April 17

Advanced Battery Technologies - Part 2 of 4

Session Code PFL730

Room 142 A Session 9:30 a.m.

This session provides a forum for both theory-oriented and application-oriented manuscripts that address state-of-art battery technologies at the cell, array, pack or vehicle levels. Typical domains encompass, but not limited to the battery component, chemistries, modeling, simulations, testing, diagnosis, prognosis, safety, reliability, durability, battery economics/cost reduction, battery charging, battery thermal management, battery management systems and controls and system integration/optimization.

Organizers - Anita Chaudhari, Ford Motor Company; Matilde D'Arpino, Ohio State University; Yi Ding, TARDEC; Santhosh Gundlapally, Gamma Technologies LLC; Xianke Lin, Ontario Tech. University; Yasaman Masoudi, Stellantis; James Miller, Argonne National Laboratory; Francesco Porpora; Prashanth Ramesh, The Ohio State University; Gene Saltzberg; Saeed Siavoshani, Eaton; Di Zhu, Ford Motor Company

Time	Paper No.	Title
9:30 a.m.	2024-01-2193	High load Operation of Lithium-Ion Batteries – Modeling Study on a $LiFePO_4$ Graphite Cell Johann Wurzenberger, Christoph Lechner, Robert Triebl, AVL LIST GmbH
10:00 a.m.	2024-01-2200	Tackling Limited Labeled Field Data Challenges for State of Health Estimation of Lithium-Ion Batteries by Advanced Semi-Supervised Regression Jinwen Li, Wenqiang Chen, Arash Khalatbarisoltani, Hongao Liu, Chongqing University; Xianke Lin, Ontario Tech University; Xiaosong Hu, Chongqing University
10:30 a.m.	2024-01-2198	Real-Time Deployment Strategies for State of Power Estimation Algorithms

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Technical Session Schedule

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Time	Paper No.	Title
		Adriano Schommer, Oxford Brookes University; Marcelo Araujo Xavier, Amazon, Kuiper Systems LLC; Denise Morrey, Gordana Collier, Oxford Brookes University
11:00 a.m.	ORAL ONLY	Slot-Die Coating Simulation
		Seyed M. Alaie, Ford Motor Company
11:30 a.m.	ORAL ONLY	Design Optimization of an Automotive Battery Cell Using a Digital Twin
		Aziz Abdellahi, Christoph Heining, John Wilson, Nils Ziegler, Siemens Digital Industries Software
12:00 p.m.	ORAL ONLY	What will the battery of the future look like?
		Carlton Brown, Dukosi Inc.

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Wednesday, April 17

Electromagnetics, Antennas, and Wiring Harnesses

Session Code AE353

Room 142 A Session 1:30 p.m.

Electromagnetics is the overarching physics for both antennas and wiring (at least for their electrical properties) and an antenna or wire is a means to convey the electromagnetic energy… while we can call this simply “electromagnetics” I don’t think there’s enough buzz words to draw any sort of crowd.

Organizers - Howard Evans, Continental Automotive UK, Ltd.; Scott Piper, General Motors LLC

Time	Paper No.	Title
1:30 p.m.	ORAL ONLY	Design Challenges of Millimeter-Wave 5G Antenna Arrays for V2V & V2X Communications in IoT-based Smart City Environment
		Laila Salman, Ansys Canada, Ltd.
2:00 p.m.	ORAL ONLY	Regenerative Acceleration Device (RAD-1.0)
		Mohammad Arbaz, Hyderabad institute of technology and ma
2:30 p.m.	ORAL ONLY	Designing 48V Zonal Architecture That Keeps the High Voltage Inside the BEV Battery Pack
		Yun-Kyu Choi, Vicor; Youngjae Kang, Infac Co.
3:00 p.m.		BREAK
3:30 p.m.	ORAL ONLY	Accelerating Antenna Array Modeling & Simulations for Autonomous Vehicle Radar Applications with Cloud Computing
		Laila Salman, Ansys Canada, Ltd.

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Technical Session Schedule

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Time	Paper No.	Title
4:00 p.m.	2024-01-1988	A Study on Optimization Development of Cooling Fan Motor for EMC Jiwan Son, Taewoong Lim, Chang Hwan Kim, Hyundai Motor Company

Wednesday, April 17

Advanced Hybrid and Electric Vehicle Powertrains - Part 3 of 5

Session Code PFL710

Room 142 B Session 9:30 a.m.

This session covers new production and near-production electric & hybrid propulsion architectures, testing, analysis and new concepts.

Organizers - Norman Bucknor, General Motors LLC; Michael Duoba, US Dept. of Energy; Vivek Kumar, Ford Motor Company; Darryl S. Taylor, Dana; Di Zhu, Ford Motor Company; Saeed Siavoshani, Eaton

Time	Paper No.	Title
9:30 a.m.	ORAL ONLY	Vehicle Simulations of Heavy-Duty Gasoline Compression Ignition with P1 Hybridization over Real-World Drive Cycles Aravindh Babu Viswanathan, University of Wisconsin-Madison; Rafael Lago Sari, Aramco Research Center - Detroit
10:00 a.m.	2024-01-2162	Development of a Dual Motor Beam eAxle for Medium Duty Commercial Vehicle Application Chengyun Guo, Keith Van Maanen, Xiaobing Liu, BorgWarner Inc.
10:30 a.m.	ORAL ONLY	An holistic assessment of zero carbon powertrain solutions for heavy-duty vehicles Michele Pipicelli, Gabriele Di Blasio, STEMS - CNR
11:00 a.m.	2024-01-2159	Development of an Electric Medium Duty Commercial Demonstration Vehicle Chengyun Guo, Keith Van Maanen, Xiaobing Liu, Wei Chen, Frans Theunissen, Neeraj Rama, Prashant Hegde, BorgWarner Inc.

Planned by Hybrid and Electric Propulsions Committee / Energy and Propulsion Activity

Wednesday, April 17

Advanced Hybrid and Electric Vehicle Powertrains - Part 4 of 5

Session Code PFL710

Room 142 B Session 1:30 p.m.

This session covers new production and near-production electric & hybrid propulsion architectures, testing, analysis and new concepts.

Organizers - Norman Bucknor, General Motors LLC; Michael Duoba, US Dept. of Energy; Vivek Kumar, Ford Motor Company; Darryl S. Taylor, Dana; Di Zhu, Ford Motor Company; Saeed Siavoshani, Eaton

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:32 PM

Time	Paper No.	Title
1:30 p.m.	2024-01-2164	Performance Parity Study of Electrified Class 8 Semi Trucks with Diesel Counterparts Xubin Song, Zhejiang University of Science & Technology; Tiancai Ma, Tongji University; Kambiz Ebrahimi, Loughborough University; Marcis Jansons, Wayne State University
2:00 p.m.	2024-01-2167	Model-Based Approach for Optimization of Propulsion System of a Heavy-Duty Class 8 Fuel Cell Electric Vehicle Sumit Paul, Dhanraj Fnu, Satyum Joshi, Michael Franke, Dean Tomazic, FEV North America Inc.
2:30 p.m.	ORAL ONLY	Two-Stage Electrified Air Induction Boosting with Multiple-Input Multiple-Output Controls on a Medium Duty Diesel Engine Nicholas Vang, University of Wisconsin-Madison; Shubham Ashta, Purdue University; Jaal Ghandhi, University of Wisconsin System; David Rothamer, University of Wisconsin-Madison; Sage Kokjohn, Univ of Wisconsin-Madison; Jacob Mazanec, University of Wisconsin-Madison; Greg Shaver, Weijin Qiu, Purdue University; Luis Giraldo, Genova Technologies; Bryan Frushour, John Deere Power Systems; Tyler Swedes, Allison Transmission Inc; Sree Harsha Rayasam, Purdue University
3:00 p.m.		BREAK
3:30 p.m.	2024-01-2154	Optimal Control Co-Design of a Parallel Electric-Hydraulic Hybrid Vehicle Amirhossein Taaghi, Yongsoon Yoon, Oakland University
4:00 p.m.	ORAL ONLY	Calculation of driving range based on GIS data for Indian road conditions for EV validation Raghavendran P R, Amrita School of Engineering, Chennai
4:30 p.m.	2024-01-2160	Design and Sizing Methodology of Electric Vehicle Powertrain to Achieve Optimal Range and Performance Abbas Fardoun, self employed/Consulting; Sanjay Singh, New Eagle

Planned by Hybrid and Electric Propulsions Committee / Energy and Propulsion Activity

Wednesday, April 17

Electric Motor & Power Electronics - Part 3 of 4

Session Code PFL740

Room 142 C Session 9:30 a.m.

Power electronics and electric motors are essential for improving vehicle efficiency through drivetrain electrification. Technologies that support high efficiency, high power density, and low cost motors and power modules are required for the success of vehicle electrification. (For Chargers and Charging Electronics Architecture/Design see AE600)

Organizers - Yilun Luo; Darrell Robinette, Michigan Technological University; Saeed Siavoshani, Eaton; Darryl S. Taylor, Dana; Di Zhu, Ford Motor Company

Time	Paper No.	Title

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Technical Session Schedule

As of March 13, 2024 19:40:32 PM

Time	Paper No.	Title
9:30 a.m.	2024-01-2215	Torque Ripple Cancellation to Reduce Electric Motor Noise for Electric Vehicles Song He, Vinod Peddi, Le Chang, General Motors LLC
10:00 a.m.	2024-01-2216	Development and optimization of jet impingement on dimpled plate for maximizing cooling performance of an inverter Hyeseung LEE, Ilsuk Yang, Hojin Jeong, Minkyu Park, Hyundai Motor Company
10:30 a.m.	2024-01-2217	Maximum Pulling Force Calculation of Permanent Magnet Tractor Motors in Electric Vehicle Applications Cheng Gong, Le Chang, Song He, Peng Zhang, Michael Muir, General Motors LLC
11:00 a.m.	2024-01-2214	Optimization of Laminated Stack Solutions for Electric Motors in Electrified Vehicles Francis Van Der Sluis, Benny Seitzinger, Sander De Vet, Oleg Alexandrov, Emile Kruijswijk, Bosch Transmission Technology BV; Andreas Herzberger, Robert Bosch GmbH
11:30 a.m.	ORAL ONLY	Packaging of a Compact, Dual-Side Cooled, Low Chip-Count 1.2 kV SiC Power Stage for 200 kW Traction Inverters Qingrui Yuchi, Joshua Gardner, Zichen Zhang, Virginia Tech; Emmanuel Arriola, De La Salle University; Gui-Jia Su, Burak Ozpineci, Oak Ridge National Laboratory; Guo-Quan Lu, Virginia Tech

Planned by Hybrid and Electric Propulsions Committee / Energy and Propulsion Activity

Wednesday, April 17

Electric Motor & Power Electronics - Part 4 of 4

Session Code PFL740

Room 142 C Session 1:30 p.m.

Power electronics and electric motors are essential for improving vehicle efficiency through drivetrain electrification. Technologies that support high efficiency, high power density, and low cost motors and power modules are required for the success of vehicle electrification. (For Chargers and Charging Electronics Architecture/Design see AE600)

Organizers - Yilun Luo; Darrell Robinette, Michigan Technological University; Saeed Siavoshani, Eaton; Darryl S. Taylor, Dana; Di Zhu, Ford Motor Company

Time	Paper No.	Title
1:30 p.m.	ORAL ONLY	Design of electric drive unit housing for enhanced vibration and lubrication performance Young-Chang Cho, Han Li, Satheesh Kandasamy, Dassault Systèmes Simulia Corp.
2:00 p.m.	ORAL ONLY	Traction Motor Peak Power Estimation Strategies for Electric Vehicles Varatharaj Neelakandan, Prabakaran B, Hindustan Inst. of Science & Technology
2:30 p.m.	ORAL ONLY	Importance of magnetic measurements in optimization of design and manufacturing processes of electric motors

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Technical Session Schedule

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Time	Paper No.	Title
		Lukasz Mierczak, Brockhaus Messtechnik GmbH & Co KG

Planned by Hybrid and Electric Propulsions Committee / Energy and Propulsion Activity

Wednesday, April 17

ADAS and Autonomous Vehicle System: AD/ADAS Path Planning and Control - Part 1 of 3

Session Code AE103

Room 250 A Session 9:30 a.m.

This session addresses technical research related to path planning and control for ADAS and autonomous vehicle systems. The topics cover latest technologies of both longitudinal and lateral path planning and motion control for various real-world applications, such as vehicle speed control, park assist/self-parking, lane changing, evasive steering, etc.

Organizers - Yixin Chen, Stellantis; Sumanth Reddy Dadam, Ford Motor Company; Subramaniam Ganesan, Oakland University; Samer Rajab, May Mobility Inc.; Xin Wang, Ford Motor Company; Chen Lv, Nanyang Technological University

Time	Paper No.	Title
9:30 a.m.	2024-01-2555	Active Collision Avoidance System for E-Scooters in Pedestrian Environment Xuke Yan, Oakland University; Dan Shen, Purdue University
10:00 a.m.	2024-01-2556	Deep Reinforcement Learning Based Collision Avoidance of Automated Driving Agent Haochong Chen, Bilin Aksun Guvenc, The Ohio State University
10:30 a.m.	2024-01-2558	Path Planning and Robust Path Tracking Control of an Automated Parallel Parking Maneuver Xincheng Cao, Levent Guvenc, The Ohio State University
11:00 a.m.	2024-01-2559	Signature-enriched Vehicle Planning and Control Qianyu Ouyang, University of Pennsylvania; Xianzhe Jia, FinitronX

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Wednesday, April 17

ADAS and Autonomous Vehicle System: AD/ADAS Path Planning and Control - Part 2 of 3

Session Code AE103

Room 250 A Session 1:30 p.m.

This session addresses technical research related to path planning and control for ADAS and autonomous vehicle systems. The topics cover latest technologies of both longitudinal and lateral path planning and motion control for various real-world applications, such as vehicle speed control, park assist/self-parking, lane changing, evasive steering, etc.

Organizers - Yixin Chen, Stellantis; Sumanth Reddy Dadam, Ford Motor Company; Subramaniam Ganesan,

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Technical Session Schedule

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Oakland University; Samer Rajab, May Mobility Inc.; Xin Wang, Ford Motor Company; Chen Lv, Nanyang Technological University

Time	Paper No.	Title
1:30 p.m.	2024-01-2561	Vehicle Trajectory Planning and Control based on Bi-Level Model Predictive Control Algorithm Xingchen Liu, Kailei Kang, Xinhong Liu, Wuhan University of Technology
2:00 p.m.	2024-01-2562	Remote Control Autonomous Driving System Kento Iwahori, Takuro Sawano, Noritsugu Iwazaki, Takeshi Kanou, Go Inoue, Yuki Okamoto, Yasuyoshi Hatano, Shogo Yasuyama, Junya Kato, Yuhei Oka, Daisuke Kakuma, Amane Yajima, Hiroya Chiba, Toyota Motor Corporation
2:30 p.m.	2024-01-2564	Modelling and Analysis of a Cooperative Adaptive Cruise Control (CACC) Algorithm for Fuel Economy Ozgenur Kavas-Torris, Ford Motor Company; Levent Guvenc, Ohio State University
3:00 p.m.	2024-01-2560	Coordinated Longitudinal and Lateral Motions Control of Automated Vehicles Based on Multi-Agent Deep Reinforcement Learning for On-Ramp Merging Wenchang Li, Zhiguo Zhao, Kaichong Liang, Kun Zhao, Tongji University
3:00 p.m.		BREAK

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Wednesday, April 17

Additive Manufacturing - Part 1 of 2

Session Code MGF300

Room 250 B Session 9:30 a.m.

This session is seeking case-studies on the development, implementation, and optimization of designs for different strategies in additive manufacturing that include both metal and non-metallic materials. We are asking for authors to provide in their manuscript's examples of appropriate AM technology for specific design-manufacturing applications; to identify and explain design challenges; and where appropriate showcase solutions that identify software tools, evaluate existing designs for workflow; and design parts that leverage the strengths of AM.

Organizers - Sameehan Joshi, UNT; Ramakrishna Koganti, University Of North Texas; Monika Minarcin, Accenture

Chairperson - Monika Minarcin, Accenture; Sameehan Joshi, UNT

Time	Paper No.	Title
9:30 a.m.	2024-01-2573	ANISOTROPIC BEHAVIOR OF 3D PRINTED CONTINUOUS FIBER COMPOSITES Jordan Garcia, Murray State University; Y Charles Lu, University of Kentucky

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Technical Session Schedule

As of March 13, 2024 19:40:32 PM

Time	Paper No.	Title
10:00 a.m.	2024-01-2574	A Study on the Correlation between Heat-Treatment Microstructure and Mechanical Properties of Additive Manufactured Al-Si-Mg Alloy with Bulk and Lattice Structure for Weight Reduction of Vehicle Parts and Application of Shock Absorbing Regions Hyomoon Joo, Hyundai Motor Group
10:30 a.m.	2024-01-2576	POLYMERIC COMPOUNDS WITH CELLULOSE NANOFIBRILS FOR 3D PRINTING APPLICATIONS Ana Paula Goncalves, Leonardo Freitas, Marina De Andrade, Katielly Polkowski, Rodrigo Polkowski, TRL9 LAB Testing and Technical Analysis
11:00 a.m.	2024-01-2575	Art meets Automotive: Design of a Curve-Adaptive Origami Gripper for Handling Textiles on Non-Planar Mould Surfaces Dora Strelkova, Ruth Jill Urbanic, University of Windsor
11:30 a.m.	2024-01-2572	Topology and Build Orientation Optimization for Additive Manufacturing: Influence of Printing on Raft and Build Plate Luke Crispo, Il Yong Kim, Queen's University

Wednesday, April 17

Additive Manufacturing - Part 2 of 2

Session Code MGF300

Room 250 B Session 1:30 p.m.

This session is seeking case-studies on the development, implementation, and optimization of designs for different strategies in additive manufacturing that include both metal and non-metallic materials. We are asking for authors to provide in their manuscript's examples of appropriate AM technology for specific design-manufacturing applications; to identify and explain design challenges; and where appropriate showcase solutions that identify software tools, evaluate existing designs for workflow; and design parts that leverage the strengths of AM.

Organizers - Sameehan Joshi, UNT; Ramakrishna Koganti, University Of North Texas; Monika Minarcin, Accenture

Chairperson - Monika Minarcin, Accenture; Sameehan Joshi, UNT

Time	Paper No.	Title
1:30 p.m.	ORAL ONLY	Surface Roughness Study on Additively Manufactured X-Band Waveguide Components for Radar Applications Laila Salman, Ansys Canada, Ltd.
2:00 p.m.	ORAL ONLY	laser powder bed fusion of functionally graded IN718-SS316L parts Ala Qattawi, The University of Toledo
2:30 p.m.	2024-01-2578	Additive Manufacturing in Powertrain Development – From Prototyping to Dedicated Production Design Wolfgang Schoeffmann, Christof Knollmayr, Kambiz Mehrabi, AVL LIST GmbH

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Technical Session Schedule

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Time	Paper No.	Title
3:00 p.m.		BREAK
3:30 p.m.	2024-01-2577	FRAM Optimization: 3D Print Orientation and Concurrent Topology Optimization for Minimize Mass Problem Statements Noah Ray, Il Yong Kim, Queen's University
4:00 p.m.	ORAL ONLY	Microstructure and Mechanical Property Evolution in Additive Friction Stir Deposited AZ31B Mg Alloy Sameehan Joshi, UNT

Wednesday, April 17

ADAS and Autonomous Vehicle System: Simulation and Testing - Part 2 of 4

Session Code AE106

Room 250 C Session 9:30 a.m.

This session focuses on simulation and testing methodologies for ADAS and automated driving systems. Development and testing these systems often relies on simulation and advance testing methodologies due to the complex operating environment

Organizers - Jace Allen, dSPACE Inc.; Yixin Chen, Stellantis; Amit Choudhury, Robert Bosch; Joseph D'Ambrosio, General Motors LLC; Benjamin Hager, dSPACE Inc.; Bin Li, Hyundai Mobis North America; Ramesh S, GM R&D Center; Mukund Chandrasekaran, General Motors; Peng Hang, Tongji University; Mukund Chandrasekaran, General Motors LLC

Time	Paper No.	Title
9:30 a.m.	ORAL ONLY	TeraSim: A Fast and Realistic City-Scale Traffic Simulator for Testing Autonomous Vehicles Haowei Sun, Xintao Yan, Haojie Zhu, Henry Liu, University of Michigan
10:00 a.m.	2024-01-1970	Vehicle Dynamics Model for Simulation Use with Autoware.AI on ROS Roger Zeits, Dennis Guenther, Marcello Canova, Gary Heydinger, The Ohio State University; Kanna Sundararaman Venkateshwara, Transportation Research Center Inc; Kamel Salaani, Devin Elsasser, NHTSA
10:30 a.m.	2024-01-1972	An Investigation of ADAS Camera Performance Degradation Using a Realistic Rain Simulation System in Wind Tunnel Long Li, Wing Yi Pao, Joshua Howorth, Martin Agelin-chaab, Langis Roy, Ontario Tech University; John Komar, Ace Climatic Wind Tunnel; Julian Knutzen, Magna Advanced Technologies; Alex Baltazar, Magna Exterior Systems; Klaus Muenker, Magna Exteriors GmbH
11:00 a.m.	2024-01-1961	Effect of Aftermarket Modifications on Driver Assistance Functionality of a Light Truck Jennifer Bastiaan, Kettering University; Mike Muller, Luis Morales, Specialty Equipment Market Association

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

WCX SAE World Congress Experience

Technical Session Schedule

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Wednesday, April 17

CAD/CAM/CAE Technology - Part 1 of 3

Session Code SS101

Room 250 C Session 1:30 p.m.

This session publishes papers and presentations advancing the knowledge in product design, manufacturing processes, and engineering analysis using the state-of-the-art computer technology. The scope includes such areas as CFD, manufacturing and assembly simulation, crash-worthiness, computational mechanics, mold flow, ride simulation, ergonomic design, NVH, reverse engineering, etc. Developments in numerical methods applicable to automotive engineering problems will also be considered.

Organizers - RANDY Gu, Oakland University; Shuxin Gu, Ford Motor Company; Gary Newton, VI-grade; Yu Teng, BAIC Motor Corporation, Ltd.; Chiranth Srinivasan, Simerics Inc; Xiyun Wang, Oakland University

Time	Paper No.	Title
1:30 p.m.	2024-01-2730	Virtual Chip Test and Washer Simulation for Machining Chip Cleanliness Management Using Particle-Based CFD James Jan, Aaron Khorran, Mark Hall, Sabrina Torcellini, David Doody, Ford Motor Company
2:00 p.m.	2024-01-2723	A Study on the Development of Architecture Virtual Driving Performance using Concept Model Youngdeuk Kim, Sang Do Na, Pyeonghwa Park, Jonghyuk Lim, JinSil Kyeong, Hyundai Motor Company
2:30 p.m.	2024-01-2724	Development of an Automated CAD Database and Application on Aluminum Wheel Jeongin Seo, Youngseok Jang, Myoungkyu Seo, Kiho Yum, Hyundai Motor Company
3:00 p.m.		BREAK
3:30 p.m.	2024-01-2738	Design and Simulation of Battery Enclosure for an Electric Vehicle Application Mudit Gupta, Randy Gu, Oakland University
4:00 p.m.	2024-01-2725	Virtual Evaluation of PM Rotor Failure Modes and Magnet Adhesive Debonding with Cohesive Interface Approach Nilankan Karmakar, Praveen P, Ashish Goel, Jaguar Land Rover

Planned by Automobile Body, Chassis, Safety, and Structures Activity / Ground Vehicle Advisory Group

Wednesday, April 17

AI and Machine Learning - Part 3 of 4

Session Code AE500

Room 251 A Session 9:30 a.m.

This session focuses on real-world and theoretical methods and advanced algorithms in AI, machine learning and related technologies for both inside and outside the Vehicle. Abstracts are being sought on the state of the art in AI and identifying potential applications of AI-bases technologies in vehicle design, control systems, human/machine interface and automated operation, as well as smart mobility and infrastructure of the future.

Organizers - Arun Adiththan, Prakash Peranandam, General Motors LLC; Ramesh S, Ramesh S, GM R&D Center; Alok Warey, Ibrahim Haskara, General Motors LLC

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Time	Paper No.	Title
9:30 a.m.	2024-01-2009	Towards the Interpretation of Customizable Imitation Learning of Human Driving Behavior in Mixed Traffic Scenarios Patrick Rebling, Reiner Kriesten, Philipp Nenninger, Karlsruhe University of Applied Sciences
10:00 a.m.	2024-01-2002	Cooperative Connected and Automated Mobility in a Roundabout Giorgio Previati, Lorenzo Uccello, Gianpiero Mastinu, Massimiliano Gobbi, Politecnico di Milano; Antonino Albanese, Italtel S.p.A.; Alessandro Roccasalva, TECH - CRF S.C.p.A.; Gabriele Santin, Massimiliano Luca, Bruno Lepri, Laura Ferrarotti, Fondazione Bruno Kessler; Nicola di Pietro, Athonet Italy
10:30 a.m.	2024-01-2005	Comparison of Neural Network Topologies for Sensor Virtualisation in Electric Vehicle Thermal Management Alex Wray, Harry Pipes, Loughborough University; Nilabza Dutta, Jaguar Land Rover; Kambiz Ebrahimi, Loughborough University
11:00 a.m.	2024-01-2012	“FEV’s ‘CogniSafe’: An Innovative Deep Learning-Based AI Driver Monitoring System for the Future of Mobility” Ankit Wani, Jyotsana Singh, Deepa Kumari, Avinash Ithape, Govind Rapanwad, FEV India Pvt, Ltd.
11:30 a.m.	2024-01-2018	Development of an Automatic Pipeline for Data Analysis and Pre-Processing for Data Driven-Based Engine Emission Modeling in a Real Industrial Application Boris Petrone, Emanuele Giovannardi, Alessandro Brusa, Nicolò Cavina, University of Bologna; Ioannis Kitsopanidis, Ferrari Spa

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Wednesday, April 17

AI and Machine Learning - Part 4 of 4

Session Code AE500

Room 251 A Session 1:30 p.m.

This session focuses on real-world and theoretical methods and advanced algorithms in AI, machine learning and related technologies for both inside and outside the Vehicle. Abstracts are being sought on the state of the art in AI and identifying potential applications of AI-bases technologies in vehicle design, control systems, human/machine interface and automated operation, as well as smart mobility and infrastructure of the future.

Organizers - Arun Adiththan, Prakash Peranandam, General Motors LLC; Ramesh S, Ramesh S, GM R&D Center; Alok Warey, Ibrahim Haskara, General Motors LLC

Time	Paper No.	Title
1:30 p.m.	2024-01-2017	Optimization of Body Parts Specifications Using A.I Technology Hyungtae Kim, Youngho Lee, Taejin Kim, Hyundai Motor Group
2:00 p.m.	2024-01-2008	Reduced Order Modeling of Engine Coolant Temperature Model in Plug-In Hybrid Electric Vehicles Tomotaka Sugai, Kohei Shintani, Takumu Honda, Hironobu Sakamoto, Minoru Tsuchiyama, Toyota Motor Corporation

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Time	Paper No.	Title
2:30 p.m.	2024-01-2004	A Digital Design Agent for Ground Vehicles Nathan Rogers, Cameron Turner, Clemson University; Matthew P. Castanier, Gregory Hartman, US Army DEVCOM GVSC; Stephen Rapp, US Army GVSC; John Wagner, Clemson University

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Wednesday, April 17

Foundations of Automobile Electronics: Cybersecurity - Part 3 of 4

Session Code AE302

Room 251 B Session 9:30 a.m.

This session focuses on cybersecurity for cyber-physical vehicle systems. Topics include: Interference of functional safety and cybersecurity in fail-operational systems; Intrusion detection for SAE J1708/J1587 networks in heavy-duty vehicles; Training approach for automotive cybersecurity engineering; Automotive data ecosystem: opportunities, monetization, and cybersecurity threats; Automotive threat intelligence using automotive threat matrix as a common language.

Organizers - John Krzeszewski, Eaton; Christopher Lupini, ETAS; Mark Monohon, DG Technologies; Mert D. Pese, Clemson University; Mark Pope, DG Technologies; Vivek Venkatachalam, CNHi; Charles Wilson, Motional Inc

Chairperson - John Krzeszewski, Eaton

Time	Paper No.	Title
9:30 a.m.	2024-01-2808	The Interference of Functional Safety and Cyber Security in the Context of Fail-Operational Systems Karsten Schmidt, AUDI AG; Udo Dannebaum, Infineon Technologies AG; Rolf Schneider, AUDI AG; Abhijit Ambekar, Infineon Technologies AG
10:00 a.m.	2024-01-2805	Trucking Forward: Intrusion Detection for SAE J1708/J1587 Networks in Heavy-Duty Vehicles David Nnaji, Jeremy Daily, Colorado State University
10:30 a.m.	2024-01-2800	A Comprehensive Training Approach for Automotive Cybersecurity Engineering Thomas Faschang, KTM Informatics GmbH; Georg Macher, Graz University of Technology; Omar Veledar, Beevadoo e.U
11:00 a.m.	ORAL ONLY	The Automotive Data Ecosystem: Opportunities, Monetization, and Cybersecurity Threats Numaan Huq, VicOne
11:30 a.m.	ORAL ONLY	Let’s talk about automotive threat intelligence in a common language using Automotive Threat Matrix Yuanbo Guo, Vultara Inc.; Josh Poster, Auto-ISAC

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

WCX SAE World Congress Experience

Technical Session Schedule

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Wednesday, April 17

Foundations of Automobile Electronics: Cybersecurity - Part 4 of 4

Session Code AE302

Room 251 B Session 1:30 p.m.

This session focuses on cybersecurity for cyber-physical vehicle systems. Topics include: Integrating functional and component-level threat analyses in automotive systems (holistic approach to risk assessment); Cybersecurity requirements taxonomy-based threat modeling; TARA as a tool for lifetime vehicle cybersecurity assurance; Automated TARA framework for cybersecurity compliance of heavy-duty vehicles; Cybersecurity rating framework and application to J1939-1C standard.

Organizers - John Krzeszewski, Eaton; Christopher Lupini, ETAS; Mark Monohon, DG Technologies; Mert D. Pese, Clemson University; Mark Pope, DG Technologies; Vivek Venkatachalam, CNHi; Charles Wilson, Motional Inc

Chairperson - John Krzeszewski, Eaton

Time	Paper No.	Title
1:30 p.m.	2024-01-2797	Integrating Functional and Component-Level Threat Analyses in Automotive Systems: A Holistic Approach to Risk Assessment Bill Mazzara, Stellantis NV; Issak Davidovich, C2A Security
2:00 p.m.	ORAL ONLY	Cybersecurity Requirements Taxonomy-based Threat Modeling Charles Wilson, Motional Inc.
2:30 p.m.	ORAL ONLY	TARA as a Tool for Lifetime Vehicle Cybersecurity Assurance Kamel Ghali, Accenture
3:00 p.m.		BREAK
3:30 p.m.	2024-01-2809	Automated TARA Framework for Cybersecurity Compliance of Heavy Duty Vehicles Qazi Mairaj ud din, Qadeer Ahmed, The Ohio State University
4:00 p.m.	2024-01-2803	Cyber Security Rating Framework and its Application to J1939-1C Standard Mark Zachos, DG Technologies; Vishal Bajpai, Preeti Agarwal, SecureThings

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Wednesday, April 17

Plastic Components, Polymeric, and Composites for EV, AVS and ICE Vehicles

Session Code M300

Room 251 C Session 9:30 a.m.

Presentations of this session will address the development of polymeric and composite materials for automotive interiors and exteriors, powertrain components, as well as structural and non-structural applications. Focus is on design, processes, bonding and manufacturing technologies, as well as lightweighting strategies.

Organizers - Somasekhar Bobba, SABIC; Emile Homsi, Cargill INC; Srikanth Pilla, Clemson Univ.; Bryant Tokarz, O-Flex Group Inc.; Holger Warth, Medmix

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Time	Paper No.	Title
9:30 a.m.	2024-01-2356	Elucidation of Sealing Mechanism of Novel Acrylate Liquid Based BluSeal™ Wire Harness Splice Sealing Technology Dennis Chung, Eurotech
10:00 a.m.	2024-01-2358	A Holistic Approach to Mitigating Warpage in Fiber-Reinforced Plastic Injection Molding for Automotive Applications Kyeong-Bae Seo, Sang Sun Park, ChoonSoo Lee, Hyundai Motor Group
10:30 a.m.	ORAL ONLY	Next Generation in Flame Retardant Polyester (PBT) for Sealed High Voltage Connectors Josh McIlvaine, Celanese
11:00 a.m.	ORAL ONLY	Challenges and Opportunities for Biomimetic Material Development Amanda Nummy, Hyundai & Kia Corp.

Planned by Polymers and Coatings Committee / Materials Engineering Activity

Wednesday, April 17

Panel Discussion: Role of Life Cycle Analysis for Sustainable Transportation

Session Code PFL497

Room 251 C Session 1:30 p.m.

This panel will acknowledge the growing interest in LCA. Description: Life Cycle Analysis (LCA) allows for evaluation of competing sustainability technologies across multiple fields. This tool has been highly developed to better understand decarbonization in the transportation sector for more than 30 years. LCA has also been incorporated into important public policies governing transportation and energy decarbonization, such as: The International Civil Aviation Organization (ICAO), International Maritime Organization (IMO), the US Bipartisan Infrastructure Law, etc. This panel of experts on LCA and public sustainable

Organizers - Christopher Kolodziej, Argonne National Laboratory; Steven Przesmitzki, Andrea Strzelec, USCAR

Moderators - Christopher Kolodziej, Argonne National Laboratory

Wednesday, April 17

Panel Discussion: Navigating Vehicle Electrification Propulsion Technical Challenges and Charting the Future Roadmap

Session Code PFL799

Room 251 C Session 3:30 p.m.

The transition to Electric Vehicles (EVs) and Hybrid Electric Vehicles (HEVs) represents a pivotal moment in the automotive industry's evolution towards sustainability and reduced environmental impact. As EV and HEV technologies continue to advance, a panel discussion featuring experts from leading EV manufacturers, research organizations, and engineering firms from China, the United States, and Europe has been organized to address the technical challenges and market impact associated with this transformative shift. This engaging panel discussion is designed to provide an overview of the technical challenges and market dynamics of EVs and HEVs propulsions, fostering a deeper understanding of the innovations, regulatory landscapes, and economic implications that will shape the future of the automotive sector.

Learn more about the Panel Participants

Organizers - Yi Ding, TARDEC; Saeed Siavoshani, Eaton; Hongming Xu, Birmingham Univ.; Di Zhu, Ford Motor Company

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Moderators - Tony M. Thampan, DOT/NHTSA

Panelists - Georgios Fontaras, European Commission Joint Research Centre; Kiran Govindswamy, FEV North America Inc.; Sarah Hipel, Federal Government; Ahmad Arshan Khan, CNH Industrial; Guoxiang Lu, BYD Auto Co. Ltd.; Gerhard Meister, AVL LIST GmbH;

Planned by Hybrid and Electric Propulsions Committee / Energy and Propulsion Activity

Wednesday, April 17

Electrification: Chargers and Charging Electronics Architecture/Design - Part 2 of 2

Session Code AE600

Room 252 A Session 9:30 a.m.

As the industry has moved to Electrified Vehicles, the need for chargers and Charging Stations have increased in quantities almost exponentially. We are seeking papers and / or oral presentations that explore all the issues of charging, charging controls, Energy / Power Management, charger to vehicle communicate, charging architecture and charging components. Some of the Topics that could be included are: Vehicle to Grid, Conductive and Wireless Vehicle Charging, Vehicle Charging Standards, (example SAE J1772, SAE J2954J, ISO 15118), New/innovative solutions for the existing HV Vehicle Charging Level 1, Level 2 and DC Fast Charging (Level 3).

Organizers - Theodore Bohn, Argonne National Lab.; Ersin Ersoy; Gene Saltzberg, UD Mercy; Vincent Socci, National Instruments; Di Zhu, Ford Motor Company; Zhouquan Wu, Eaton

Time	Paper No.	Title
1:30 p.m.	2024-01-2026	Optimizing the Dispense Time of a Battery from the Swappable Charging Station Chiranjeevi Gera, Shashank Holavanahalli, Bosch Global Software
2:00 p.m.	2024-01-2025	Charging Load Estimation for a Fleet of Autonomous Vehicles Saroj Paudel, Jiangfeng Zhang, Beshah Ayalew, Clemson University; Annette Skowronska, US Army
2:30 p.m.	ORAL ONLY	Achieving EM Conducted Emission Compliance for High Voltage Conversion with Switching Frequency Above 1.2 MHz Nicola Rosano, Vicor

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Wednesday, April 17

Electric Infrastructure

Session Code AE601

Room 252 A Session 1:30 p.m.

As the number of EVs sold increases, it is critical to evaluate and plan strategies on infrastructure development to facilitate Smart Charging and Charging EMC/EMI that are environmentally impactful. Municipalities and electric companies know that with public policy and consumer concerns, electricity generation and utility development must be cleaner than current operations. This session is seeking speakers to present their work in cost-effective, large-scale infrastructure development that can accommodate mass utilization of EV charging. Topics for consideration include; development of green energy through solar, photovoltaic, or other sustainable energy models, utilizing existing power grid connections for effective business models in charging station development, public/private partnerships and effective public policy to support large scale deployment. Additionaltopics includeharmonic distortion impact to the power grid and mitigation techniques to eliminate the harmonics and minimize EV’s adverse impacts on power grid.

Organizers - Dr. Phares Noel, Oakland Univerity; Gene Saltzberg, UD Mercy; Zhouquan Wu, Eaton

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Time	Paper No.	Title
1:30 p.m.	2024-01-2032	Assessing Powertrain Technology Signposts for Electrified Heavy Duty Commercial Freight Vehicles Vivek Sujan, Veda Prakash Galigekere, Oak Ridge National Laboratory
2:00 p.m.	ORAL ONLY	An optimal dispatch framework supporting heavy-duty vehicle charging infrastructure incorporating photovoltaics and energy storage In the United States automotive sector, medium- and heavy-duty (MHD) vehicles contribute approximately 23% to annual greenhouse gas emissions, despite comprising slightly less than 5% of the total vehicles on the road. Of these MHD vehicles, around one-third are engaged in drayage applications, operating in densely populated areas such as cities, seaports, and intermodal terminals. Consequently, these vehicles are recognized as prime candidates for electrification. However, the widespread adoption of electric heavy-duty drayage trucks faces challenges due to the current infrastructure's limitations in providing the necessary at-scale electrical energy. A potential remedy comes in the form of dynamic wireless charging (DWC), offering the flexibility to augment or replace traditional plug-in charging, enabling on-the-go charging. Nonetheless, the implementation of additional DWC infrastructure significantly raises the region's electricity demand. To ensure that the carbon reduction benefits from electrification are not offset by increased electricity demand, it is imperative to supplement grid capacity with carbon-free renewable energy resources. Our approach involves leveraging Oak Ridge National Lab's OR-SAGE and the National Renewable Energy Lab's rEV tools to assess the availability of solar resources for powering this additional infrastructure in a specific region, considering factors like land availability and local bylaws. Additionally, we explore how optimal energy storage technology dispatch can further enhance carbon reduction. The efficacy of this framework is demonstrated through its application to the transportation network around the Port of Savannah. Looking ahead, we aim to extend this framework to other major intermodal hubs in the continental United States. Joseph N. E. Lucero, Stanford Univ.; Vivek Sujan, Brandon Miller, Ruixiao Sun PhD, Oak Ridge National Laboratory; Simona Onori, Stanford Univ
2:30 p.m.	2024-01-2031	A Technical and Economical Evaluation for the Potential of Using Fuel Cells as Charging Stations for Electric Vehicles in MENA Region Mostafa Abdulrazeq, Ahmed A. Abdel-Rehim, The British University in Egypt
3:00 p.m.	2024-01-2034	Quantifying the Costs of Charger Availability Uncertainty for Residents of Multi-Unit Dwellings Aaron Rabinowitz, Gil Tal, Institute of Transportation Studies; Thomas Bradley, Colorado State University
3:30 p.m.	2024-01-2033	A Study of Charge Point Infrastructure Policies on EV Driver Satisfaction Peter Fussey, Akintomiwa Akin-Onigbinde, Spyros Skarvelis-Kazakos, University of Sussex

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WCX SAE World Congress Experience

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Wednesday, April 17

Panel Discussion: ADS, Safety Models and Metrics – A Modern Stone Soup

Session Code AE110

Room 252 B Session 9:30 a.m.

This panel will dive deep into the intersection of safety-related models and safety metrics derived from those models. These two topics are currently being explored with the SAE Validation & Verification Task Force and the IEEE P3321 Task Force. This session will culminate by bringing together these two topics from the perspective of an implementer of safety related models and associated metrics. Panelists will share progress and key findings along with areas for future standards work.

Learn more about the Panel Participants

Organizers - Kevin Gay, Uber

Moderators - Kevin Gay, Uber Technologies Inc

Panelists - Scott Schnelle, Waymo; Jeffrey Wishart, Science Foundation Arizona; Gil Amid, Foretellix Inc;

Wednesday, April 17

Panel Discussion: SAE J3400 Overnight Transition From Specification To Draft Standard And The Applications Of J3271 Moving From Concept To Reality

Session Code AE111

Room 252 B Session 1:30 p.m.

This panel will discuss the motivation of vehicle manufacturers of a range of vehicle sizes and types that have committed to adopt the SAE J3400 charging system that is on a path to standardization. In a similar fashion, the panel will discuss the path of SAE J3271 over the past ~6 years of development from concept to technical information reference to recommended practice and pre-production EVSEs/MCS vehicles in 2024. Non-road applications such as rail, aviation, mining, marine and agriculture will be discussed.

Organizers - Theodore Bohn, Argonne National Lab.

Wednesday, April 17

Panel Discussion: Best Practices in Autonomous Vehicle Safety - A Conversation With The AVSC

Session Code AE112

Room 252 B Session 3:30 p.m.

The Automated Vehicle Safety Consortium is comprised of manufacturers, developers, and fleet operators in the AV industry. Members include, Aurora, GM/Cruise, Lyft, Motional, Torq, Uber, Volkswagen, Waymo, and Zoox. Come join us to hear about our most recent best practices and what prompted their development. Hear directly from some of our members on why these best practices are vital to the industry.

Learn more about the Panel Participants

Organizers - Darcyne Foldenauer, SAE Industry Technologies Consortia

Moderators - Darcyne Foldenauer, SAE Industry Technologies Consortia

Panelists - Michelle Chaka, TORC Robotics Inc; Kevin Gay, Uber; John Lobsiger, Volkswagen Group of America Inc.; Laura Fraade-Blanar, Waymo;

WCX SAE World Congress Experience

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Wednesday, April 17

Design Optimization - Methods and Applications - Part 2 of 2

Session Code SS103

Room 258 Session 9:30 a.m.

Design Optimization Methods and Application session features papers on new and improved optimization techniques and on application of different optimization methods in component and vehicle design. Methods include deterministic and stochastic optimization techniques. Applications range from noise pressure optimization and vehicle dynamic response optimization to sub-system topology and shape and full vehicle gage and topology optimization.

Organizers - Mallikarjuna Bennur, Vesna Savic, General Motors LLC; Andres Tovar, Purdue University; Di Zhu, Ford Motor Company

Time	Paper No.	Title
9:30 a.m.	2024-01-2454	Lightweight Design Enabled by Innovative CAE Based Development Method Using Topology Optimization Yoshiya Kato, Satoru Ishikawa, Toyota Motor Corporation; Klaus Puchner, Martin Schossleitner, Christian Gaier, Engineering Center Steyr GmbH & Co., KG
10:00 a.m.	2024-01-2456	Efficient Design of Shell-and-Tube Heat Exchangers using CAD Automation and Multiphysics Analysis in a Multi-objective Bayesian Optimization Framework Prathamesh Chaudhari, Joel Najmon, Andres Tovar, Purdue University
10:30 a.m.	2024-01-2458	Stress-Constrained Multi-Material Topology Optimization Yifan Shi, Yuhao Huang, Zane Morris, Mira Teoli, Daniel Tameer, Il Yong Kim, Queen's University
11:00 a.m.	ORAL ONLY	A Study on developing Rim-representative Shape Index corresponding to Rim Mode of Aluminum Alloy Wheel using Shape Factor Data WOOSEOK CHOI, Hyundai Motor Company
11:30 a.m.	2024-01-2460	A Study on the Evaluation of UX of Mid SUV Heeen Zoo, Changsub Kim, Keun-Ryang Park, Hyundai Motor Company

Planned by Automobile Body, Chassis, Safety, and Structures Activity / Ground Vehicle Advisory Group

Wednesday, April 17

Tire and Wheel Technology

Session Code SS700

Room 258 Session 1:30 p.m.

The aim of this session is to provide a forum to bring together researchers do discuss and disseminate the research on tire and wheel technology. Examples of topics to this session include (but are not limited to) nonlinear behavior of tires and wheels, static/dynamic stress analysis, nonlinear material modeling, contact stress, impact, noise, vibration, traction, hydroplaning, effect of tires on vehicle performance, rolling resistance, and durability.

Organizers - David Howland, General Motors LLC; Volker Hildebrand, Continental Tire North America Inc

Chairperson - Volker Hildebrand, Continental Tire North America Inc; David Howland, General Motors LLC

WCX SAE World Congress Experience

Technical Session Schedule

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Time	Paper No.	Title
1:30 p.m.	2024-01-2648	Investigation of Truck Tire Rubber Material Definitions Using Finite Element Analysis Alfonse Ly, Ontario Tech. University; Zeinab El-Sayegh, Moustafa El-Gindy, Ontario Tech University; Fredrik Oijer, Volvo Group Trucks Technology; Inge Johansson
2:00 p.m.	2024-01-2650	Real-Time Cornering Stiffness Estimation and Road Friction State Classification under Normal Driving Conditions Sanjay Raghav Balaga, Mario labella, Kanwar Bharat Singh, Goodyear Tire andn Rubber Company
2:30 p.m.	2024-01-2651	Development and Simulation Validation of a Wheel/Tire Selective-Matching Algorithm Considering an Error Function of Wheel Runout Measuring Equipment. Youngsam Yoon, Taesuk Lee, Hyungjoo Kim, Jaekil Lee, Hyundai Motor Company; Kyuho Sim, Seoul National University of Science
3:00 p.m.		BREAK
3:30 p.m.	2024-01-2652	Threaded Joints Pre-Load Enhancement Shreyas Raghatate, Suchit Sharma, Vinayak Sindal, Volvo Eicher Commercial Vehicles
4:00 p.m.	2024-01-2654	Virtual Tire Development for New Electric Vehicle through Driver in Loop Approach Shivam Vivek Asthana, Shraddhesh Rasal, Vikraman Vellandi, Mahindra & Mahindra, Ltd.; Rutger Uil, Goodyear Dunlop Tires Operations S A; Gonzalo Lanas, Guido Tosolin, IDIADA Automotive Technology SA
4:30 p.m.	ORAL ONLY	World's first silicone recyclable self-sealing tire solution Timothy Morley, Dow Inc.

Wednesday, April 17

Dual Fuel Combustion - Part 1 of 2

Session Code PFL260

Room 259 Session 9:30 a.m.

This session focuses on combustion with multiple fuels, typically with one direct-injected fuel that is not fully premixed. Combustion phasing and duration may be mixing-controlled or kinetically-controlled. Papers describing experiments and test data, simulation results focused on applications, fuel/additive effects, and RCCI (Reactivity-Controlled Compression Ignition) are included. Part 1 includes methanol, hydrogen, and other dual-fuel applications.

Organizers - Brian Kaul, Oak Ridge National Laboratory; Raul Payri, Universitat Politecnica de Valencia; Diego Bestel, Argonne National Laboratory; Gurneesh Jatana, US Dept of Energy; Adam Dempsey, Marquette University

Time	Paper No.	Title
9:30 a.m.	2024-01-2361	Experimental investigation of internal and external EGR effects on a CNG-OME dual-fuel engine Ann-Kathrin Jost, Michael Guenthner, Alexander Weigel, RPTU University of Kaiserslautern-Landau

WCX SAE World Congress Experience

Technical Session Schedule

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Time	Paper No.	Title
10:00 a.m.	2024-01-2364	Engine-out Gaseous Emissions in a Diesel Engine using Methanol as a Low-carbon Fuel under Dual-fuel Operation Khanh Cung, Nolan Wright, Thomas Briggs, Edward Smith, Alexander Michlberger, Daniel Christopher Bitsis, Pruthvi Bachu, Prathik Meruva, Yehya Aussi, Southwest Research Institute
10:30 a.m.	2024-01-2363	Analysis of Dual Fuel Hydrogen/Diesel Combustion Varying Diesel and Hydrogen Injection Parameters in a Single Cylinder Research Engine Ezio Mancaruso, Salvatore Rossetti, Bianca Maria Vaglieco, STEMS - CNR
11:00 a.m.	2024-01-2367	Combustion analysis of Hydrogen-DDF mode based on OH* chemiluminescence images Ghazian Amin Mukhtar, Koki Shimogawa, Naoto Horibe, Jun Hayashi, Hiroshi Kawanabe, Kyoto University; Gin Morita, Kenji Hiraoka, YANMAR HOLDINGS CO., LTD.

Planned by Engine Combustion / Energy and Propulsion Activity

Wednesday, April 17

Exhaust Emission Control Systems - Part 2 of 2

Session Code PFL420

Room 259 Session 1:30 p.m.

Multiple sub-sessions cover the following exhaust emissions control topics: System integration and durability, advances in catalyst substrates, advances in particulate filter substrates, advances in NOx reduction technology, and on-board measurement and control.

Organizers - Shekhar Vats, Cummins Inc.; Rasto Brezny, MECA Clean Mobility; Michael Geller, MECA: Supplying Clean Mobility; Vitaly Prikhodko, US Dept. of Energy; Kevin Brown, MECA; Rahul Mital, General Motors LLC; Brad Adelman, Navistar

Time	Paper No.	Title
1:30 p.m.	2024-01-2133	Effective Utilization of Pt Catalyst in Three-Way Catalytic System by Employing Calcined Ceria with Alumina Itaru Morita, Hiroki Tanaka, Shohei Saeki, Akihiro Isayama, Katsuya Iwashina, Yuki Nagao, Yoshinori Endo, Takashi Wakabayashi, Mitsui Mining & Smelting Co., Ltd.; Masaaki Haneda, Nagoya Institute of Technology
2:00 p.m.	2024-01-2131	Leveraging DOConFilter to Improve Exhaust System Packaging Takashi Kinoshita, Katsunori Tanaka, Yasuyuki Furuta, Takashi Aoki, Hirofumi Sakamoto, NGK Insulators, Ltd.; Hussein Fakih, Yuki Fukumi, Fumihiko Yoshioka, Kyohei Kato, NGK Automotive Ceramics USA Inc.
2:30 p.m.	2024-01-2136	Cost-Effective D-DPF Design of Aftertreatment System for Non-Road Mobile Machinery China Stage IV Jian Chen, Chiyi He, Xuhua Wang, Yi Liu, ActBlue Co., Ltd.; Lei Yu, Quanchai Engine Co, Ltd.
3:00 p.m.	ORAL ONLY	Isocyanic Acid (HNCO) Hydrolysis on SCR Catalysts Lai Wei, Rohil Daya, Unmesh Menon, Lauren Garrison, Krishna Kamasamudram, Cummins Inc

WCX SAE World Congress Experience

Technical Session Schedule

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Planned by Mobile Emissions Committee / Energy and Propulsion Activity

Wednesday, April 17

Material Environment Interactions & Multi-Discipline CAE Applicatons

Session Code M222

Room 260 Session 9:30 a.m.

Organizers - Peiran Ding, Farasis Energy USA; Mingchao Guo, FCA US LLC; Fan Li, Yi Liu, Wenxin(Daniel) Qin, Qigui Wang, General Motors LLC

Time	Paper No.	Title
9:30 a.m.	2024-01-2428	Parameter Optimization and Characterization of Aluminum-Copper Laser Welded Joints Byung Min Ko, Andrew Gryguc, University of Waterloo; Jim Chen, Justin Hunt, Mingchao Guo, Wensheng Zhang, Stellantis NV; Hamid Jahed, Adrian Gerlich, University of Waterloo
10:00 a.m.	2024-01-2592	Study of the Connection between E-Machine and Gearbox of a Hybrid Powertrain Maxime Hay, Laurent Dutfoy, Renault SA; Jean-louis Ligier; Patrice Merçay, Renault SA
10:30 a.m.	2024-01-2593	Design and Development of Base Valve for a Semi-Active Damper Paramesh Chintala, Aakash Patwa, Shivanand Sankaran, Hitachi Astemo Americas, Inc.
11:00 a.m.	2024-01-2594	Characterization of Embedded Debris Particles on Failed Crankshaft Bearings Jianghuai Yang, Qigui Wang, Zhe Li, General Motors LLC
11:30 a.m.	2024-01-2595	Multidisciplinary Design Method for Off-Road Vehicles Using Bayesian Active Learning Hiroaki Kawamura, Misuzu Haruki, Hiroyuki Toyoda, Kohei Shintani, Toyota Motor Corporation

Wednesday, April 17

Panel Discussion: Opportunities and Challenges Facing Li Ion Battery Recycling and Recovered Material Reuse in New Products

Session Code SDP101

Room 260 Session 1:30 p.m.

This session consists of panelists from key segments of the Electric Vehicle Battery end of life infrastructure, who will discuss the important issues facing closing the loop from the end of a battery's first life to reuse of recycled battery materials in new EV batteries.

Organizers - Nakia Simon, GM

Moderators - Nakia Simon, GM

Panelists - Dan Bowerson, Alliance for Automotive Innovation; Albert L. Lipson, Argonne National Laboratory; Ludwig Minassian, Lithion; Leo Raudys, Call2Recycle;

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Technical Session Schedule

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Wednesday, April 17

Panel Discussion: Design, Analysis, and Validation of the Battery Pack

Session Code M220

Room 260 Session 3:00 p.m.

The battery is a critical part of BEV engineering design and a complex system - electrochemical-thermal-mechanical coupling with multiscale and highly required safety. How to fundamentally understand the BEVs battery, and what CAE process can aid and optimize engineering design are interesting topics by the technical experts in this panel.

Learn more about the Panel Participants

Organizers - Gavin Song, Ford Motor Company

Moderators - Gavin Song, Ford Motor Company

Panelists - Robert Galyen, Galyen Energy, LLC; Johan Sundqvist, COMSOL Inc.; Andrew Halfpenny, HBM-nCode; Arvind Jujare, ANSYS Inc; Hongsuk Lee, Hexagon Manufacturing Intelligence;

Wednesday, April 17

Exhaust Emission Control Systems - Part 1 of 2

Session Code PFL420

Room 310 A Session 9:30 a.m.

Multiple sub-sessions cover the following exhaust emissions control topics: System integration and durability, advances in catalyst substrates, advances in particulate filter substrates, advances in NOx reduction technology, and on-board measurement and control.

Organizers - Shekhar Vats, Cummins Inc.; Rasto Brezny, MECA Clean Mobility; Michael Geller, MECA: Supplying Clean Mobility; Vitaly Prikhodko, US Dept. of Energy; Kevin Brown, MECA; Rahul Mital, General Motors LLC; Brad Adelman, Navistar

Time	Paper No.	Title
9:30 a.m.	2024-01-2130	CARB Off-Road Low NOx Demonstration Program - Engine Calibration and Initial Test Results Gary Neely, Christopher Sharp, Kartik Adsule, Bryan Zavala, Southwest Research Institute
10:00 a.m.	2024-01-2129	Further Advances in Demonstration of a Heavy-Duty Low NOX System for 2027 and Beyond Christopher Sharp, Gary Neely, Bryan Zavala, Sandesh Rao, Southwest Research Institute; Joseph McDonald, James L. Sanchez, US EPA
10:30 a.m.	ORAL ONLY	Emissions Control Catalyst Tolerance to Renewable Fuel-based Phosphorous Todd Toops, Oak Ridge National Laboratory
11:00 a.m.	2024-01-2132	Oxygenated Fuels as Reductants for Lean NOx Trap Regeneration Navjot Singh Sandhu; Xiao Yu, David Ting, Ming Zheng, University of Windsor
11:30 a.m.	2024-01-2134	On Road vs. Off Road Low Load Cycle Comparison Jonathan Wine, Zar Nigar Ahmad, James McCarthy, Jr., Eaton; Vitaly Prikhodko, Josh Pihl, Oak Ridge National Laboratory; Ivan Tate, Ryan Bradley, FPT Industrial; Thomas Howell, AVL Mobility Tech Inc.

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Planned by Mobile Emissions Committee / Energy and Propulsion Activity

Wednesday, April 17

Emissions Measurement and Testing - Part 1 of 3

Session Code PFL440

Room 310 A Session 1:30 p.m.

Sub-sessions cover emissions measuring techniques and testing regimes. This includes new analysis techniques and the novel application of existing techniques, the comparison of existing and proposed testing regimes with real world experience, including modeling.

Organizers - Svitlana Kroll, Southwest Research Institute; J. Felipe Rodriguez, International Council On Clean Transport; Susumu Sato, Tokyo Institute of Technology; Yuesen Wang, Exponent; Dado Karim Sylla, Cummins Inc.; Michael Akard, Horiba, Ltd.; Mi-Young Kim, Mert Zorlu, Cummins Inc.

Time	Paper No.	Title
1:30 p.m.	ORAL ONLY	Verification of Real-world Driving Emissions Prediction Model for Traffic Flow Simulator Susumu Sato, Ryota Ishida, Tokyo Institute of Technology; Norifumi Mizushima, Advanced Industrial Science & Technology
2:00 p.m.	ORAL ONLY	How GHG regulations and various vehicle technologies impact in-use CO2 emissions in the heavy-duty transportation sector Troy Hurren, Tianyi Ma, Tianbo Tang, Kent Johnson, Zisimos Toumasatos, Tom Durbin, George Karavalakis, University Of California Riverside
2:30 p.m.	2024-01-2707	Performance Comparison Analysis between Biodiesel and Diesel over a Commercial DOC Catalyst Yuanzhou Xi, Nathan Ottinger, Z. Gerald Liu, Cummins Inc.
3:00 p.m.		BREAK
3:30 p.m.	2024-01-2710	Using ALPHA v3.0 to Simulate Conventional and Electrified GHG Reduction Technologies in the MY2022 Light-Duty Fleet Andrew Moskalik, John Kargul, Karla Butters, US Environmental Protection Agency; Piyush Bhagdikar, Southwest Research Institute
4:00 p.m.	ORAL ONLY	Results from Sensor Based On-board Sensing Analysis and Reporting (OSAR) Phase 2 Deployment Zisimos Toumasatos, Kent Johnson, George Karavalakis, George Scora, Grace Johnson, Tom Durbin, University of California Riverside
4:30 p.m.	ORAL ONLY	Particulate Emissions Measurements of Fumigation Methanol in a Heavy-duty Single-cylinder Engine (SCE): particulate mass (PM), particle number (PN), and particle size distribution (PSD) Yehya Aussi, Khanh Cung, Imad Khalek, Daniel Christopher Bitsis, Southwest Research Institute

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WCX SAE World Congress Experience

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Wednesday, April 17

Particle Emissions and Control from Combustion Sources - Part 1 of 2

Session Code PFL450

Room 310 B Session 9:30 a.m.

Direct gasoline injection engines are gaining popularity because of their improved fuel economy over port fueled injection engines. The downside is that direction injection engines have higher particle emissions. To meet the US Tier 4 and China 7 regulations an OEM may require a Gasoline Particulate Filter (GPF). This session covers several different GPF technologies for meeting the future particle regulations. One paper also looks at the effect of a 3-way catalyst on particle removal.

Organizers - Kirby Baumgard; Danan Dou, Deere & Company; Mark Hoffman, Auburn Univ.; Ezio Mancaruso, STEMS - CNR; Gongshin Qi, General Motors LLC; Andrea Strzelec, USCAR; Julian Tan, Stellantis NV

Time	Paper No.	Title
9:30 a.m.	2024-01-2384	Next Generations of Gasoline Particulate Filters for Catalyzed Applications Thorsten Boger, Corning Inc.; Dominik Rose, Corning GmbH; Chunbo Li; Ryoko Chijiiwa, Corning GmbH; Christophe Remy, Rabeka Alam, Corning Inc.
10:00 a.m.	ORAL ONLY	Gasoline Particulate Filter for Tier4 regulation Kiwamu Sugiura, NGK Insulators, Ltd.; Yosuke Uesaka, Yasuyuki Furuta, Takashi Aoki, Masaki Ito, Yuichi Hamazaki, NGK Insulators Ltd; Alejandro Newberry, Shogo Obata, Reghunathan-Nair Anoop, NGK Automotive Ceramics USA Inc
10:30 a.m.	2024-01-2381	Investigation of Injection Strategy on Combustion and Emission Characteristics in a GDI Engine with a 50 MPa Injection System Tong Wang, Diming Lou, Yinghua Zhao, Yunhua Zhang, Piqiang Tan, Zhiyuan Hu, Liang Fang, Tongji University
11:00 a.m.	2024-01-2383	Evaluation of Uncoated Gasoline Particulate Filter Performance for US EPA MY27+ Particulate Mass Emissions Regulation Angus Craig, Jason Warkins, Bassel Wassouf, Douglas Beall, Corning Inc.; Vonda Banker, Corning Research & Development Corporation; Dominick Madaffari Jr, Corning Inc.
11:30 a.m.	2024-01-2387	Improved Coated Gasoline Particulate Filters for China 7 and US Tier 4 Legislations Jan Schoenhaber, Shota Kawashima, Meike Gotthardt, Johannes Schühle, Umicore AG & Co. KG
12:00 p.m.	ORAL ONLY	Potential for particle removal through a three-way catalyst during gasoline direct injection engine cold start Brady Wilmer, Univ of Minnesota-Twin Cities; Alexander Voice, Aramco Americas; William F. Northrop, Univ. of Minnesota-Twin Cities

Planned by Mobile Emissions Committee / Energy and Propulsion Activity

Wednesday, April 17

Particle Emissions and Control from Combustion Sources - Part 2 of 2

Session Code PFL450

Room 310 B Session 1:30 p.m.

Low net carbon fuels are becoming more popular and therefore a couple of papers in this session investigate particle formation from ethylene, ammonia and gasoline/ethanol blends. The other papers cover diesel combustion, DPFs and real- world driving emissions.

WCX SAE World Congress Experience

Technical Session Schedule

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Organizers - Kirby Baumgard; Danan Dou, Deere & Company; Mark Hoffman, Auburn Univ.; Ezio Mancaruso, STEMS - CNR; Gongshin Qi, General Motors LLC; Andrea Strzelec, USCAR; Julian Tan, Stellantis NV

Time	Paper No.	Title
1:30 p.m.	2024-01-2385	Effect of Residence Time on Morphology and Nanostructure of Soot in Laminar Ethylene and Ammonia-Ethylene Flames Weiwei Qian, Xiuyong Shi, Tongji University; Song Li, East China Jiaotong University
2:00 p.m.	2024-01-2386	RDE PN Emission Challenges for a China 6 PHEV Yi Liu, Chunbo Li, Corning (Shanghai) Company Ltd.; Thorsten Boger, Xiangyu Feng, Weiwei Li, Xiaolang Chen, Corning Inc.
2:30 p.m.	2024-01-2380	Compression Ignition Engine Smoke Emissions at Reduced Ambient Pressures and Temperatures Jonathan Mattson, DEVCOM Army Research Laboratory; Joseph Gibson, DEVCOM Aviation & Missile Center; Chol-Bum Kweon, Kenneth Kim, Erik Schroen, Kyle Hepp, DEVCOM Army Research Laboratory; Rik Meininger, DEVCOM Aviation & Missile Center; Peter Clerkin, Kurt Kruger, DEVCOM Army Research Laboratory; Marshall Musser, U.S. Army PEO Aviation; Aaron Pope, Sang-Guk Kang, DEVCOM Army Research Laboratory
3:00 p.m.		BREAK
3:30 p.m.	ORAL ONLY	PAREMPI – a Comprehensive Assessment of Real-World Particulate Emissions from the Transport Sector, with a Focus on Secondary Aerosol Piotr Bielaczyc, Wojciech Honkisz, Joseph Woodburn, BOSMAL Automotive Research and Development Institute Ltd,; Topi Rönkkö, Panu Karjalainen, Matt Rissanen, Tampere University; Hilkka Timonen, Luis Barreira, Finnish Meteorological Institute; Anna Oudin, Joakim Pagels, Lund University; Ismael Ortega, David Delhaye, Louise Ganeau, ONERA; Jan Topinka, Tereza Cervena, Michal Vojtisek-Lom, IEM Institute of Experimental Medicine
4:00 p.m.	2024-01-2382	Particulate filter performance mapping for in-service conformity Sandeep Viswanathan, Ghadi Sadek, Vishal Reddy, Suhao He, Rabeka Alam, Corning Inc.

Planned by Mobile Emissions Committee / Energy and Propulsion Activity

Wednesday, April 17

The Future of Mobility and How to Achieve Equitable Mobility for All

Session Code DEI100

Room 312 A/B Session 9:30 a.m.

This session will address what are the challenges facing industry for the built environment, the user and of the technology in creating equitable mobility. This session is seeking abstracts that will provide thought-provoking insights on designing vehicles and infrastructure that creates equitable mobility for future state vehicles based upon user needs. We are also seeking case studies on what it takes to make it happen in today's current environment.
Sponsored by

Organizers - Shengyong Zhang, Purdue University Northwest

Chairperson - Tarek Abdel-Salam, East Carolina University

WCX SAE World Congress Experience

Technical Session Schedule

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Time	Paper No.	Title
9:30 a.m.	2024-01-2497	Study of Braking Characteristics of New Manual Braking System (1st Report) Tomohiro Yokoyama, Kaito Ogawa, Masayuki Soga, Toyota Motor Corporation
10:00 a.m.	2024-01-2496	Quality and Affordability by Design in Vehicle Realization Mohamed El-Sayed, Eastern Michigan University
10:30 a.m.	2024-01-2494	Potential and Challenges of Using Biomass-Based Resources in Bhutan Singye Wangchuk, Naveen Kumar, Delhi Technological University

Planned by Sustainable Development Committee / Ground Vehicle Advisory Group

Wednesday, April 17

Load Simulation and Vehicle Performance: Nonlinear Components/Systems

Session Code M206

Room 312 A/B Session 3:30 p.m.

Focusing on new theory, formulation and modeling of amplitude-, frequency- and temperature-dependent nonlinear components/systems such as rubber and hydraulic mounts or bushings, air spring, shock absorbers, and any joint friction/damping; dynamic characterization through lab and field testing; Linearization methodology; Model validation, application, and sensitivity analysis in vehicle system/subsystem simulations; Nonlinear system identification, modeling, and application in testing accuracy improvement, etc.

Organizers - Guangqiang Wu, Tongji University; Jinglai Wu, Huazhong University of Science and Tech.; Peijun Xu, Ebco Inc.; Fulun Yang, Hanon Systems

Time	Paper No.	Title
3:30 p.m.	2024-01-2285	Analysis and Design of Suspension State Observer for Wheel Load Estimation Tianyi Zeng, Zeyu Liu, Chenyu He, Zimo Zeng, Haotian Chen, Feiyang Zhang, Kai Fu, Xinbo Chen, Tongji University
4:00 p.m.	2024-01-2284	Modeling and Time Discrete Characteristics Analysis of the Oil Filling Process of Wet Clutch for a Specialized Vehicle’s Automatic Transmission Jun Guo, Huazhong University of Science and Techology; Guangjun Feng, China North Vehicle Research Institute; Jinglai Wu, Yunqing Zhang, Huazhong University of Science and Techology
4:30 p.m.	2024-01-2282	An Adaptive Clamping Force Control Strategy for Electro-Mechanical Brake System Considering Nonlinear Friction Resistance Zelin Xu, Jian Wu, Gongyuan Bi, Jilin University; Jie Hou, Wenbo Zheng, Lun Li, Shang Gao, China FAW Group Corp., Ltd.; Zhicheng Chen, Jilin University

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

WCX SAE World Congress Experience

Technical Session Schedule

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Wednesday, April 17

Exhaust Emissions Control - New Developments

Session Code PFL410

Room 313 A/B Session 9:30 a.m.

Papers are invited on novel approaches and/or unconventional modifications to emission controls for IC engines fueled by gasoline, diesel, biofuels or hydrogen. Topics include the integration of external heat or power sources and other interactions between engine and emission controls as well as uncommon solutions to reduce criteria pollutants. Reviews of future regulations and potential strategies to meet them including sensors and control systems will also be considered.

Organizers - Anand Srinivasan, Cummins Inc.; Holmes Ahari, FCA US LLC; Krishna Kamasamudram, Cummins Inc.; Andrea Strzelec, USCAR; Jun Peng

Time	Paper No.	Title
9:30 a.m.	2024-01-2377	Electrically Heated Mixer for Near-Zero Urea Deposit
		Bruce Vernham, Vaibhav Kadam, Isuzu Technical Center of America Inc.; Mansour Masoudi, Sahm Noorfeshan, Nick Poliakov, Emissol LLC
10:00 a.m.	2024-01-2379	Advanced Aftertreatment System Meeting Future HD CNVII Legislation
		Yan Wang, Shuyue Chen, Jun Zhang, Junyin Chen, Lucas Long, Umicore Autocat (China) Co. Ltd.; Andreas Geisselmann, Michael Bender, Umicore AG & Co. KG; Zemin Tao, Minlin Zhu, Guangxi Yuchai Machinery Company Ltd.
10:30 a.m.	ORAL ONLY	Reducing Cold Start Emissions by 80 to 90%
		Kit Whipple
11:00 a.m.	2024-01-2378	A Rapid Catalyst Heating System for Gasoline-Fueled Engines
		Christian Disch, Robert Bosch GmbH; Ryan O'Donnell, Ripudaman Singh, Somjai Chutipassakul, Robert Bosch LLC; William Krein, Bosch Engineering GmbH; Frank Heinzelmann, Matthias Oesterle, Friedrich Boysen GmbH & Co. KG
11:30 a.m.	ORAL ONLY	Emissions, Propulsion, and Regulations - A Year in Review
		Andrea Strzelec, USCAR; Ameya Joshi, ClearFlame Engines; Ronald Silver, Caterpillar (retired); Christopher Depcik, Univ of Kansas

Planned by Mobile Emissions Committee / Energy and Propulsion Activity

Wednesday, April 17

Load Simulation and Vehicle Performance: Autonomous Vehicle Dynamics

Session Code M211

Room 313 A/B Session 1:30 p.m.

In view of the fast pace of autonomous vehicle development and its challenges associated with different applications, this session is to focus on the following topics: Autonomous vehicle dynamics modeling and simulation methodology; Vehicle Dynamics and terrain coupling with sensor performance, autonomy prediction, planning and control in different mobility scenarios; Autonomous vehicle system duty cycle definition and durability performance evaluation; Autonomous vehicle system dynamics performance simulation verification & validation; Autonomy system and software assurance: How we can define and demonstrate the right level of acceptability.

Organizers - Xiaobo Yang, Oshkosh Corporation; Hui Zhang, Beihang University; Paramsothy Jayakumar, US Army DEVCOM GVSC

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Time	Paper No.	Title
1:30 p.m.	2024-01-2328	Torque Vectoring for Lane-Changing Control during Steering Failures in Autonomous Commercial Vehicles Ao Lu, Runfeng Li, Xu Yinggang, Zexin Nie, Peilin Li, Guangyu Tian, Tsinghua University
2:00 p.m.	2024-01-2331	An Improved AEB Control System Based on Risk Factors with Consideration of Vehicle Stability Shaozhong Guo, Jun Guo, Yunqing Zhang, Jinglai Wu, Huazhong University of Science and Technology
2:30 p.m.	2024-01-2332	Trajectory Planning of Autonomous Vehicles Based on Parameterized Control Optimization with Three-Degree-of-Freedom Vehicle Dynamics Model Longxi Liu, Zihao Wang, Yunqing Zhang, Jinglai Wu, Huazhong University of Science and Technology
3:00 p.m.	2024-01-2329	Design of Steer-by-Wire Road feeling Feedback System Based on Sliding Mode Control Jianhui You, Yunqing Zhang, Zixuan Chen, Jinglai Wu, Huazhong University of Science and Technology
3:30 p.m.	2024-01-2333	Data-Enabled Human-Machine Cooperative Driving Decoupled from Various Driver Steering Characteristics and Vehicle Dynamics Hongyan Guo, Wanqing Shi, Jiaming Zhang, Jun Liu, Jilin University
4:00 p.m.	2024-01-2330	Maximum Curve-Passing Speed Correction for Online Trajectory Optimization of Autonomous Vehicles Baichuan Lou, Nanyang Technological University; Bolin Zhao, Meituan Group; Xiangkun He, Nanyang Technological University; Dongchun Ren, Meituan Group; Chen Lv, Nanyang Technological University
4:30 p.m.	2024-01-2326	Methodology to Estimate Load Spectra of Autonomous and Highly Automated Vehicles Gerrit Brandes, Ron Rebesberger, Marcel Sander, Lars Erxleben, Roman Henze, Ferit Küçükay, Technische Universität Braunschweig

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Wednesday, April 17

Thermal Modeling and Simulations - Part 1 of 2

Session Code HX700

Room 320 Session 9:30 a.m.

The session will focus on the use of latest simulation technologies in the design and evaluation of new thermal systems and their control strategies. Contributions will focus on both 1D and 3D simulation tools as applied to steady and transient phenomenon.

Organizers - Bashar AbdulNour, Kettering Univ.; Ales Alajbegovic, Four Elements Technologies; Wilko Jansen, Jaguar & Land Rover; Vamshi Korivi, US Army; Gursaran Mathur, Highly-Marelli North America; Kumar Srinivasan, Cadence Design Systems Inc.; Sudhi Uppuluri, Romain Nicolas, Siemens Digital Industries Software

Time	Paper No.	Title

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Time	Paper No.	Title
10:00 a.m.	2024-01-2582	Digital Twin Modeling Using High-fidelity Battery Models for State Estimation and Control Nikhil Biju, Harshad Pandit, Gamma Technologies LLC
10:30 a.m.	2024-01-2583	Optimization of Power Module Cooling Plate: an Application of Deep Learning for Thermal Management devices Alessandro Lombardi, Neural Concept; Luca Zampieri, Neural Concept, Ltd.; Monika Agrawal, Mohit Singhal, Eaton Innovation Center; Thomas Von Tschammer, Neural Concept, Ltd.
11:00 a.m.	2024-01-2584	Analysis of Thermal Stress on Silicon Nitride Surface Caused by Drop-Wall Interaction at Engine Conditions Sheikh Ahamed, Song-Charng Kong, Texas Tech University

Wednesday, April 17

Thermal Management for Batteries and Battery Management - Part 1 of 2

Session Code HX1500

Room 320 Session 1:30 p.m.

This session covers the technical trends and innovations in battery and battery management system thermal management. This includes the key trends dealing with the thermal needs of battery and battery management systems including thermal management system optimization, packaging, and technology innovations to improve efficiency. Thermal management architecture for optimized performance and the latest means for mitigating battery thermal runaway are covered in this session.

Organizers - Gursaran Mathur, Highly-Marelli North America; Ronald Semel, Ford Motor Company; Bing Shuttlewood, General Motors Corporation; Sowmya Jayaraman, General Motors LLC; Raj Ranganathan, Simerics Inc; Marc LeDuc, SAE-I; Jeff Schlautman, General Motors LLC

Time	Paper No.	Title
1:30 p.m.	2024-01-2665	Energy-Aware Predictive Control for the Battery Thermal Management System of an Autonomous Off-Road Vehicle Anirudh Sundar, Atharva Ghate, Qilun Zhu, Robert Prucka, Clemson University; Vamshi Korivi, Yeefeng Ruan, US Army GVSC
2:00 p.m.	2024-01-2664	Enhancing Battery Thermal Management in Electric Vehicles through Reduced Order Modeling and Predictive Control for Quick Charging Qiuhao Hu, Peiran Ding, Weiran Jiang, Kenny Fung, Farasis Energy
2:30 p.m.	2024-01-2667	Thermal Characterization of Lithium-Ion Batteries under Varying Operating Conditions Adekanmi M. Adeyinka, Kyungjin Yu, Song-Yul Choe, Auburn University; Wooju Lee, Hyundai Motor Company
3:00 p.m.		BREAK
3:30 p.m.	2024-01-2668	CFD Analysis of the Battery Thermal Management System for a Heavy-Duty Truck Matthew Makings, Mateusz Maciocha, Jonathan Biggs, University of Leeds; Farhad Salek, Oxford Brookes University; Ali Zare, Deakin University; Shahaboddin Resalati, Oxford Brookes University; Thomas Short, University of Leeds; Meisam Babaie, University Of Leeds

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Time	Paper No.	Title
4:00 p.m.	2024-01-2670	Procedures for Experimental Characterization of Thermal Properties in Li-Ion Battery Modules and Parameters Identification for Thermal Models Francesco Fiorillo, Faissal El Idrissi, Center For Automotive Research; Prashanth Ramesh; Marcello Canova; Adolfo Senatore, Universita di Napoli; Emma Frosina, University of Sannio; Assunta Andreozzi; Marcello Iasiello; Luca Romagnuolo, Università degli Studi del Sannio
4:30 p.m.	2024-01-2673	Measured Thermal Performances at Brick and Module Levels in a Battery Pack of a Mid-Size Electric Vehicle under WLTC and FTP Cycles Kamaleshwar Nandagopal, Ratnak Sok, Kentaro Kishida, Tomohiro Otake, Jin Kusaka, Waseda University

Wednesday, April 17

Vehicle Cabin Air Quality & Human Factors

Session Code HX200

Room 321 Session 9:30 a.m.

Cabin indoor air quality is becoming very important as we are spending more time in our vehicles. This is becoming even more important in the post pandemic era. In today's some of the vehicles a unique climate control system with sensors to address the air quality within the cabin to ensure comfort and safety of the occupants. This session will support design and development related to solutions to cabin air quality.

Organizers - Jeffrey Bozeman; Jason Lustbader, US Dept. of Energy; Gursaran Mathur, Highly-Marelli North America; Jie Zeng, Denso

Time	Paper No.	Title
9:30 a.m.	2024-01-2579	Investigation of Propagation of Viruses and Risk of Infection in Automobile Cabins Gursaran Mathur, Highly-Marelli North America
10:00 a.m.	2024-01-2410	Exploring User Interface Designs and Temperature for Automotive Heated Seats Baekhee Lee, Hyundai Motor Company; Matthew Salas, Noah Morrison, Jangwoon Park, Texas A&M University

Wednesday, April 17

Waste Heat Recovery

Session Code HX900

Room 321 Session 10:30 a.m.

Increases in energy cost combined with more stringent emissions standards has made the need to increase overall energy efficiency a critical part of the vehicle development process. The capture and reuse of waste energy is a way of improving overall energy efficiency. This session deals with methods for waste heat recovery and its use for improved energy efficiency.

Organizers - Raj Ranganathan, Simerics Inc.; Ronald Semel, Ford Motor Company; Gursaran Mathur, Highly-Marelli North America

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Time	Paper No.	Title
10:30 a.m.	2024-01-2589	On the Application of Joule-Cycle-Based Waste Heat Recovery to Heavy-Duty Vehicles James Turner, Kesty Yong Kenkoh, Sreenivasa Gubba, Giovanni Vorraro, King Abdullah University of Science and Technology
11:00 a.m.	2024-01-2591	Waste Heat Recovery via Inverted Brayton Cycle Bottoming a Twin-Turbo Gasoline Engine Farhad Salek, Oxford Brookes University; Meisam Babaie, University Of Leeds; Ali Zare, Deakin University; Junfeng Yang, University of Leeds; Fabrizio Bonatesta, Oxford Brookes University
11:30 a.m.	2024-01-2590	Use of Accurate Simulation Workflows to Optimize Waste Heat Recovery from Thermoacoustic Engines Devadatta Mukutmoni, Robert Powell, Dassault Systemes; Satheesh Kandasamy, Dassault Systemes America Corp (DSAC)

Wednesday, April 17

Thermal Modeling and Simulations - Part 2 of 2

Session Code HX700

Room 321 Session 1:30 p.m.

The session will focus on the use of latest simulation technologies in the design and evaluation of new thermal systems and their control strategies. Contributions will focus on both 1D and 3D simulation tools as applied to steady and transient phenomenon.

Organizers - Bashar AbdulNour, Kettering Univ.; Ales Alajbegovic, Four Elements Technologies; Wilko Jansen, Jaguar & Land Rover; Vamshi Korivi, US Army; Gursaran Mathur, Highly-Marelli North America; Kumar Srinivasan, Cadence Design Systems Inc.; Sudhi Uppuluri, Romain Nicolas, Siemens Digital Industries Software

Time	Paper No.	Title
1:30 p.m.	2024-01-2587	Numerical Investigation on Heat Dissipation Performance of Multi-Fan Cooling Module Yi Ming Guo, Bin Xiao, Hubei Automotive Industries Institute; Yu Huang, Guoqiang Li, Shandong Meichen Industry Group Co., Ltd; Wen-Bin Shangguan, South China University of Technology
2:00 p.m.	2024-01-2586	Maximizing FCEV Stack Cooling Performance: Developing a Performance Prediction Model Based on Machine Learning for Evaporative Cooling Radiator Dong Keon Lee, Dong Seok Kim, Hyung Suk Byun, Hyundai Motor Company; Hyun Sung Kang, Yoon Hyuk Shin, Ho Seong Lee, Korea Automotive Technology Institue
2:30 p.m.	ORAL ONLY	THE DEVELOPMENT OF SURROGATE MODELS WITH MACHINE LEARNING APPROACHES FOR ENGINEERING APPLICATIONS Yeefeng Ruan, US Army GVSC

WCX SAE World Congress Experience

Technical Session Schedule

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Wednesday, April 17

Alternative Refrigerant Systems (R-744, R-123yf, Other Refrigerants)

Session Code HX1400

Room 321 Session 3:30 p.m.

Currently used refrigerants for the automotive industry are not suitable for heat pump application for EVs. Hence, the future of HFO-1234yf is uncertain as it is not acceptable for EV application, specifically for heating. Also, this refrigerant is a known PFAS, a known chemical that affects human health. Automotive industry is working with refrigerant suppliers to develop an alternative refrigerant suitable for heat pump application that does not affect human health. This session will address the potential shortcomings of the current refrigerant and new or natural refrigerants that can be used as alternatives.

Organizers - Jeffrey Bozeman; Aamir Khawaja, FCA US LLC; Gursaran Mathur, Highly-Marelli North America

Time	Paper No.	Title
3:30 p.m.	2024-01-2876	Using Natural Refrigerants Propane (R290) & Carbon Dioxide (R744) as Direct & or Indirect Heat Pump Systems to Address PFAS Issue Gursaran Mathur, Highly-Marelli North America
4:00 p.m.	2024-01-2877	Experimental Investigation on Novel Indirect Heat Pump System using R290 Refrigerant for Automotive Application Raghav Gupta, Rohan Saraswat, Aled Gravelle, Jaguar & Land Rover
4:30 p.m.	ORAL ONLY	Due to FGAS and FPAS regulation, what are the refrigerant of the future ? A comparative study between some alternatives. Georges De Pelsemaeker, Valeo

Wednesday, April 17

Vehicle NVH CAE Analysis & Testing - Part 2 of 4

Session Code M212

Room 330 A Session 9:30 a.m.

This session covers the forefront NVH development in electrical vehicle, ICE vehicle and autonomous vehicle - numerical methods along with test correlation and optimization for NVH issues of full vehicle and vehicle subsystems. All structural components, subsystems and complete systems found in automotive vehicles will be considered. Topics include noise control materials, structure NVH, vibro-acoustics, wind noise and aeroacoustics, intake/exhaust noise and vehicle interior noise, sound quality etc.

Organizers - Farokh Kavarana, Nissan Technical Center NA; Pranab Saha, Kolano and Saha Engineers Inc.; Gavin Song, Ford Motor Company; Mark Stebbins, Wenlong Yang, General Motors LLC; Weiguo Zhang, Stellantis

Chairperson - Pranab Saha, Kolano and Saha Engineers Inc; Farokh Kavarana, Nissan Technical Center NA

Time	Paper No.	Title
9:30 a.m.	ORAL ONLY	A Subjective and Objective Psychoacoustic Evaluation Model for Door Closing Sound Quality of Passenger car Liping Xie, Fuzhou University

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Technical Session Schedule

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Time	Paper No.	Title
10:00 a.m.	2024-01-2353	Numerical Simulation of Fluctuating Wind Noise of a Vehicle in Reproduced on-Road Wind Condition Atsushi Tajima, Kobe University; Jun Ikeda, Kosuke Nakasato, Takahiro Kamiwaki, Junichi Wakamatsu, Munehiko Oshima, Nissan Motor Co.,Ltd.; ChungGang Li, Riken; Makoto Tsubokura, Kobe University / Riken
10:30 a.m.	2024-01-2346	Vibrational Energy Propagation Analysis at Point Joints between Frame and Panel for Vehicle Interior Noise Reduction Keisuke Abe, Subaru Corporation, Kanagawa University; Yunosuke Tanaka, Subaru Corporation; Toru Yamazaki, Kanagawa University
11:00 a.m.	2024-01-2348	Split Ring Resonator-based Metamaterial with Total Bandgap for Reducing NVH in Electric Vehicles Prathik Reddy Gunreddy, Michael Leamy, Georgia Institute of Technology
11:30 a.m.	2024-01-2338	Identification of Low Vibration Damping Areas on Automotive Door Panel and Improvement Using Natural Fibers Pradeep Jawale, Ashok Mache, Chirag Chhatlani, Omkar Wagh, Sakshi Pandit, Vishwakarma Institue of Information Technology

Wednesday, April 17

Material Characterization Modeling, Environment Interactions & Multi-Discipline CAE Applications

Session Code M226

Room 330 A Session 1:30 p.m.

Organizers - Ke An, Oak Ridge National Laboratory; Mingchao Guo, FCA US LLC; Hamid Jahed, University of Waterloo; Yi Liu, Qigui Wang, General Motors LLC; Xijia Wu, National Research Council Canada; Marc LeDuc

Time	Paper No.	Title
1:30 p.m.	2024-01-2679	Multiphysical Modeling of Industrial Top Coating with Rotary Bells Dmitrii Panov, Muraleekrishnan Menon, Huaxiang Zhu, Alexander Stadik, Lingran Zhang, Akhilesh Kotian, Chong Peng, Ernesto Monaco, Ravi Kanth Borra, Mohammed Boraey, ESS Engineering Software Steyr
2:00 p.m.	2024-01-2680	Exploring Mechanical Impact Properties of 3D Printing Filaments: A Comprehensive Study of Brazilian Market Products Leonardo Cardoso de Freitas, Ana Paula Goncalves, Katielly Polkowski, Marina De Andrade, Rodrigo Polkowski, TRL9 LAB Testing and Technical Analysis
2:30 p.m.	2024-01-2681	The Influence of Fundamental Processing Parameters of Ultrasonic Shot Peening on Surface Characteristics of 7B50-T7751 Alloy Muhammad Adeel, Mechanical Engineering Services; Naqash Azeem, Parthenope University of Naples; Hongqian Xue, Northwestern Polytechnical University
3:00 p.m.		BREAK

WCX SAE World Congress Experience

Technical Session Schedule

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Time	Paper No.	Title
3:30 p.m.	2024-01-2682	Advanced Material Characterization of Hood Insulator Foams for Pedestrian Head Impact Gokula Krishnan M, Tata Consultancy Services; Vesna Savic, General Motors LLC; Rajamanickam V S, Swaroop Kavi, Tata Consultancy Services
4:00 p.m.	2024-01-2683	Thermomechanical Fatigue Behavior of a Cast Austenitic Stainless Steel Yi Liu, Devin Hess, Qigui Wang, Jason Coryell, General Motors LLC

Wednesday, April 17

Occupant Protection: Accident Reconstruction - Part 2 of 3

Session Code SS500

Room 330 B Session 9:30 a.m.

Presentations detailing new methods for virtual analysis of collision events. Studying bicycle GPS devices and modelling tractor-trailer rollover events in HVE

Organizers - Christopher Armstrong, Armstrong Forensic Reconstruction Corp.; Alan Asay, Asay Engineering; Dean Beaumont, TRL; Jarrod Carter, Origin Forensics LLC; Edward Fatzinger, Momentum Engineering Corp.; Nathan Rose, Explico Engineering Co.

Time	Paper No.	Title
9:30 a.m.	2024-01-2486	Quantifying uncertainty in bicycle-computer position measurements Gunter P. Siegmund, Ian L. Miller, Gabrielle Booth, Jonathan M. Lawrence, MEA Forensic Engineers & Scientists
10:00 a.m.	2024-01-2474	The Effect of Image Stabilization on PhotoModeler Project Accuracy Joseph Neal, Tara Leipold, Karla Petroskey, Explico
10:30 a.m.	2024-01-2485	Uncertainty Introduced by Image Projection in Video-Based Reconstructions of Vehicle Positions and Speeds Cole Young, Thomas Flynn, Ian Miller, Gunter P. Siegmund, MEA Forensic Engineers & Scientists
11:00 a.m.	2024-01-2483	Video and Object Tracking for Speed Determination using Aerial LiDAR Toby Terpstra, Sean McDonough, Ethan Helms, Steven Beier, David Hessell, J.S. Held LLC
11:30 a.m.	2024-01-2487	Comparison of Tractor-Trailer Rollover Tests and HVE Simulation Daniel Honeycutt, Gary Rogers, Engineering Systems Inc; Shu Yang, IMMI (Indiana Mills & Mfg Inc); James Chinni, Engineering Answers LLC

WCX SAE World Congress Experience

Technical Session Schedule

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Wednesday, April 17

Occupant Protection: Safety Test and Simulation Methods and Applications

Session Code SS508

Room 330 B Session 1:30 p.m.

This session reports the research work dealing with advances of safety-related state-of-the-art experimental and computer modeling methods. The topics include evaluation of occupant safety and passive/active counter-measures development in various impact test modes; safety designs of new vehicle concepts/products (like Li-ion battery systems, EVs and self-driving cars); applications of advanced CAE and optimization techniques; characterization and utilization of novel light-weight materials.

Organizers - Clifford Chou, Wayne State Univ.; Anindya Deb, Indian Institute of Science; Binhui Jiang, Hunan University; P. Miller, MGA Research Corp.; Feng Zhu, Johns Hopkins University

Chairperson - Clifford Chou, Wayne State Univ; Helen Kaleto, MGA Research Corporation; Robert McCoy, Ford Motor Company; Feng Zhu, Johns Hopkins University

Time	Paper No.	Title
1:30 p.m.	2024-01-2514	Investigation of the Prediction Model and Assessment Parameters of Head Injury of Children Occupants Based on Machine Learning Haiyan Li, Yanxin Wang, Lijuan He, Wenle Lv, Shihai Cui, Jesse Shijie Ruan, Tianjin University of Science and Technology
2:00 p.m.	2024-01-2511	Development of Predictive Model for Flexible Pedestrian Legform Impactor Injury Junaid Hassan Barbhuiya, Subhav Jain, Maruti Suzuki India Ltd.
3:00 p.m.		BREAK
3:30 p.m.	2024-01-2509	Development of a Dynamic Nonlinear Finite Element Model of the Large Omnidirectional Child Crash Test Dummy Balaji Naga Sai Abhishikt Challa, Peiyu Yang, The Ohio State University; Michael Carlson, Brian Suntay, Transportation Research Center Inc.; Jason Stammen, NHTSA; Scott Noll, The Ohio State University
4:00 p.m.	ORAL ONLY	Enabling fast and predictive assessment for occupant safety using CAE for several seating postures Prasanna Vadanan Nallan Chakravarthy, Vinayak Walvekar, Siemens Digital Industries Software
4:30 p.m.	2024-01-2754	Title: Study of Indian accident characteristics using clustering analysis Kulothungan Vimalathithan, Pranesh Rao K M, Pratapnaidu Vallabhaneni, Vivekraj Selvarathinam, Jeyabharath Manoharan, RNTBCI; Chinmoy Pal, Nissan Motor Co. Ltd.; Sitikantha Padhy, Madhusudan Joshi, International Centre For Automotive Technology

Wednesday, April 17

Safety and Performance of Active Safety and Driving Automation Features - Part 1 of 2

Session Code SS400

Room 331 A/B/C Session 9:30 a.m.

This session will focus on evaluating the safety impacts that can be achieved by Active Safety features and Driving Automation features. Topics will include the both the predictive and retrospective safety impact assessments of these technologies, safety benefits for projected systems, the development of a safety case, human interactions and driver monitoring systems, regulatory testing, consumer acceptance, market demand, and subsystem performance assessment of perception, path planning, and other subsystems.

Organizers - Jason Hallman, Toyota Motor North America Inc.; Luke Riexinger, Virginia Tech.; John Scanlon,

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Waymo; Jeffrey Wishart, Science Foundation AZ/AZ Comm Authority

Time	Paper No.	Title
9:30 a.m.	2024-01-2640	A Method of Generating a Composite Dataset for Monitoring of Non-Driving Related Tasks Xian Wu, Junjie Gou, Jianwang Shao, Tongji University
10:00 a.m.	2024-01-2641	Evaluating Safety Metrics for Vulnerable Road Users at Urban Traffic Intersections Using High-Density Infrastructure LiDAR System Prabin Kumar Rath, Blake Harrison, Arizona State University; Duo Lu, Rider University; Yezhou Yang, Arizona State University; Jeffrey Wishart, Science Foundation AZ/AZ Comm Authority; Hongbin Yu, Arizona State University
10:30 a.m.	2024-01-2643	STEAM & MoSAFE: SOTIF Error-and-Failure Model & Analysis for AI-Enabled Driving Automation Krzysztof Czarnecki, University of Waterloo; Hiroshi Kuwajima, DENSO CORPORATION
11:00 a.m.	2024-01-2645	Representative Cyclist Collision Injury Risk Distributions for a Dense-Urban US ODD Using Naturalistic Dash Camera Data Eamon T. Campolettano, John M. Scanlon, Kristofer D. Kusano, Waymo

Wednesday, April 17

Safety and Performance of Active Safety and Driving Automation Features - Part 2 of 2

Session Code SS400

Room 331 A/B/C Session 1:30 p.m.

This session will focus on evaluating the safety impacts that can be achieved by Active Safety features and Driving Automation features. Topics will include the both the predictive and retrospective safety impact assessments of these technologies, safety benefits for projected systems, the development of a safety case, human interactions and driver monitoring systems, regulatory testing, consumer acceptance, market demand, and subsystem performance assessment of perception, path planning, and other subsystems.

Organizers - Jason Hallman, Toyota Motor North America Inc.; Luke Riexinger, Virginia Tech.; John Scanlon, Waymo; Jeffrey Wishart, Science Foundation AZ/AZ Comm Authority

Time	Paper No.	Title
1:30 p.m.	2024-01-2644	A Scenario-Based Test Selection and Scoring Methodology for Inclusion into a Safety Case Framework for Automated Vehicles Gavin O'Malley, Arizona State University; Jeffrey Wishart, Science Foundation AZ/AZ Comm Authority; Junfeng Zhao, Arizona State University; Brendan Russo, Northern Arizona University
2:00 p.m.	2024-01-2642	Comprehensive Evaluation of Behavioral Competence of an Automated Vehicle Using the Driving Assessment (DA) Methodology Tinghan Wang, University of Michigan; Shujauddin Rahimi, Sunder Swaminathan, Mohsin Zaidi, Arizona State University; Jeffrey Wishart, Science Foundation AZ/AZ Comm Authority; Henry Liu, University of Michigan
2:30 p.m.	ORAL ONLY	Benchmarking Automated Driving Performance Using Public Crash Data John Scanlon, Kristofer Kusano, Laura Fraade-Blanar, Timothy McMurry, Yin-Hsiu Chen, Trent Victor, Waymo

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Technical Session Schedule

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Time	Paper No.	Title
3:00 p.m.		BREAK
3:30 p.m.	ORAL ONLY	Annual Update for the SAE ORAD Committee's V&V Task Force Jeffrey Wishart, Science Foundation AZ/AZ Comm Authority
4:00 p.m.	ORAL ONLY	Formal Safety Verification in Automated Vehicles: Challenges, Strategies, and Future Directions Alireza Partovi, University of Notre Dame; Mohammad Pashaee, K.N Toosi University of Technology; Rafael Rodrigues da Silva, University of Notre Dame

Wednesday, April 17

Digital Engineering Fundamentals: Design Intent Through Disposal - Part 2 of 2

Session Code SS111

Room 338 Session 9:30 a.m.

Join us for a set of presentations exploring the progress underway for Digital Engineering (DE) transformation on defense vehicle programs. Consider what emerging takeaways and lessons can be transferred to automotive integrated design development, as Systems Engineering (SE) practices and integrated modeling/simulation tools are increasingly required during this period of rapid innovation. Perspectives are shared by various key players implementing and providing these enabling digital tools.

Organizers - Anne O'Neil, AOC Systems Consortium; Aleczander Jackson, Enola Technologies; Gary Rushton, General Motors LLC

Chairperson - Aleczander Jackson, Enola Technologies

Time	Paper No.	Title
9:30 a.m.	ORAL ONLY	Digital Engineering Fundamentals: Design Intent Through Disposal Michael Vinarcik, SAIC
10:00 a.m.	ORAL ONLY	Digital Engineering - A Tool Vendor Perspective Steve Cash, Zuken Vitech Inc.
10:30 a.m.	ORAL ONLY	Harnessing Digital Engineering Transformation Troy A. Peterson, System Strategy Inc.
11:00 a.m.	ORAL ONLY	Q&A with Speakers Moderators - Aleczander Jackson, Enola Technologies LLC Aleczander Jackson, Enola Technologies LLC

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Planned by Body Engineering Committee / Automobile Body, Chassis, Safety, and Structures Activity

Wednesday, April 17

Roadside Safety Special Session

Session Code SS520

Room 338 Session 1:30 p.m.

The Roadside Safety session presents research pertaining to impact safety standards for roadside safety hardware, AASHTO MASH impact safety standards, guardrail design, and encroachment and departure events. This includes interaction with guardrail by powered two-wheelers, electric vehicles, and pickup trucks.

Organizers - Warren Hardy, VT Center for Injury Biomechanics; Warren Hardy, Virginia Tech; John Scanlon, Waymo

Chairperson - Ronald Faller, Univ. of Nebraska-Lincoln

Time	Paper No.	Title
1:30 p.m.	ORAL ONLY	Roadside Safety - Where We Began Ronald Faller, Univ. of Nebraska-Lincoln
2:00 p.m.	ORAL ONLY	Impact Safety Standards for Roadside Safety Hardware & Features - Then to Now Ronald Faller, Univ. of Nebraska-Lincoln
2:30 p.m.	ORAL ONLY	AASHTO MASH Impact Safety Standards for Crash Testing & Evaluation Ronald Faller, Univ. of Nebraska-Lincoln
3:30 p.m.	ORAL ONLY	-Evolution and Advances in Roadside Safety Design Cody Stolle, Midwest Roadside Safety Facility
4:00 p.m.	ORAL ONLY	Current Challenges/Needs & Vehicle-to-Hardware Compatibility with Roadside Safety Hardware & Features Cody Stolle, Midwest Roadside Safety Facility
4:30 p.m.	ORAL ONLY	Roadside Safety Hardware - Design Considerations for Electric Vehicles (EVs) Cody Stolle, Midwest Roadside Safety Facility

Planned by Body Engineering Committee / Automobile Body, Chassis, Safety, and Structures Activity

Wednesday, April 17

Vehicle Aerodynamics - Part 3 of 5

Session Code SS871

Room 353 Session 9:30 a.m.

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:36 PM

Time	Paper No.	Title
9:30 a.m.	2024-01-2531	The Effects of Solid Wall Wind Tunnel Blockage on Incremental Changes to Generic and Simplified Automotive Bodies Mark Gleason, Gleason Aero LLC; Eugen Riegel, Nimeric Systems GmbH
10:00 a.m.	2024-01-2534	Further Analysis of the Blockage Phenomenon During the Testing of Bluff Automotive Bodies in Closed Wall Wind Tunnels - Revision and Update Mark Gleason, Gleason Aero LLC; Eugen Riegel, Numeric Systems GmbH
10:30 a.m.	2024-01-2532	Development, Application, and Implementation of Passenger Vehicle Wind Averaged Drag for Vehicle Development Meghan Kaminski, Zackery Borton, Rivian Automotive LLC
11:00 a.m.	2024-01-2533	Numerical Simulations of High-Fidelity Class 8 Semi-Trailer Truck Geometries and Comparison with Wind-Tunnel Data Joel Varghese, Simerics Inc.; Yifeng Wu, Cummins Inc.; Albert Jorda Juanos, Simerics Inc.; Rohit Saha, Cummins Inc.; Sujan Dhar, Simerics Inc.
11:30 a.m.	2024-01-2546	Experimental Investigation of Low-Frequency Flow Phenomena on the Vehicle Underbody Using Particle Image Velocimetry Laura Breitenbücher, Dr. Ing. h.c. F. Porsche AG; Andreas Wagner, FKFS; Thomas Wiegand, Maarten Brink, Dr. Ing. h.c. F. Porsche AG

Wednesday, April 17

Vehicle Aerodynamics - Part 4 of 5

Session Code SS871

Room 353 Session 1:30 p.m.

Time	Paper No.	Title
1:30 p.m.	2024-01-2542	CAATS - Automotive Wind Tunnel Statistical Process Control Katlynn Bringhurst, Joel Walter, Scott Best, Jacobs
2:00 p.m.	2024-01-2543	CAATS - Automotive Wind Tunnel Test Techniques Felix Wittmeier, FKFS; Antonello Bianco, HALO; James Bratby, Kevin Howard, Ford Motor Company; Thomas Roper, Toyota Gazoo Racing; Victor Senft, MTS Systems Corporation
2:30 p.m.	2024-01-2541	The new China Automotive Technology and Research Center aerodynamic-acoustic and climatic wind tunnels Peter Waudby-Smith, Trevor Bender, Christopher Sooriyakumaran, Aiolos Engineering; Yilun Zhang, Haiyang Wang, Feng Zhao, Guangjun Fan, Jinhong Sun, Xuelong Liu, CATARC
3:00 p.m.	2024-01-2544	Wheel drive unit lift corrections in automotive wind tunnels Erik Josefsson, Chalmers University of Technology; Magnus Urquhart, Volvo Cars; Simone Sebben, Chalmers University of Technology

WCX SAE World Congress Experience

Technical Session Schedule

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Wednesday, April 17

Panel Discussion: On the Standardization of Automotive Aerodynamic Wind Tunnel Measurements

Session Code SS870

Room 353 Session 4:00 p.m.

A collection of working groups representing academic, OEM, government, and private sector wind tunnel viewpoints will provide insights into the status and plans for their work on the Commonized Automotive Aerodynamics Test Standards [CAATS]. Discussion will cover a range of subjects across Definitions & Nomenclature, Calibrations, Corrections, Test Techniques, and Uncertainty Analysis

Organizers - Timo Kuthada, FKFS; Kurt Zielinski, American Honda Motor Co. Inc.

Moderators - Edward Duell, Jacobs

Panelists - Katlynn Bringhurst, Jacobs Technology; Gregory Fadler, Stellantis; David Sims-Williams, Durham University; Joel Walter, Jacobs; Felix Wittmeier, FKFS;

Wednesday, April 17

Magnesium Technology

Session Code M109

Room 355 Session 9:30 a.m.

The interest in Magnesium alloys in the automotive market for new and existing applications is primarily due to their mass reduction potential. Research of magnesium alloys, processing methods including die-casting, sheet and extrusion, enabling developments in durability, corrosion and joining technologies, and development of new applications continues to receive strong interest. The technical papers to be presented in this session reflect these new developments in magnesium technologies.

Organizers - Mark Kozdras, Natural Resources Canada; Jonathan Weiler, Meridian Lightweight Technologies

Time	Paper No.	Title
9:30 a.m.	ORAL ONLY	Application of High Pressure Die Casting (HPDC) Magnesium Alloys in Electric Vehicles (EVs) Ruchit Shilu, Meridian Lightweight Technologies
10:00 a.m.	ORAL ONLY	The Magnesium to Aluminum Price Ratio in the Age of Decarbonization and Deglobalization Alex Grant, Magrathea Metals
10:30 a.m.	ORAL ONLY	How Can Magnesium Build Automotive Inroads? Edwin Pope, S&P Global Commodity Insights

Planned by Metallic Materials Committee / Materials Engineering Activity

WCX SAE World Congress Experience

Technical Session Schedule

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Wednesday, April 17

Automotive Engineering Testing and Test Methods - Part 1 of 3

Session Code M203

Room 355 Session 1:30 p.m.

M203 is for the presentation of new results, research developments, and applications related to test activities and methods employed in automotive engineering and research. Papers with an emphasis on the application of tests and test methods to automotive design and evaluation are highly encouraged. Papers with a research focus or come from other industries that may have a potential impact on automotive testing and test methods are also welcome.

Organizers - Darryl S. Taylor, Dana; Mikhail Temkin, Rivian Automotive; Liang Wang, Stellantis NV

Time	Paper No.	Title
1:30 p.m.	ORAL ONLY	Development of Structure Durability Test Method for System Level (Module) Using Frame Car SUNGHO BYUN, Hyundai & Kia Corp.
2:00 p.m.	ORAL ONLY	Methodology for India Specific Generic Load Spectra Development for Accelerated Validations of Axle, Wheel Rim & Bearing Dr Prashant R Pawar, Vikram V Shinde, Virendra S Kuwar, Nikhil Rajendra Bakal, Omkar Prakash Joshi, Automotive Research Association of India
2:30 p.m.	2024-01-2275	Multi-Contact Real-Time Tire Model Validation Using a Novel Hardware-in-the-Loop Simulator Apparatus Luca Veneroso, Renzo Capitani, University of Florence; Federico Alfatti, Claudio Annicchiarico, Meccanica 42 S R L; Flavio Farroni, Aleksandr Sakhnevych, University of Naples
3:00 p.m.		BREAK
3:30 p.m.	2024-01-2274	Application of Motor Load Emulation Techniques for EPB (Electric Parking Brake) System Tests Changhyun Son, Hyunuk Yu, Hyundai Mobis
4:00 p.m.	2024-01-2277	Hardware-in-the-loop Experimental Platform Design for a Novel Electrically Interconnected Suspension System Xiangjun Xia, University of Wollongong; Pengfei Liu, Ocean University of China; Weihua Li; Haiping Du; Donghong Ning, Ocean University of China
4:30 p.m.	2024-01-2272	XiLS (X in the Loop Simulation) Based Thermal Management Development Taewoong Lim, Junho Baek, Lee Dongmyeong, Jee Hwan Jeon, Hyeonseob Lee, Junhyeong Park, Hanseung Myeong, Myeongwoo Kim, Seockhwan Choi, Hyundai Motor Group

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Wednesday, April 17

Fatigue Analysis and Design - Part 3 of 3

Session Code M200

Room 356 Session 9:30 a.m.

1 customer usage development 2 structural stress generation 3 fatigue of metallic material including new lightweight metals 4 fatigue of non-metallic materials 5 fatigue of joints and bearings 6 environmental effects on fatigue performance 7 effect of manufacturing processes on fatigue behavior 8 vibration fatigue 9 probabilistic fatigue 10 microstructure-mechanics based fatigue 11 machine learning 12 battery

pack, electrical motor and BEV drivetrain fatigue and durability.

Organizers - Gavin Song, Ford Motor Company; Paul Lubinski, Thermo King Corp.; Yung-Li Lee, Stellantis Retired; Mingchao Guo, Stellantis; Xijia Wu, National Research Council Canada; Sean McKelvey, Stellantis; Jeong Hong, Thornton Tomasetti; Hong Tae Kang, Univ of Michigan-Dearborn; Matteo Facchinetti, Stellantis

Chairperson - Paul Lubinski, Thermo King Corp; Sean McKelvey, Stellantis; Gavin Song, Ford Motor Company

Time	Paper No.	Title
9:30 a.m.	2024-01-2255	Fatigue Analysis and Rapid Design Process of Anti-vibration Rubber Parts for Automobiles Nao Sugimoto, Honda R&D Co., Ltd.
10:00 a.m.	ORAL ONLY	Hyperelastic Modeling of Silicone Adhesives and Sealants to Enable More Robust Joint Design in Automotive Electronics Jie Feng, Sze-Sze Ng, William Johnson, Andy Kenney, Kyle Atkins, Chi-Wei Tsang, Laura Dietsche, Liangkai Ma, Dow Inc.; Gulab N. Malunjkar, Dow Chemical International Pvt. Ltd.
10:30 a.m.	2024-01-2254	A Special User Shell Element for Coarse Mesh and High-Fidelity Fatigue Modeling of Spot-Welded Structures Lunyu Zhang, Shengjia Wu, Pingsha Dong, University of Michigan
11:00 a.m.	2024-01-2252	A New Equation for Modeling S-N data of Steels Gang Huang, ArcelorMittal
11:30 a.m.	ORAL ONLY	A study of material properties for chassis weld fatigue analysis and evaluating the durability influence of end processing factors Jinhee Jang, Automotive Industries

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Wednesday, April 17

Vehicle Dynamics - Part 1 of 2

Session Code SS900

Room 356 Session 1:30 p.m.

This session is focused on vehicle dynamics and controls using modeling and simulation, and experimental analysis of ICE, BEV and Hybrid passenger cars, heavy trucks, and wheeled military vehicles. This session addresses active and passive safety systems affecting the yaw, pitch and roll of the vehicle; driving simulators and hardware-in-the-loop systems; suspension kinematics and compliance; steering dynamics, advanced active suspension technologies; and tire force and moment mechanics.

Organizers - Gary Heydinger, SEA, Ltd.; Giampiero Mastinu, POLITECNICO DI MILANO; Sughosh Rao, Transportation Research Center Inc.; Scott Zagorski, SEA, Ltd.; Jian Jun Zhu, Cruise Automation Inc.

Time	Paper No.	Title

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Technical Session Schedule

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Time	Paper No.	Title
1:30 p.m.	ORAL ONLY	A Proposal for Virtual Evaluation and Contribution Analysis of Vehicle Handling Performance Using R&H All-In-One Process JinHee Lee, Hyundai Motor Company
1:30 p.m.	ORAL ONLY	How drivers lose control of the car Giampiero Mastinu, Fabio Della Rossa, Giorgio Previati, Massimiliano Gobbi, Politecnico di Milano; Marco Fainello
2:00 p.m.	2024-01-2755	Testing and Analysis of Riding a Road Bicycle Over an Artificial Pothole David Michael Sweet, Collision & Injury Dynamics Inc.; Gerald Bretting, Christopher Wilhelm, Collision & Injury Dynamics Inc
2:00 p.m.	2024-01-2762	Multiple Forgot Factor Recursive Least Squares Method for Mass Estimation of Heavy Commercial Vehicles Hongyu Zheng, Yafei Xin, Yang Yan, ASCL, Jilin University
2:30 p.m.	2024-01-2758	A Simulation Model for an Online Corrective Look-Ahead Road Profiling System (CLARPS) for Active Suspension Applications Dane Morison, James Mynderse, Lawrence Technological University
3:00 p.m.	2024-01-2756	Lyapunov Exponent Based Stability Analysis for a High-Dimensional Nonlinear Vehicle System under Extreme Conditions Renzong Lian, Zhiheng Li, Tsinghua University & Pengcheng Lab
3:30 p.m.	2024-01-2757	3DOF Vehicle Dynamics Model for Fuel Consumption Estimation Matteo De Carlo, Paolo Dragone, Giuseppe Pio Tempone, Massimiliana Carello, Politecnico di Torino

Planned by Vehicle Dynamics Committee / Automobile Body, Chassis, Safety, and Structures Activity

Wednesday, April 17

Welcome and Keynote: Deciphering the Coded Car & The Role of GenAI

Session Code LS201

Room Exhibit Hall Session 8:30 a.m.

The convergence of software-defined vehicles, cutting-edge technology, and Generative Artificial Intelligence (GenAI) promises a future defined by innovation, intelligence, and unparalleled driving experiences. Join Jeremiah Golston, Group SVP Engineering, AP Tech, AI, and Auto, Qualcomm Technologies, Inc., for an insightful keynote session that will navigate the true landscape of SDVs, cloud-native development, and the critical role of edge-based GenAI in transforming the cabin by delivering powerful, efficient, private, safer and more personalized experiences to drivers and passengers.

Keynote Speakers Jeremiah Golston, Qualcomm Technologies Inc.

Time	Paper No.	Title
8:30 a.m.	ORAL ONLY	Deciphering the Coded Car & The Role of GenAI

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:36 PM

Time	Paper No.	Title
		Jeremiah Golston, Qualcomm Technologies Inc.

Wednesday, April 17

Learning Lab - Day 2

Session Code LL200

Room Exhibit Hall Session ALL DAY

Time	Paper No.	Title
9:30 a.m.	ORAL ONLY	Real-Time Automotive Design via a Unified Simulation, Data and Physics AI Solution - A Case Study
		David Heiny, SimScale GmbH
10:00 a.m.	ORAL ONLY	AutoDrive Challenge
		.. TBD
10:30 a.m.	ORAL ONLY	AutoDrive Challenge
		.. TBD
11:00 a.m.	ORAL ONLY	AutoDrive Challenge
		.. TBD
11:30 a.m.	ORAL ONLY	AutoDrive Challenge
		.. TBD
12:00 p.m.	ORAL ONLY	AutoDrive Challenge
		.. TBD
12:30 p.m.	ORAL ONLY	Presentation
		.. TBD, Simerics
1:00 p.m.	ORAL ONLY	Presentation
		.. TBD, Caresoft
1:30 p.m.	ORAL ONLY	Insights on the Tesla Cyber Truck

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:36 PM

Time	Paper No.	Title
		Sandy Munro, Munro & Associates
2:00 p.m.	ORAL ONLY	Presentation
		.. TBD, ChargeX
3:00 p.m.	ORAL ONLY	Presentation
		.. TBD, Battery Passport
4:00 p.m.	ORAL ONLY	Presentation
		.. TBD, MWTEC Consortium
4:30 p.m.	ORAL ONLY	Battery Supply Chain
		Robert Galyen, Galyen Energy LLC

Wednesday, April 17

The Business of Software Defined Vehicle

Session Code LS202

Room Exhibit Hall Session 10:00 a.m.

What have we learned from last year's discussion on how the OEMs' move to software-defined vehicles are enabling new and important breakthroughs for Autonomous, Connected, Electric and Shared mobility. OEMs must now balance differentiating in-vehicle features for consumer acceptance while maintaining a non-negotiable "safety first" brand. So, what does this SDV approach provide for the OEM and consumer? What are the benefits to new value chain and expanded lifecycle of the vehicle provide and what are the challenges? Finally, while the vehicle integration with smart devices is a requirement for the customer, is there a stronger need for interdependencies between ADAS and HMI from a systems approach that provide services consumers want while making sure it is not a distraction. Learn more about the Panelists

Moderators - James Buczkowski, (retired) Ford Motor Company

Panelists - Michael Bell, Lucid Motors; Jeremiah Golston, Qualcomm Technologies Inc.; Steve Tengler, Envorso; Prashant Tiwari, Toyota Info Technology Center USA; Qiyan Wang, NIO USA Inc.;

Wednesday, April 17

Building the Automotive Digital Customer Experience

Session Code LS203

Room Exhibit Hall Session 1:00 p.m.

What have we learned from last year's discussion on how the OEMs' move to software-defined vehicles are enabling new and important breakthroughs for Autonomous, Connected, Electric and Shared mobility. OEMs must now balance differentiating in-vehicle features for consumer acceptance while maintaining a non-negotiable "safety first" brand. So, what does this SDV approach provide for the OEM and consumer? What are the benefits to new value chain and expanded lifecycle of the vehicle provide and what are the challenges? Finally, while the vehicle integration with smart devices is a requirement for the customer, is there a stronger need for interdependencies between ADAS and HMI from a systems approach that provide services consumers want while making sure it is not a distraction. Learn more about the Panelists

Moderators - Taylor Leone, SBD Automotive

Panelists - Peter Amthor, Harman/Becker Automotive Systems GmbH; Thad Dungan, Amazon; Pranjali Kalsekar, Google Auto LLC; Kristin Kolodge, J.D.Powers; Doug Wolff, Epic Games;

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:36 PM

Wednesday, April 17

Transforming in a Digital World: The State of Systems Engineering Adoption

Session Code LS204

Room Exhibit Hall Session 2:45 p.m.

Today's vehicle functionality has shifted from a focus on physical components to functionality derived from interactions between embedded controls, software, sensors and communications.

Additional changes are redefining the vehicle systems' boundary -- with electrification, the ongoing ADAS / autonomy evolution, and connected vehicle technology emerging from E/E architectures migration to ECU consolidation that coupled with connected communications and cloud infrastructure enables functional updates over the life of the vehicle. These dynamic developments necessitate iterative, integrated design development including with supply chain partners and across other business functions, such as contracts, marketing and subscription service teams, and aftermarket services.

This session explores Systems approaches for business level decision-making and the trends for Systems Engineering adoption against this backdrop of historic change. We consider industry's ability to keep pace and systemically adopt Systems Engineering – for design practices and workforce development; among supply chain interactions and organizational restructuring; and to inform and influence business decisions and strategic external parties. Learn more about the Panelists

Moderators - Anne O'Neil, AOC Systems Consortium

Panelists - Ankur Ganguli, General Motors LLC; Sammy Omari, Ford Motor Company; John Robb, Hyundai America Technical Center Inc (HATCI); John Alexander, Stellantis;

Wednesday, April 17

SAE EDGE™ Reports Knowledge Bar - Wednesday, April 17

Session Code KB200

Room SAE EDGE Reports Knowledge Bar Session 10:00 a.m.

Time	Paper No.	Title
10:00 a.m.	ORAL ONLY	The Software Defined Vehicle (SDV) and its Evolution - a New Paradigm of Product Development SDV represents a fundamental shift and a complete redesign of the automobile from a mechanical hardware-centric system to a cloud-connected, software-centric ecosystem. This report examines the state of the industry, explores key challenges and provides recommendations as to how to embrace the change. Partha Goswami, PG Mobility Analysis LLC
10:45 a.m.		Break
11:00 a.m.	ORAL ONLY	Industrialization of Batteries for Electrification in USA – Why so slow? Understanding of industrialization of batteries as an integral part of the adoption of electrification in North America is essential. We will investigate how China was so successful and why the USA is so slow in adoption and how to plan for the future. Presenter: Bob Galyen, SAE Fellow, Galyen Energy LLC Robert Galyen, SAE Fellow, Galyen Energy LLC
11:45 a.m.		Break

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:37 PM

Time	Paper No.	Title
1:00 p.m.	ORAL ONLY	How SAE A WORLD IN MOTION (AWIM) is building the next generation of STEM leaders Let's have a discussion on the importance to introduce hands on, fun STEM projects to students at a very early age. SAE AWIM is key in providing classroom experiences with industry volunteers and showing students that math and science is fun and useful. Being a volunteer in the classroom provides direct access to influencing the next generation of STEM leaders – reenergize and reconnect with why you choose a STEM career. Presenter: Rosana G Hull, General Motors Rosana Hull, General Motors LLC
1:45 p.m.		Break
2:00 p.m.	ORAL ONLY	Circularity of Textiles in Mobility Industry Textile wastes is the world's New Ore to wean us off of oil and petrochemicals. With the world's shift to 3-trillion transition to Electric Vehicles, the time is now to harness Circularity Superpowers of Mobility to transform wastes into NextGen sources for restorative growth and jobs. Ann Lee-Jeffs, Modern Meadow; Joanna Safi
2:45 p.m.		Break
3:00 p.m.	ORAL ONLY	Liquid Hydrogen and Mobility Liquid hydrogen is beginning to play a key role in the decarbonization of the global energy landscape. Successful commercial approaches to hydrogen production, liquefaction, storage, distribution, operations, and economics will vary depending on the region, industry sector, and mobility application. Matt Moran, Moran Innovation LLC

Wednesday, April 17

Load Simulation and Vehicle Performance: Ride Comfort (Written Only)

Session Code M207

Room TBD Session

Focusing on vehicle ride comfort, addressing issues such as ride evaluation, suspension tuning, occupant biomechanics, seating dynamics, and semi-active and active suspensions. Topics may include traditional vehicle primary and secondary ride issues, structural shake, brake pulsation, smooth road shake, power hop, launch shudder, freeway hop, etc. and any new ride issues raised from electric vehicles (e.g. in-wheel motors driven EVs) and autonomous vehicles (e.g. motion sickness prevention through vehicle design and driving pattern optimization).

Organizers - Haiping Du, University of Wollongong; Xuting Wu, GAC R&D Center; James Yang, Texas Tech. University; Zhi Yuan, Dassault Systèmes

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:37 PM

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Thursday, April 18

Multi-Dimensional Engine Modeling - Part 2 of 3

Session Code PFL120

Room 140 A Session 9:30 a.m.

The spectrum of papers solicited for this session reflect the truly multi-disciplinary nature of the field of Multi-Dimensional Engine Modeling. The session covers advances in the development and application of models and tools involved in multi-dimensional engine modeling. This includes advances in chemical kinetics, combustion and spray modeling, turbulence, heat transfer, mesh generation, and approaches targeting improved computational efficiency. Papers employing multi-dimensional modeling to gain a deeper understanding of processes related to turbulent transport, transient phenomena, and chemically reacting, two-phase flows are also encouraged.

Organizers - Hardo Barths, General Motors LLC; Anand Nageswaran Bharath, Cummins Inc.; Gianluca D'Errico, Politecnico di Milano; Stefano Fontanesi, Universita di Modena e Reggio Emilia; Haiwen Ge, Zhejiang Laboratory; Yuanjiang Pei, Aramco Americas

Time	Paper No.	Title
9:30 a.m.	2024-01-2694	Computational Investigation of Hydrogen-Air Mixing in a Large-Bore Locomotive Dual Fuel Engine Patrick O'Donnell, Samuel Kazmouz, Sicong Wu, Muhsin Ameen, Argonne National Laboratory; Adam Klingbeil, Thomas Lavertu, Vijayaselvan Jayakar, Pushkar Sheth, Wabtec Corporation; Sameera Wijeyakulasuriya, Convergent Science Inc.
10:00 a.m.	2024-01-2696	Conjugate Heat Transfer Analysis of an i-4 Engine including Pistons, Liners, Block, Heads, Water Cooling Jacket, and Oil Cooling Jets Ashutosh Pandey, Simerics Inc.; Jeff Schlautman, Zhe Liu, General Motors LLC; Sujan Dhar, Simerics Inc.; Bangalore Lingaraj Yashwanth, American Axle & Manufacturing
10:30 a.m.	2024-01-2684	Fast CFD Diesel Engine Modelling Using the 1-Dimensional SprayLet Approach Vinaykumar Reddy Kurapati, Brandenburg University of Technology; Borg Anders, Loge AB; Lars Seidel, Loge Deutschland GmbH; Fabian Mauss, Brandenburg University of Technology
11:00 a.m.	2024-01-2689	Enhancing Ducted Fuel Injection Simulations: Assessment of RANS Turbulence Models Using LES Data Cristiano Segatori, Andrea Piano, Benedetta Peiretti Paradisi, Federico Millo, Politecnico di Torino; Andrea Bianco, Powertech Engineering SRL
11:30 a.m.	2024-01-2695	A study on the relationship between ECN Spray D and Marine-Sized nozzles using FGM combustion model Andrea Di Matteo, Bart Somers, Eindhoven University Of Technology

Planned by General Powertrain Development / Energy and Propulsion Activity

Thursday, April 18

Multi-Dimensional Engine Modeling - Part 3 of 3

Session Code PFL120

Room 140 A Session 1:30 p.m.

The spectrum of papers solicited for this session reflect the truly multi-disciplinary nature of the field of Multi-Dimensional Engine Modeling. The session covers advances in the development and application of models and tools involved in multi-dimensional engine modeling. This includes advances in chemical kinetics, combustion and spray modeling, turbulence, heat transfer, mesh generation, and approaches targeting improved computational efficiency. Papers employing multi-dimensional modeling to gain a deeper understanding of processes related to turbulent transport, transient phenomena, and chemically reacting, two-phase flows are also encouraged.

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:37 PM

Organizers - Hardo Barths, General Motors LLC; Anand Nageswaran Bharath, Cummins Inc.; Gianluca D'Errico, Politecnico di Milano; Stefano Fontanesi, Universita di Modena e Reggio Emilia; Haiwen Ge, Zhejiang Laboratory; Yuanjiang Pei, Aramco Americas

Time	Paper No.	Title
1:30 p.m.	2024-01-2690	Modeling Pre-Chamber Assisted Efficient Combustion in an Argon Power Cycle Engine Joohan Kim, Riccardo Scarcelli, Argonne National Laboratory; Guillaume Beardsell, Tyler Strickland, Christopher Nilsen, Miguel Sierra Aznar, Noble Thermodynamic Systems, Inc.
2:00 p.m.	2024-01-2691	Advancements in Combustion Modeling and Simulation for an Innovative Homogenous Reactivity-Controlled Compression Ignition (hRCCI) Concept Pravin Kumar Sundaram, Larissa Michaela Grundl, Christian Trapp, University of the Bundeswehr Munich
2:30 p.m.	2024-01-2686	Gas Exchange Process Investigation in a Two-Stroke Camless Engine Using 1D-3D CFD Simulations Srinibas Tripathy, Petter Dahlander, Chalmers University of Technology; Joop Somhorst, Claes Kuylenstierna, Volvo Group Trucks Technology
3:00 p.m.		BREAK
3:30 p.m.	2024-01-2688	Numerical Evaluation of Injection Parameters on Transient Heat Flux and Temperature Distribution of a Heavy-duty Diesel Engine Piston Avinash Ravikumar, Stephen Wright, Laura Redmond, Clemson University; Eric Gingrich, Vamshi Korivi, Michael Tess, Joshua Piehl, Ground Vehicle Systems Center; Benjamin Lawler, Clemson University
4:00 p.m.	2024-01-2692	Eddy-Resolving Simulation of Conjugate Heat Transfer in a Test Specimen pertinent to Cooling Channels in IC Engines Lukas Kutej, Artur Klink, Sebastian Wegt, Ruediger Reitz, Suad Jakirlic, Technische Universitat Darmstadt

Planned by General Powertrain Development / Energy and Propulsion Activity

Thursday, April 18

Gasoline Compression Ignition

Session Code PFL223

Room 140 B Session 9:30 a.m.

Submissions in this session address the compression ignition of gasoline. While the fuel is gasoline or a gasoline surrogate, the various subtopics include: spark assisted compression ignition, premixed charged compression ignition, fuel stratified low temperature gasoline combustion, premixed charger compression ignition, and novel multi-mode compression ignition strategies.

Organizers - Mark Hoffman, Auburn Univ; Chad Koci, Caterpillar Inc; Giacomo Belgiorno, Punch Torino SpA

Time	Paper No.	Title
9:30 a.m.	2024-01-2822	Effect of Spark Assisted Compression Ignition on the End-gas Autoignition with DME-air Mixtures in a Rapid Compression Machine Long Jin, Xiao Yu, Meiping Wang, Graham Reader, Ming Zheng, University of Windsor

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:37 PM

Time	Paper No.	Title
10:00 a.m.	ORAL ONLY	A Novel Spark-assisted Compression Ignition Strategy for Robust Low-load Operation in a LD-GCI Engine Ashish Shah, Aramco - Detroit Research Center
10:30 a.m.	ORAL ONLY	PPCI-Diffusion Combustion Process for Efficient And Clean Full Load Range Capability in a GCI Engine For LD/MD Application Ashish Shah, Mark Sellnau, Christopher Whitney, Rafael Sari, Aramco Americas - Detroit; Yu Zhang, formerly Aramco Americas - Detroit
11:00 a.m.	2024-01-2821	From Idle to 7.5 Bar IMEPg – Using Fuel Stratification to Control LTGC with Next-Cycle Capability Dario Lopez Pintor, James MacDonald, Sanguk Lee, Sandia National Laboratories
11:30 a.m.	ORAL ONLY	Demonstration of 2027 Emissions Standards Compliance Using Heavy-Duty Gasoline Compression Ignition with P1 Hybridization Aravindh Babu Viswanathan, University of Wisconsin-Madison; Brock Merritt, Steven Sommers, Praveen Kumar, Yu Zhang, Aramco Research Center - Detroit

Planned by Engine Combustion / Energy and Propulsion Activity

Thursday, April 18

Combustion Controls and Optimization

Session Code PFL280

Room 140 B Session 1:30 p.m.

This session covers engine combustion control and optimization techniques. Topics include engine combustion diagnostics as specialized for control, control methodologies and algorithms, optimization, related combustion sensing, etc.

Organizers - Michael Prucka, Stellantis NV; Gabriele Di Blasio, Gabriele Di Blasio; Jaime Martin, Universitat Politecnica de Valencia; Robert Prucka, Clemson University

Chairperson - Michael Prucka, Stellantis NV; Robert Prucka, Clemson University

Time	Paper No.	Title
1:30 p.m.	2024-01-2835	Classification and Characterization of Heat Release Rate Traces in Low Temperature Combustion for Optimal Engine Operation Sadaf Batool, Jeffrey Naber, Michigan Technological University; Mahdi Shahbakhti, University of Alberta
2:00 p.m.	2024-01-2837	Evaluation of closed-loop combustion phase optimization for varying fuel compensation and cylinder balancing in a HD SI-ICE Ola Björnsson, Per Tunestal, Lund University
2:30 p.m.	2024-01-2836	Impact of Injection Valve Condition on Data-driven Prediction of Key Combustion Parameters Based on an Intelligent Diesel Fuel Injector for Large Engine Applications Christian Laubichler, Constantin Kiesling, Sven Warter, Martin Kober, LEC GmbH; Andreas Wimmer, LEC GmbH; Graz University of Technology; Marco Coppo, Claudio Negri, Danilo Laurenzano, OMT S.p.A.; Hans-Michael Koegeler, Thomas Kammerdiener, AVL LIST GmbH

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:37 PM

Time	Paper No.	Title
3:00 p.m.	ORAL ONLY	Evaluation of Divided Exhaust Period Effectiveness for Enrichment Reduction in a 2.2L Light-Duty SI Engine Praveen Kumar, Xin Yu, Anqi Zhang, Andrew Baur, Aramco Americas; Nayan Engineer, Aramco

Planned by Engine Combustion / Energy and Propulsion Activity

Thursday, April 18

Basic CI Combustion - Part 2 of 2

Session Code PFL221

Room 140 C Session 9:30 a.m.

Submissions in this session address compression ignition and mixing controlled combustion concepts. Injection strategies, combustion refinement, and the use of alternative fuels/blends utilizing these combustion strategies are also included.

Organizers - Mark Hoffman, Auburn Univ; Chad Koci, Caterpillar Inc; Giacomo Belgiorno, Punch Torino SpA; Antowan Zyada, General Motors

Time	Paper No.	Title
9:30 a.m.	ORAL ONLY	Influence of piston bowl design on energy-assisted compression-ignition with low cetane number sustainable aviation fuels Eri Amezcua, University of Wisconsin - Madison; Evan Baker, Jacob Stafford, University of Wisconsin-Madison; Kenneth Kim, DEVCOM Army Research Laboratory; Chol-Bum Kweon, Dept Of Army; David Rothamer, University of Wisconsin-Madison
10:00 a.m.	2024-01-2698	Impact of a split-injection strategy on energy-assisted compression-ignition combustion with low cetane number sustainable aviation fuels Jacob Stafford, Eri Amezcua, Niranjan Miganakallu Narasimhamurthy, University of Wisconsin-Madison; Kenneth Kim, Chol-Bum Kweon, DEVCOM Army Research Laboratory; David Rothamer, University of Wisconsin-Madison
10:30 a.m.	ORAL ONLY	Optimization of Combustion in a Compression Ignition Engine Using a Combustion Activator Based on Methanol and Alkyl Nitrates as Combustion Activator Richard Samson, Université d'Orléans; Fabrice Foucher, UNIVERSITE D'ORLEANS; Anne-Gaëlle Morin
11:00 a.m.	ORAL ONLY	Optimization of post fuel injection to suppress partial oxidation and cylinder wall adhesion Gen Shibata, Kensei Karumai, Hideyuki Ogawa, Hokkaido Univ.

Planned by Engine Combustion / Energy and Propulsion Activity

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:37 PM

Thursday, April 18

Advanced CI Combustion

Session Code PFL222

Room 140 C Session 1:30 p.m.

Submissions in this session address fundamental alterations to traditional compression ignition combustion process. The utilization of prechambers, ducted fuel injection, and turbulent jet controlled compression ignition are included.

Organizers - Mark Hoffman, Auburn Univ; Chad Koci, Caterpillar Inc; Giacomo Belgiorno, Punch Torino SpA

Time	Paper No.	Title
1:30 p.m.	2024-01-2885	Ducted Fuel Injection: Confirmed re-entrainment hypothesis Kenth Svensson, Russell Fitzgerald, Glen Martin, Caterpillar Inc.
2:00 p.m.	ORAL ONLY	Improving Heavy-Duty Engine Performance via Ducted Fuel Injection Charles Mueller, Sandia National Laboratories
2:30 p.m.	ORAL ONLY	Numerical Investigation of Equivalence Ratio Effects on Flex-Fuel Mixing Controlled Combustion Enabled by Prechamber Ignition Jared Zeman, Adam Dempsey, Marquette University
3:00 p.m.		BREAK
3:30 p.m.	ORAL ONLY	Experimental Comparison of Prechamber Enabled Mixing Controlled Combustion & Conventional Spark Ignition in a Heavy-Duty Ethanol Fueled Engine Adam Dempsey, Jared Zeman, Marquette University
4:00 p.m.	ORAL ONLY	High-Fidelity Numerical Modeling of Mixing-Controlled Compression Ignition in Direct- Injected Hydrogen Engines Harsh Sapra, University of Wisconsin-Madison; Weston Ohl, Univ of Wisconsin-Madison; Randy Hessel, University of Wisconsin-Madison; Sage Kokjohn, Univ of Wisconsin-Madison
4:30 p.m.	ORAL ONLY	Experimental Investigation of Turbulent Jet Controlled Compression Ignition Engine Using a Single Nozzle High Pressure Direct Injection Gasoline Injector Xin Yu, Aramco Research Center; Anqi Zhang; Andrew Baur

Planned by Engine Combustion / Energy and Propulsion Activity

Thursday, April 18

Basic SI Combustion - Part 1 of 2

Session Code PFL211

Room 140 D Session 9:30 a.m.

This session focuses on basic SI combustion processes including studies of mixture formation, engine efficiency, flame propagation, knock, preignition, and emissions formation. Papers cover both 4-stroke and 2-stroke engines characterized by 1) ignition by an external energy source that serves to control combustion phasing, and 2) a combustion rate that is limited by flame propagation.

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Technical Session Schedule

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Organizers - Justin Ketterer, General Motors LLC; Richard Davis, Michigan Technological Univ; Cinzia Tornatore, Italian National Research Council; Philipp Seyfried, GM

Time	Paper No.	Title
9:30 a.m.	2024-01-2819	Deflagration-Based Knock of Methanol SI Combustion and its Implications for Combustion Noise Eshan Singh, Tyler Strickland, Sandia National Laboratories; Rami Abboud, Polytechnic University of Valencia; James MacDonald, Sanguk Lee, Dario Lopez Pintor, Sandia National Laboratories
10:00 a.m.	2024-01-2816	Fuel Sensitivity Affects on the Knock and CoV limits of a Spark Ignited Engine Robert Mitchell, Graham Conway, Yanyu Wang, Southwest Research Institute
10:30 a.m.	ORAL ONLY	Biofuel Effects and Seasonal Fuel Property Variations Related to Abnormal Combustion Occurrences Observed in the Field Derek Splitter, Gurneesh Jatana, Oak Ridge National Laboratory; Gina Fioroni, National Renewable Energy Laboratory; Elana Chapman, General Motors LLC
11:00 a.m.	ORAL ONLY	Understanding the Low-speed Pre-ignition Promoting Mechanisms of Calcium Matthew J. McAllister, Martin H. Davy, Luke J. Doherty, Laurent M. Le Page, Christopher Wheeler, University of Oxford

Planned by Engine Combustion / Energy and Propulsion Activity

Thursday, April 18

Basic SI Combustion - Part 2 of 2

Session Code PFL211

Room 140 D Session 1:30 p.m.

This session focuses on basic SI combustion processes including studies of mixture formation, engine efficiency, flame propagation, knock, preignition, and emissions formation. Papers cover both 4-stroke and 2-stroke engines characterized by 1) ignition by an external energy source that serves to control combustion phasing, and 2) a combustion rate that is limited by flame propagation.

Organizers - Justin Ketterer, General Motors LLC; Richard Davis, Michigan Technological Univ; Cinzia Tornatore, Italian National Research Council; Philipp Seyfried, GM

Time	Paper No.	Title
1:30 p.m.	2024-01-2817	Effects of Ethanol Blending on the Reactivity and Laminar Flame Speeds of Gasoline, Methanol-to-Gasoline, and Ethanol-to-Gasoline Surrogates James MacDonald, Dario Lopez Pintor, Sandia National Laboratories; Naoyoshi Matsubara, Koji Kitano, Ryota Yamada, Toyota Motor Corporation
2:00 p.m.	2024-01-2815	Investigation of Ammonia-Fueled SI Combustion in a High Tumble Engine Ziming Yan, Nathan Peters, Anthony Harrington, Michael Bunce, Jonathan Hall, MAHLE Powertrain
2:30 p.m.	2024-01-2818	Development of Ammonia Direct Injection 4-Cylinder Spark-Ignition Engine Chan ki Min, Seung Woo Lee, Hong-Kil Baek, Hyundai Motor Company

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:37 PM

Time	Paper No.	Title
3:00 p.m.	ORAL ONLY	Temperature-equivalence ratio analysis for understanding nitrogen species formation in ammonia engine combustion William F. Northrop, Univ. of Minnesota-Twin Cities; Shawn Reggeti, University of Minnesota

Planned by Engine Combustion / Energy and Propulsion Activity

Thursday, April 18

Powertrains, Components and Sensors

Session Code PFL500

Room 140 E Session 9:30 a.m.

Organizers - Anand Nageswaran Bharath, Cummins Inc.; Marcello Canova, The Ohio State University; Wei Chen, Borg Warner; Sanjib Chowdhury, Education Center; Aaron Costall, Cranfield University; Sumanth Reddy Dadam, Sumanth Reddy Dadam, Ford Motor Company; Yashodhan Joshi, Dover- Environmental Solutions Group; Eric Krivitzky, Thermofluid Research Laboratory; Daniel Mather, Digital-Engines LLC; Jeffrey Naber, Michigan Technological Univ.; Cinzia Tornatore, Italian National Research Council

Time	Paper No.	Title
9:30 a.m.	2024-01-2388	Evaluating the Effects of an Electrically Assisted Turbocharger on Scavenging Control for an Opposed Piston Two Stroke (OP2S) Compression Ignition Engine Ankur Bhatt, John Gandolfo, Clemson University; Ming Huo, Achates Power, Inc.; Brian Gainey, Benjamin Lawler, Clemson University
10:00 a.m.	2024-01-2390	Low-Cost Open-Source Data Acquisition for High-Speed Cylinder Pressure Measurement with Arduino Eduart Celislami; Osamah Rawashdeh, Dan DelVescovo, Oakland University
10:30 a.m.	ORAL ONLY	Development of Model-Based Controller for High-Pressure GDI Injection System Operating Under Multiple Injection Strategy for High Efficiency Combustion Giacomo Silvagni, Pier Paolo Brancaleoni, University of Bologna; Federico Stola, Marelli Europe SpA; Davide Viscione, Vittorio Ravaglioli, University of Bologna; Matteo De Cesare, Marelli Europe S.p.A.; Enrico Corti, University of Bologna

Planned by Powertrains, Components and Sensors / Energy and Propulsion Activity

Thursday, April 18

Valvetrain, Including VVA

Session Code PFL570

Room 140 E Session 1:30 p.m.

The design, development, and testing of Valve Train and Variable Valve Actuation mechanisms, devices, and systems; and the impact and control of such systems on thermodynamics, combustion, fuel economy, emissions, noise and vibration, and performance.

Organizers - Scott Fisher, Stellantis NV; Timothy Kunz; David Rutledge, Cummins Inc.

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Technical Session Schedule

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Time	Paper No.	Title
1:30 p.m.	2024-01-2827	An Experimental Study on Camshaft Impact Noise by Dynamic Coupling of Valve Train and Chain System Keychun Park, Sungwoo Kang, Sukzoon Kim, Hyundai Motor Company
2:00 p.m.	2024-01-2828	Gas Exchange Potential Ratio – a Quantitative Evaluation Parameter for Fully Variable, Time-Based Valve Train Concepts Tobias Dost, Ricardo Schambach, Joern Getzlaff, West Saxon University Zwickau

Planned by Powertrains, Components and Sensors / Energy and Propulsion Activity

Thursday, April 18

Engine Block, Cylinder Heads, Oil & Water Pumps, Intake & Exhaust Systems

Session Code PFL580

Room 140 E Session 2:30 p.m.

This session describes the design, modeling and performance validation of cylinder heads, lubrication systems and pumps, coolant systems and pumps, intake manifolds, exhaust manifolds, crankshaft and bearing systems and engine block structures.

Organizers - Anand Nageswaran Bharath, Cummins Inc.; Sujan Dhar, Simerics Inc.; Dwight Doig, Shakti Saurabh, Cummins Inc.

Time	Paper No.	Title
2:30 p.m.	2024-01-2832	Improving the Performance of Diesel Engines by Bore Profile Control under Operating Conditions Taiga Hibi, Takuro Mita, Kenichi Yamashita, Isuzu Advanced Engineering Center Ltd.
3:00 p.m.	2024-01-2831	Cylinder Head Insulation Plate, Design, Analysis and Testing for an Extreme High Efficiency Internal Combustion Engine Paolo Ortolani, Katie Evans, Fabrizio Treccarichi, Dolphin N2 Ltd.
3:30 p.m.	ORAL ONLY	Improved Cooling of an Air-Cooled Finned-Cylinder with Slits in Front under Forced Convection Kohei Nakashima, Meijo Univ.; Kento Nishi, Shinya Ozaki, Sota Hirai, Meijo University; Masao Yoshida, Aichi University of Technology

Planned by Powertrains, Components and Sensors / Energy and Propulsion Activity

Thursday, April 18

Driveline NVH and Launch Devices

Session Code PFL660

Room 140 F Session 1:30 p.m.

This session features papers on transmission/driveline related noise, vibration, rattle issues- and design solutions for conventional and hybrid/electrified applications.

Organizers - Michael Fingerman, FCA US LLC; Joel Gunderson, Song He, Steve Moorman, Craig David Reynolds, General Motors LLC; Darrell Robinette, Michigan Technological University

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:37 PM

Time	Paper No.	Title
9:30 a.m.	2024-01-2715	Dynamic Characterization of a Twin Plate Torque Converter Clutch During Controlled Slip
		Darrell Robinette, Jason Blough, Luke Jurmu, Michigan Technological University; Craig Reynolds, Andrew Scheich, General Motors LLC
10:00 a.m.	2024-01-2716	Objective and Perceptual Sound Quality Analysis of Internal Combustion Engine and Electric Vehicles
		Duy Loc Dao, Isabella Baldwin, Kettering University; Andrew McGuire, Multimatic Product Services; Wade Bray, HEAD acoustics Inc.; Javad Baqersad, Kettering University
10:30 a.m.	ORAL ONLY	Evaluation of Select Condition Indicators for Detecting Ring Tooth Damage in Geared Transmissions Using a Finite Element/Contact Mechanics Model
		Suhas Gupta Thunuguntla, Oakland University; Adrian Hood, Army Research Laboratory; Christopher Cooley, Oakland University
11:00 a.m.	ORAL ONLY	Driveline Vibration Control of All-Wheel Drive Robotics Platform
		Ryan Monroe, Oakland University; Christopher Sebastian, Pratt Miller; Kaelea Hayes, Pennsylvania State University; Megan Freid, Lehigh University
11:30 a.m.	ORAL ONLY	Effects of electric motor electromagnetic stiffness on the natural frequencies of electric powertrains
		Marcos Ricardo Souza, Loughborough Univ; Ahmed Haris, ARRIVAL; Gunter Offner, AVL LIST GmbH
12:00 p.m.	ORAL ONLY	Reduced order model for steady-state vibroacoustic predictions of electric motors
		Panagiotis Andreou, Loughborough University; Stephanos Theodossiades, Loughborough Univ; Amal Z. Hajjaj; Mahdi Mohammadpour, Marcos Ricardo Souza, Loughborough Univ
3:00 p.m.		BREAK

Planned by Electrified and Conventional Transmission and Driveline Com / Energy and Propulsion

Thursday, April 18

Controls for Hybrids and Electric Powertrains - Part 2 of 3

Session Code PFL750

Room 140 G Session 9:30 a.m.

This session covers propulsion control processes related to achieving stringent market fuel economy, emissions, performance, reliability, and quality demands of hybrid and electric powertrains. Topics include the control, calibration, and diagnostics of the engine, powertrain, and supporting electromechanical subsystems related to energy management. (For Chargers and Charging Electronics Architecture/Design see AE600)

Organizers - Ji Li, University of Birmingham; Vinod Ravi, Wayne State University; Saeed Siavoshani, Eaton; Di Zhu, Ford Motor Company

Time	Paper No.	Title
9:30 a.m.	2024-01-2780	Torque Converter Modeling for Torque Control of Hybrid Electric Powertrains
		Hangxing Sha, Nadirsh Patel, FCA US LLC; Abdulquadri Banuso, FCA Canada Inc

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Technical Session Schedule

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Time	Paper No.	Title
10:00 a.m.	2024-01-2779	A Review of Production Multi-Motor Electric Vehicles and Energy Management and Model Predictive Control Techniques Alexander Allca-Pekarovic, Phillip Kollmeyer, McMaster Automotive Resource Centre; Mairi Middleton, McMaster University; Ali Emadi, McMaster Automotive Resource Centre
10:30 a.m.	2024-01-2782	Analysis of flatness based active damping control of hybrid vehicle transmission Ali Achir, Stellantis NV; Nadirsh Patel, FCA US LLC; Vincent Divet, Stellantis NV

Planned by Hybrid and Electric Propulsions Committee / Energy and Propulsion Activity

Thursday, April 18

Controls for Hybrids and Electric Powertrains - Part 3 of 3

Session Code PFL750

Room 140 G Session 1:30 p.m.

This session covers propulsion control processes related to achieving stringent market fuel economy, emissions, performance, reliability, and quality demands of hybrid and electric powertrains. Topics include the control, calibration, and diagnostics of the engine, powertrain, and supporting electromechanical subsystems related to energy management. (For Chargers and Charging Electronics Architecture/Design see AE600)

Organizers - Ji Li, University of Birmingham; Vinod Ravi, Wayne State University; Saeed Siavoshani, Eaton; Di Zhu, Ford Motor Company

Time	Paper No.	Title
1:30 p.m.	2024-01-2783	Engine Stall Recovery and Restart Procedure for Hybrid Electric Vehicles Ameya Basutkar, Nadirsh Patel, Cristian Rostiti, FCA US LLC
2:00 p.m.	2024-01-2784	Engine Crank Stop Position Control to Reduce Starting Vibration of a Parallel Hybrid Vehicle Jihyun Park, Byunghoon Yang, Jongkyong LIM, SungKyu Kim, Hyundai Motor Company
2:30 p.m.	ORAL ONLY	Development of a Soft Actor-Critic Energy Management System for a Plug-in Hybrid Electric Vehicle Luigi Tresca, Luca Pulvirenti, Luciano Rolando, Federico Millo, Politecnico di Torino

Planned by Hybrid and Electric Propulsions Committee / Energy and Propulsion Activity

Thursday, April 18

Sheet Metal Forming Technology - Part 1 of 2

Session Code M105

Room 141 Session 9:30 a.m.

This session will feature the latest developments in sheet metal forming technology. Presentations will address general areas of forming processes, formability issues and modeling. These include forming processes (Stamping, hydroforming, gas forming, and high temperature forming), formability Issues (springback, edge cracking, stretch-bend failures and fracture), Modeling (materials, forming limits, failure criteria in various deformation modes and process modeling & optimization).

WCX SAE World Congress Experience

Technical Session Schedule

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Organizers - Xiaoming (Ming) Chen, Novelis North America; Raghu Echempati, Kettering University; Lu Huang, Dohyun Leem, General Motors; ZiQiang Sheng, General Motors LLC; Dohyun Leem, General Motors

Time	Paper No.	Title
9:30 a.m.	2024-01-2858	Design and Evaluation of an in-Plane Shear Test for Fracture Characterization of High Ductility Metals Lucas Pilozo-Hibbit, Advaith Narayanan, Armin Abedini, Cliff Butcher, University of Waterloo
10:00 a.m.	2024-01-2857	Distortion Reduction in Roller Offset Forming Using Geometrical Optimization Pawan Veeresh, Arizona State University; Lu Huang, Tae Hwa Lee, Hui-Ping Wang, Joshua Solomon, General Motors LLC; Jay Oswald, Arizona State University
10:30 a.m.	ORAL ONLY	An Efficient Methodology to Characterize Formability of Aluminum Sheet using Nakazima and Marciniak Tests Kenneth Cheong, Jacqueline Noder, Armin Abedini, Amir Zhumagulov, Advaith Narayanan, Sante DiCecco, Cliff Butcher, University of Waterloo; Zhi Deng, Raj Dasu, Commonwealth Rolled Products
11:00 a.m.	2024-01-2856	Characterizing Galling Conditions in Sheet Metal Stamping Natalia Reinberg, Oakland University; Ryan Murray, University of Virginia; Sindi Ascencio Barrera, California State University Long Beach; Cristina Pineda Carranza, San Joaquin Delta College; Sergey Golovashchenko, Oakland University
11:30 a.m.	2024-01-2859	Springback Control through Post-stretching Using Different Hybrid Bead Designs with Tonnage Consideration Sobhan T. Nazari, Feng Zhu, John Makrygiannis, Jimmy Zhang, Yu-Wei Wang, Cleveland-Cliffs

Planned by Metallic Materials Committee / Materials Engineering Activity

Thursday, April 18

Life Cycle Analysis

Session Code PFL760

Room 141 Session 1:30 p.m.

Regulatory bodies and climate groups are calling for lower GHG emissions. However automotive emissions are assessed at the vehicle's tailpipe where no emissions are measured for battery electric and fuel cell electric vehicles. Despite this, emissions are generated during the vehicle's manufacturing and end-of-life phases as well as during fuel production. To properly quantify emissions reductions from electrified powertrains a life-cycle analysis, or cradle-to-grave, approach is required.

Organizers - Graham Conway, Southwest Research Institute; Christopher Kolodziej, Argonne National Laboratory; Saeed Siavoshani, Eaton

Time	Paper No.	Title
1:30 p.m.	2024-01-2829	An LCA evaluation for passenger cars based on the comparison of scenarios and vehicles with different technologies Giovanni Meccariello, Livia Della Ragione, STEMS - CNR

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:37 PM

Time	Paper No.	Title
2:00 p.m.	2024-01-2830	Comprehensive Cradle to Grave Life Cycle Analysis of On-Road Vehicles in the United States based on GREET Jarod C. Kelly, Taemin Kim, Christopher P. Kolodziej, Rakesh K. Iyer, Shashwat Tripathi, Amgad Elgowainy, Michael Wang, Argonne National Laboratory
2:30 p.m.	ORAL ONLY	Cradle-to-Grave Life Cycle Analysis of Decarbonization Pathways for a Large Agricultural Tractor Christopher P. Kolodziej, Jarod C. Kelly, Namdoo Kim, Ram Vijayagopal, Argonne National Laboratory

Planned by Hybrid and Electric Propulsions Committee / Energy and Propulsion Activity

Thursday, April 18

Advanced Battery Technologies - Part 3 of 4

Session Code PFL730

Room 142 A Session 9:30 a.m.

This session provides a forum for both theory-oriented and application-oriented manuscripts that address state-of-art battery technologies at the cell, array, pack or vehicle levels. Typical domains encompass, but not limited to the battery component, chemistries, modeling, simulations, testing, diagnosis, prognosis, safety, reliability, durability, battery economics/cost reduction, battery charging, battery thermal management, battery management systems and controls and system integration/optimization.

Organizers - Anita Chaudhari, Ford Motor Company; Matilde D'Arpino, Ohio State University; Yi Ding, TARDEC; Santhosh Gundlapally, Gamma Technologies LLC; Xianke Lin, Ontario Tech. University; Yasaman Masoudi, Stellantis; James Miller, Argonne National Laboratory; Francesco Porpora; Prashanth Ramesh, The Ohio State University; Gene Saltzberg; Saeed Siavoshani, Eaton; Di Zhu, Ford Motor Company

Time	Paper No.	Title
9:30 a.m.	2024-01-2201	Rapid assessment of power battery states for electric vehicles oriented to after-sales maintenance Yongjun Yuan, Tongji University; Yuxin Shao, USST; Bo Jiang, Xueyuan Wang, Haifeng Dai, Tongji University
10:00 a.m.	2024-01-2202	Analyzing the Expense: Cost Modeling for State-of-the-Art Electric Vehicle Battery Packs Ehsan Sabri Islam, Joseph Kubal, Kevin Knehr, Shabbir Ahmed, Namdoo Kim, Ram Vijayagopal, Ayman Moawad, Aymeric Rousseau, Argonne National Laboratory
10:30 a.m.	2024-01-2191	Development of Time-Temperature Analysis Algorithm for Estimation of Lithium-Ion Battery Useful Life Dipan Arora, Alaa El-Sharkawy, FCA US LLC; Satyam Panchal, Stellantis NV
11:00 a.m.	ORAL ONLY	Optimization and state of charge balancing in second life battery pack consisting of modules with heterogeneous state of heaths Farhad Salek, Shahaboddin Resalati, Lei Yao, Oxford Brookes University
11:30 a.m.	ORAL ONLY	Advanced Development of Swappable Battery Mounting Structure For Baas And Future Mobility Battery system Gyunghoon Shin, Yong Hwan Choi, Seunghak Lee, Joon Ha Lee, JEONG SEUNGMIN, Hyundai Motor Company; Youngjoo Yoon, Hwashin

WCX SAE World Congress Experience

Technical Session Schedule

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Planned by Hybrid and Electric Propulsions Committee / Energy and Propulsion Activity

Thursday, April 18

Advanced Battery Technologies - Part 4 of 4

Session Code PFL730

Room 142 A Session 1:30 p.m.

This session provides a forum for both theory-oriented and application-oriented manuscripts that address state-of-art battery technologies at the cell, array, pack or vehicle levels. Typical domains encompass, but not limited to the battery component, chemistries, modeling, simulations, testing, diagnosis, prognosis, safety, reliability, durability, battery economics/cost reduction, battery charging, battery thermal management, battery management systems and controls and system integration/optimization.

Organizers - Anita Chaudhari, Ford Motor Company; Matilde D'Arpino, Ohio State University; Yi Ding, TARDEC; Santhosh Gundlapally, Gamma Technologies LLC; Xianke Lin, Ontario Tech. University; Yasaman Masoudi, Stellantis; James Miller, Argonne National Laboratory; Francesco Porpora; Prashanth Ramesh, The Ohio State University; Gene Saltzberg; Saeed Siavoshani, Eaton; Di Zhu, Ford Motor Company

Time	Paper No.	Title
1:30 p.m.	2024-01-2195	Performance Comparison between Different Battery Architectures with Cell-to-Cell Variations Chinmaya Patil, Ye Cheng, GM
2:00 p.m.	ORAL ONLY	A Multi-Physic Modelling Approach to Support Battery Pack Design Luigi Iannucci, University of Naples, Federico II; Clemente Capasso, National Research Council of Italy; Stanislao Patalano PhD, University of Naples Federico II; Ottorino Veneri, National Research Council of Italy; Ferdinando Vitolo PhD, University of Naples Federico II; Luigi Sequino, CNR Consiglio Nazionale delle Ricerche
2:30 p.m.	ORAL ONLY	Thermal Analysis of a 12S3P Prismatic Lithium-Ion Battery Pack with a Liquid Cooling System Under High Current Dynamic Driving Cycles Antonio Paolo Carlucci, Hossein Darvish, Domenico Laforgia, University of Salento

Planned by Hybrid and Electric Propulsions Committee / Energy and Propulsion Activity

Thursday, April 18

Advanced Hybrid and Electric Vehicle Powertrains - Part 5 of 5

Session Code PFL710

Room 142 B Session 9:30 a.m.

This session covers new production and near-production electric & hybrid propulsion architectures, testing, analysis and new concepts.

Organizers - Norman Bucknor, General Motors LLC; Michael Duoba, US Dept. of Energy; Vivek Kumar, Ford Motor Company; Darryl S. Taylor, Dana; Di Zhu, Ford Motor Company; Saeed Siavoshani, Eaton

Time	Paper No.	Title

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Technical Session Schedule

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Time	Paper No.	Title
9:30 a.m.	ORAL ONLY	Multi-fidelity multibody dynamics analysis based on modular, parametric electric drive unit model Young-Chang Cho, Nikhil Dhavale, Satheesh Kandasamy, Dassault Systèmes Simulia Corp.
10:00 a.m.	2024-01-2156	Design Methodology for Efficient Electrified Powertrains Applied to Customer Technical Need Identification Matthieu Couillandeau, Renault/IFP School; Ouafae El Ganaoui-Mourlan, El Hadj Miliani, IFPEN/IFP School; Daniel Carlos Da Silva, Nassila Oussedik, Tristan Lombard, Breno Mendes Alves, IFP School
10:30 a.m.	2024-01-2163	Exploring Optimization Opportunities for Battery Electric Vehicle Compact Powertrains by Enhancing Power Density to Meet Customer Demand Jaret Villarreal, Toyota Motor North America Inc.
11:00 a.m.	2024-01-2172	Drive Cycle-Based Design Optimization of Traction Motor Drives for Battery Electric Vehicles Using Data-Driven Approaches Hossain Mohammadi, Vitesco Technologies Canada Inc.; Sandeep Saini, Vitesco Technologies USA LLC; Reza Nasirizarandi, Aiswarya Balamurali, Vitesco Technologies Canada Inc.
11:30 a.m.	2024-01-2166	Electric Vehicle Modeling: Advanced Torque Split Analysis across Different Architectures David Oswald, Jacqueline Escobar, Guoyuan Wu, Heejung Jung, Matthew Barth, University Of California Riverside
12:00 p.m.	2024-01-2158	Impact of Automated Driving on Design and Energy Consumption of Electrified Drives Axel Wolfgang Sturm, Roman Henze, IAE, Technische Universität Braunschweig; Ferit Küçükay, Center Automotive, iTU-Braunschweig mbH

Planned by Hybrid and Electric Propulsions Committee / Energy and Propulsion Activity

Thursday, April 18

Material Characterization, Modeling & Environment Interactions

Session Code M227

Room 142 B Session 1:30 p.m.

Organizers - Ke An, Oak Ridge National Laboratory; Mingchao Guo, FCA US LLC; Hamid Jahed, University of Waterloo; Yi Liu, Qigui Wang, General Motors LLC; Xijia Wu, National Research Council Canada

Time	Paper No.	Title
1:30 p.m.	2024-01-2883	A Study on Correlation between Micro Structure of Porous Sound Absorbing Materials and Sound Absorption Performance Using CT Taeyoon Kim, Hyundai & Kia Corp.
2:00 p.m.	2024-01-2884	New Solution for Material Damage Characterization of CFRP Laminate with Filament Winding Structure Using a Hexagonal-Shaped Mandrel Takeshi Watanabe, Honda R&D Co., Ltd.; Michael Bruyneel, Rajaneesh Anantharaju, GDTech. SA; Yusuke Tsuchiyama, Honda R&D Co., Ltd.; Hsumin Huang, Advanced Technologies Co., Ltd.; Yuta Urushiyama, Honda

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Technical Session Schedule

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Time	Paper No.	Title
		R&D Co., Ltd.
2:30 p.m.	ORAL ONLY	Silicone Sealant Behavior in Automotive Coolant and Material Model for Joint Analysis Joe Wardlow, Jie FENG, Jason Reese, Sze-Sze Ng, William Johnson, Kyle Atkins, Dow
3:00 p.m.		BREAK
3:30 p.m.	ORAL ONLY	Why is my Silicone Melting? Influence of Fire Retardant Thermoplastics on Silicone Rubber Noel Chang, Kaila Mattson, Dow
4:00 p.m.	ORAL ONLY	Simultaneous Thermal and Mechanical Fatigue Cycling of Thermal Interface Materials for Mobility Applications Joseph Sootsman, Stephanie Valenzuela, Emma Gonzalez, Andres Becerra, Dow
4:30 p.m.	ORAL ONLY	Effects of Cast Skin on the Mechanical Properties of AE44 Die-cast Magnesium Alloy Andy WANG, Qigui Wang, General Motors LLC

Thursday, April 18

Future Vehicle Lubricants

Session Code PFL340

Room 142 C Session 9:30 a.m.

To meet the challenge of global warming, in particular global carbon dioxide reduction, a range of vehicle powertrains will be required. While full battery electric vehicles have gained significant attention, hybridized powertrains or those driven purely by internal combustion engines using a range of green fuels, such as biomass derived gasoline and diesel (carbon-neutral) or non-carbon containing compounds such as hydrogen or ammonia will be needed. In all these powertrain configurations, lubricants and greases will be essential for durable and efficient operation. This session discusses the interaction of lubricants and greases with all automotive powertrains.

Organizers - Jason Andersen, PACCAR Inc.; Jason Bares, BorgWarner Inc.; Richard Butcher, BP Castrol; George S. Dodos, ELDON'S SA; Timothy Newcomb, Lubrizol Corp.; Jenny Sigelko, Daimler Trucks North America

Time	Paper No.	Title
9:30 a.m.	2024-01-2825	Impact of Advanced Engine Technologies in Energy Consumption Reduction Potentials Ehsan Sabri Islam, Namdoo Kim, Ram Vijayagopal, Ayman Moawad, Aymeric Rousseau, Argonne National Laboratory
10:00 a.m.	2024-01-2824	Aspects of Engine Lubricant Operating Conditions and Fuel Economy Differentiation; In-Vehicle Comparisons of Standard Internal Combustion Engine with Two Types of Hybrid Electric Richard Butcher, Nathan Bradley, Mathew Jamieson, Thomas Chambers, bp Castrol

WCX SAE World Congress Experience

Technical Session Schedule

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Time	Paper No.	Title
10:30 a.m.	ORAL ONLY	Lubricants for electrified heavy-duty (HD) trucks (Part 1) - Benchmarking Transmission Efficiency: An Investigation and Correlation of Bench Tests and Heavy Duty (HD) Axle Efficiency Rig Test. Hyeok Hahn, Kuldeep Mistry, Chevron Lubricants
11:00 a.m.	ORAL ONLY	Exploring conductivity limits for e-fluids Auke Faber, Lubrizol Limited; Gregory Hunt, Christopher Saxton, Kieron Donnelly, Harry Wesson, Timothy Newcomb, Lubrizol
11:30 a.m.	ORAL ONLY	Opportunities and Challenges of Utilizing Renewable Materials as Additives for Automotive Lubricating Greases George S. Dodos, ELDON'S S.A.; Mehdi Fathi-Najafi, Nynas AB
12:00 p.m.	ORAL ONLY	Sustainability Aspects of Automotive Lubricating Greases George S. Dodos, ELDON'S S.A., Greece

Planned by Fuels and Lubricants / Energy and Propulsion Activity

Thursday, April 18

ADAS and Autonomous Vehicle System: AD/ADAS Path Planning and Control - Part 3 of 3

Session Code AE103

Room 250 A Session 9:30 a.m.

This session addresses technical research related to path planning and control for ADAS and autonomous vehicle systems. The topics cover latest technologies of both longitudinal and lateral path planning and motion control for various real-world applications, such as vehicle speed control, park assist/self-parking, lane changing, evasive steering, etc.

Organizers - Yixin Chen, Stellantis; Sumanth Reddy Dadam, Ford Motor Company; Subramaniam Ganesan, Oakland University; Samer Rajab, May Mobility Inc.; Xin Wang, Ford Motor Company; Chen Lv, Nanyang Technological University

Chairperson - Xin Wang, Ford Motor Company

Time	Paper No.	Title
9:30 a.m.	2024-01-2568	A Naturalistic Driving Study for Lane Change Detection and Personalization Radhika Anandrao Lakhkar, Tim Talty, Virginia Tech
10:00 a.m.	2024-01-2566	Risk field enhanced game theoretic model for interpretable and consistent lane-changing decision makings Taokai Xia, Hui Chen, Shaoka Su, Tongji University

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Technical Session Schedule

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Time	Paper No.	Title
10:30 a.m.	2024-01-2567	Combining Dynamic Movement Primitives and Artificial Potential Fields for Lane Change Obstacle Avoidance Trajectory Planning of Autonomous Vehicles Kaichong Liang, Zhiguo Zhao, Danshu Yan, Wenchang Li, Tongji University

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Thursday, April 18

ADAS and Autonomous Vehicle System: Localization

Session Code AE104

Room 250 A Session 1:30 p.m.

This session addresses state of the art technical research related to GNSS, mapping for AD/ADAS systems, novel simultaneous localization and mapping algorithm and any other localization related topics. The audience for this session includes AD/ADAS, robotics and automotive engineers, as well as other individuals interested in perception and localization.

Organizers - Yixin Chen, Stellantis; Sumanth Reddy Dadam, Ford Motor Company; Subramaniam Ganesan, Oakland University; Samer Rajab, May Mobility Inc.; Xin Wang, Ford Motor Company; Chen Lv, Nanyang Technological University

Time	Paper No.	Title
1:30 p.m.	2024-01-2845	A Visual SLAM Based-Method for Vehicle Localization Chih-Yuan Hsu, Nong-Hong Lin, Automotive Research & Testing Center
2:00 p.m.	2024-01-2846	Simulator Development for Vehicle Localization Using Low Earth Orbit Satellites Jingxiong Meng, Yan Chen, Junfeng Zhao, Arizona State University
2:30 p.m.	2024-01-2847	RIO-Vehicle: A Tightly-Coupled Vehicle Dynamics Extension of 4D Radar Inertial Odometry Jiaqi Zhu, Guirong Zhuo, Lu Xiong, he zihang, Bo Leng, Tongji University

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Thursday, April 18

Smart Transportation and Infrastructure

Session Code AE400

Room 250 B Session 9:30 a.m.

This session is seeking submissions focusing on Intelligent Transportation Systems and their associated technologies. Abstracts addressing case studies or research could include smart transportation, Automated Vehicles 3.0, V2I/V2X, testing and simulation, roads and infrastructure technologies, and similar mobility and transportation topics. Projects exploring automotive-specific applications of technologies such as 5G, edge computing, artificial intelligence/machine learning, and cloud-based application will also be considered.

Organizers - Ozgenur Kavas-Torris, Ford Motor Company; James Li, MWCOG; Dr. Phares Noel, Oakland Univerity; Xin Wang, Ford Motor Company; Xiangrui Zeng, Huazhong University of Science and Tech.; Peng Hang, Tongji University; Zhouquan Wu, Eaton

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:38 PM

Time	Paper No.	Title
9:30 a.m.	2024-01-1990	Energy Efficiency Technologies of Connected and Automated Vehicles: Findings from ARPA-E's NEXTCAR Program Marina Sofos, Priyanka Bakaya, Advanced Research Projects Agency-Energy; Saleh Mousa, Booz Allen Hamilton Inc; Chris Atkinson, The Ohio State University; Reid Heffner, Booz Allen Hamilton Inc
10:00 a.m.	2024-01-1991	An Enhanced Obstacle Detection in ADAS Applications by Integrating C-V2X with a Stereo Camera Vision System Mohammad Hasan Amin, Haswanth Babu Konjeti, Jungme Park, Kettering University; Yunsheng Wang, Cal Poly Pomona
10:30 a.m.	ORAL ONLY	A Comprehensive Study on Corner Traffic Scenarios and Safety Applications based on V2X-Fused Digital Twin method Mian Dai, CATARC

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Thursday, April 18

Smart Transportation and Infrastructure: V2X-Interactions among Vehicles and Others

Session Code AE404

Room 250 B Session 1:30 p.m.

In this session, V2X-interactions among vehicles and others, an important part of the smart transportation and infrastructure concept, is discussed. Vehicle to Everything (V2X) refers to the communication between vehicles and other road agents such as pedestrians, aerial vehicles, etc. V2X based models can be utilized to decrease energy consumption and emissions in vehicles, as well as improve safety. This session includes topics such as valet parking of autonomous vehicles, pedestrian to vehicle (P2V) communication, vehicle speed optimization for traffic lights.

Organizers - Ozgenur Kavas-Torris, Ford Motor Company; James Li, MWCOG; Xin Wang, Ford Motor Company; Zhouquan Wu, Eaton

Time	Paper No.	Title
1:30 p.m.	ORAL ONLY	Revolutionizing How Connected Transportation Systems are Integrated and Tested Danielle Chou, Federal Highway Administration; Robin Laqui, Archak Mittal, Leidos
2:00 p.m.	2024-01-1998	Development and Validation of Dynamic Programming algorithm for energy-efficient signalized intersection crossing Vasu Goyal, Ahammad Basha Dudekula, Jeffrey Naber, Michigan Technological University
2:30 p.m.	2024-01-2000	Impact of Vehicle-to-Grid (V2G) on Battery Degradation in a Plug-in Hybrid Electric Vehicle Laxman Timilsina, Ali Moghassemi, Elutunji Buraimoh, Ali Arsalan, Phani Kumar Chamarthi, Gokhan Ozkan, Behnaz Papari, Christopher Edrington, Clemson University
3:00 p.m.		BREAK
3:30 p.m.	2024-01-1996	Dynamic Speed Limit for Self-Identifying Platoons of Mixed Vehicular Traffic on Freeways under Connected Environment Archak Mittal, Leidos

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Time	Paper No.	Title
4:00 p.m.	2024-01-2001	A Terminal-velocity Heuristic Method for Speed Optimization of EVs in Multi-intersection Scenarios Zhengyi Hao, Tongji University; Zeyang Zhang, Dongfeng Motor Corporation; Yuyao Jiang, Shanghai Customs College; Hongqing Chu, Bingzhao Gao, Hong Chen, Tongji University
4:30 p.m.	2024-01-1999	Digital Twin Based Multi-Vehicle Cooperative Warning System on Mountain Roads Liheng Tian, Zirui Yu, Xinguo Chen, Wuhan University of Technology

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Thursday, April 18

ADAS and Autonomous Vehicle System: Simulation and Testing - Part 3 of 4

Session Code AE106

Room 250 C Session 9:30 a.m.

This session focuses on simulation and testing methodologies for ADAS and automated driving systems. Development and testing these systems often relies on simulation and advance testing methodologies due to the complex operating environment

Organizers - Jace Allen, dSPACE Inc.; Yixin Chen, Stellantis; Amit Choudhury, Robert Bosch; Joseph D'Ambrosio, General Motors LLC; Benjamin Hager, dSPACE Inc.; Bin Li, Hyundai Mobis North America; Ramesh S, GM R&D Center; Mukund Chandrasekaran, General Motors; Peng Hang, Tongji University; Mukund Chandrasekaran, General Motors LLC

Time	Paper No.	Title
9:30 a.m.	2024-01-1980	Rapid Development of an Autonomous Vehicle for the SAE AutoDrive Challenge II Competition Sriram Ashokkumar, Anirudh Jayendra, Sam Tobin, Ariel Leykin, Robert Stegeman, Abhiraj Dashora, Bryan Look, Joseph Koenig, Brian Hu, Mason Crooks, Ishaan Mahajan, Pravin Boopathy, Mukund Krishnakumar, Nevindu Batagoda, Han Wang, Aaron Young, Victor Freire, Glenn Bower, Xiangru Xu, Dan Negrut, University of Wisconsin-Madison
10:00 a.m.	2024-01-1962	Enhancing Lateral Stability in Adaptive Cruise Control: A T-S Fuzzy Model-Based Strategy Yang Yan, Yafei Xin, Hongyu Zheng, Jilin University
10:30 a.m.	2024-01-1981	Developing an Automated Vehicle Research Platform by Integrating Autoware with the DataSpeed Drive-By-Wire System Hengcong Guo, Jiangtao Li, Nithish Kumar Saravanan, Arizona State University; Jeffrey Wishart, Science Foundation AZ/AZ Commerce Authority; Junfeng Zhao, Arizona State University
11:00 a.m.	2024-01-1967	Vehicle-in-Virtual-Environment Method for ADAS and Connected and Automated Driving Function Development, Demonstration and Evaluation Xincheng Cao, Haochong Chen, Sukru Yaren Gelbal, Bilin Aksun Guvenc, Levent Guvenc, The Ohio State University

WCX SAE World Congress Experience

Technical Session Schedule

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Time	Paper No.	Title
11:30 a.m.	2024-01-1982	Design, Prototyping, and Implementation of a Vehicle-to-Infrastructure (V2I) System for Eco-Approach and Departure through Connected and Smart Corridors Suhrit Chowduri, Shawn Midlam-Mohler, The Ohio State University; Karun Prateek Singh, Tesla Inc.

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Thursday, April 18

ADAS and Autonomous Vehicle System: Simulation and Testing - Part 4 of 4

Session Code AE106

Room 250 C Session 1:30 p.m.

This session focuses on simulation and testing methodologies for ADAS and automated driving systems. Development and testing these systems often relies on simulation and advance testing methodologies due to the complex operating environment

Organizers - Jace Allen, dSPACE Inc.; Yixin Chen, Stellantis; Amit Choudhury, Robert Bosch; Joseph D'Ambrosio, General Motors LLC; Benjamin Hager, dSPACE Inc.; Bin Li, Hyundai Mobis North America; Ramesh S, GM R&D Center; Mukund Chandrasekaran, General Motors; Peng Hang, Tongji University; Mukund Chandrasekaran, General Motors LLC

Time	Paper No.	Title
1:30 p.m.	ORAL ONLY	High Fidelity Multiphysics Simulation-Based Reliability Assessment and Design of a 77 GHz Radar Sensor for Advanced Driver Assistance Systems Ushe Chipengo, David Dang, Pouya Shojaei, Satish Meenakshisundaram, Ansys
2:00 p.m.	2024-01-1964	Enhanced Safety of Heavy-Duty Vehicles on Highways through Automatic Speed Enforcement – A Simulation Study Ankur Shiledar, The Ohio State University; Vivek Sujan, Adam Siekmann, Jinghui Yuan, Oak Ridge National Laboratory
2:30 p.m.	ORAL ONLY	High-Fidelity Physics-Based Electromagnetics Simulation for Advanced Driver Assistance Systems Ushe Chipengo, Ansys
3:00 p.m.	2024-01-1963	On-road testing to characterize speed-following behavior in production automated vehicles Michael Duoba, Argonne National Laboratory; Tinu Vellamattathil Baby, Jorge Pulpeiro Gonzalez, Baisravan HomChaudhuri, Illinois Institute of Technology

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:38 PM

Thursday, April 18

AI and ML in Vehicle-Level Applications - Part 1 of 2

Session Code IDM300

Room 251 A Session 9:30 a.m.

This session focuses on automotive applications of artificial intelligence (AI) and machine learning (ML), including use of connected vehicle data sources, predictive or prescriptive, preventive maintenance, and big data analytics.

Organizers - Monika Minarcin, Accenture; Ramakrishna Koganti, University Of North Texas; Zhenfei Zhan, Chongqing Jiaotong Univ.

Chairperson - Monika Minarcin, Accenture; Ramakrishna Koganti, University Of North Texas

Keynote Speakers Inga Morkveniate-Vilkonciene

Time	Paper No.	Title
9:30 a.m.	ORAL ONLY	Technical Keynote: Enabling Sustainable Transportation through AI” Inga Morkveniate-Vilkonciene
10:00 a.m.	2024-01-2862	Beyond Digital Twin, Innovative Use of AI/ML Technology from Ideation to Design of Next Generation Electric Drive Systems Pascal David, Skander Oueslati, Eric Bourniche, BorgWarner Inc.; Harsha Nanjundaswamy, BorgWarner Inc
10:30 a.m.	2024-01-2870	A data driven approach for real-world vehicle energy consumption prediction Garrett Whitmore, Massachusetts Institute of Technology; Toby Rockstroh, Patrick Haenel, Karsten Wilbrand, Shell Global Solutions (Deutschland); Michael Pomrehn, Shell Energy Europe
11:00 a.m.	2024-01-2867	Predictive Maintenance of a Ground Vehicle Using Digital Twin Technology Conner William Eddy, Clemson University; Matthew P. Castanier, US Army DEVCOM GVSC; John R. Wagner, Clemson University
11:30 a.m.	2024-01-2864	Inherent Diverse Redundant Safety Mechanisms for AI based SW Elements Mandar Manohar Pitale, NVIDIA; Alireza Abbaspour, Qualcomm Technologies Inc; Devesh Upadhyay, SAAB Inc

Thursday, April 18

AI and ML in Vehicle-Level Applications - Part 2 of 2

Session Code IDM300

Room 251 A Session 1:30 p.m.

This session focuses on automotive applications of artificial intelligence (AI) and machine learning (ML), including use of connected vehicle data sources, predictive or prescriptive, preventive maintenance, and big data analytics.

Organizers - Ramakrishna Koganti, University Of North Texas; Monika Minarcin, Accenture; Zhenfei Zhan, Chongqing Jiaotong Univ.

Chairperson - Monika Minarcin, Accenture; Ramakrishna Koganti, University Of North Texas

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Time	Paper No.	Title
1:30 p.m.	ORAL ONLY	Engine feedback control system using virtual sensors combined with neural network image processing Ratnak Sok, Arravind Jeyamoorthy, Jin Kusaka, Waseda University
2:00 p.m.	2024-01-2872	A Data-driven Approach for Enhanced On-Board Fault Diagnosis to Support Euro 7 Standard Implementation Stella Canè, University of Bologna; Lorenzo Brunelli, FEV Italia s.r.l.; Volker Müller, FEV Europe GmbH; Giuseppe Sammito, FEV Italia s.r.l.; Tobias Brinkmann, RWTH Aachen University; Joschka Schaub, FEV Europe GmbH; Nicolò Cavina, University of Bologna
2:30 p.m.	2024-01-2866	A study on estimation of stuck probability in off-road based on AI Junhan Kang, Jijun byun, Um Jin, Hyundai Motor Company; Kunsoo Huh, Hanyang University; Chanuk Yang, Hanyang Univ
3:00 p.m.	2024-01-2871	Research on Artificial Potential Field based Soft Actor-Critic Algorithm for Roundabout Driving Decision Shi Yk, Jian Wu, Jilin University; Shiwei Wang, Diyuan Gan, CHINA FAW GROUP CO; Rui He, Jiaqi Chen, Zhicheng Chen, Jilin University
3:30 p.m.	2024-01-2865	Innovative Virtual Evaluation Process for Outer Panel Stiffness Using Deep Learning Technology Taekyoung Uhm, Seunghyeok Oh, Hyundai Motor Company
4:00 p.m.	2024-01-2863	A Study on the Noise Separation Method of Fuel Pump Using AI Model Tac Koon Kim, Hyundai Motors Namyang Institute
4:30 p.m.	2024-01-2868	AI-based EV Range Prediction with Personalization in the Vast Vehicle Data Kihyung Joo, Lina kim, Hyundai Motor Company

Thursday, April 18

Steering and Suspension Technology Symposium

Session Code SS600

Room 251 B Session 9:30 a.m.

The purpose of this session is to provide a forum for presentations on suspension and steering related topics as it applies to ground vehicles. Papers for this session should address new approaches in the design, control, testing and simulation of suspension and steering systems, as well as integration of the aforementioned in to drivers assistance and autonomous vehicle systems.

Organizers - Mahmoud Abdelfatah, Hitachi, Ltd.; Robert Ackley, Ford Motor Company

Time	Paper No.	Title
9:30 a.m.	2024-01-2520	Steering Angle Safety Control for Redundant Steering System Considering Motor Winding’s Faults Jian Zhao, Ruijie Dang, Jilin University; Hangzhe Wu, China Faw Group Co; Bing Zhu, Zhicheng Chen, Jilin University

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Technical Session Schedule

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Time	Paper No.	Title
10:00 a.m.	2024-01-2897	Development of Noise Diagnosis and Prediction Technology of Column-based Electric Power Steering System using Vehicle Controller Area Network Data Soo Sik Chung, Hyundai Motor Company
10:30 a.m.	2024-01-2516	Dynamic Yaw Rate Regulation for Moderate Understeer in Four-Wheel Steering Vehicles with Zero Sideslip Angle Yihang Guan; Hongliang Zhou; Houhua Jing; Weiwei Miao
11:00 a.m.	2024-01-2519	Design, Analysis, and Comparative Study of Conventional Double Wishbone Control Arms with the Modified Split Type Control Arms Design for a Passenger Car Ghanshyam Shivhare, Manpreet Singh, Nitin Chopra, OLA Electric

Planned by Steering and Suspension Committee / Automobile Body, Chassis, Safety, and Structures

Thursday, April 18

Sheet Metal Forming Technology - Part 2 of 2

Session Code M105

Room 251 B Session 1:30 p.m.

This session will feature the latest developments in sheet metal forming technology. Presentations will address general areas of forming processes, formability issues and modeling. These include forming processes (Stamping, hydroforming, gas forming, and high temperature forming), formability Issues (springback, edge cracking, stretch-bend failures and fracture), Modeling (materials, forming limits, failure criteria in various deformation modes and process modeling & optimization).

Organizers - Xiaoming (Ming) Chen, Novelis North America; Raghu Echempati, Kettering University; Lu Huang, Dohyun Leem, General Motors; ZiQiang Sheng, General Motors LLC; Dohyun Leem, General Motors

Time	Paper No.	Title
1:30 p.m.	2024-01-2860	Experimental Study on Bendability of Advanced High Strength Steels Hua-Chu Shih, United States Steel Corporation
2:00 p.m.	ORAL ONLY	Origami Sheet Metal (OSM) Forming for Body-in White: Formability and Strain versus Topological Designs Ala Qattawi, The University of Toledo
2:30 p.m.	ORAL ONLY	Revealing the Relationships Between Formability and Fracture in a New Comprehensive Map for Steel & Aluminium Alloy Sheets FADI Abu-Farha, FADI-AMT LLC

Planned by Metallic Materials Committee / Materials Engineering Activity

WCX SAE World Congress Experience

Technical Session Schedule

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Thursday, April 18

Panel Discussion: Transportation is a Part of Real Estate, Not Apart from Real Estate

Session Code SDP102

Room 251 C Session 9:30 a.m.

Transportation is inexplicably bound up with land use: people choose where to work, live, socialize, and shop based on their transportation options and vice versa. With housing costs rising, post-pandemic teleworking policies adjusting, and domestic migration patterns showing growth in suburbs, the Sunbelt, and the South, the present moment offers opportunities to re-frame “transportation as a part of real estate, not apart from real estate.” Our panel members will explore synergies between the transportation and real estate sectors to further our collective goals around a safer, more sustainable, and more equitable future

Organizers - Danielle Chou, Federal Highway Administration

Moderators - Danielle Chou, Federal Highway Administration

Panelists - Mark Arizmendi, Northwestern Capital Partners; William Chernicoff, Toyota Mobility Foundation; Mark De La Vergne, Michigan Central Station; Jiaqi Ma, Univ. of California-Los Angeles;

Thursday, April 18

Electric Vehicle Drivetrain Dynamics for in-wheel motors Application

Session Code SS901

Room 251 C Session 1:30 p.m.

This session deals with the analytical and experimental studies of vehicles with electric drives or any non-conventional concepts that stretch the vehicle dynamics/mobility performance using intelligent technologies such as in-wheel motors, torque-vectoring controls, multi-wheel steer-by-wire, etc.

Organizers - Riccardo Groppo, SA Technologies; Valentin Ivanov, Technische Universitat Ilmenau; Barys Shyrokau, Delft Univ of Technology; Dzmitry Savitski, Volkswagen Group

Time	Paper No.	Title
1:30 p.m.	2024-01-2551	Extended Deep Learning Model to Predict the Electric Vehicle Motor Operating Point Srikanth Kolachalama, Hafiz Malik, University of Michigan
2:00 p.m.	2024-01-2552	Improving Vehicle Stability and Comfort through Active Corner Positioning Viktor Skrickij, Eldar Šabanovi, Paulius Kojis, Vidas Žuraulis, Vilnius Gediminas Technical University; Valentin Ivanov, Technische Universitat Ilmenau; Barys Shyrokau, Delft Univ of Technology
2:30 p.m.	2024-01-2550	Integrated Chassis Control for Energy-Efficient Operation of a 2WD Battery-Electric Vehicle with In-Wheel Propulsion Marius Heydrich, Thomas Mitsching, Technische Universität Ilmenau; Sebastian Gramstat, Audi AG; Matthias Lenz, Valentin Ivanov, Technische Universität Ilmenau
3:00 p.m.	2024-01-2553	Innovative Zero-Emissions Braking System: Performance Analysis Through a Transient Braking Model Giuseppe Pio Tempone, Giovanni Imberti, Henrique de Carvalho Pinheiro, Massimiliana Carello, Politecnico di Torino

Planned by Vehicle Dynamics Committee / Automobile Body, Chassis, Safety, and Structures Activity

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:38 PM

Thursday, April 18

Foundations of Automobile Electronics: In-Vehicle Networks

Session Code AE301

Room 252 A Session 9:30 a.m.

Vehicle networks and communication protocols play a key role in meeting today's complex system requirements and product flexibility. This session will feature critical talks on in-vehicle networks followed by a panel discussion on system integration and testing challenges. Come prepared to ask questions of these experts.

Organizers - Christopher Lupini, ETAS; Peter Subke, Softing Automotive Electronics; Mark Zachos, DG Technologies

Time	Paper No.	Title
9:30 a.m.	ORAL ONLY	Technical Keynote: A paradigm shift from binary protocols towards service-oriented vehicle diagnostics The presentation will give an idea how the paradigm shift from binary protocols towards service oriented vehicle diagnostics could effect in-vehicle communication as well as off-board diagnostics in the future Andreas Hege, RA Consulting GMBH
10:00 a.m.	2024-01-1985	Diagnostic Communication with Zero Emission Vehicles (ZEV) Using ISO 14229-5 (UDS on IP) and SAE J1979-3 (ZEV on UDS) Peter Subke, Softing Automotive Electronics; Lindsey Heineman, Rivian Automotive; Julian Mayer, Softing Automotive Electronics
10:30 a.m.	ORAL ONLY	AUTOSAR and the Challenging market trends in Automotive Sherif Aly, AUTOSAR
11:00 a.m.	2024-01-1987	Improving CRC Fault Detection Probability in AUTOSAR E2E Based on Known Hamming Weights Taichi Emi, Han Nay Aung, Yasuhiro Yamasaki, Hiroyuki Ohsaki, Kwansei Gakuin University
11:30 a.m.	2024-01-1986	Simulative Assessments of Cyclic Queuing and Forwarding with Preemption in In-Vehicle Time-Sensitive Networking Feng Luo, Zitong Wang, Yi Ren, Mingzhi Wu, Tongji University; Xiaoxian Zhang, iSOFT Infrastructure Software Co., Ltd.

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Thursday, April 18

Human Factors in Driving and Automotive Telematics

Session Code SS302

Room 252 A Session 1:30 p.m.

As information and entertainment to and from the vehicle (Telematics) become more prolific it is critical to increase our understanding of how the driver understands and uses Telematics functions. Equally critical is how those functions impact the driver. This session will address those issues.

Organizers - Shantha Kumari Rajendran, Harvard University; Derek Fraser, Stellantis

Chairperson - Shantha Kumari Rajendran, Harvard University

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Technical Session Schedule

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Time	Paper No.	Title
1:30 p.m.	2024-01-2505	Distribution of In-Vehicle Task Element Times for Determining Task Distraction and Ease of Use Paul Green, University of Michigan
2:00 p.m.	2024-01-2506	Trends in Driver Response to Forward Collision Warning and the Making of an Effective Alerting Strategy Mansoor Nasir, Ko Kurokawa, Neha Singhal, Ken Mayer, Andrea Chowanic, Benjamin Osafo Yeboah, Ford Motor Company; Michael Blommer, AVSimulation

Planned by Human Factors Committee / Automobile Body, Chassis, Safety, and Structures Activity

Thursday, April 18

Foundations of Automobile Electronics: Reliability, Diagnostics & Prognostics for Safety Critical Electronic Systems

Session Code AE304

Room 252 B Session 9:30 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 is machine readable. This session 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.

Organizers - Mark Monohon, Mark Pope, DG Technologies; Athar Hanif, OSU; Sumanth Reddy Dadam, Ford Motor Company

Time	Paper No.	Title
9:30 a.m.	2024-01-2789	Development of Classification of Customer Complaints Using Deep Learning Hanmin You, Hyundai Motor Company
10:00 a.m.	2024-01-2790	Machine Learning Approach for Open Circuit Fault Detection and Localization in EV Motor Drive Systems Ali Arsalan, Behnaz Papari, S M Imrat Rahman, Laxman Timilsina, Ali Moghassemi, Grace Muriithi, Gokhan Ozkan, Christopher Edrington, Elutunji Buraimoh, Clemson University
10:30 a.m.	2024-01-2791	Process Improvements for Determining Fault Tolerant Time Intervals Darren Jones, Pavankumar Gangadhar, Randall McGrail, Sudipta Pati, FEV North America Inc; Erik Antonsson, Ravi Patel, Streetscope

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

WCX SAE World Congress Experience

Technical Session Schedule

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Thursday, April 18

Panel Discussion: Advanced Diagnostics for Autonomous Vehicles

Session Code AE311

Room 252 B Session 1:30 p.m.

This panel will focus on the fact that On-board Measurement (OBM) and Prognostics are quickly becoming a necessity to inform the operator or passengers that all systems and monitors are fully functioning. At this panel discussion we will present some developing solutions to performance monitoring; and discuss what needs to happen for the public to maintain confidence that ADAS functions or ADS driven vehicles are safe.

Learn more about the Panel Participants

Organizers - Mark Monohon, Mark Pope, DG Technologies

Moderators - Mark Pope, DG Technologies

Panelists - Andreas Hege, RA Consulting GMBH; Troy Schilling, ETAS Inc.; Mark Zachos, DG Technologies; Steven Holland, VHM Innovations LLC; Charles Wilson, Motional Inc;

Thursday, April 18

Advanced Analysis, Design, and Optimization of Materials, Restraints, and Structures for Enhanced Automotive Safety and Weight Reduction - Part 1 of 2

Session Code M202

Room 258 Session 9:30 a.m.

This session explores innovative ideas to enhance automotive safety with improved material constitutive modeling, analysis method developments, simulation and pre/post processing tools, optimization techniques, crash code developments, finite element model updating, model validation and verification techniques, dummies and occupants, restraint systems, passive safety as well as lightweight material applications and designs.

Organizers - William Altenhof, Univ. of Windsor; Guofei Chen, General Motors; Wei Li, Autoliv; Jwo Pan, University of Michigan; Danielle Zeng, Ford Research and Innovation Center

Time	Paper No.	Title
9:30 a.m.	ORAL ONLY	Improvement on three-point bend test towards consistent result interpretation for materials of varying thickness Yang Li, Daniel Freiberg, Danielle Zeng, Arjun Sundararajan, Ford Motor Company
10:00 a.m.	2024-01-2267	Inverse Analysis of Road Contact Force and Contact Location Using Machine Learning with Measured Strain Data Yuya Yamaki, Shohei Tsuji, Kazuhiro Zama, Takanori Ogata, Yoichiro Okuhira, Toyota Motor Corporation
10:30 a.m.	2024-01-2264	Computational Modeling and Optimization of a Flapping Mechanism Based on the Scotch Yoke Principle Ashraf Mahmud Rayed, CUET; Balasubramanian Esakki, NITTTR; Sajal Chandra Banik, Ashrafun Nahin, CUET
11:00 a.m.	2024-01-2266	Vehicle Lightweighting Impacts on Energy Consumption Reduction Potential Across Advanced Vehicle Powertrains Ehsan Sabri Islam, Namdoo Kim, Ram Vijayagopal, Ayman Moawad, Aymeric Rousseau, Argonne National Laboratory; Matthew Seitz, University of Georgia

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:38 PM

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Thursday, April 18

Advanced Analysis, Design, and Optimization of Materials, Restraints, and Structures for Enhanced Automotive Safety and Weight Reduction - Part 2 of 2

Session Code M202

Room 258 Session 1:30 p.m.

This session explores innovative ideas to enhance automotive safety with improved material constitutive modeling, analysis method developments, simulation and pre/post processing tools, optimization techniques, crash code developments, finite element model updating, model validation and verification techniques, dummies and occupants, restraint systems, passive safety as well as lightweight material applications and designs.

Organizers - William Altenhof, Univ. of Windsor; Guofei Chen, General Motors; Wei Li, Autoliv; Jwo Pan, University of Michigan; Danielle Zeng, Ford Research and Innovation Center

Time	Paper No.	Title
1:30 p.m.	2024-01-2262	Multi-Material and Multi-Objective Topology Optimization Considering Crashworthiness Yuhao Huang, Yifan Shi, Zane Morris, Mira Teoli, Daniel Tameer, Il Yong Kim, Queen's University
2:00 p.m.	ORAL ONLY	A Study on Electric Vehicle Side Sill Structure for Sliding Door Characteristics wonjung song, Hyundai & Kia Corp.
2:30 p.m.	ORAL ONLY	An Efficient Machine Learning-Based Approach for Prediction of Crash Safety of Automotive Systems Anindya Deb, Indian Institute of Science
3:00 p.m.		BREAK
3:30 p.m.	2024-01-2263	Multi-Objective Optimization of Occupant Survival Space of a Medium-Duty Vehicle under Rollover Condition Jiangfan Zhang, Nanjing University of Science and Technology; Xiaojun Zou, Liu-kai Yuan, Tang-yun Zhang, Naveco Ltd.; Tao Wang, Liangmo Wang, Nanjing University of Science and Technology
4:00 p.m.	ORAL ONLY	Bioinspired Golden Spiral Shapes on Crushing Protection Behaviors of Tubular Structures John Sherman, UNC Charlotte Motorsports Engineering

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Thursday, April 18

Alternative and Advanced Fuels - Part 1 of 2

Session Code PFL330

Room 259 Session 9:30 a.m.

This session focuses on work pertaining to the production and fundamental properties of new fuels and methods for assessing their performance as well as combustion properties in spark and compression ignition engines. This will include work related to the issues of fuel stability, storage and transportation. Examples include diesel fuel stability, lubricity, cold weather issues, and environmental and toxicological impacts.

Organizers - Brian Gainey, Clemson University; Ashwini Karmarkar, Argonne National Laboratory; Elisa

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Toulson, Michigan State University; Ziming Yan, Mahle Powertrain

Chairperson - Elisa Toulson, Michigan State University; Ziming Yan, Aramco Americas

Time	Paper No.	Title
9:30 a.m.	ORAL ONLY	Laminar burning speed measurements of ammonia/hydrogen/synthetic air mixtures at high pressure Gihun kim, Louis Yovino, University Of Central Florida
10:00 a.m.	ORAL ONLY	Recent Changes in ASTM Biodiesel Quality Standards to Support B20 in New Technology Diesel Engines and Data Testing Needs for Supporting up to B100 in 2027-2031 Ultra Low Emissions Diesel Engines Steve Howell, MARC-IV Consulting
10:30 a.m.	2024-01-2371	Experimental Study of Ammonia Combustion in a Heavy-Duty Diesel Engine Converted to Spark Ignition Operation Luis F. Alvarez, Cosmin E. Dumitrescu, West Virginia University
11:00 a.m.	2024-01-2373	Numerical Study of a Six-Stroke Gasoline Compression Ignition (6S-GCI) Engine Combustion with Oxygenated Fuels Ashwin Karthik Purushothaman, Youngchul Ra, Michigan Technological University; Kyoung Pyo Ha, Shengrong Zhu, Ankith Ullal, HATCI Hyundai-Kia America Technical Center
11:30 a.m.	ORAL ONLY	High Biodiesel Content Fuels and Their Influence on Low NOX Aftertreatment Systems Bryan Zavala, Southwest Research Institute

Planned by Fuels and Lubricants / Energy and Propulsion Activity

Thursday, April 18

Alternative and Advanced Fuels - Part 2 of 2

Session Code PFL330

Room 259 Session 1:30 p.m.

This session focuses on work pertaining to the production and fundamental properties of new fuels and methods for assessing their performance as well as combustion properties in spark and compression ignition engines. This will include work related to the issues of fuel stability, storage and transportation. Examples include diesel fuel stability, lubricity, cold weather issues, and environmental and toxicological impacts.

Organizers - Brian Gainey, Clemson University; Ashwini Karmarkar, Argonne National Laboratory; Elisa Toulson, Michigan State University; Ziming Yan, Mahle Powertrain

Chairperson - Elisa Toulson, Michigan State University; Ziming Yan, Aramco Americas

Time	Paper No.	Title
1:30 p.m.	2024-01-2372	Experimental Study on Performance and Emissions of BS VI Complaint EFI Motorbike with Oxygenated Fuel Blends (E0, E10, E20 & M15) Yaman Sahu, Sakthivel P, M Sithananthan, Mukul Maheshwari, Indian Oil Corporation

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Technical Session Schedule

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Time	Paper No.	Title
2:00 p.m.	2024-01-2375	Performance Evaluation of High Octane Gasoline Fuel(s) on High Compression Ratio (HCR) Motorcycle – Based on Chassis Dynamometer Test Shyamsher Saroj, Mrinmoy Kalita, Prashant Kumar, Chander Kant, Pradeep Patanwal, Maya Chakradhar, M Sithananthan, Ajay Kumar Arora, Ajay Kumar Harinarain, Mukul Maheshwari, Indian Oil Corporation Ltd.
2:30 p.m.	2024-01-2374	Development of Oxygenated Diesel Fuel and Impact on Vehicle Performance Maya Chakradhar, Kiran K. Chakrahari, Shanti Prakash, Justin Raj, Ajay Arora, Mukul Maheshwari, Ajay Harinarain, Indian Oil Corporation Ltd.

Planned by Fuels and Lubricants / Energy and Propulsion Activity

Thursday, April 18

Vehicle Internet of Things

Session Code IOT100

Room 260 Session 9:30 a.m.

The criticality of Vehicle Internet of Things (VIOT) has grown significantly with the advancement of ADAS, Avs and Smart Transportation technologies as well as new business models on connected consumer. The organizers of these sessions are looking for abstract submissions on the following areas: smart transportation, driverless transportation, route optimization, new and emerging technologies and business practices, vehicle data (big data) analytics and machine learning algorithms, and Edge Devices.

Organizers - Sumit Bhargava, Mahle Aftermarket Inc.; James Li, MWCOG; Partha Goswami, PG Mopbility; Mert D. Pesé, Clemson University; Kyle Taylor, Luxoft

Chairperson - Mert D. Pesé, Clemson University

Time	Paper No.	Title
9:30 a.m.	2024-01-2881	Evaluating Network Security Configuration (NSC) Practices in Vehicle-related Android Applications Linxi Zhang, Central Michigan University; Di Ma, University of Michigan
10:00 a.m.	ORAL ONLY	Building a better Bluetooth Lab for Security Testing and Education Mohammad Ghali, Car Hacking Village
10:30 a.m.	2024-01-2880	Coordinated Charging and Dispatching for Large-Scale Electric Taxi Fleets based on Bi-level Spatiotemporal Optimization Yelin Lyu, Ning Wang, Hangqi Tian, Tongji University
11:00 a.m.	2024-01-2879	A percipient analysis of Jaguar IPACE electric vehicle energy consumption using big data analytics Nilabza Dutta, David Evans, Atharva sapte, Jaguar Land Rover
11:30 a.m.	2024-01-2878	Leveraging the Internet to Drive a Real Car in the Virtual Earth 3D Model Helen S. Loeb, Jaime Hernandez, Chase Leibowitz, Benjamin Loeb, Jitsik LLC; Erick Guerra, Rahul Mangharam, University of Pennsylvania

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Time	Paper No.	Title
12:00 p.m.	ORAL ONLY	Vibration Energy Harvesting for Automotive Propulsion Internet of Things (IoT) Sayed Nahiyan Masabi, Loughborough University; Hailing Fu, Beijing Institute of Technology; James Flint, Stephanos Theodossiades, Loughborough University
3:00 p.m.		BREAK

Planned by Vehicle Internet of Things Program Committee / Ground Vehicle Advisory Group

Thursday, April 18

Automotive Embedded Software and Systems: Modeling, Simulation, and Testing

Session Code AE202

Room 260 Session 1:30 p.m.

This session seeks submissions concerning innovations in automotive embedded systems with a specific focus on software methodologies to model, simulate, implement, and test them in the vehicle. Control and signal processing algorithm developments are encouraged, and topics can come from a wide range of vehicle subsystems such as Infotainment, Navigation, Driver Assistance, Battery management, Propulsion, Chassis, etc..

Organizers - Sumanth Reddy Dadam, Ford Motor Company; Mahendra Muli, dSPACE Inc.; Scott Rush, General Motors LLC; Kevin Sittner, Mitsubishi Motors R&D of America Inc.; Chirag Sonchal, John Deere India Pvt, Ltd.

Time	Paper No.	Title
1:30 p.m.	2024-01-2848	Automotive Validation Using Python to Control Test Equipment and Automate Test Cases Brandon Rosiewicz, Bravin Link, Magna Seating of America Inc.
2:00 p.m.	2024-01-2850	Reduced Order Modeling Technology with AI for Model-Based-Development Takahiro Inagaki, Tadaaki Nasu, Minoru Takeshige, Motofumi Iwata, Naoto Nakane, Toyota Technical Development Corporation
2:30 p.m.	2024-01-2853	Streamlining Hybrid Vehicle Control Development with an Efficient MATLAB/Simulink Simulation Platform Achyut Venkataramu, IAV Automotive Engineering Inc.; Yue Wang, Kyyba Canada Inc.; Nadirsh Patel, FCA US LLC; Daniel Berger, Shichao Huo, FEV North America Inc; Onur enolu, FCA US LLC
3:00 p.m.		BREAK
3:30 p.m.	2024-01-2854	Hardware-in-the-Loop (HIL) Test Platform Development for Seat Electronic Control Unit (ECU) Validation Shuo Wang, Bravin Link, Brandon Rosiewicz, Hanlong Yang, Magna Seating
4:00 p.m.	2024-01-2851	Value Driving-A Guide to Save Fuel, Travel Time, and Emissions David B. Smith

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Time	Paper No.	Title
4:30 p.m.	2024-01-2852	Electric Vehicle Battery SoH and RUL prediction using Digital Twin Hybrid ML Model considering Effect of Driving Behaviour Saharsh Dongaonkar, Tata Motors, Ltd.; Prasanta Sarkar, Manish Kondhare, Subhrajyoti nath, Tata Motors, Ltd

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Thursday, April 18

Emissions Measurement and Testing - Part 2 of 3

Session Code PFL440

Room 310 A Session 9:30 a.m.

Sub-sessions cover emissions measuring techniques and testing regimes. This includes new analysis techniques and the novel application of existing techniques, the comparison of existing and proposed testing regimes with real world experience, including modeling.

Organizers - Svitlana Kroll, Southwest Research Institute; J. Felipe Rodriguez, International Council On Clean Transport; Susumu Sato, Tokyo Institute of Technology; Yuesen Wang, Exponent; Dado Karim Sylla, Cummins Inc.; Michael Akard, Horiba, Ltd.; Mi-Young Kim, Mert Zorlu, Cummins Inc.

Time	Paper No.	Title
9:30 a.m.	ORAL ONLY	Field Cycle Results for a Low NOX Aftertreatment System Bryan Zavala, Southwest Research Institute
10:00 a.m.	2024-01-2705	Estimating Light-duty Vehicle Gaseous Emissions Using a Data-driven Approach for Off-cycle Measurements Ashton Hashemi, Dean Schlingmann, Hyundai America Technical Center Inc.
10:30 a.m.	2024-01-2703	Exhaust Slip-Stream Sampling System for Aftertreatment Device Testing Jason Loprete, Rodrigo Ristow Hadlich, Amanda Sirna, Dimitris Assanis, Stony Brook University; Tala Mon, Eleni Kyriakidou, University of Buffalo
11:00 a.m.	ORAL ONLY	Current heavy-duty diesel and natural gas vehicle technology can meet future EPA in-use NOx emissions standards Troy Hurren, Tianyi Ma, Cavan McCaffery, Hanwei Zhu, Tianbo Tang, Kent Johnson, Tom Durbin, George Karavalakis, University Of California Riverside
11:30 a.m.	ORAL ONLY	Update on Opposed Piston Engines for Commercial Vehicles - Hydrogen Combustion and Ultralow NOx Diesel Laurence Fromm, Achates Power Inc.

Planned by Mobile Emissions Committee / Energy and Propulsion Activity

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:39 PM

Thursday, April 18

Emissions Measurement and Testing - Part 3 of 3

Session Code PFL440

Room 310 A Session 1:30 p.m.

Sub-sessions cover emissions measuring techniques and testing regimes. This includes new analysis techniques and the novel application of existing techniques, the comparison of existing and proposed testing regimes with real world experience, including modeling.

Organizers - Svitlana Kroll, Southwest Research Institute; J. Felipe Rodriguez, International Council On Clean Transport; Susumu Sato, Tokyo Institute of Technology; Yuesen Wang, Exponent; Dado Karim Sylla, Cummins Inc.; Michael Akard, Horiba, Ltd.; Mi-Young Kim, Mert Zorlu, Cummins Inc.

Time	Paper No.	Title
1:30 p.m.	ORAL ONLY	Activity Data of Zero and Near-Zero Port-Related Equipment and Vehicles Tom Durbin, Chas Frederickson, Alexander Vu, Maedeh Makki, Kent Johnson, George Karavalakis, University Of California Riverside
2:00 p.m.	ORAL ONLY	As Assessment of Carbon Dioxide Capturing from the Exhaust Gases of Power Packs - An Experimental Study Prabakaran B, Hindustan Institute Of Technology Scie
2:30 p.m.	ORAL ONLY	CHARACTERIZING THE GASEOUS TOXIC POLLUTANTS, PARTICULATE EMISSIONS AND THEIR TOXICITY FROM A PHEV OPERATING WITH ETHANOL BLENDS Maedeh Makki, Troy Hurren, Zisimos Toumasatos, Tom Durbin, University of California Riverside; George Karavalakis, University Of California Riverside
3:00 p.m.	2024-01-2711	Diesel Oxidation Catalyst Performance with Biodiesel Formulations Venkata Lakkireddy, Phillip Weber, Southwest Research Institute; Robert McCormick, National Renewable Energy Laboratory; Steve Howell, MARC-IV Consulting

Planned by Mobile Emissions Committee / Energy and Propulsion Activity

Thursday, April 18

Emission Control Modeling - Part 1 of 2

Session Code PFL430

Room 310 B Session 9:30 a.m.

Papers are invited for mobile emissions control modeling, as well as their validation and application. Technologies covered include aftertreatment systems with injectors, heaters, filters and catalysts for both on-road and off-road powertrains including, but not limited to internal combustion engines and hybrid electric platforms, fed by liquid fossil fuels and alternatives such as biofuels, gaseous fuels, and hydrogen. Modeling aspects range from fundamental, 3-D thermal, fluid or reaction models of individual components to system level simulation, optimization, and control.

Organizers - Vincenzo Mulone, Univ. Of Roma Tor Vergata; Mufaddel Dahodwala, KPIT Technologies, Ltd.; Jian Gong, Achuth Munnannur, Krishna Gunugunuri, Cummins Inc.

Chairperson - Vincenzo Mulone, Univ Of Roma Tor Vergata; Krishna Gunugunuri, Cummins Inc

Time	Paper No.	Title

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:39 PM

Time	Paper No.	Title
9:30 a.m.	2024-01-2629	Post-Oxidation Phenomena as a Thermal Management Strategy for Automotive After-Treatment Systems: Assessment by Means of 3D-CFD Virtual Developmen t Loris Barillari, Politecnico di Milano; Mario Pipolo, Universität Stuttgart; Augusto Della Torre, Gianluca Montenegro, Angelo Onorati, Politecnico di Milano; Antonino Vacca, Marco Chiodi, FKFS; André Kulzer, Universität Stuttgart
10:00 a.m.	2024-01-2627	Development of Optimal Specification of Exhaust Purification System for Euro7 Commercial Diesel Legislation Jiho Cho, Sungmu Choi, Sang Min Lee, Dong Min Hwang, Hyundai Motor Group
10:30 a.m.	2024-01-2624	Full-Scale CFD Prediction of the Performance of Advanced After-Treatment Systems during Severe RDE Test Cycle Andrea Sartirana, Gianluca Montenegro, Augusto Della Torre, Angelo Onorati, Politecnico di Milano; Lorenzo Pace, Naroa Zaldua-Moreno, Emitec Technologies GmbH
11:00 a.m.	2024-01-2626	Numerical Modeling of Liquid Film Boiling, Urea Deposition and Solidification in SCR Applications Mrugank P. Bhatt, Pengze Yang, Convergent Science Inc.; Chaouki Habchi, IFP Energies Nouvelles
11:30 a.m.	2024-01-2630	Algorithm to Calibrate Catalytic Converter Simulation Light-Off Curve John Parley Wilson, FCA US LLC; Dan DelVescovo, Oakland University

Planned by Mobile Emissions Committee / Energy and Propulsion Activity

Thursday, April 18

Emission Control Modeling - Part 2 of 2

Session Code PFL430

Room 310 B Session 1:30 p.m.

Papers are invited for mobile emissions control modeling, as well as their validation and application. Technologies covered include aftertreatment systems with injectors, heaters, filters and catalysts for both on-road and off-road powertrains including, but not limited to internal combustion engines and hybrid electric platforms, fed by liquid fossil fuels and alternatives such as biofuels, gaseous fuels, and hydrogen. Modeling aspects range from fundamental, 3-D thermal, fluid or reaction models of individual components to system level simulation, optimization, and control.

Organizers - Mufaddel Dahodwala, KPIT Technologies, Ltd.; Jian Gong, Krishna Gunugunuri, Cummins Inc.; Vincenzo Mulone, Univ. Of Roma Tor Vergata; Achuth Munnannur, Cummins Inc.

Chairperson - Krishna Gunugunuri, Cummins Inc; Mufaddel Dahodwala, KPIT Technologies Ltd

Time	Paper No.	Title
1:30 p.m.	2024-01-2628	Evaluation of Engine and Aftertreatment Concepts for Proposed Tier 5 off-Road Emission Standards Dhanraj Fnu, Satyum Joshi, Erik Koehler, Michael Franke, Dean Tomazic, FEV North America Inc.

WCX SAE World Congress Experience

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Time	Paper No.	Title
2:00 p.m.	ORAL ONLY	Structure-Property Relations of Soot Aggregates via Computational and Machine Learning Approaches with Applications to Particulate Emission Control and Measurement Athanasios Konstandopoulos, AUTH and SYNEST PC
2:30 p.m.	ORAL ONLY	A comprehensive two-site NH3 storage SCR model and its application in a light-duty vehicle driving cycle Zhiming Gao, Oak Ridge National Laboratory
3:00 p.m.	ORAL ONLY	Effect of Different Inlet Conditions on the Pollutant Synergistic Purification Performance of SDPF Ying-jie Chen, Piqiang TAN, Diming Lou, Zhiyuan Hu, Tongji University
3:30 p.m.	ORAL ONLY	An Analytic Model for Wall-Flow Particulate Filters Timothy C. Watling, Johnson Matthey PLC
4:00 p.m.	ORAL ONLY	Experimental and modeling study on impact of hydrocarbon species on V-SCR catalyst Mugdha Ambast, Cummins; Anand Srinivasan, Yuanzhou Xi, Richa Raj, Cummins Inc
4:30 p.m.	2024-01-2625	System Level Simulation of H2 ICE after Treatment System Venkata Rajesh Chundru, Christopher Sharp, Mohammed Mustafizur Rahman, Arun Balakrishnan, Southwest Research Institute

Planned by Mobile Emissions Committee / Energy and Propulsion Activity

Thursday, April 18

Load Simulation and Vehicle Performance: Multi-body Dynamics - Part 1 of 2

Session Code M209

Room 312 A/B Session 9:30 a.m.

Multibody system modeling and simulation, rigid and flexible body modeling, loads predictions for vehicle body, frame/sub-frame, exhaust system, driveline, and powertrain, modeling of vehicle dynamics simulation and durability loads simulation, process considering vehicle dynamics and durability loads, data processing and analysis, loads sensitivity analyses for model parameters, design load minimization, prediction of loads effects, robust design methods, driver modeling, and system modeling.

Organizers - Yunkai Gao, Tongji University; Yunqing Zhang, Huazhong University of Science and Tech.; Hengjia Zhu

Time	Paper No.	Title
9:30 a.m.	2024-01-2309	Optimization of Mount Bracket on Whine Noise Performance for a Battery Electric Vehicle Chao Ding, Xiaodong Jiang, Weikang He, Huiqiang Yu, Yan Ma, Zhejiang LeapPower Technology Co.,Ltd.

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:39 PM

Time	Paper No.	Title
10:00 a.m.	2024-01-2302	Analysis of natural characteristics and dynamic response of battery pack system of new energy vehicle Yi Ming Guo, Xiaowei Shao, Hubei University of Automotive Technology; Lei Xiao, GuoHong Li, Shiyan Dongsen Automotive Seals Co., Ltd.; Wen-Bin Shangguan, South China University of Technology
11:00 a.m.	ORAL ONLY	Development of virtual evaluation techniques to predict the rear curb climbing parking Test YoungJin Seo, Hyundai-Kia Corp. R&D Div.

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Thursday, April 18

Load Simulation and Vehicle Performance: Multi-body Dynamics - Part 2 of 2

Session Code M209

Room 312 A/B Session 1:30 p.m.

Multibody system modeling and simulation, rigid and flexible body modeling, loads predictions for vehicle body, frame/sub-frame, exhaust system, driveline, and powertrain, modeling of vehicle dynamics simulation and durability loads simulation, process considering vehicle dynamics and durability loads, data processing and analysis, loads sensitivity analyses for model parameters, design load minimization, prediction of loads effects, robust design methods, driver modeling, and system modeling.

Organizers - Yunkai Gao, Tongji University; Yunqing Zhang, Huazhong University of Science and Tech.; Hengjia Zhu

Time	Paper No.	Title
1:30 p.m.	2024-01-2305	Protection Implementation of Electric Power Steering Based on Functional Safety Xiaoming Ye, WUT School of Materials Science and Engineering; Yanding Yang, Lingyang Li, Jia Du, Yongliang Wang, Dongfeng Motor Corporation
2:00 p.m.	2024-01-2304	Optimisation of Idle Vibration Characteristics of Powertrain Suspension Systems Yi Ming Guo, Bao Bao Zheng, Hubei University of Automotive Technology; Lei Xiao, GuoHong Li, Shiyan Dongsen Automotive Seals Co., Ltd.; Wen-Bin Shangguan, South China University of Technology

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Thursday, April 18

Load Simulation and Vehicle Performance: Tire and Terrain

Session Code M208

Room 313 A/B Session 9:30 a.m.

Focusing on tire and terrain mechanics modeling, tire model and test development, parameters identification, sensitivity analysis, road profile characterization, interactions between tire, suspension/steering/brake systems, and different terrains, spindle loads/travel variation attributes due to deterministic and rough roads, tire noise, rolling resistance, correlation studies, design of intelligent tires and ADAS, and changes in tire load duty cycles from traditional to autonomous vehicles.

Organizers - Mustafa Ali Arat, Goodyear Tire & Rubber Co.; Jennifer Bastiaan, Kettering University; Emmanuel Bolarinwa, Revvo Technologies Inc.; Nan Xu, Jilin University

WCX SAE World Congress Experience

Technical Session Schedule

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Chairperson - Jennifer Bastiaan, Kettering University

Time	Paper No.	Title
9:30 a.m.	2024-01-2297	A Numerical Analysis of Terrain and Vehicle Characteristics in Off-Road Conditions Through Semi-Empirical Tyre Contact Modelling Luca Zerbato, Angelo Domenico Vella, Enrico Galvagno, Alessandro Vigliani, Politecnico di Torino; Silvio Data, Matteo Eugenio Sacchi, Stellantis Europe SpA
10:00 a.m.	2024-01-2295	Real-time Road Recognition Technology Based on Intelligent Tire System Equipped with Three-Axis Accelerometer Zongzhi Han, Weidong Liu, Dayu Liu, Zhenhai Gao, Yang Zhao, Jilin University
10:30 a.m.	2024-01-2296	A Physics-Based Dynamic Model for the Rolling Resistance Considering Thermal States and Conditions Oskar Lind Jonsson, Lars Eriksson, Robin Holmbom, Linkoping University
11:00 a.m.	2024-01-2292	Evaluation of a Design Support Tool Incorporating Sensory Performance Model of Ride Comfort for Conceptual Design of Controlled Suspensions Hironobu Kikuchi, Kazuaki Inaba, Tokyo Institute of Technology

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Thursday, April 18

Load Simulation and Vehicle Performance: Handling and Dynamics

Session Code M210

Room 313 A/B Session 1:30 p.m.

Focusing on analysis and enhancement of vehicle dynamics performance including handling/braking/traction characteristics as well as robustness and active stability under the influence of loading, tire forces, and intelligent tire technology for improving overall vehicle system dynamics and safety. Influence of load variations and other uncertainties, as well as impact of system hybridization, electrification, and autonomous systems on vehicle dynamics and controls will be discussed. (ADAS related papers should be submitted to M211)

Organizers - Jennifer Bastiaan, Kettering University; Hyung-Joo Hong, ANSYS Inc.; Xuewu Ji, Tsinghua Univ.; Ken Kang, Honda R & D; Bin Li, Hyundai Mobis North America

Chairperson - Jennifer Bastiaan, Kettering University; Hyung-Joo Hong, Ansys

Time	Paper No.	Title
1:30 p.m.	2024-01-2319	A Suspension Tuning Parameter Study for Brake Pulsation Hyung-Joo Hong, Changwook Lee, Hyochan Jun, Dongzhe Zhu, Ansys Inc.
2:00 p.m.	2024-01-2323	Modeling & Validation of a Digital Twin Tracked Vehicle Nicholas Daly, Pranav Manvi, Tanmay Chhatbar, Matthias Schmid, Clemson University; Matthew P. Castanier, US Army DEVCOM GVSC; John Wagner, Clemson University

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Time	Paper No.	Title
2:30 p.m.	2024-01-2317	An advanced tire modeling methodology considering road roughness for chassis control system development Changsu Kim, Hyundai Motor Group; Alexander O'Neill, Carlo Lugaro, Siemens Digital Industries Software
3:00 p.m.		BREAK
3:30 p.m.	2024-01-2324	Vehicle Yaw Stability Model Predictive Control Strategy for Dynamic and Multi-Objective Requirements Hanlin Wang, Jian Wu, Zhicheng Chen, Rui He, Haiqiao Li, Jilin University
4:00 p.m.	2024-01-2315	A Novel Torque Distribution Approach of Four-Wheel Independent-Drive Electric Vehicles for Improving Handling and Energy Efficiency Jingyang Dou, Zixuan Chen, Yunqing Zhang, Jinglai Wu, Huazhong University of Science and Technology

Thursday, April 18

Thermal Management for Batteries and Battery Management - Part 2 of 2

Session Code HX1500

Room 320 Session 9:30 a.m.

This session covers the technical trends and innovations in battery and battery management system thermal management. This includes the key trends dealing with the thermal needs of battery and battery management systems including thermal management system optimization, packaging, and technology innovations to improve efficiency. Thermal management architecture for optimized performance and the latest means for mitigating battery thermal runaway are covered in this session.

Organizers - Marc LeDuc, SAE-I; Ronald Semel, Ford Motor Company; Bing Shuttlewood, General Motors Corporation; Gursaran Mathur, Highly-Marelli North America; Sowmya Jayaraman, General Motors LLC; Raj Ranganathan, Simerics Inc; Jeff Schlautman, General Motors LLC

Time	Paper No.	Title
9:30 a.m.	2024-01-2672	Review of Production Electric Vehicle Battery Thermal Management Systems and Experimental Testing of a Production Battery Module Lucia Ifunanya Uwalaka, Qi Yao, Phillip Kollmeyer, Ali Emadi, McMaster Automotive Research Centre
10:00 a.m.	2024-01-2671	Revolutionizing Battery Cooling: 2-Phase Immersion Cooling System for Thermoplastic Battery Enclosures Gero Mimberg, Kautex Textron GmbH & Co. KG; Moritz Lipperheide, Kautex Textron GmbH & Co KG
10:30 a.m.	2024-01-2675	Modeling the Impact of Thermal Management on Time and Space-Resolved Battery Degradation Rate Grigorios Koltsakis, Dimitrios Besinas, Apostolos Kanatas, Spyridon Spyridopoulos, Aristotle University of Thessaloniki; Zisis Lampropoulos, Odysseas Koutsokeras, EMISIA SA
11:00 a.m.	2024-01-2666	Numerical Investigation of a Single Cell (Li-Ion) Combined with Phase Change Material and Additives for Battery Thermal Management Durgesh Srivastav; Nagesh Devidas Patil; Pravesh Chandra Shukla, Indian Institute Of Technology Bhilai

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:40 PM

Thursday, April 18

CAD/CAM/CAE Technology - Part 2 of 3

Session Code SS101

Room 321 Session 9:30 a.m.

This session publishes papers and presentations advancing the knowledge in product design, manufacturing processes, and engineering analysis using the state-of-the-art computer technology. The scope includes such areas as CFD, manufacturing and assembly simulation, crash-worthiness, computational mechanics, mold flow, ride simulation, ergonomic design, NVH, reverse engineering, etc. Developments in numerical methods applicable to automotive engineering problems will also be considered.

Organizers - RANDY Gu, Oakland University; Shuxin Gu, Ford Motor Company; Gary Newton, VI-grade; Yu Teng, BAIC Motor Corporation, Ltd.; Chiranth Srinivasan, Simerics Inc; Xiyun Wang, Oakland University

Time	Paper No.	Title
9:30 a.m.	2024-01-2726	Mitigation of Underslung Engine Induced Rail Coach Floor Vibration Mukesh Kumar, Cummins India, Ltd
10:00 a.m.	2024-01-2740	CAE transfer path analysis and its accuracy evaluation using a validation method Ninad Pimpalkhare, Maruti Suzuki India, Ltd.; Shinei Mochizuki, Suzuki Motor Corporation
10:30 a.m.	2024-01-2732	Effect of Surface Roughness on Tribological and NVH Behaviour Brake System Gurumoorthy S, Naresh Bhimchand, FCA Engineering India Pvt., Ltd.; Alyssa Bourgeau, Yugandhar Bhumireddy, FCA US LLC
11:00 a.m.	2024-01-2727	Prediction of Air Generation in Engine Oil Pan by MPS and DEM Kenji Sato, Honda Motor Co., Ltd.; Junpei Takano, Fasotec Co., Ltd.
11:30 a.m.	2024-01-2733	Dynamic Simulation of Steering Crimp Ring Assembly Process using CAE and its Correlation with Testing Gavin Song, Michael Vlademar, Narayana Venugopal, Ford Motor Company

Planned by Automobile Body, Chassis, Safety, and Structures Activity / Ground Vehicle Advisory Group

Thursday, April 18

CAD/CAM/CAE Technology - Part 3 of 3

Session Code SS101

Room 321 Session 1:30 p.m.

This session publishes papers and presentations advancing the knowledge in product design, manufacturing processes, and engineering analysis using the state-of-the-art computer technology. The scope includes such areas as CFD, manufacturing and assembly simulation, crash-worthiness, computational mechanics, mold flow, ride simulation, ergonomic design, NVH, reverse engineering, etc. Developments in numerical methods applicable to automotive engineering problems will also be considered.

Organizers - RANDY Gu, Oakland University; Shuxin Gu, Ford Motor Company; Gary Newton, VI-grade; Yu Teng, BAIC Motor Corporation, Ltd.; Chiranth Srinivasan, Simerics Inc; Xiyun Wang, Oakland University

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:40 PM

Time	Paper No.	Title
1:30 p.m.	2024-01-2731	Iterative Aero-Structural Analysis of a Passenger Vehicle Wheel Liner Under Aero Loading Gurumoorthy Venkatraman, Vijayamuthan M, Rajaguru Durairaj, FCA Engineering India Pvt., Ltd.; Santiago Antonelli, Stellantis NV
2:00 p.m.	2024-01-2736	Effect of Secondary Dendrite Arm Spacing on Strength Behaviour of Automotive Alloy Wheel Gurumoorthy S, Karthick A, FCA Engineering India Pvt., Ltd.
2:30 p.m.	2024-01-2739	1D Modeling Approach for Prediction of Heat Transfer in Exhaust Aftertreatment System and Sensors Module Mukesh K Singh, Cummins India, Ltd.
3:00 p.m.		BREAK
3:30 p.m.	2024-01-2735	Development of simulation methodology to evaluate Leaf Spring strength and predict the Leaf Interface stresses and correlating with test Sritharkumar Balasubramani, Simulation Services; Suhas S Kangde, Durga Prasad Mohapatra, Ayyappadas M, Mahindra & Mahindra, Ltd.
4:00 p.m.	2024-01-2722	CEM based Optimization Approach for Effective Placement of Antenna Jeyavendeesh Kumar S; Abhay Siingh, Tata Consultancy Services Limited

Planned by Automobile Body, Chassis, Safety, and Structures Activity / Ground Vehicle Advisory Group

Thursday, April 18

Vehicle NVH CAE Analysis & Testing - Part 3 of 4

Session Code M212

Room 330 A Session 9:30 a.m.

This session covers the forefront NVH development in electrical vehicle, ICE vehicle and autonomous vehicle - numerical methods along with test correlation and optimization for NVH issues of full vehicle and vehicle subsystems. All structural components, subsystems and complete systems found in automotive vehicles will be considered. Topics include noise control materials, structure NVH, vibro-acoustics, wind noise and aeroacoustics, intake/exhaust noise and vehicle interior noise, sound quality etc.

Organizers - Farokh Kavarana, Nissan Technical Center NA; Gavin Song, Ford Motor Company; Mark Stebbins, GM; Wenlong Yang, General Motors LLC; Weiguo Zhang, Stellantis

Chairperson - Wenlong Yang, General Motors LLC; Weiguo Zhang, Stellantis; Mark Stebbins, GM; Gavin Song, Ford Motor Company

Time	Paper No.	Title
9:30 a.m.	2024-01-2340	Test and Simulation Model Based Vehicle Sound Auralization Sangyoung Park, Junmin Park, Hyundai Motor Group; Yeon June Kang, Jeongmin Nam, Seoul National University; Tom Dirickx, Vinícius Gonçalves, Siemens Digital Industries Software

WCX SAE World Congress Experience

Technical Session Schedule

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Time	Paper No.	Title
10:00 a.m.	2024-01-2349	Sound transmission loss through front of dash and instrument panel Wenlong Yang, Jamie Hamilton, Gang Yin, Kara Gordon, General Motors LLC
10:30 a.m.	2024-01-2342	Braking Judder Test and Simulation Analysis of Commercial Vehicle Dehui Huang, Kai Zhang, Jichao Sun, FAW Jiefang Qingdao Automobile Co., Ltd.; Wenbo Li, Kaikun Pei, Tongji University
11:00 a.m.	ORAL ONLY	Acoustic Source Reconstruction of a Commercial Generator Set using Inverse Pellicular Modes as Basis Functions Xin Yan, David Herrin, Univ. of Kentucky; Nikhil Ghaisas, Hexagon Manufacturing Intelligence

Thursday, April 18

Vehicle NVH CAE Analysis & Testing - Part 4 of 4

Session Code M212

Room 330 A Session 1:30 p.m.

This session covers the forefront NVH development in electrical vehicle, ICE vehicle and autonomous vehicle - numerical methods along with test correlation and optimization for NVH issues of full vehicle and vehicle subsystems. All structural components, subsystems and complete systems found in automotive vehicles will be considered. Topics include noise control materials, structure NVH, vibro-acoustics, wind noise and aeroacoustics, intake/exhaust noise and vehicle interior noise, sound quality etc.

Organizers - Farokh Kavarana, Nissan Technical Center NA; Pranab Saha, Kolano and Saha Engineers Inc.; Gavin Song, Ford Motor Company; Mark Stebbins, Wenlong Yang, General Motors LLC; Weiguo Zhang, Stellantis

Chairperson - Wenlong Yang, Mark Stebbins, General Motors LLC; Weiguo Zhang, Stellantis

Time	Paper No.	Title
1:30 p.m.	2024-01-2352	Assessing the Effects of Computational Model Parameters on Aerodynamic Noise Characteristics of a Heavy-Duty Diesel Engine Turbocharger Compressor at Full Operating Conditions Rong Huang, Jimin Ni, Qiwei Wang, Tongji University; Qi Yin, SAIC Motor
2:00 p.m.	2024-01-2339	Experimental Analysis on Noise and Vibration of Electric Drive System Focusing on Order Contribution Ratio Mingxin Jin, Shuguang Zuo, Tongji University; Lei Shi, SAIC Motor Corp., Ltd.; Qingshao Mao, Tongji University
2:30 p.m.	2024-01-2345	A 3D Computational Fluid Dynamics and Acoustics Simulation Approach for Noise Mitigation Prediction in Gerotor Pumps Salar Taghizadeh, Simerics Inc.; Kok Chian Ng, Jezrah Horen, Allison Transmission; Sujan Dhar, Simerics Inc.

WCX SAE World Congress Experience

Technical Session Schedule

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Thursday, April 18

Occupant Protection: Accident Reconstruction - Part 3 of 3

Session Code SS500

Room 330 B Session 9:30 a.m.

Presentations on new methods for analyzing bumper dive, fluid evidence and acceleration and speed profiles for right turning vehicles and everyday driving conditions. Calculating A and B stiffness coefficients. Validating Sun Systems in Blender, rectifying oblique aerial images and validating reality capture for pointcloud creation using sUAS imagery.

Organizers - Christopher Armstrong, Armstrong Forensic Reconstruction Corp.; Alan Asay, Asay Engineering; Dean Beaumont, TRL; Jarrod Carter, Origin Forensics LLC; Edward Fatzinger, Momentum Engineering Corp.; Nathan Rose, Explico Engineering Co.

Time	Paper No.	Title
9:30 a.m.	2024-01-2469	Front Bumper Dive During Maximum Braking of ABS-Equipped Vehicles Steven Young, Russell Gish, Gunter P. Siegmund, MEA Forensic Engineers & Scientists
10:00 a.m.	2024-01-2467	Analysis of Fluid Evidence on Various Vehicle Components Kevin Boysen, Chantal Parenteau, Daniel Toomey, Richard H. Gregg, Design Research Engineering
10:30 a.m.	2024-01-2472	Typical Acceleration and Speed Profiles for Right-Turn Maneuvers Based on SHRP2 Naturalistic Driving Data Thomas I. Flynn, Craig Wilkinson, Gunter P. Siegmund, MEA Forensic Engineers & Scientists
11:00 a.m.	2024-01-2480	Vehicle Accelerations Under Everyday Driving Conditions David Danaher, JS Held LLC; Drew Donaldson, Sean McDonough, Reece Cochran, J.S. Held LLC; Titus Reed, JSHeld
11:30 a.m.	2024-01-2473	Calculating A and B Stiffness Coefficients from NCAP Barrier Crash Test Utilizing Load Cell and Accelerometer Data Joseph Neal, Explico Engineering Co.; Matthew Lipscomb, Explico Enginnering Co.; Charles Funk, Explico Engineering Co.

Thursday, April 18

Occupant Protection: Event Data Recorders (EDR)

Session Code SS502

Room 330 B Session 1:30 p.m.

This session includes the latest research on Event Data Recorders (EDRs) equipped in light-duty vehicles including passenger vehicles, medium-duty vehicles, and Heavy Vehicle Event Data Recorders (HVEDR) found in medium- and heavy-duty trucks and buses. Emphasis is placed on the application, interpretation and use of EDRs and HVEDRs in the investigation of motor vehicle crashes.

Organizers - David Plant, D P Plant & Associates; John Sprague; John Christopher Steiner, Mecanica Scientific Svcs Corp.; Craig Wilkinson, MEA Forensic Engineers & Scientists

Time	Paper No.	Title

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:40 PM

Time	Paper No.	Title
1:30 p.m.	2024-01-2889	Simulation of Vehicle Speed Sensor Data for use in Heavy Vehicle Event Data Recorder Testing Matthew C. DiSogra, Charles Getz, Amit Patel, DELTA |v| Forensic Engineering; Wesley Grimes, Mecanica Scientific Svcs Corporation; David Plant, D P Plant & Associates; Greg Wilcoxson, Wilcoxson Consulting LLC
2:00 p.m.	2024-01-2893	An Evaluation of the Performance of the Bendix® Wingman® Fusion™ Collision Mitigation System in a 2017 Kenworth T680 Shawn Harrington, Nicholas Martin, Forensic Rock; Peter Leiss, Robson Forensic Inc
2:30 p.m.	2024-01-2890	Accuracy of Late Model EDR's in IIHS crash tests Richard Ruth, Ruth Consulting LLC; Charles King, J.S. Held LLC; Andrew Rich, Rich Consulting LLC; Hamed Sadrnia, Timothy D. Brown & Associates
3:00 p.m.		BREAK
3:30 p.m.	2024-01-2888	Analysis of the Event Data Recorder (EDR) Function of a GM Active Safety Control Module (EOCM3 LC) Cleve Bare, Red Hawk Reconstruction LLC; Jason Skiera, Brian Smyth, Exponent Inc.; Tommy Beetham, Donald Floyd, Winston Koo, Devin Newell, General Motors LLC
4:00 p.m.	2024-01-2892	Comparing Event Data Recorder Data (EDR) in Front/Rear Collisions from the Crash Investigation Sampling System (CISS) Database Ryan Fix, Craig Wilkinson, Gunter P. Siegmund, MEA Forensic Engineers & Scientists
4:30 p.m.	2024-01-2891	Study on a Method for Reconstructing Pre-Crash Situations Using Data of an Event Data Recorder and a Dashboard Camera Hideki Matsumura, Institute for Traffic Accident Research (ITARDA)/NTSEL; Motoki Sugiyama, Takekazu IWATA, Institute for Traffic Accident Research (ITARDA)

Planned by Occupant Protection Committee / Automobile Body, Chassis, Safety, and Structures Activity

Thursday, April 18

Motorcycle Safety Special Session

Session Code SS515

Room 331 A/B/C Session 9:30 a.m.

The Motorcycle Safety session presents research on motorcycle-friendly infrastructure, barrier testing, motorcycle safety technology such as ABS, AEB, and left-turn assistance, and general motorcycle technology. This includes restraint, communication, and protective equipment issues.

Organizers - Saeed Barbat, Ford Motor Company; Warren Hardy, VT Center for Injury Biomechanics

Presenters - Ronald Faller, Univ. of Nebraska-Lincoln; Cody Stolle, Midwest Roadside Safety Facility

Time	Paper No.	Title
	ORAL ONLY	Motorcycle Safety: Where Are We and How Can We Improve?

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Technical Session Schedule

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Time	Paper No.	Title
		.. TBD
	ORAL ONLY	Do Current Automatic Emergency Braking Systems Mitigate Rear-End Crashes Between Passenger Vehicles and Motorcycles David Kidd, Insurance Institute for Highway Safety
	ORAL ONLY	Current State of ABS and Motorcycle Stability Control and Advanced Rider Assistance Systems Brad Heiler, Robert Bosch LLC
	ORAL ONLY	Design and Evaluation of Roadside Safety Hardware to Address Motorcyclist Impacts .. TBD
	ORAL ONLY	Panel Discussion: Motorcycle Safey Moderators - Chiara Dobrovolny, Hill & Smith Inc. .. TBD

Planned by Body Engineering Committee / Automobile Body, Chassis, Safety, and Structures Activity

Thursday, April 18

Occupant Protection: Occupant Restraints (Air Bags, Seat Belts, Knee Bolsters, Child Seats, Etc)

Session Code SS504

Room 331 A/B/C Session 1:30 p.m.

Organizers - Mitesh J. Lalwala, General Motor GM; Julie Mansfield, Ohio State University; Scott Thomas; Chris Van Ee, Design Research Engineering

Time	Paper No.	Title
1:30 p.m.	2024-01-2751	Compatibility Between Vehicle Seating Environments and Load Legs on Child Restraint Systems (CRS) Julie Mansfield, The Ohio State University
2:00 p.m.	2024-01-2508	Vehicle Seat Occupancy Detection and Classification Using Capacitive Sensing Rahul Prasanna Kumar, Clemson University; David Melcher, Pietro Buttolo, Ford Motor Company; Yunyi Jia, Clemson University
2:30 p.m.	2024-01-2752	Analysis of Occupants by Seating Location, Restraint Use and Injury Risk in Tow-Away Crashes Chantal Parenteau, Roger Burnett, Design Research Engineering

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Technical Session Schedule

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Time	Paper No.	Title
3:00 p.m.		BREAK
3:30 p.m.	2024-01-2749	Effects of Anthropometry and Passive Restraint Deployment Timing on Occupant Metrics in Moderate-Severity Offset Frontal Collisions Amy Courtney, Exponent Inc.; Charles Crosby, Bruce Miller, Exponent Inc; Aaron Osterhout, James Walker, Carr Engineering Inc; Jonathon Gondek, Calspan Corporation
4:00 p.m.	2024-01-2750	Evaluation of the Full-Frontal Crash Regulation for the M1 Category of Vehicles from an Indian Perspective Pooja Mehta, Avinash Prasad, Aakash Srivastava, Pankaj Arora, Ashim Howlader, Maruti Suzuki India Ltd

Thursday, April 18

Material Characterization, Modeling & Multi-Discipline CAE Applications

Session Code M223

Room 338 Session 9:30 a.m.

Organizers - Ke An, Oak Ridge National Laboratory; Peiran Ding, Farasis Energy USA; Hamid Jahed, University of Waterloo; Fan Li, Yi Liu, Wenxin(Daniel) Qin, Qigui Wang, General Motors LLC; Xijia Wu, National Research Council Canada

Time	Paper No.	Title
1:30 p.m.	2024-01-2810	Simplify Design Modification by Accurate Thermal Simulation of Baking Oven André Skagius-Kallin, Farzad Kiani, Ernesto Monaco, Alexander Stadik, Mohammed Boraey, Muraleekrishnan Menon, Chong Peng, Dmitrii Panov, ESS Engineering Software Steyr
2:00 p.m.	2024-01-2811	Complexity Reduction of Damper Base Valve Design Based on Computational and Experimental Validation Paramesh Chintala, Hitachi Astemo Americas, Inc.; Joseph Oh, Hitachi America Ltd.; Markus Steeb, Shivanand Sankaran, Hitachi Astemo Americas, Inc.
2:30 p.m.	2024-01-2812	Long-Haul Truck Electrification: Challenge Evaluation and Potential Pathways Zhiming Gao, Oak Ridge National Laboratory
3:30 p.m.	2024-01-2813	Performance Calculation and Analysis of Engine Cooling Fan Based on Bidirectional Fluid Structure Coupling Yi Ming Guo, Xuefeng Jiang, Hubei Automotive Industries Institute; Xinling Wang, Yaolong Duan, Ningbo Xuelong Group Co., Ltd.; Wen-Bin Shangguan, South China University of Technology
4:00 p.m.	ORAL ONLY	Elevating Battery Manufacturing Quality with Electron Microscopy Alexander M. Sammut, Thermofisher

WCX SAE World Congress Experience

Technical Session Schedule

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Thursday, April 18

Vehicle Aerodynamics - Part 5 of 5

Session Code SS871

Room 353 Session 9:30 a.m.

Time	Paper No.	Title
9:30 a.m.	2024-01-2273	Introduction of the eGTU – an electric version of the Generic Truck Utility Aerodynamic Research Model Kevin Howard, Sheng Chen, Sayan Dobronsky, Zachary Kochanek, Shaun Skinner, Ford Motor Company
10:00 a.m.	2024-01-2521	Effect Of Cooling Airflow Intake Positioning On The Aerodynamics Of A Simplified Battery Electric Road Vehicle Avaneesh Upadhyaya, Simone Sebben, Chalmers University of Technology; Emil Willeson, Guglielmo Minelli, Volvo Car Corporation
10:30 a.m.	2024-01-2535	The Aerodynamic Development of the New BREZZA and FRONX Sukanta Dey, Devesh Bajpai, Chandan Kumar, Felix Regin, Maruti Suzuki India Ltd.
11:00 a.m.	2024-01-2536	Transient Aerodynamics Simulations of a Passenger Vehicle during Deployment of Rear Spoiler Nicolas Fougere, Michael DeMeo, Dassault Systemes Simulia Corporation; Henry Tuit Farquhar, Danilo Oliveira, Alexander Nastov, General Motors LLC
11:30 a.m.	2024-01-2537	Integrating simulation and test to develop the aerodynamics of the new Land Rover Defender Jehan Eliyas, Adrian P. Gaylard, Jaguar Land Rover Limited

Thursday, April 18

Automotive Engineering Testing and Test Methods - Part 2 of 3

Session Code M203

Room 355 Session 9:30 a.m.

M203 is for the presentation of new results, research developments, and applications related to test activities and methods employed in automotive engineering and research. Papers with an emphasis on the application of tests and test methods to automotive design and evaluation are highly encouraged. Papers with a research focus or come from other industries that may have a potential impact on automotive testing and test methods are also welcome.

Organizers - Darryl S. Taylor, Dana; Mikhail Temkin, Rivian Automotive; Liang Wang, Stellantis NV

Time	Paper No.	Title
9:30 a.m.	2024-01-2270	Development of Benchmarking Methods for Electric Vehicle Drive Units Ethan Schauer, Andrew Moskalik, John Kargul, Mark Stuhldreher, Karla Butters, Daniel Barba, U.S. Environmental Protection Agency; Joseph Drallmeier, Michael Gross, Southwest Research Institute

WCX SAE World Congress Experience

Technical Session Schedule

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Time	Paper No.	Title
10:00 a.m.	2024-01-2268	Development of a Driving Pedal Robot for Indoor Chassis Dynamometer Testing Daeyup Lee, Jeonghyun Park, Byeonghee Choi, Sungwoon Choi, Jimyeong Kang, Minkyoung Chae, Jongwoo Kim, Inha University; Jong Tae Lee, Jungwon Han, Yunsung Lim, Sangil Kwon, National Institute of Environmental Research
10:30 a.m.	ORAL ONLY	Real time testing of Motors used in Electric Vehicles and analyze its performance with fault detection using dq0 (reference frames) for sensor and sensorless systems. Srikrishna N.H., Tektronix
11:00 a.m.	2024-01-2271	Electrification and control of a 1:5 scale vehicle for automotive testing methodologies Angelo Domenico Vella, Luca Biondo, Antonio Tota, Alessandro Vigliani, Politecnico di Torino
11:30 a.m.	2024-01-2276	Data-Driven Estimation of Coastdown Road Load Yuvraj Singh, Adithya Jayakumar, Giorgio Rizzoni, The Ohio State University

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Thursday, April 18

Automotive Engineering Testing and Test Methods - Part 3 of 3

Session Code M203

Room 355 Session 1:30 p.m.

M203 is for the presentation of new results, research developments, and applications related to test activities and methods employed in automotive engineering and research. Papers with an emphasis on the application of tests and test methods to automotive design and evaluation are highly encouraged. Papers with a research focus or come from other industries that may have a potential impact on automotive testing and test methods are also welcome.

Organizers - Darryl S. Taylor, Dana; Mikhail Temkin, Rivian Automotive; Liang Wang, Stellantis NV

Time	Paper No.	Title
1:30 p.m.	2024-01-2269	Elucidation of Deteriorating Oil Consumption Mechanism Due to Piston Top Ring Groove Wear Kenta Yoshii, Katsuyuki Takahashi, Kenji Sato, Honda Motor Co., Ltd.; Hideshi Hitosughi, Fumihiro Nakada, Nippon Piston Ring Co., Ltd.
2:00 p.m.	ORAL ONLY	Digital transformation of NVH development with data science and flow visualization Daehun Song, Hojung Jeong, Hyunkeun Kim PhD, Hyundai
2:30 p.m.	ORAL ONLY	3 Rules for Traceable Testing Greg Clapp, Invensity Inc.

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:41 PM

Time	Paper No.	Title
3:00 p.m.	2024-01-2280	The Influence of Sample Geometry on the Mechanical Properties and Failure Mechanisms of 6111 Aluminum Alloy Tensile Specimens Zhongfang Gao, Oakland University; Xiaoming Chen, Novelis North America; Xiaowan Zheng, Lianxiang Yang, Oakland University

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Thursday, April 18

Vehicle Dynamics - Part 2 of 2

Session Code SS900

Room 356 Session 9:30 a.m.

This session is focused on vehicle dynamics and controls using modeling and simulation, and experimental analysis of ICE, BEV and Hybrid passenger cars, heavy trucks, and wheeled military vehicles. This session addresses active and passive safety systems affecting the yaw, pitch and roll of the vehicle; driving simulators and hardware-in-the-loop systems; suspension kinematics and compliance; steering dynamics, advanced active suspension technologies; and tire force and moment mechanics.

Organizers - Gary Heydinger, SEA, Ltd.; Giampiero Mastinu, POLITECNICO DI MILANO; Sughosh Rao, Transportation Research Center Inc.; Scott Zagorski, SEA, Ltd.; Jian Jun Zhu, Cruise Automation Inc.

Time	Paper No.	Title
9:30 a.m.	2024-01-2759	Implementation of a Driver-in-the-Loop Methodology for Virtual Development of Semi-Active Dampers Shraddhesh Rasal, Shivam Asthana, Vikraman Vellandi, Mahindra & Mahindra Ltd; Verónica Santos Arconada, Tenneco Automotive Ibérica; Guido Tosolin, IDIADA Automotive Technology SA
10:00 a.m.	2024-01-2763	Fourth Axle Steering Control of an 8x8 Scaled Electric Combat Vehicle Junwoo Kim, Ontario Tech. University; Glenn Vaz, Moustafa El-Gindy, Zeinab El-Sayegh, Ontario Tech University
10:30 a.m.	2024-01-2761	Compatibility between Handling Agility and Stability of Vehicle using Rear Wheel Steering with Dual-Link Actuators Jaeyong Park, Hyundai & Kia Corp.; Sungsoo Na, Korea University
11:00 a.m.	2024-01-2764	On the Investigation of Car Steady-State Cornering Equilibria and Drifting Giovanni Righetti, Elisabetta Binetti, Università di Padova; Ricardo Pinto de Castro, University of California - Merced; Roberto Lot, Matteo Massaro, Basilio Lenzo, Università di Padova
2:30 p.m.	ORAL ONLY	Development of target cascading method enhancing ride comfort in the electric vehicle Seungmin Kwon, Seungmin Kwon

Planned by Vehicle Dynamics Committee / Automobile Body, Chassis, Safety, and Structures Activity

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:41 PM

Thursday, April 18

SAE Sits Down with Doug Field for a Fireside Chat

Session Code LS301

Room Exhibit Hall Session 8:30 a.m.

SAE President, Carla Bailo sits down for an in-depth conversation with Doug Field Chief EV, Digital and Design Officer, Ford Motor Company on the issues impacting the automotive industry. Come hear Doug's nuanced perspective based on his extensive years of service working with leading mobility companies like Ford Motor Company, Tesla, Segway as well as Apple.

Time	Paper No.	Title
8:30 a.m.	ORAL ONLY	Fireside Chat
		Doug Field, Ford Motor Company

Thursday, April 18

Learning Lab - Day 3

Session Code LL300

Room Exhibit Hall Session 9:30 a.m.

Time	Paper No.	Title
10:00 a.m.	ORAL ONLY	Replacing Hardware with Software - The Future of TPMS
		Gregory Weber, NIRA Dynamics AB
10:30 a.m.	ORAL ONLY	Presentation
		.. TBD, UL Solutions
11:00 a.m.	ORAL ONLY	Hero Cars That Saved Their Companies
		Leonard Kata, (Retired) SAE Mobility History Committee
11:10 a.m.	ORAL ONLY	Gardner Automotive Diesels - Changing the Industry 1929 - 1989
		Howard Evans, Continental Automotive UK, Ltd.
11:40 a.m.	ORAL ONLY	Saving Studebaker: The Story of the Lark
		Robert Elton, SAE Mobility History Committee

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:41 PM

Time	Paper No.	Title
11:50 a.m.	ORAL ONLY	Q&A with Mobility History Committee Presenters
		Leonard Kata, (Retired); Howard Evans, Continental Automotive UK, Ltd.; Robert Elton, (Retired)
12:30 p.m.	ORAL ONLY	The Return of Mini Baja
		.. TBD, SAE Membership
1:00 p.m.	ORAL ONLY	Presentation
		.. TBD, SAE Membership

Thursday, April 18

In The Wake of J3400™ (NACS), Are Standards Still Needed?

Session Code LS302

Room Exhibit Hall Session 10:00 a.m.

If standards are critical to the success of industry, then what do standards organizations need from industry to maintain their importance? How has the speed of business changed expectations of standards.

Moderators - Andy Jeffers, (retired) General Motors

Panelists - Rebeca Delgado, Intel; James P. Flaharty, Toyota; Sarah Hipel, US Dept. of Energy; Robert Sheehan, US Dept. of Transportation; Christian Thiele, SAE International;

Thursday, April 18

Automobility 2025-2030: A Tier 1 Perspective

Session Code LS304

Room Exhibit Hall Session 1:00 p.m.

For Tier 1 suppliers, there has never been a greater time of both innovation and challenge in the automotive industry. Expectations from OEM's and those in the Tier 2 and Tier 3 group of suppliers are changing year-to-year and order-to-order. Everyone has a greater urgency to acquire market share in EV and AV markets and Tier 1's are in a key position. Changing consumer buying habits and a complex business environment in transition create challenges to the role the Tier 1 Supplier has in the success and return on investment for the entire supply chain. Come hear our panelist address these critical issues. Learn more about the Panelists

Moderators - Jason Stein, Flat Six Media LLC

Panelists - William Foy, Amazon Web Services; Harry Husted, BorgWarner; Patrick Lindemann, Schaeffler Group USA Inc.; Joe Palazzolo, Dana Inc.; Jörg Trampler, ZF;

Thursday, April 18

SAE EDGE™ Reports Knowledge Bar - Thursday, April 18

Session Code KB300

Room SAE EDGE Reports Knowledge Bar Session 10:00 a.m.

WCX SAE World Congress Experience

Technical Session Schedule

As of March 13, 2024 19:40:41 PM

Time	Paper No.	Title
10:00 a.m.	ORAL ONLY	What Do We Know About the Safety Impacts of Active Safety and Driving Automation Features? Contemporary vehicles are replete with technology, including features related to the dynamic driving task (DDT). Active Safety features assist the human driver intermittently and driving automation features take on some (or all) of the DDT away from the human driver. While promises abound, understanding the actual impacts to safety of both feature types is a key topic for automakers, governments, and the general public. Jeffrey Wishart, Science Foundation AZ/AZ Comm Authority
10:45 a.m.		Break
11:00 a.m.	ORAL ONLY	Presentation Andrea Strzelec, USCAR; John Kasab