WCX SAE World Congress Experience

Technical Session Schedule

As of March 16, 2023 19:49:43 PM

Tuesday, April 18

New CI & SI Engines and Components, Part 1

Session Code PFL510

Room 140 A Session 9:30 a.m.

This session covers topics regarding new CI and SI engines and components. This includes analytical, experimental, and computational studies covering hardware development as well as design and analysis techniques.

Organizers - Wei Chen, Borg Warner; Daniel Mather, Digital-Engines LLC; Jeffrey Naber, Michigan Technological Univ.; Andrea Strzelec, Andrea Strzelec, University of Wisconsin-Madison; Cinzia Tornatore, Italian National Research Council

Chairperson - Jeffrey Naber, Michigan Technological Univ.

Time	Paper No.	Title
9:30 a.m.	2023-01-0401	Combustion Experiments of Focusing Engine with Asymmetric Double-Piston System Leading to Relatively-Silent High Compression Ratios Ken Naitoh, Tomotaka Kobayashi, Satoshi Saba, Fumiya Kase, Ryui Matsuno, Riku Tanishima, Keidai Kawano, Waseda University
10:00 a.m.	2023-01-0398	Development of New V6 3.0 L Turbocharged and 3.5 L Naturally Aspirated Gasoline Direct Injection Engines Shotaro Taki, Yukio Konishi, Yuki Tomitani, Kazumasa Ishii, Akio Imakita, Satoshi Kawawa, Honda Motor Co., Ltd.
10:30 a.m.	2023-01-0397	The Hybrid IC Engine – Challenges of Hydrogen and E-Fuel Compatibility within Current Production Boundaries Wolfgang Schoeffmann, Paul Kapus, Mirko Plettenberg, Michael Howlett, AVL LIST GmbH
11:00 a.m.	2023-01-0400	New 2.0 L Inline 4-Cylinder Gasoline Direct Injection Engine Ryo Yamaguchi, Takeshi Egawa, Nobuhiro Ushio, Yuya Kasajima, Toshifumi Kondo, Honda Motor Co., Ltd.; Kenichiro Ikeya, Honda R&D Co., Ltd.
11:30 a.m.	2023-01-0399	The Be-Rex Engine-Generator: A Revolutionary Two-Stroke, Lightweight and Cost-Efficient Singular Unit Pim Bekking, Godfried Puts, Be-Rex B.V.; Martin Spiller, Isatec GmbH; Georgios Bikas, Technische Hochschule Nuernberg

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

Tuesday, April 18

New CI & SI Engines and Components, Part 2

Session Code PFL510

Room 140 A Session 1:30 p.m.

This session covers topics regarding new CI and SI engines and components. This includes analytical, experimental, and computational studies covering hardware development as well as design and analysis techniques.

Organizers - Wei Chen, Borg Warner; Daniel Mather, Digital-Engines LLC; Jeffrey Naber, Michigan Technological Univ.; Andrea Strzelec, Andrea Strzelec, University of Wisconsin-Madison; Cinzia Tornatore, Italian National Research Council

WCX SAE World Congress Experience

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Time	Paper No.	Title
1:30 p.m.	2023-01-0402	Experimental and Numerical Investigation of Hydrogen Injection and its Preliminary Impact on High Performance Engines Development Stefano Paltrinieri, Mattia Olcuire, Vito Calia, Fabio Mortellaro, Massimo Medda, Fabrizio Gullino, Ferrari SpA; Karl Georg Stapf, Jan Geiler, Paul Jochmann, Matthias Boee, Michael Lippisch, Robert Bosch GmbH; Claus Wundling, Bosch Engineering
2:00 p.m.	2023-01-0403	Development of a High-Pressure Fuel Injection System for Use with Propane-DME William De Ojeda, WM International Engineering; Simon (Haibao) Wu, Wm International Engineering
2:35 p.m.	2023-01-0404	Self-Cleaning EGR Valve for Current and Future Diesel Applications Nicola Fachechi, Stanadyne Corporation
3:00 p.m.		BREAK
3:30 p.m.	2023-01-0407	A Compact and Efficient Modular High Pressure Diesel Common Rail Pump Platform for Future Diesel Engine Applications Bradlee Stroia, Stanadyne Corporation
4:00 p.m.	2023-01-0408	Potential of a Hydrogen Fueled Opposed-Piston Four Stroke (OP4S) Engine Philip Zoldak, Julien Douvry-Rabjeau, Enginuity Power Systems; Antowan Zyada, Wayne State University

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

Tuesday, April 18

Powertrain Actuators and Sensors

Session Code PFL560

Room 140 B Session 1:30 p.m.

Topics cover actuator and sensor mechanisms, devices, and systems; and the impact and control of such actuation and sensing systems on Powertrain thermodynamics, combustion, fuel economy, emissions, and performance.

Organizers - Anand Nageswaran Bharath, Cummins Inc.; Sumanth Reddy Dadam, Ford Motor Company

Chairperson - Sumanth Reddy Dadam, Ford Motor Company

Time	Paper No.	Title
1:30 p.m.	2023-01-0434	A Comparison of Virtual Sensors for Combustion Parameter Prediction of Gas Engines Based on Knock Sensor Signals Achilles Kefalas, Graz University of Technology; Andreas Ofner, KNOW-CENTER GmbH; Stefan Posch, Gerhard Pirker, Clemens Gößnitzer, LEC GmbH; Bernhard Geiger, KNOW-CENTER GmbH; Andreas Wimmer, Graz University of Technology

WCX SAE World Congress Experience

Technical Session Schedule

As of March 16, 2023 19:49:44 PM

Time	Paper No.	Title
2:00 p.m.	2023-01-0435	Auto-Tuning PID Controller on Electromechanical Actuators Using Machine Learning Sandeep Saini, Vitesco Technologies USA LLC; Jorge Hernandez; Sameer Nayak, Vitesco Technologies USA LLC
3:00 p.m.		BREAK

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

Tuesday, April 18

Valvetrain, Including VVA

Session Code PFL570

Room 140 B Session 2:30 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, BorgWarner; David Rutledge, Cummins Inc.; Andrea Strzelec, University of Wisconsin-Madison

Chairperson - Scott Fisher, Stellantis NV; Timothy Kunz, BorgWarner

Time	Paper No.	Title
2:30 p.m.	2023-01-0436	New Cam Profile Design Approach, Analysis and Testing for Extreme High Efficiency Internal Combustion Engine Development Paolo Ortolani, Dolphin N2, Ltd.; Frank Nation, Dolphin N2 Ltd
3:00 p.m.	ORAL ONLY	Development of a variable valve actuation system for new generation heavy duty engines Matteo Magni, Streparava Spa
3:00 p.m.		BREAK

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

Tuesday, April 18

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

Session Code PFL580

Room 140 B Session 3:30 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.

Chairperson - Shakti Saurabh, Cummins Inc.

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Technical Session Schedule

As of March 16, 2023 19:49:45 PM

Time	Paper No.	Title
3:00 p.m.		BREAK
3:30 p.m.	2023-01-0439	Cast Iron Cylinder Blocks: Same Weight as Aluminum; Lower Emissions Steve Dawson, SinterCast Ltd.; Andre Ferrarese, Ralf Marquard, Tupy SA
4:00 p.m.	2023-01-0438	The Effect of Exhaust Emission Conditions and Coolant Temperature on the Composition of Exhaust Gas Recirculation Cooler Deposits Minato Tomuro, IPA, Ltd.; Kaustav Bhadra, Jason Hebert, Andre Boehman, University of Michigan

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

Tuesday, April 18

Combustion Control and Optimization

Session Code PFL280

Room 140 C Session 9:30 a.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 - Vincent Costanzo; Gabriele Di Blasio, Gabriele Di Blasio; Jaime Martin, Universitat Politecnica de Valencia; MICHAEL Prucka, Stellantis NV; Robert Prucka, Clemson Univ.; Riccardo Scarcelli, Argonne National Laboratory

Chairperson - MICHAEL Prucka, Stellantis NV

Time	Paper No.	Title
9:30 a.m.	2023-01-0291	Data-Driven Prediction of Key Combustion Parameters Based on an Intelligent Diesel Fuel Injector for Large Engine Applications Sven Warter, Christian Laubichler, Constantin Kiesling, Martin Kober, LEC GmbH; Andreas Wimmer, TU Graz; Marco Coppo, Danilo Laurenzano, Claudio Negri, OMT Torino SpA
10:00 a.m.	2023-01-0292	Non-Intrusive Accelerometer-Based Sensing of Start-Of-Combustion in Compression-Ignition Engines Mitchell Reisetter, Joshua Herzog, Eri Amezcua, University of Wisconsin-Madison; Kenneth Kim, Chol-Bum Kweon, DEVCOM Army Research Laboratory; David Rothamer, University of Wisconsin-Madison
10:30 a.m.	2023-01-0293	Active Plasma Probing for Lean Burn Flame Detection Linyan Wang, Xiao Yu, Binghao Cong, Univ of Windsor; Liguang Li, Tongji University; Guangyun Chen, ZHUZHOU TORCH SPARK PLUG CoLtd; Ming Zheng, Univ of Windsor
11:00 a.m.	2023-01-0294	Freevalve: Control and Optimization of Fully Variable Valvetrain-Enabled Combustion Strategies for Steady-State Part Load Performance and Transient Rise Times Abdelrahman W. M. Elmagdoub, IAAPS, University Of Bath; Urban Carlson, Freevalve AB; Mattias Halmearo, Koenigsegg Automotive AB; James Turner, KAUST; Chris Brace, Sam Akehurst, Nic Zhang, IAAPS, University Of Bath

WCX SAE World Congress Experience

Technical Session Schedule

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Planned by Engine Combustion / Energy and Propulsion Activity

Tuesday, April 18

Abnormal SI Combustion

Session Code PFL213

Room 140 C Session 1:30 p.m.

This session addresses abnormal SI combustion processes with a focus on spark knock and preignition (including low-speed, stochastic preignition on boosted engines). 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 - Alessandro D'Adamo, Universita di Modena e Reggio Emilia; Flavio Dal Forno Chuahy, Oak Ridge National Laboratory; Richard Davis, Michigan Technological Univ.; John O. Waldman, General Motors LLC

Chairperson - Alessandro D'Adamo, Universita di Modena e Reggio Emilia; John Waldman, General Motors LLC; Flavio Dal Forno Chuahy, Oak Ridge National Laboratory

Time	Paper No.	Title
1:30 p.m.	~~2023-01-0249~~ ORAL ONLY	Engine Operating Conditions, Fuel Property Effects, and Associated Fuel–Wall Interaction Dependencies of Stochastic Preignition Derek Splitter, Vicente Boronat Colomer, Sneha Neupane, William Partridge, Oak Ridge National Laboratory
2:00 p.m.	2023-01-0248	A New Methodology for Comparing Knock Mitigation Strategies and Their Stability Margin Robert Mitchell, Graham Conway, Yanyu Wang, Southwest Research Institute
2:30 p.m.	2023-01-0250	CFD-Based Assessment of the Effect of End-Gas Temperature Stratification on Acoustic Knock Generation in an Ultra-Lean Burn Spark Ignition Engine Tyler Strickland, Magnus Sjöberg, Sandia National Laboratories; Naoyoshi Matsubara, Koji Kitano, Kazuki Kaneko, Toyota Motor Corp
3:00 p.m.		BREAK
3:30 p.m.	2023-01-0251	Development of a Supercharged Octane Number and a Supercharged Octane Index Alexander Hoth, Christopher P. Kolodziej, Muhammad Waqas, Argonne National Laboratory; James Szybist, Oak Ridge National Laboratory; Scott A. Miers, Michigan Technological University
3:30 p.m.	2023-01-0252	Comparison of Water Dilution Effects on Spark-Ignition Engine Performance and Emissions using Hydrous Fuel Blends and Discrete Water Injection Alex Voris, Matthew Lundberg, Paulius Puzinauskas, Univ of Alabama
4:00 p.m.	ORAL ONLY	Fuel effects on the Onset of Knock and Intensity of Superknock at SPI-Relevant Engine Conditions Xin Yu, Aramco Research Center

Planned by Engine Combustion / Energy and Propulsion Activity

WCX SAE World Congress Experience

Technical Session Schedule

As of March 16, 2023 19:49:45 PM

Tuesday, April 18

Basic SI Combustion, Part 1

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, 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 - Richard Davis, Michigan Technological Univ.; Gabriele Di Blasio, CNR STEMS; Sid Gopujkar, Michigan Technological University; Justin Ketterer, General Motors LLC; Simona Silvia Merola, CNR STEMS; Cinzia Tornatore, Italian National Research Council

Chairperson - Justin Ketterer, John Waldman, General Motors LLC

Time	Paper No.	Title
9:30 a.m.	2023-01-0247	A Method to Reduce Cold Start Emissions while Shortening Fast Idle Catalyst Light-off Time Shengrong Zhu, HATCI Hyundai-Kia America Technical Ctr.; Jeffrey Hollowell, Kyoung-Pyo Ha, Nicholas Fantin, Mark Shirley, HATCI Hyundai-Kia America Technical Ctr
10:00 a.m.	2023-01-0244	Investigation of High Fuel Pressure and Multiple Injection to Reduce Engine Emission during Catalyst Light-Off Yashodeep Lonari, Hitachi America, Ltd.; Naoki Yoneya, Hitachi Ltd; Takao Miyake, Yasuo Namaizawa, Hitachi Astemo, Ltd.
10:30 a.m.	2023-01-0239	Ultra-High Fuel Pressure in GDI to Suppress Particulate Formation during Warming-Up and Load Transients Akichika Yamaguchi, DENSO Corporation; Johan Dillner, DENSO Sweden; Arjan Helmantel, Aurobay; Lucien Koopmans, Petter Dahlander, Chalmers Univ of Technology
11:00 a.m.	2023-01-0236	Effect of Split-Injection Strategies on Engine Performance and Emissions under Cold-Start Operation Gurneesh S. Jatana, Flavio Dal Forno Chuahy, James Szybist, Oak Ridge National Laboratory
11:30 a.m.	2023-01-0243	Impact of Thermal Barrier Coatings on Intake and Exhaust Valves in a Spark Ignition Engine John Gandolfo, Brian Gainey, Clemson University; Chen Jiang, Eric Jordan, Solution Spray Technologies LLC; Zoran Filipi, Benjamin Lawler, Clemson University

Planned by Engine Combustion / Energy and Propulsion Activity

Tuesday, April 18

Basic SI Combustion, Part 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, 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 - Richard Davis, Michigan Technological Univ.; Gabriele Di Blasio, CNR STEMS; Sid Gopujkar, Michigan Technological University; Justin Ketterer, General Motors LLC; Simona Silvia Merola, CNR STEMS; Cinzia Tornatore, Italian National Research Council

WCX SAE World Congress Experience

Technical Session Schedule

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Chairperson - Justin Ketterer, General Motors LLC; Richard Davis, Michigan Technological Univ

Time	Paper No.	Title
1:30 p.m.	2023-01-0240	Optical Investigation of Mixture Formation in a Hydrogen-Fueled Heavy-Duty Engine with Direct-Injection Judith Laichter, Sebastian A. Kaiser, University of Duisburg-Essen; Rajavasanth Rajasegar, Ales Srna, Sandia National Laboratories
2:00 p.m.	2023-01-0246	Increasing Engine Efficiency with Hydrogen Assisted Lean Burn Operation on a Small Bore, Long Stroke DISI Engine Erich Wenz, Peter Eilts, Technische Universität Braunschweig
2:30 p.m.	2023-01-0245	Performance, Combustion and Emissions Evaluation of Liquid Phase Port-Injected LPG on a Single Cylinder Heavy-Duty Spark Ignited Engine Toluwalase Fosudo, Tanmay Kar, Bret Windom, Jacob Schlagel, Daniel Olsen, Colorado State University
3:00 p.m.		BREAK
3:30 p.m.	2023-01-0238	Characterization of High-Tumble Flow Effects on Early Injection for a Lean-Burn Gasoline Engine James Richard MacDonald, Logan White, Isaac Ekoto, Lyle Pickett, Sandia National Laboratories; Heechang Oh, Donghee Han, Hyundai Motor Group
4:00 p.m.	2023-01-0235	Isolated Low Temperature Heat Release in Spark Ignition Engines Samuel White, Abdullah Bajwa, Felix Leach, University of Oxford
4:30 p.m.	ORAL ONLY	Improved correlations for the unstretched laminar flame properties of mixtures of air with iso-octane, and gasoline surrogates TRF86 and TRF70 Delong Li; Matthew Hall, Ron Matthews, Univ. of Texas-Austin

Planned by Engine Combustion / Energy and Propulsion Activity

Tuesday, April 18

Electric Motor & Power Electronics, Part 1

Session Code PFL740

Room 140 E 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 - Ted Bohn, Intercim LLC; Elana Chapman, General Motors LLC; Yilun Luo, General Motors; Saeed Siavoshani, Saeed Siavoshani, Eaton; Andrea Strzelec, University of Wisconsin-Madison; Hongming Xu, Birmingham Univ.

Chairperson - Yilun Luo, General Motors LLC

Time	Paper No.	Title

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Technical Session Schedule

As of March 16, 2023 19:49:45 PM

Time	Paper No.	Title
1:30 p.m.	ORAL ONLY	Benefits of Silicon Nitride Bearing Balls for High Voltage Traction Motors Stephen Pawlowski, CoorsTek Inc.
2:00 p.m.	ORAL ONLY	Design and test challenges of 800V powertrain architecture for Electric Vehicle Denis Solomon, Tektronix Inc.
2:30 p.m.	ORAL ONLY	Thermal and mechanical consideration for double side cooled power module for xEV Junhee Park, Hyundai Motors
3:00 p.m.		BREAK
3:30 p.m.	ORAL ONLY	High voltage line ripple rejection using high bandwidth DC/DC Haris Muhedinovic, Vicor Corporation; Ranya Badawi, General Motors
4:00 p.m.	ORAL ONLY	The transition to 800V Electric Vehicles: Bi-Directional Conversion of 800V to 400V Matthew Jenks, Vicor Corporation
4:30 p.m.	2023-01-0528	Development of Inverter Drive Unit for Battery Electric Vehicle Shimo Yuichi, TOYOTA MOTOR CORPORATION; Takao Kanzaki, Takashi Yanagi, TOYOTA MOTOR COPORATION; Yukio Goto, Takashi Kurihara, Masayoshi Kobayashi, DENSO CORPORATION

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

Tuesday, April 18

Life Cycle Analysis

Session Code PFL760

Room 140 F Session 9:30 a.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; Yi Ding; Hongming Xu, Birmingham Univ.; Saeed Siavoshani, Eaton; Elana Chapman, General Motors LLC; Andrea Strzelec, University of Wisconsin-Madison

Chairperson - Graham Conway, Southwest Research Institute

Time	Paper No.	Title

WCX SAE World Congress Experience

Technical Session Schedule

As of March 16, 2023 19:49:45 PM

Time	Paper No.	Title
9:30 a.m.	ORAL ONLY	A life-cycle analysis approach to showing the potential of renewable diesel for decarbonization Chris Bitsis, Southwest Research Institute
10:00 a.m.	2023-01-0554	Impact of the 2022 European Energy Crisis on its Transportation Decarbonization Ambition: Life Cycle Techno-Economic Analysis Antonio Garcia, Santiago Martinez, Javier Monsalve-Serrano, Shashwat Tripathi, Universitat Politecnica de Valencia
10:30 a.m.	2023-01-0555	Freevalve: A Comparative GWP Life Cycle Assessment of E-fuel Fully Variable Valvetrain-equipped Hybrid Electric Vehicles and Battery Electric Vehicles Abdelrahman W. M. Elmagdoub, Joris Simaitis, IAAPS, University Of Bath; Mattias Halmearo, Koenigsegg Automotive AB; Urban Carlson, Freevalve AB; James Turner, KAUST; Chris Brace, Sam Akehurst, Nic Zhang, IAAPS, University Of Bath

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

Tuesday, April 18

Advanced Fuel Cell Vehicle Applications, Part 1

Session Code PFL720

Room 140 F 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; Di Zhu, Ford Motor Company; Yi Ding; Rafael Lago Sari, Aramco Services Co.; Saeed Siavoshani, Eaton; Hongming Xu, Birmingham Univ.

Chairperson - Santhosh Gundlapally, Gamma Technologies LLC

Time	Paper No.	Title
1:30 p.m.	ORAL ONLY	Hydrogen Fuel Cell Electric Bus (FCEB) Evaluations in US Public Transit Service Matthew B. Post, Elizabeth Collins, National Renewable Energy Laboratory
2:00 p.m.	ORAL ONLY	H2@Rescue Fuel Cell Powered Emergency Vehicle Demonstration Nicholas Marcus Josefik, Carol Bailey, US Army Corps of Engineers ERDC-CERL
2:30 p.m.	2023-01-0489	Revisions of Modeling Scenario for Hydrogen Fueling Protocol under MC Multi Map Shigehiro Yamaguchi, Honda R&D Inc; Kiyoshi Handa, Honda R&D Inc.

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As of March 16, 2023 19:49:46 PM

Time	Paper No.	Title
3:00 p.m.		BREAK
3:30 p.m.	2023-01-0491	A Plug-In Hybrid Electric Vehicle Concept with Fuel Cell Range Extender for Urban Delivery Transport – Vehicle Application Tobias Stoll, Andre Kulzer, Hans-Juergen Berner, FKFS
4:00 p.m.	2023-01-0494	Systematic Development Approach for a Hybrid Electric Powertrain Using Fuel-Cell-in-the-Loop Test Methodology Christoph Steindl, Peter Hofmann, TU Wien
4:30 p.m.	2023-01-0487	Data processing and performance analysis of PEMFC stacks on urban-route buses Ruojing Zhang, Shanghai AI NEV Innovative Platform Co.; Haomin Zhu, Xiangyang Zhou, Weibo Zheng, Shanghai AI NEV Innovative Platform Co; Xiangmin Pan, SMVIC

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

Tuesday, April 18

Advanced Hybrid and Electric Vehicle Powertrains, Part 1

Session Code PFL710

Room 140 G Session 9:30 a.m.

This session covers new production and near-production hybrid propulsion, hybrid architecture, testing, analysis and new concepts.

Organizers - Norman Bucknor, Elana Chapman, General Motors LLC; Sumanth Reddy Dadam, Ford Motor Company; Michael Duoba, Argonne National Laboratory; Vivek Kumar, Ford Motor Co.; Saeed Siavoshani, Eaton; Hongming Xu, Birmingham Univ.

Chairperson - Norman Bucknor, General Motors LLC

Time	Paper No.	Title
9:30 a.m.	2023-01-0481	TREMEC gen1 EDU – Double The Power! Jannick De Landtsheere, TREMEC
10:00 a.m.	2023-01-0470	Development of e-AWD Hybrid System with Turbo Engine for SUVs Koichi Sasaki, Kensuke Kamichi, Manabu Ishimoto, Sei Kojima, Alistair Bridge, Noritaka Takebayashi, Toyota Motor Corporation
10:30 a.m.	2023-01-0477	Trade-offs and Opportunities to Improve Hybrid Vehicle Performance, Cost and Fuel Economy Through Better Component Technology and Sizing Daniela Nieto Prada, Ram Vijayagopal, Argonne National Laboratory; Vincent Costanzo, Formerly Aramco Research Center Detroit

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Time	Paper No.	Title
11:00 a.m.	2023-01-0485	Experimental Evaluation of VECTO Hybrid Electric Truck Simulations
		Evangelos Bitsanis, Stijn Broekaert, Alessandro Tansini, European Commission Joint Research Center; Dimitrios Savvidis, European Commission DG CLIMA; Georgios Fontaras, European Commission Joint Research Center
11:30 a.m.	2023-01-0486	Lowering Vehicle Powertrain Electrification Entry Cost Barrier
		Ugo Nwoke, Avotronics Powertrain Inc.

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

Tuesday, April 18

Advanced Hybrid and Electric Vehicle Powertrains, Part 2

Session Code PFL710

Room 140 G Session 1:30 p.m.

This session covers new production and near-production hybrid propulsion, hybrid architecture, testing, analysis and new concepts.

Organizers - Norman Bucknor, Elana Chapman, General Motors LLC; Sumanth Reddy Dadam, Ford Motor Company; Michael Duoba, Argonne National Laboratory; Vivek Kumar, Ford Motor Co.; Saeed Siavoshani, Eaton; Hongming Xu, Birmingham Univ.

Chairperson - Norman Bucknor, General Motors LLC

Time	Paper No.	Title
1:30 p.m.	2023-01-0484	Application of 48V Mild-Hybrid Technology for Meeting GHG and Low NOx Emission Regulations for MHD Vehicles
		Dhanraj Fnu, Oscar Bustamante, Satyum Joshi, Erik Koehler, Michael Franke, Dean Tomazic, FEV North America Inc
2:00 p.m.	2023-01-0479	Development of New Powertrain System for the Global Deployment of Hybrid Vehicles
		Katsunori Akiyama, Hiroyuki Murakami, ICHIRO INABA, Honda
2:30 p.m.	2023-01-0483	Development of Charging System for bZ4X
		Akito Motohira, Daisuke Tsutsumi, Toyota Motor Corporation
3:00 p.m.		BREAK
3:30 p.m.	ORAL ONLY	Experimental study of a battery electric truck under real world and regulatory conditions
		Stijn Broekaert, Evangelos Bitsanis, Georgios Fontaras, Joint Research Centre

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Technical Session Schedule

As of March 16, 2023 19:49:46 PM

Time	Paper No.	Title
4:00 p.m.	2023-01-0476	Verification and Validation for Modular Development Platforms
		Michael Leighton, AVL LIST GmbH; RAKESH RAY, AVL Technical Centre Pvt Ltd
4:30 p.m.	2023-01-0472	Commercial Vehicle - Drive Cycle Development and validation using GT Real Drive & 1D GT Suite Electric vehicle models
		Sparsh Saxena, Bharat Kudachi, Santhosh Pasupathi, Gerald Bergsieker, Isuzu Technical Center of America Inc

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

Tuesday, April 18

Advanced Battery Technologies, Part 1

Session Code PFL730

Room 141 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 - Elana Chapman, General Motors LLC; Curtis Collar, Nanotech Energy; Matilde D'Arpino, Ohio State University; Yi Ding; Santhosh Gundlapally, Gamma Technologies LLC; Xianke Lin, Ontario Tech. University; James Miller, Argonne National Laboratory; Satyam Panchal, Stellantis NV; Eugene Saltzberg; Saeed Siavoshani, Eaton; Hongming Xu, Birmingham Univ.; Di Zhu, Ford Motor Company

Chairperson - Matilde D'Arpino, Ohio State University

Time	Paper No.	Title
1:30 p.m.	2023-01-0521	Analytical Failure Modeling of Thermal Interface Material in High Voltage Battery Modules in Electric Vehicle Crash Scenario
		Sriram Seshadri, Tata Consultancy Services; Tejas bhavsar, General Motors LLC; Narayana R, Shivaprakash GH, Tata Consultancy Services
2:00 p.m.	2023-01-0509	Cylindrical Li-Ion Cell Crush CAE Capability in Automotive Application
		Tejas Bhavsar, General Motors LLC; Gaurav Kanvinde, Sriram Seshadri, Virupakshappa Lakkannavar, Tata Consultancy Services
2:30 p.m.	2023-01-0504	Performance Evaluation of Lithium-ion Batteries under Low-Pressure Conditions for Aviation Applications
		Faissal El Idrissi, Prashanth Ramesh, Center For Automotive Research; Matilde D'Arpino, Marcello Canova, Ohio State University
3:00 p.m.		BREAK
3:30 p.m.	2023-01-0520	Comparison of Representative Wet and Dry Fire Suppressants to Retard Fire Propagation in Lithium-Ion Modules Initiated by Overcharge Abuse
		Bapiraju Surampudi, Kevin Jones, Zachary Banks, Southwest Research Institute

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Time	Paper No.	Title
4:00 p.m.	2023-01-0510	Fractional Thermal Runaway Calorimetry: A Novel Tool to Assess Battery Thermal Runaway Energy May Yen, Artyom Kossolapov, Sergio Mendoza, Francesco Colella, Exponent Inc.
4:30 p.m.	ORAL ONLY	Evaluating the Safety of Li-ion Batteries Using their Distributed Time Constants: Theory and Experiments Damoon Soudbakhsh, Temple Univ.

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

Tuesday, April 18

Alternative and Advanced Fuels, Part 1

Session Code PFL330

Room 142 A 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; Elana Chapman, General Motors LLC; Elisa Toulson, Michigan State University; Cinzia Tornatore, Italian National Research Council; Derek Splitter, Oak Ridge National Laboratory; Vickey Kalaskar, Southwest Research Institute; George Karavalakis, University Of California Riverside; Andrew Ickes, Chevron

Chairperson - Brian Gainey, Clemson University

Time	Paper No.	Title
9:30 a.m.	2023-01-0319	Effect of Jet Ignition on Lean Methanol Combustion Using High Compression Ratio Anthony Harrington, Jonathan Hall, Mike Bassett, Adrian Cooper, MAHLE Powertrain, Ltd.
10:00 a.m.	2023-01-0335	Experimental Comparison of Diesel and Wet Ethanol on an Opposed-Piston Two Stroke (OP2S) Engine Brian Gainey, Ankur Bhatt, John Gandolfo, Kunal Vedpathak, Christopher Pearce, Clemson University; Fabien Redon, Achates Power Inc; Benjamin Lawler, Clemson University
10:30 a.m.	2023-01-0339	Experimental Investigation of Combustion Characteristics, Performance, and Emissions of a Spark Ignition Engine with 2nd Generation Bio-Gasoline and Ethanol Fuels Mohamed Mohamed, Brunel University; Hua Zhao; Anthony Harrington, Jonathan Hall, Mahle Powertrain Ltd
11:00 a.m.	2023-01-0326	Split Injection of High-Ethanol Content Fuels to Reduce Knock in Spark Ignition Brian Gainey, John Gandolfo, Mingyang Gao, Benjamin Lawler, Clemson University

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Technical Session Schedule

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Planned by Fuels and Lubricants / Energy and Propulsion Activity

Tuesday, April 18

Alternative and Advanced Fuels, Part 2

Session Code PFL330

Room 142 A 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 - Vickey Kalaskar, Southwest Research Institute; Elana Chapman, General Motors LLC; Elisa Toulson, Michigan State University; Cinzia Tornatore, Italian National Research Council; Derek Splitter, Oak Ridge National Laboratory; George Karavalakis, University Of California Riverside; Brian Gainey, Clemson University; Andrew Ickes, Chevron

Chairperson - Vickey Kalaskar, Southwest Research Institute

Time	Paper No.	Title
1:30 p.m.	2023-01-0329	NH_3 Impact on Combustion and Emission Characteristics of N-Heptane Flame M. Zuhaib Akram, Yangbo Deng, Dalian Maritime University; Muhammad Aziz, The University of Tokyo; Bingquan Ge, Hao Jiang, Dalian Maritime University
2:00 p.m.	ORAL ONLY	Ignition enhancement of liquid ammonia sprays under engine-relevant conditions via ambient hydrogen addition Ahmad Bakir, The University of Tennessee; Haiwen Ge, Texas Tech University; Peng Zhao, The University of Tennessee
2:30 p.m.	2023-01-0338	A Numerical Approach for the Analysis of Hydrotreated Vegetable Oil and Dimethoxy Methane Blends as Low-Carbon Alternative Fuel in Compression Ignition Engines Jose M Garcia-Oliver, Ricardo Novella, Universitat Politècnica de València, CMT; Dario Lopez Pintor, Sandia National Laboratories; Carlos Micó, Universitat Politècnica de València, CMT; Usama Bin-Khalid, Universitat Politecnica de Valencia, CMT
3:00 p.m.		BREAK
3:30 p.m.	ORAL ONLY	Application of Fast Pyrolysis Bio-Oil in a Diesel Genset Engine Yu Wang, Noud Maes, Bart Somers, Eindhoven University Of Technology
4:00 p.m.	2023-01-0318	Comparison and Evaluation of Engine Wear, Engine Performance, NOx Reduction and Nanoparticle Emission by using Gasoline, JP-8, Karanja Oil Methyl Ester Biodiesel, and Diesel in a Military 720 kW, Heavy-Duty CIDI Engine Applying EGR with Turbo Charging Anand Kumar Pandey, Symbiosis Institute Of Technology,SIU; Milankumar Nandgaonkar, College of Engineering Pune; Anil Varghese, C sonawane, Symbiosis Institute Of Technology,SIU; Ritesh Kohil, Army Base Workshp, Pune; Arundhati Warke, Symbiosis Institute of Technology, SIU
4:30 p.m.	2023-01-0336	Material Compatibility of Elastomers and Plastics in Gasoline- Ethanol-Methanol Blends Dr. Maya Chakradhar, A S Ramadhas, Prakash Shanti, P Raj Justin, Ajay Arora, M Maheshwari, Indian Oil Corporation Limited

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Technical Session Schedule

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Planned by Fuels and Lubricants / Energy and Propulsion Activity

Tuesday, April 18

Fuel and Additive Effects on Engine Systems

Session Code PFL310

Room 142 B 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 - Elana Chapman, General Motors LLC; Thomas Dubois, Total Acs; Antonino La Rocca, University of Nottingham; Toby Rockstroh, Argonne National Laboratory; Derek Splitter, Oak Ridge National Laboratory; James Turner, KAUST

Time	Paper No.	Title
9:30 a.m.	2023-01-0297	Diesel Particulate Filter Durability Performance Comparison Using Metals Doped B20 vs. Conventional Diesel Part I: Accelerated Ash Loading and DPF Performance Evaluation Venkata Lakkireddy, Southwest Research Institute; Robert L. McCormick, National Renewable Energy Laboratory; Phillip Weber, Southwest Research Institute; Steve Howell, MARC-IV Consulting
10:00 a.m.	2023-01-0296	Diesel Particulate Filter Durability Performance Comparison Using Metals Doped B20 vs. Conventional Diesel Part II: Chemical and Microscopic Characterization of Aged DPFs Venkata Lakkireddy, Southwest Research Institute; Robert L. McCormick, National Renewable Energy Laboratory; Phillip Weber, Southwest Research Institute; Steve Howell, MARC-IV Consulting
10:30 a.m.	2023-01-0298	Correlation of Detailed Hydrocarbon Analysis with Simulated Distillation of US Market Gasoline Samples and its Effect on the PEI-SimDis Equation of Calculated Vehicle Particulate Emissions Veronica Reilly, General Motors LLC; Sarah Goralski, General Motors; John Salyers, Pat Geng, Jon Dozier, General Motors LLC

Planned by Fuels and Lubricants / Energy and Propulsion Activity

Tuesday, April 18

Automotive Gasoline Engine Lubricants

Session Code PFL340

Room 142 B Session 1:30 p.m.

The industry continues to work on understanding the interaction of lubricating fluids with engine hardware in order to improve vehicle efficiency, durability, and performance. The Engine Lubricants Session presents a variety of papers dealing with advances in engine oils and their relationship to improved hardware performance.

Organizers - Ewa Bardasz; Richard Butcher, BP Castrol; Elana Chapman, General Motors LLC; Gerald Micklow, Florida Institute of Technology; Derek Splitter, Oak Ridge National Laboratory

Chairperson - Richard Butcher, BP Castrol

Time	Paper No.	Title

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Time	Paper No.	Title
1:30 p.m.	2023-01-0342	Real Time Observations of Water Entering and Leaving Internal Combustion Engine Oil, Over Both Standard Engine, ICE and Plug-in Hybrid, PHEV Dynamic Drive-Cycles Richard Butcher, Nathan Bradley, Timothy Powell, bp Castrol
2:00 p.m.	ORAL ONLY	Impact of boron-containing lubricant additives on performance and physicochemical properties of Pd-based TWC Dae-Kun Kim, University of Tennessee; Todd Toops, Oak Ridge National Laboratory; Ke Nguyen, The University of Tennessee; Michael Lance, Jun Qu, Oak Ridge National Laboratory
2:30 p.m.	ORAL ONLY	Measuring Engine Lubricant Degradation in Hybrid Electric Vehicles – How do we Ensure Corrosion Protection? David Growney, Lubrizol, Ltd.

Planned by Fuels and Lubricants / Energy and Propulsion Activity

Tuesday, April 18

Driveline Controls

Session Code PFL640

Room 142 C Session 9:30 a.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 Univ.; Zhe Xie, Stellantis NV

Chairperson - Hussein Dourra, Magna Global IT Canada; Dongxu Li, Paul Otanez, General Motors LLC

Time	Paper No.	Title
9:30 a.m.	2023-01-0454	Development of a Gear Backlash Compensator for Electric Machines in P0-P4 Parallel Hybrid Drivelines Vicente Capito, Pranay Ketineni, Center For Automotive Research; Shawn Midlam-Mohler, Ohio State University
10:00 a.m.	2023-01-0452	Sensorless Control of a Brushless Motor for the ESC Unit Hikaru Kawamura, Koichi Kokubo, Masayuki Naito, Takanori Iida, Atsushi Takahashi, ADVICS CO., LTD.; Tomoya Takahashi, DENSO CORPORATION
10:30 a.m.	2023-01-0453	Impact of Sampling Time, Actuation/measurement Delays and Controller Calibration on Closed-loop Frequency Response for Non-linear Systems Cristian Rostiti, FCA US LLC

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

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Tuesday, April 18

Driveline Components / Subsystems

Session Code PFL670

Room 142 C Session 1:30 p.m.

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

Organizers - Joel Gunderson, Chunhao Lee, Farzad Samie, General Motors LLC; Thomas Wellmann, FEV North America Inc.

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

Time	Paper No.	Title
1:30 p.m.	2023-01-0461	Power Loss Studies for Rolling Element Bearings Subject to Combined Radial and Axial Loading SEN Zhou, Avinash Singh, General Motors LLC; Ahmet Kahraman, Isaac Hong, Ohio State University; Kevin Vedera, General Motors LLC
2:00 p.m.	2023-01-0464	Drag Torque Analytical 3D Model Development for a Driveline System using a Probability Transformation Eric R Frenz, Carlos Martinez, Thomas Garvey, Jason Murtagh, Magna Powertrain USA Inc.
2:30 p.m.	2023-01-0463	Specialised Gear Rig for the Assessment of Loaded Transmission Error, Line of Action and Summarized Mesh Point Michael Leighton, AVL LIST GmbH; Marcell Surányi, Direct Line Kft.
3:00 p.m.		BREAK

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Tuesday, April 18

AWD/4WD/Driveline Components

Session Code PFL620

Room 142 C Session 3:30 p.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, FCA US LLC; Mark Levine, Stellantis NV; Bangalore Lingaraj Yashwanth, American Axle & Manufacturing Inc.

Chairperson - John Collins, Mark Levine, FCA US LLC; Bangalore Lingaraj Yashwanth, American Axle & Manufacturing

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

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Time	Paper No.	Title
3:30 p.m.	2023-01-0449	Integrated Analytical Approach for Electronic Locking Differential Systems
		Moogoondaraja Rangarajan, Ralph Ilunga, Nantu Roy, Yogesh Mehta, American Axle & Manufacturing Inc.
4:00 p.m.	2023-01-0448	Efficient Physics-Based System Level Thermal Management for Electric Drive Units using Reduced Order Modeling Techniques Assisted by Neural Networks
		Bangalore Lingaraj Yashwanth, American Axle & Manufacturing Inc.; Alexy Kolesnikov, Jeff Ronning, American Axle & Manufacturing
4:30 p.m.	2023-01-0451	Disconnect Actuator System for AWD EV's Driving system
		Sedong Yang, BongJoo Shin, Hyundai Transys Inc.; Moonsik Woo, Hyundai-Transys Inc.; Jongbae Ahn, Hyundai Transys Inc; Sangheon lee, Hyundai Transys Inc.; Yeonho Kim, Hyundai-Transys Inc.; Jongmoon Jung, Hyundai Motors Group

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

Tuesday, April 18

Learning from Nature: Biomimicry Advancing Automotive Material Innovations

Session Code M444

Room 250 A Session 9:30 a.m.

This session is designed to provide the audience a deeper understanding of how nature is being applied in various physical and chemical ways in order to improve automotive advancements for safety and energy efficiency.

Time	Paper No.	Title
9:30 a.m.	ORAL ONLY	Introduction and Overview of Biomimicry in Automotive
		Trisha Brown, Carol Thaler, Great Lakes Biomimicry
10:00 a.m.	ORAL ONLY	Learning from Nature to Tackle Adhesion and Traction in Wet and Icy Conditions
		This presentation will showcase research which describes how nature has developed strategies to improve adhesion and traction on wet and icy surfaces. Examples in nature such as geckos and mussels use various physical and chemical ways to improve adhesion and traction in presence of water. Polar bears interestingly use taller papillae to improve traction on snow. Presenter will address how these natural systems have inspired new materials.
		Ali Dhinojwala, Univ. of Akron; Carol Thaler, Great Lakes Biomimicry

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Time	Paper No.	Title
10:30 a.m.	ORAL ONLY	NASA's Bio-inspired Broadband Acoustic Absorber: Technology for Quieter Transportation NASA has patented bio-inspired acoustic absorbers that might be useful as multifunctional structures in a wide variety of aerospace, industrial, automotive, rail, and architectural noise control applications. Proof-of-concept tests indicate that synthetic structures that resemble bundles of natural reeds offer an increase in sound absorption at frequencies below 1000 Hz as compared to state-of-the-art commercially available structures of similar thickness and weight. L. Danielle Koch, NASA John Glenn Research Center
11:00 a.m.	ORAL ONLY	TBD .. TBD
11:30 a.m.	ORAL ONLY	Q&A with the Speakers Trisha Brown, Carol Thaler, Great Lakes Biomimicry; Ali Dhinojwala, Univ. of Akron

Tuesday, April 18

Occupant Protection for Vulnerable Passengers & Road Users

Session Code SS505

Room 250 A Session 1:30 p.m.

This session will focus on critical nature of protecting vulnerable child occupants through restraints(Air bags, Seat Belts, Knee Bolsters, Child Seats, etc.) as well as those outside the vehicle such as pedestrians and cyclist.

Organizers - Jason Forman, Univ. of Virginia; Ryan Gellner, General Motors LLC; Jason Kerrigan, Univ. of Virginia; Julie Mansfield, Ohio State University; Bingbing Nie, Tsinghua Univ.; David Poulard, C.E.E.S.A.R.; Scott Thomas, General Motors LLC; Chris A. Van Ee, Design Research Engineering

Time	Paper No.	Title
1:30 p.m.	2023-01-0787	A Data-Driven Framework of Crash Scenario Typology Development for Child Vulnerable Road Users in the U.S. Huizhong Guo, Zifei Wang, University of Michigan; Rini Sherony, Toyota Motor North America, Inc.; Shan Bao, University of Michigan
2:00 p.m.	2023-01-0786	Full-Scale Validation of Modified Pedestrian Dummy Hiroyuki Asanuma, Hyejin Bae, Hidetoshi Nakamura, Yasuaki Gunji, Honda R&D Co., Ltd.; Akiko Nagashima, Fumie Mori, Honda Techno Fort Co., Ltd.
2:30 p.m.	2023-01-0817	Comparison of Child Restraint System (CRS) Installation Methods and Misuse During Far-Side Impact Sled Testing Julie Mansfield, Ohio State University

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Technical Session Schedule

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

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

Tuesday, April 18

Design Optimization - Methods and Applications - Part 1

Session Code SS103

Room 250 B 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; Di Zhu, Ford Motor Company

Chairperson - Mallikarjuna Bennur, Vesna Savic, General Motors LLC

Time	Paper No.	Title
9:30 a.m.	2023-01-0023	Multi-Joint Topology Optimization: An Effective Approach for Practical Multi-Material Design Problems Tim Sirola, Andrew Hardman, Zane Morris, Yuhao Huang, Yifan Shi, Il Yong Kim, Queen's University; Manish Pamwar, Balbir Sangha, General Motors Canada Ltd.
10:00 a.m.	2023-01-0027	The Methodology of the System-Level Topology Optimization for Road Booming Noise Jong Ho Park, Kwang Hyeon Hwang, Hyundai Motors Namyang Institute
10:30 a.m.	2023-01-0029	Frequency-Constrained Multi-Material Topology Optimization: Commercial Solver Integrable Sensitivities Yuhao Huang, Zane Morris, Tim Sirola, Andrew Hardman, Yifan Shi, Il Yong Kim, Queen's University; Manish Pamwar, Balbir Sangha, General Motors Canada Ltd.
11:00 a.m.	2023-01-0030	Multi-Material Topology Optimization Considering Crashworthiness Andrew Hardman, Tim Sirola, Yuhao Huang, Zane Morris, Yifan Shi, Il Yong Kim, Queen's University; Manish Pamwar, Balbir Sangha, General Motors Canada Ltd.
11:30 a.m.	2023-01-0032	Topography Optimization of a Sheet Metal Assembly of Repetitive Features Paranthaman Krishnan, Valeo India Private Limited; Zane Yang, Valeo-Kapec

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WCX SAE World Congress Experience

Technical Session Schedule

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Tuesday, April 18

Design Optimization - Methods and Applications - Part 2

Session Code SS103

Room 250 B Session 1:30 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; Di Zhu, Ford Motor Company

Chairperson - Mallikarjuna Bennur, Vesna Savic, General Motors LLC

Time	Paper No.	Title
1:30 p.m.	2023-01-0026	Efficient Design of Automotive Structural Components via De-Homogenization Joel Najmon, Purdue University; Andres Tovar, IUPUI
2:00 p.m.	2023-01-0031	Multi-Objective Bayesian Optimization Supported by Deep Gaussian Processes Homero Valladares, Purdue University; Andres Tovar, IUPUI
2:30 p.m.	2023-01-0025	Differential Case Imbalance Calculation Using Monte Carlo Simulation Sanjib Chowdhury, Susheel Ravuri, Nantu Roy, Yogesh Mehta, American Axle & Manufacturing
3:00 p.m.		BREAK

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

Tuesday, April 18

Vehicle Aerodynamics: Commercial Vehicles

Session Code SS803

Room 250 C Session 9:30 a.m.

This collection of Vehicle Aerodynamics sessions are focused on the following topics: Commercial Vehicle Aerodynamics, Wheel and Tire Aerodynamics, Vehicle Aerodynamic Fundamentals, CFD Methods, Surface Contamination & Soiling, Experimental Technologies & Correlation, Platooning & Vehicle Interactions, and Aerodynamic Development.

Organizers - Edward Duell, Jacobs; Chen Fu, Rivian Automotive LLC; Timo Kuthada, FKFS; Kurt Zielinski, American Honda Motor Co. Inc.

Time	Paper No.	Title
9:30 a.m.	2023-01-0919	The Influence of Traffic Wakes on the Aerodynamic Performance of Heavy Duty Vehicles Brian McAuliffe, Hali Barber, Faegheh Ghorbanishohrat, National Research Council Canada

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Time	Paper No.	Title
10:00 a.m.	ORAL ONLY	Reynolds Equivalent Rolling Road 1/3 Scale Tractor-Trailer Wind Tunnel Model Ben Brady, Pratt Miller Engineering

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

Tuesday, April 18

Vehicle Aerodynamics: Wheel & Tire

Session Code SS805

Room 250 C Session 10:30 a.m.

This collection of Vehicle Aerodynamics sessions are focused on the following topics: Commercial Vehicle Aerodynamics, Wheel and Tire Aerodynamics, Vehicle Aerodynamic Fundamentals, CFD Methods, Surface Contamination & Soiling, Experimental Technologies & Correlation, Platooning & Vehicle Interactions, and Aerodynamic Development.

Organizers - Arturo Guzman, FCA US LLC; Taeyoung Han, General Motors LLC; Timo Kuthada, Felix Wittmeier, FKFS; Kurt Zielinski, American Honda Motor Co. Inc.

Time	Paper No.	Title
10:30 a.m.	2023-01-0843	Accurate Automotive Spinning Wheel Predictions Via Deformed Treaded Tire on a Full Vehicle Compared to Full Width Moving Belt Wind Tunnel Results Khaled Sbeih, Arturo Guzman, FCA US LLC; David Barrera Garcia, FCA Mexico S.A. de C.V.; Nicolas Fougere, Dassault Systemes Simulia Corp.; Sam Jeyasingham, FCA US LLC; Richard Shock, Mehdi Mortazawy, Michael DeMeo, Dassault Systemes Simulia Corp.
11:00 a.m.	2023-01-0842	Influence of Wheel Wake on Vehicle Aerodynamics: An Eddy-Resolving Simulation Study Louis Krüger, Ivan Joksimovic, Technical University of Darmstadt; Sebastian Wegt, Focused Energy GmbH; Johannes Burgbacher, Timo Kuthada, Felix Wittmeier, FKFS; Jeanette Hussong, Technical Univeristy of Darmstadt; Andreas Wagner, FKFS; Suad Jakirlic, Technical University of Darmstadt
11:30 a.m.	2023-01-0844	Assessment of Actuator Line and Rotor Disk as Alternative Approaches for the Numerical Simulation of Rotating Wheels Federico Evangelista, Francesco Fabio Semeraro, Paolo Schito, Politecnico di Milano

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

Tuesday, April 18

Vehicle Aerodynamics: Fundamentals

Session Code SS800

Room 250 C Session 1:30 p.m.

This collection of Vehicle Aerodynamics sessions are focused on the following topics: Commercial Vehicle Aerodynamics, Wheel and Tire Aerodynamics, Vehicle Aerodynamic Fundamentals, CFD Methods, Surface Contamination & Soiling, Experimental Technologies & Correlation, Platooning & Vehicle Interactions, and Aerodynamic Development.

Organizers - Edward Duell, Jacobs; Naethan Eagles, TotalSim LLC; Chen Fu, Rivian Automotive LLC; Adrian P. Gaylard, Jaguar Land Rover Limited; Mark Gleason, Gleason Aero LLC; Arturo Guzman, FCA US

LLC; Taeyoung Han, General Motors LLC; Jonathan Jilesen, Dassault Systemes; Bahram Khalighi, General Motors LLC; John Komar, Ace Climatic Aerodynamic Wind Tunnel; Timo Kuthada, FKFS; Raymond Leto, TotalSim LLC; Todd Lounsberry, Stellantis NV; Nicholas Oettle, Jaguar Land Rover; Frederick Ross, TBD; Sivapalan Senthooran, Dassault Systemes; David Sims-Williams, Durham Univ.; Arpit Tiwari, Gamma Technologies LLC; Mesbah Uddin, Univ. of North Carolina; H. Robert (Bob) Welge, Retired; Felix Wittmeier, FKFS; Kurt Zielinski, American Honda Motor Co. Inc.; Jeffrey Bordner, General Motors LLC

Time	Paper No.	Title
1:30 p.m.	2023-01-0015	Research on the Automobile Aerodynamic Field at the Politecnico di Torino in the Second Half of the Twentieth Century Patrizio Nuccio
2:00 p.m.	2023-01-0016	Using Multi-Fidelity Turbulence Modelling Approaches to Analyse DrivAer External Aerodynamics Peter Altmann, Giorgio Giangaspero, Marian Zastawny, Simone Landi, Sylvain Lardeau, Siemens Digital Industries Software; Michael Mays, Imperial College London
2:30 p.m.	2023-01-0017	Vortex Drag Revisited Jeff Howell, Daniel Butcher, Loughborough University; Geoffrey Le Good, G L Aerodynamics, Ltd.
3:00 p.m.		BREAK

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

Tuesday, April 18

Vehicle Aerodynamics: CFD Methods

Session Code SS802

Room 250 C Session 3:30 p.m.

This collection of Vehicle Aerodynamics sessions are focused on the following topics: Commercial Vehicle Aerodynamics, Wheel and Tire Aerodynamics, Vehicle Aerodynamic Fundamentals, CFD Methods, Surface Contamination & Soiling, Experimental Technologies & Correlation, Platooning & Vehicle Interactions, and Aerodynamic Development.

Organizers - Naethan Eagles, TotalSim LLC; Taeyoung Han, General Motors LLC; Timo Kuthada, FKFS; Frederick Ross, Siemens; Kurt Zielinski, American Honda Motor Co. Inc.

Time	Paper No.	Title
3:30 p.m.	2023-01-0560	Early Stage Vehicle Aerodynamics Development using a GPU based LBM CFD Solver Mehdi Mortazawy, Mukul Rao, Jonathan Jilesen, Dalon Work, Richard Shock, Dassault Systemes Simulia Corp.
4:00 p.m.	2023-01-0562	Tuning of Turbulence Model Closure Coefficients Using an Explainability Based Machine Learning Algorithm Charles Patrick Bounds, Mesbah Uddin, Shishir Desai, University of North Carolina Charlotte
4:30 p.m.	2023-01-0561	Scale-Resolving Simulations Combined with the Immersed Boundary Method for Predicting Car Aerodynamics

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Time	Paper No.	Title
		Branislav Basara, Zoran Pavlovic, Zoran Zunic, AVL LIST GmbH; Aleksandar Jemcov, Notre Dame University; Sanjin Saric, AVL LIST GmbH

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

Tuesday, April 18

Reliability and Robust Design in Automotive Engineering

Session Code IDM100

Room 251 A Session 9:30 a.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, FCA US LLC; Paul Lubinski, Thermo King Corp.; Zissimos Mourelatos, Vijitashwa Pandey, Oakland University

Time	Paper No.	Title
9:30 a.m.	ORAL ONLY	A Dynamic Ensemble of NARX Models for Mobility Prediction of Off-Road Ground Vehicles Yixuan Liu, University of Michigan
10:00 a.m.	2023-01-0088	Topological Data Analysis for Navigation in Unstructured Environments Calahan Mollan, Vijitashwa Pandey, Amith Pinapala, Oakland University
10:30 a.m.	2023-01-0087	The Potential of Data-Driven Engineering Models: An Analysis Across Domains in the Automotive Development Process Julian Knödler, Christian Könen, Philip Muhl, Porsche AG; Thomas Rudolf, Porsche Engineering Services GmbH; Eric Sax, FZI Research Center for Information Technologies; Hans-Christian Reuss, University of Stuttgart; Lutz Eckstein, RWTH Aachen University; Sören Hohmann, KIT Karlsruhe Institute of Technology
11:00 a.m.	2023-01-0084	Nested Vs. Non-Nested Sampling: Definition of an Infilling Strategy for Multi-Fidelity Bayesian Optimization Based on Data Correlation Piero Favaretti, University of Trieste BSH GmbH
11:30 a.m.	2023-01-0083	A Subdomain Approach for Uncertainty Quantification of Long Time Horizon Random Processes Onkar Mande, Zissimos Mourelatos, Dimitrios Papadimitriou, Oakland University

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Tuesday, April 18

Electric Vehicle Drivetrain Dynamics

Session Code SS901

Room 251 A 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, Ideas & Motion; Valentin Ivanov, TU Ilmenau

Time	Paper No.	Title
1:30 p.m.	2023-01-0563	Optimal Torque-Vectoring Control Strategy for Energy Efficiency and Vehicle Dynamic Improvement of Battery Electric Vehicles with Multiple Motors Raffaele Manca, Luis MIguel Castellanos Molina, Shailesh Hegde, Andrea Tonoli, Nicola Amati, Politecnico di Torino; Luigi Pazienza, Silk Sports Car Company Srl
2:00 p.m.	2023-01-0565	Motor Level Torque Ripple Requirement Development for Vehicle Seat Track Acceleration Xing Xing, Colin Hebert, Robert Morris, General Motors LLC
2:30 p.m.	ORAL ONLY	Activity Data of Zero and Near-Zero Port-Related Equipment and Vehicles Tom Durbin, University Of California Riverside; Chas Frederickson, Univ of California-Riverside; Chengguo Li; Kent Johnson, George Scora, Univ of California-Riverside; Kanok Boriboonsomsin, University Of California Riverside; Wayne Miller, Univ of California-Riverside
3:00 p.m.		BREAK

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

Tuesday, April 18

Steering and Suspension Technology Symposium

Session Code SS600

Room 251 A Session 3:30 p.m.

The purpose of this session is to provide a forum for presentations on 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 steering systems, as well as integration of the aforementioned in to drivers assistance and autonomous vehicle systems.

Organizers - Mahmoud Abdelfatah, Mobis North America LLC; Robert Ackley, Ford Motor Company; Timothy Drotar, Stellantis

Chairperson - Mahmoud Abdelfatah, Hitachi, Ltd.; Robert Ackley, Ford Motor Company; Timothy Drotar, Stellantis

Time	Paper No.	Title
3:30 p.m.	2023-01-0638	Target Driven Bushing Design for Wheel Suspension Concept Development

WCX SAE World Congress Experience

Technical Session Schedule

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Time	Paper No.	Title
		Akshay Naik, Tobias Brandin, Yansong Huang, Volvo Car Corporation; Bengt Jacobson, Chalmers University of Technology
4:00 p.m.	2023-01-0642	A Study on the Correlation between Fallback Torque and Controllability of Steer-by-Wire System
		Dohwan Kim, Taeyun Koo, Seongguen Cho, Seongho Ham, Seokil Hong, Taewan Byun, Mando Corp.

Planned by Steering and Suspension Committee / Automobile Body, Chassis, Safety, and Structures

Tuesday, April 18

Panel Discussion: Military Vehicles Electrification

Session Code PFL799

Room 251 B Session 9:30 a.m.

Organizers - Yi Ding, US Army DEVCOM GVSC; Eugene Saltzberg, University of Detroit Mercy; Saeed Siavoshani, Eaton; Hongming Xu, Birmingham Univ.

Moderators - Peter Schihl, US Army

Panelists - Aric Haynes, US Army DEVCOM GVSC; John Kelly, GDLS; Dean McGrew, US Army; John Putrus, US Army Detroit Arsenal; Chad Smith, Oshkosh Corporation;

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

Tuesday, April 18

Military Ground Vehicles - Part 1

Session Code MIL400

Room 251 B 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. Part 2 includes presentations on testing courses, drive cycles, vehicle maneuvers, and powertrain electrification.

Organizers - Matthew P. Castanier, David J. Gorsich, Vamshi Korivi, Denise M. Rizzo, Michael Tess, US Army DEVCOM GVSC

Chairperson - Denise Rizzo, Matt Castanier, US Army DEVCOM GVSC

Time	Paper No.	Title
1:30 p.m.	2023-01-0114	A Standard Set of Courses to Assess the Quality of Driving Off-Road Combat Vehicles
		Paul Green, University of Michigan
2:00 p.m.	2023-01-0115	Synthesis of Statistically Representative Driving Cycle for Tracked Vehicles
		Daniel Egan, Anirudh Sundar, Asit Kumar, Qilun Zhu, Robert Prucka, Zoran Filipi, Clemson University; Morgan Barron, Miriam Figueroa-Santos PhD, Matthew Castanier, US Army DEVCOM GVSC

WCX SAE World Congress Experience

Technical Session Schedule

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Time	Paper No.	Title
2:30 p.m.	2023-01-0101	Analysis of Geo-Location Data to Determine Combat Vehicle Idling Times Vikram Mittal, Brandon Lawrence, Andrew Rodriguez, Paul Evangelista, Brian Novoselich, US Military Academy
3:00 p.m.		BREAK
3:30 p.m.	2023-01-0108	Military Unmanned Ground Vehicle Maneuver: A Review and Formulation Jordan A. Whitson, University of Alabama Birmingham; David Gorsich, US Army CCDC GVSC; Vladimir V. Vantsevich, Worcester Polytechnic Institute; Michael Letherwood, Oleg Sapunkov, US Army CCDC GVSC; Lee Moradi, Worcester Polytechnic Institute
4:00 p.m.	2023-01-0119	Modeling and Analysis of Fully Electric and Hydrogen-Powered Bradley Fighting Vehicles Vikram Mittal, US Military Academy; Miriam Figueroa-Santos, US Army DEVCOM GVSC
4:30 p.m.	ORAL ONLY	Practical Investigation of a Parallel Through the Road Hybrid Vehicle System: Fuel Economy and Range Testing Dan Jakiela

Planned by Integrated Design and Manufacturing Activity / Ground Vehicle Advisory Group

Tuesday, April 18

Foundations of Automobile Electronics: Cybersecurity - Part 1

Session Code AE302

Room 251 C Session 9:30 a.m.

This session focuses on cybersecurity for cyber-physical vehicle systems. Topics include: design, development and implementation of security-critical cyber-physical vehicle systems, cybersecurity design, development, and implementation strategies, analysis methodologies, process and life-cycle management, comparisons of system safety and cybersecurity, etc. Application areas include: security-critical automotive systems as well as other security-critical ground vehicle and aviation systems.

Organizers - Amit Choudhury, Visteon Corp.; Sumanth Reddy Dadam, Ford Motor Company; John Krzeszewski, Eaton; Christopher Lupini, ETAS Inc; Mark Monohon, DG Technologies; Mert D. Pese, Clemson University; Mark Pope, DG Technologies

Chairperson - John Krzeszewski, Eaton; Christopher Lupini, ETAS Inc.; Mark Monohon, DG Technologies; Mert D. Pese, Clemson University; Mark Pope, DG Technologies

Time	Paper No.	Title
9:30 a.m.	2023-01-0035	Cybersecurity by Agile Design Bill Mazzara; Yuanbo Guo, Vultara Inc.
10:10 a.m.	2023-01-0036	Digital-Twin-Based Approaches and Applications for Improving Automotive Cybersecurity in Different Lifecycle Stages Jinghua Yu, Zeru Lou, TICPSH; Hongxing Hu, China Automotive Innovation Corporation; Geguang Pu, TICPSH; Mingsong Chen, East China Normal University

WCX SAE World Congress Experience

Technical Session Schedule

As of March 16, 2023 19:49:48 PM

Time	Paper No.	Title
10:30 a.m.	2023-01-0042	A Novel Method for Secure Odometer in Automotive Systems
		Asadullah Ansari, Harman International India Pvt Ltd.; Karthik P.C., PCKarthik; Sharath D H, Harman International India Pvt. Ltd.; Dhanasekaran Devarasu, Harman International Industries Inc.
11:00 a.m.	2023-01-0043	Protection of Firewall Rules Using Secure Storage for the Infotainment System
		Sreedhar Reddy Pacharla, Pavan Kumar Prasad, Suryansh Vimlendra, Saurav Varshney, Vishal Tiwari, Harman International India Pvt. Ltd.
11:30 a.m.	ORAL ONLY	Improvements to Threat Analysis and Risk Assessment (TARA)
		Chad Childers, Privafy Inc.

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Tuesday, April 18

Foundations of Automobile Electronics: Cybersecurity - Part 2

Session Code AE302

Room 251 C Session 1:30 p.m.

This session focuses on cybersecurity for cyber-physical vehicle systems. Topics include: design, development and implementation of security-critical cyber-physical vehicle systems, cybersecurity design, development, and implementation strategies, analysis methodologies, process and life-cycle management, comparisons of system safety and cybersecurity, etc. Application areas include: security-critical automotive systems as well as other security-critical ground vehicle and aviation systems.

Organizers - Amit Choudhury, Robert Bosch; Sumanth Reddy Dadam, Ford Motor Company; John Krzeszewski, Eaton; Christopher Lupini, ETAS Inc.; Mark Monohon, DG Tech; Mert D. Pese, Clemson University; Mark Pope, DG Tech

Chairperson - John Krzeszewski, Eaton; Christopher Lupini, ETAS Inc.; Mark Monohon, DG Technologies; Mert D. Pese, Clemson University; Mark Pope, DG Technologies

Time	Paper No.	Title
1:30 p.m.	2023-01-0038	Hardware-Based Cyber Security for Connected Vehicles
		Lee Harrison, James Pickford, Siemens Digital Industries Software
2:00 p.m.	2023-01-0037	A First Look at Android Automotive Privacy
		Mert D. Pese, Clemson University
2:30 p.m.	ORAL ONLY	Advanced Day-Zero Secure Automotive Module Provisioning
		Chad Childers, Privafy Inc.
3:00 p.m.		BREAK

WCX SAE World Congress Experience

Technical Session Schedule

As of March 16, 2023 19:49:48 PM

Time	Paper No.	Title
3:30 p.m.	2023-01-0034	Vehicle Diagnostics Adapter Cybersecurity Concerns with Wireless Connectivity Edward Larson, Wyatt Ford, Sam Lerner, Red Balloon Security Inc.; Jeremy Daily, Colorado State University
4:00 p.m.	ORAL ONLY	Cyber Security Recommendations for Event Data Recorder (EDR) Data Extraction Tools Mark Zachos, DG Technologies
4:30 p.m.	2023-01-0044	An Intrusion Detection System Based on the Double-Decision-Tree Method for In-Vehicle Network Bowen Wang, Yuance Zhang, TICPSH; Zhaojing Zhang, Tongji University; Hongxing Hu, China Automotive Innovation Corporation; Geguang Pu, TICPSH

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Tuesday, April 18

Vehicle Internet of Things

Session Code IOT100

Room 252 A 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.; Jacques Fluet, Telecommunications Industry Association; Partha Goswami, General Motors LLC; Jan-Mou Li, Metropolitan Washington Council of Gover; Raj Paul, Microsoft Corporation

Chairperson - Sumit Bhargava, Mahle Aftermarket Inc.; Partha Goswami, General Motors LLC; Raj Paul, Microsoft Corporation

Time	Paper No.	Title
9:30 a.m.	ORAL ONLY	How is VIOT Impacting Automotive Sumit Bhargava, Mahle Aftermarket Inc.; Partha Goswami, General Motors LLC; Raj Paul, Microsoft Corporation
10:00 a.m.	ORAL ONLY	The Future of Standards-Based, Data-Driven Vehicle Services Steve Crumb, AUTOSAR
10:30 a.m.	ORAL ONLY	The Edge Enablement Platform Kyle Taylor, Luxoft; James Simon, Amazon
11:00 a.m.	2023-01-0049	On-Road Real-Time Hyper-Local Air Quality Monitoring Based on Mobile IoT Enabled by a Network of Vehicles Equipped with Air Quality Sensors

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Technical Session Schedule

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Time	Paper No.	Title
		Heejung Jung, University of California Riverside; Herve Borrel, Paolo Taddonio, Airlib
11:30 a.m.	2023-01-0048	Shared Autonomous Vehicle Mobility for a Transportation Underserved City
		Karina Meneses Cime, Levent Guvenc, Bilin Aksun Guvenc, Ohio State University

Planned by Vehicle Internet of Things Program Committee / Ground Vehicle Advisory Group

Tuesday, April 18

Foundations of Automobile Electronics: Electromagnetics, Antennas and Wiring Harnesses

Session Code AE303

Room 252 A Session 1:30 p.m.

In automotive system design there are critical elements involving the design and engineering of high performance and cost-effective antennas, electromagnetics, and electrical distribution systems (EDS). This session will feature discussions on Utilizing Dynamic Road Condition Scenarios to Automate Battery-Electric Vehicle Testing, Opportunities and Challenges for the Implementation of Electromagnetic Modeling Tools and Reducing Range Anxiety by Reducing Harness Weight using Power Modules

Organizers - Ersin Ersoy; Howard Evans, Continental Automotive UK, Ltd.; Joseph Lowndes, JCB; Christopher Lupini, ETAS; Vipul Patel, GM; Scott Piper, General Motors LLC

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

Time	Paper No.	Title
1:30 p.m.	2023-01-0611	The Automated Radio Measurement System (ARMS) for Characterizing Broadband Performance of Transmitters and Receivers
		Karen Burnham, Electro Magnetic Applications
2:00 p.m.	ORAL ONLY	Reducing Range Anxiety by Reducing Harness Weight using Power Modules
		Nicolas Richard, Vicor Corporation
2:30 p.m.	ORAL ONLY	Utilizing Dynamic Road Condition Scenarios to Automate Battery-Electric Vehicle Testing
		Jeremy Cline, Rohde & Schwarz USA
3:00 p.m.	ORAL ONLY	Opportunities and Challenges for the Implementation of Electromagnetic Modeling Tools in Automotive Engineering
		Scott Piper, General Motors LLC

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

WCX SAE World Congress Experience

Technical Session Schedule

As of March 16, 2023 19:49:48 PM

Tuesday, April 18

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

Session Code AE102

Room 252 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 D. Asher, Western Michigan Univ.; Yixin Chen, Stellantis; Amit Choudhury, Visteon Corp.; Nicholas A Goberville, Argonne National Laboratory; Libin Jia, Ford Motor Co., Ltd.; Scott Craig, INNOVIZ TECHNOLOGIES LTD

Chairperson - Zachary D. Asher, Western Michigan Univ.; Nick Goberville, Argonne National Laboratory

Time	Paper No.	Title
9:30 a.m.	2023-01-0053	Enhancing Traffic Safety by Developing Vehicle Safety Envelope with Real Time Data Interface and Machine Learning Based Sensor Fusion Platform Valentin Soloiu, David Obando Ing, Shaen Mehrzed, Kody Pierce, James Willis, Aidan Rowell, Georgia Southern University
10:00 a.m.	2023-01-0055	An Analysis of Data Curation Techniques throughout the Perception Development Pipeline Jacob Perrin, dSPACE Inc.; Daniel Hasenklever, dSPACE GmbH
10:30 a.m.	2023-01-0059	Real-time Estimation of Perception Sensor Misalignment in Autonomous Vehicles Richard Meyer, Western Michigan University
11:00 a.m.	ORAL ONLY	How Clean is Clean? An Approach to Perception Enablement System Development and Testing to Detect and Mitigate Function Loss in Vision Sensors David Menicovich, Actasys

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Tuesday, April 18

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

Session Code AE102

Room 252 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 D. Asher, Western Michigan Univ.; Yixin Chen, Stellantis; Amit Choudhury, Robert Bosch; Nick Goberville, Argonne National Laboratory; Libin Jia, Ford Motor Co., Ltd.; Scott Craig, INNOVIZ TECHNOLOGIES LTD

Chairperson - Zachary D. Asher, Western Michigan Univ.; Nick Goberville, Argonne National Laboratory

WCX SAE World Congress Experience

Technical Session Schedule

As of March 16, 2023 19:49:48 PM

Time	Paper No.	Title
1:30 p.m.	2023-01-0050	Vehicle Kinematics-Based Image Augmentation against Motion Blur for Object Detectors Zhuang Zhang, Lijun Zhang, Dejian Meng, Luying Huang, Wei Xiao, Wei Tian, Tongji University
2:00 p.m.	2023-01-0060	A Unified Frequency Understanding of Image Corruptions and its Application to Autonomous Driving Zhuang Zhang, Lijun Zhang, Dejian Meng, Wei Tian, Wei Xiao, Tongji University
2:30 p.m.	2023-01-0051	Projecting Lane Lines from Proxy High-Definition Maps for Automated Vehicle Perception in Road Occlusion Scenarios Kyle Carow, Parth Kadav, Johan Fanas Rojas, Zachary Asher, Western Michigan University
3:30 p.m.	2023-01-0057	Road Snow Coverage Estimation Using Camera and Weather Infrastructure Sensor Inputs Parth Kadav, Western Michigan University; Nicholas A Goberville, Argonne National Laboratory; Kyle Prins, Western Michigan University; Amanda Siems-Anderson, Curtis Walker, National Center for Atmospheric Research; Farhang Motallebiaraghi, Kyle Carow, Johan Fanas Rojas, Guan Yue Hong, Zachary Asher, Western Michigan University
4:00 p.m.	ORAL ONLY	Impact and Mitigation of Atmospheric Precipitation Issues in Modern and Autonomous Vehicles Farshad Barghi; Behrouz Mohammadian, Abdel Hakim Abou Yassine, Hossein Sojoudi, University Of Toledo
4:30 p.m.	ORAL ONLY	DIN SAE SPEC 91471 - Assessment Methodology for Automotive LiDAR Sensors Adrian Zlocki, FKA GmbH

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Tuesday, April 18

Panel Discussion: What's Next on Connected and Automated Transportation System Deployment?

Session Code AE107

Room 258 Session 9:30 a.m.

The industry and government experts will discuss the current state of ADAS and connected and automated transportation system research and deployment, the lesson learned, next steps, and the future deployment plan. The topics include and not limited to connectivity and automation technology, consumer acceptance, safety assurance, infrastructure, sustainability, government involvement, and regional pilot status and lessons learned.

Organizers - Samer Rajab, Texas; Thomas Wallner, Argonne National Laboratory; Sue Bai, Honda

Chairperson - Sue Bai, Honda

Moderators - Sue Bai, Honda

Panelists - Christopher Atkinson, US Department of Transportation; Matthew Barth, University Of California Riverside; Derek Caveney, Toyota Motor North America Inc.; Aaron Moore, Driveohio (Ohio Dot);

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Technical Session Schedule

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Tuesday, April 18

ADAS and Autonomous Vehicle System: Safety, Fundamentals, and Driver Interface - Part 1

Session Code AE101

Room 258 Session 1:30 p.m.

This session addresses technical research related to ADAS and AVS safety, 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 - Sue Bai, Honda; Yixin Chen, Stellantis; Amit Choudhury, Visteon Corp.; Joseph D'Ambrosio, General Motors LLC; Sumanth Reddy Dadam, Ford Motor Company; Bin Li, Aptiv PLC; Danyang Tian, Honda

Chairperson - Sue Bai, Honda; Samer Rajab, Locomation

Time	Paper No.	Title
1:30 p.m.	ORAL ONLY	What Safe Enough Means for Autonomous Vehicle Deployment Philip Koopman, Carnegie Mellon Univ.
2:00 p.m.	2023-01-0569	Traffic Safety Improvement through Evaluation of Driver Behavior – An Initial Step Towards Vehicle Assessment of Human Operators Chengshi Wang, Yue Wang, Kim Alexander, John Wagner, Clemson University
2:30 p.m.	2023-01-0570	Modular Domain Controller Design Approach: A Key Enabler for ADAS and Automated Driving Functionality Iyad Mansour, Arriver Software LLC; Sanjay Singh, New Eagle
3:00 p.m.		BREAK
3:30 p.m.	2023-01-0571	Development of Truck Platoon System Including Emergency Braking Function with Vehicle-in-the-Loop Testing Jeong-Ki Hong, Joohan Nam, Hyundai Motor Company; Chanhwa Lee, Sejong University; Jong Su Lim, Byeonghyeok Min, Sangjun Kim, Hyundai Motor Company
4:00 p.m.	2023-01-0581	Challenges with the Introduction of X-By-Wire Technologies to Passenger Vehicles and Light Trucks in regards to Functional Safety, Cybersecurity and Availability Klaus Scheibert, Infineon Technologies AG; Artemis Kostarigka, REE; Udo Dannebaum, Abhijit Ambekar, Infineon Technologies AG; Wenlin Cai, REE; Laurent Heidt, Infineon Technologies AG
4:30 p.m.	2023-01-0584	Scenario-Based Risk Quantification Approach for Assuring Safety in Autonomous Vehicles Kaushik Madala, Mert Solmaz, UL Solutions

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Technical Session Schedule

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Tuesday, April 18

Panel Discussion: Developing Taxonomy and Beyond of AI Applications for Ground Mobility

Session Code AE110

Room 259 Session 9:30 a.m.

SAE Ground Vehicle AI Committee is developing best practices related to AI applications for building safer, more efficient and robust automated ground transportation systems. Given the rapid interest in AI, especially on how these technologies are applied or deployed in the ground mobility domain, it is important to understand the technical terms & definitions used in order to reduce uncertainty, so confusion and/or discrepancies are minimized or misperceptions are avoided. This panel is meant to facilitate the process starting from development of the taxonomy. Learn more about the Participants

Organizers - Jan-Mou Li, Metropolitan Washington Council of Gover

Moderators - Jan-Mou Li, Metropolitan Washington Council of Gover

Panelists - Hoseinali Borhan, Cummins Inc.; Douglas Brooks, Southwest Research Institute; Ramesh S, GM R&D Center; Daniel Selke, DJPS Consulting LLC; Wei Tong, GM R&D Center;

Tuesday, April 18

Automotive Embedded Systems and Software

Session Code AE200

Room 259 Session 1:30 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; Fabian Koark, Cariad; Mahendra Muli, dSPACE Inc.; Prakash Peranandam, Scott Rush, General Motors LLC; Ramesh S, GM R&D Center; Kevin Sittner, IAV Automotive Engineering Inc.; Chirag Sonchal, John Deere India Pvt, Ltd.

Chairperson - Prakash Peranandam, General Motors LLC; Ramesh S, GM R&D Center

Time	Paper No.	Title
1:30 p.m.	2023-01-0591	Automatic Sound Static Analysis for Integration Verification of AUTOSAR Software Daniel Kaestner, Stephan Wilhelm, Christoph Mallon, Stefana Schank, Christian Ferdinand, Laurent Mauborgne, Absint Angewandte Informatik GmbH
2:00 p.m.	2023-01-0588	Innovative Architecture of a Smart Bidirectional Input /Output Interface Based upon Frugal Engineering Concepts Vishwas Manohar Vaidya, Four Front Pvt. Ltd.
2:30 p.m.	ORAL ONLY	Production Code Generation for Modern Vehicles Thomas Erkkinen, MathWorks Inc.
3:00 p.m.	2023-01-0589	Automatic Generation of Evaluation Courses for Car Navigation Systems Via Combinatorial Optimization Kiyohisa Tomita, Kousuke Kojima, Susumu Saito, Takuya Iwami, Ryo Matsumoto, Aisin Corporation; Renichiro Haba, Masayuki Ohzeki, Tohoku University

WCX SAE World Congress Experience

Technical Session Schedule

As of March 16, 2023 19:49:49 PM

Tuesday, April 18

Battery Safety Summit - Part 1

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 Advanced Sensors; Vinay Premnath, Southwest Research Institute

Chairperson - Brian Engle, Amphenol Advanced Sensors; Vinay Premnath, Southwest Research Institute

Time	Paper No.	Title
9:30 a.m.	ORAL ONLY	Keynote – Setting the Stage: Issues of Battery Safety Robert Galyen, Galyen Energy LLC
10:00 a.m.	ORAL ONLY	Overview of NHTSA EV R&D Tony M. Thampan, DOT/NHTSA
10:30 a.m.	ORAL ONLY	NTSB and PHMSA – Battery Fire Investigations and Transportation Impact The NTSB and PHMSA will provide an overview and safety considerations from investigations involving lithium-ion battery fire events. These include fires in private and commercial vehicles as well as transportation of hazardous goods. Bob Clatterbuck, Dept of Transportation; Thomas Barth, NTSB
11:00 a.m.	ORAL ONLY	Hurricane Ian Effects on xEVs Brian Engle, Amphenol Advanced Sensors
11:30 a.m.	ORAL ONLY	Transport and Storage George Kerchner, PRBA

Tuesday, April 18

Battery Safety Summit - Part 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. Learn more about the Participants

WCX SAE World Congress Experience

Technical Session Schedule

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Organizers - Brian Engle, Amphenol Advanced Sensors; Vinay Premnath, Southwest Research Institute

Chairperson - Brian Engle, Amphenol Advanced Sensors; Vinay Premnath, Southwest Research Institute

Time	Paper No.	Title
1:30 p.m.	ORAL ONLY	Functionally Enhanced Venting Units as Part of a Holistic Battery Safety Concept for High-Voltage Battery Packs Michael Harenbrock, Jürgen Kosicki, Martin Ploppa, Robert Zbiral, Markus Hanselmann, Mann+Hummel GmbH
2:00 p.m.	ORAL ONLY	The Evolution of Li-Ion Battery Regulations and Standards Supporting the Transition to Electric Vehicles Provide an overview of the battery safety, storage, and transportation regulations and how they are changing. Discuss the importance of the battery standards which have augmented gaps in these regulations to support electrification transition in the automotive industry. Todd F. Mackintosh, General Motors LLC
2:30 p.m.	2023-01-0593	A One-Way Coupled Modeling Method to Simulate Battery Pack Thermal Runaway Initiated by an External Impact Matthew Hoffmeyer, Bansal Shah, Bapiraju Surampudi, Southwest Research Institute
3:00 p.m.		BREAK

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Tuesday, April 18

Panel Discussion: Battery Safety Mitigation

Session Code AE701A

Room 260 Session 3:30 p.m.

To conclude the Battery Safety Summit, we have convened a group of expert panelists to focus on the critical issues of battery safety Learn more about the Participants

Organizers - Brian Engle, Amphenol Advanced Sensors; Vinay Premnath, Southwest Research Institute

Chairperson - Brian Engle, Amphenol Advanced Sensors; Vinay Premnath, Southwest Research Institute

Moderators - Ian Beattie Smith, Southwest Research Institute

Panelists - Brandon Bartling, 3M; Oliver Gross, Stellantis NV; Judith Jeevarajan, UL Research Institutes; Galen Ressler, General Motors LLC;

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

WCX SAE World Congress Experience

Technical Session Schedule

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Tuesday, April 18

Optical Measurement and Nondestructive Testing Techniques in Automotive Engineering

Session Code M204

Room 311 A/B Session 9:30 a.m.

Optical based Techniques/technologies for Materials Characterization, Strain/Measurement, Nondestructive Testing, and Validation of Materials Models etc.

Organizers - Beiwen Li, Iowa State University; Sheng Liu, General Motors LLC; Lianxiang Yang, Oakland University

Chairperson - Sheng Liu, General Motors LLC; Lianxiang Yang, Oakland University

Time	Paper No.	Title
9:30 a.m.	2023-01-0066	Deep Generative Networks for Nondestructive Cylinder Liner Inspection in Large Internal Combustion Engines Christoph Angermann, University of Innsbruck; Christian Laubichler, Constantin Kiesling, LEC GmbH; Florian Dreier, Markus Haltmeier, University of Innsbruck; Steinbjörn Jonsson, INNIO Jenbacher GmbH & Co. OG
10:00 a.m.	2023-01-0067	Suction Cup Quality Predication by Digital Image Correlation Bicheng Guo, Xiaowan Zheng, Siyuan Fang, Lianxiang Yang, Oakland University
10:30 a.m.	2023-01-0069	In Line Nondestructive Testing for Sheet Metal Friction Stir Welding Johnathon Hunt, Brigham Larsen, Yuri Hovanski, Brigham Young University
11:00 a.m.	2023-01-0068	Development of Digital Shearography for Dual Sensitivity Simultaneous Measurement Using Carrier Frequency Spatial Phase Shift Technology Xiaowan Zheng, Bicheng Guo, Siyuan Fang, Oakland University; Bernard Sia, US Army Ground Vehicle Systems Center; Lianxiang Yang, Oakland University

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Tuesday, April 18

Panel Discussion: AHSS Outlook in Future Automotive Architectures

Session Code M104A

Room 311 A/B Session 1:30 p.m.

With enduring versatility, advanced high-strength steels (AHSS) will play an increasingly important role in securing automotive safety, performance and sustainability targets. During this panel discussion, experts from automotive OEMs, steelmakers, and academia will provide insights regarding the future of AHSS in upcoming vehicle structures. Topics will include: (1) AHSS applications outlook, (2) technological trends, and (3) current and forecasted challenges related to AHSS implementation. Additionally, the transition toward eco-friendly and carbon-neutral advanced high-strength steel products will be addressed. Learn more about the Participants

Moderators - Brandon Michael Hance, Hyundai Steel Company

Panelists - Constantin Chiriac, Ford Motor Company; JB Chronister, Cleveland Cliffs Inc.; Emmanuel De Moor, Colorado School of Mines; Dean Kanelos, Nucor; Michael L. Shaw, FCA US LLC; Ming Shi, General Motors LLC;

WCX SAE World Congress Experience

Technical Session Schedule

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Tuesday, April 18

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

Session Code M104

Room 311 A/B Session 3:30 p.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 Company; Emmanuel De Moor, Colorado School of Mines; Brandon Michael Hance, Hyundai Steel Company; Ming Shi, JP Singh, Ming Shi, General Motors LLC

Chairperson - Constantin Chiriac; Emmanuel De Moor, Colorado School of Mines; Brandon Hance, Hyundai Steel Company; Ming Shi, General Motors LLC

Time	Paper No.	Title
3:30 p.m.	2023-01-0612	Forming Characteristics of Nano-Precipitation Strengthened Cold-Rolled Batch Annealed HSLA Sheet Steels (>490MPa Yield Strength) Siddhartha Biswas, Bilin Chen, Shobhit Bhartiya, Yashwanth Injeti, William Williams, Amar De, Big River Steel
4:00 p.m.	2023-01-0613	Characterization and Modeling of Anisotropic Fracture of Advanced High-Strength Steel Sheets Jun Hu, Cleveland-Cliffs Inc.; Hao Pan, University of Central Florida; Erik Pavlina, Cliffs Steel Corporation; Grant Thomas, Cleveland-Cliffs Inc.
4:30 p.m.	ORAL ONLY	Lightweight Swivel Seat Frame Concepts using Advanced Steel Grades Jaehyun Kim, Materials Forming Research Group, POSCO

Planned by Metallic Materials Committee / Materials Engineering Activity

Tuesday, April 18

Plastic Components, Polymeric, and Composites for EV, AVS and ICE Vehicles - Part 1

Session Code M300

Room 312 A/B 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; Srikanth Pilla, Clemson Univ.; Bryant Tokarz, O-Flex Group Inc.; Holger Warth, Aliaxis Holding Germany GmbH

Chairperson - Emile Homsi, Cargill INC; Bryant Tokarz, O-Flex Group Inc.

Time	Paper No.	Title
9:30 a.m.	2023-01-0071	Effect of Fiber Content on Anisotropic Behavior of 3D Printed Fiber Composites Jordan Garcia, Sayer Smith, Brian Sibley, Y Charles Lu, University of Kentucky

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Time	Paper No.	Title
10:00 a.m.	ORAL ONLY	Innovations of Polyphenylene Sulfide (PPS) for Vehicle Electrification Frank Zhao, Raghavendra Maddikeri, Celanese
10:30 a.m.	ORAL ONLY	Thermal Management in BEVs: A Balancing Act We Must Get Right Jakub Kadlcak, Datwyler
11:00 a.m.	ORAL ONLY	Light Weighting Solution for BIW Reinforcements for Mitigating Moving Progressive Barrier Impact Vinod Jose Kavalakkat, SABIC Research & Technology Pvt, Ltd.; Somasekhar Bobba, SABIC

Planned by Polymers and Coatings Committee / Materials Engineering Activity

Tuesday, April 18

Plastic Components, Polymeric, and Composites for EV, AVS and ICE Vehicles - Part 2

Session Code M300

Room 312 A/B Session 1:30 p.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; Srikanth Pilla, Clemson Univ.; Bryant Tokarz, O-Flex Group Inc.; Holger Warth, Aliaxis Holding Germany GmbH

Chairperson - Emile Homsi, Cargill INC; Bryant Tokarz, O-Flex Group Inc.

Time	Paper No.	Title
1:30 p.m.	2023-01-0074	A Study on Flexible Transparent Electrode Materials for Touch Sensor Kyoungchun Kweon, Seungchan Hong, Hyundai Motor Company
2:00 p.m.	ORAL ONLY	Non-Halogenated Long Fiber Thermoplastic for EV Components Aaron Johnson, Celanese
2:30 p.m.	2023-01-0072	Sustainable Plastic Solution for Automotive Interior & Exterior Trim Applications Sandeep Kumar Shukla, K V Balaji, Mahindra & Mahindra, Ltd.; Jayasurya K, Product Design & Development
3:00 p.m.		BREAK

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Tuesday, April 18

Panel Discussion: Sustainable Material Trends for Rigid and EV Applications and Special Features for Market Attractiveness

Session Code M300A

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

Learn more about the Participants

Organizers - Somasekhar Bobba, SABIC; Emile Homsi, Cargill

Panelists - Curtis Collar, Nanotech Energy; Matthew Delaney, The Materials Group; Nathan Noyes, Cargill; Vandita Pai-Paranjape, SABIC; Jonathan McEuen, Nycoa;

Tuesday, April 18

Advances in Lightweight Materials

Session Code M102

Room 313 A/B 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 Univ.; Jidong Kang, CanmetMATERIALS; Jonathan Weiler, Meridian Lightweight Technologies; Peijun Xu, Ebco Inc.

Chairperson - Jidong Kang, CanmetMATERIALS

Time	Paper No.	Title
9:30 a.m.	2023-01-0077	A High Strength Aluminum Solution for Polymer Coated Bearings Sylvia Campbell, Mahle Engine Systems UK; John Stearns, MAHLE Industries Inc.; Paulo Morais, MAHLE Metal Leve S.A.
10:00 a.m.	ORAL ONLY	NVH and EMI Modeling Of Lightweight Materials for Applications in Electric Vehicles Javad Baqersad, Kettering Univ.; Seongchan Pack, General Motors LLC; Huseyin Hiziroglu, Seyed Jamaleddin Mostafavi Yazdi, Kettering University
10:30 a.m.	ORAL ONLY	Minimalistic Approach in Designing an Air Tight Light Weight Fender Filler/Blocker using Expanded Poly Propylene (EPP) & EPDM Foam Manga Narayana Patnaik, Mahindra Research Valley
11:00 a.m.	ORAL ONLY	Ultra-High Strength Aluminum Applications for Body Structures Yuri Hovanski, Brigham Young Univ.; Dawn Stubleski, Thomas Luzanski, Karunakaran Saambavi, TWB Co

Planned by Metallic Materials Committee / Materials Engineering Activity

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Technical Session Schedule

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Tuesday, April 18

Fatigue Analysis and Design - Part 1

Session Code M200

Room 313 A/B Session 1:30 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 application on fatigue and durability 12 battery pack and electrical motor fatigue and durability.

Organizers - Guofei Chen, General Motors LLC; Jeong Hong, Engineering Mechanics Corp. of Columbus; Hong Tae Kang, Univ. of Michigan-Dearborn; Yung-Li Lee, FCA US LLC; Paul Lubinski, Thermo King Corp.; Sean McKelvey, Stellantis NV; Xuming Su; Zhigang Wei, University of Michigan; Xijia Wu, National Research Council Canada; Gavin Song, Ford Motor Company; Mingchao Guo, FCA US LLC

Chairperson - Mingchao Guo, FCA US LLC; Sean McKelvey, Stellantis NV; Yung-Li Lee, FCA US LLC

Time	Paper No.	Title
1:30 p.m.	ORAL ONLY	KEYNOTE: Structural Integrity & Reliability: Recent Insights & Perspectives for the Automotive The automotive industry is tackling several major challenges like sustainable mobility, data revolution, and virtual certification. Despite the customer attention and the carmaker care are focused on these front end key features, the structural integrity of the product and its basic mechanical reliability stay as fundamental requirements to be fulfilled. Within this framework, the present keynote aims at comment some recent examples about how the traditional mechanical engineering discipline is adapting itself to release safe products on the market, including new mobility devices, new embedded capabilities, and taking advantage of the most recent improvement of virtual computations. The intended outcome is to confirm the essential rule of the “homo engineer” during all the design process. Matteo Luca Facchinetti, Stellantis
2:00 p.m.	2023-01-0595	Application of a Mechanism-Based Short Crack Growth Model for the Fatigue Analysis of an Engine Cylinder Block Including Low-Frequency Thermal and High-Frequency Dynamic Loading Radwan Hazime, Ali-Alhadi Kobaissy, ADACS Inc.; Thomas Seifert, Offenburg University of Applied Sciences; Qichao Zheng, Cherng-Chi Chang, General Motors LLC
2:30 p.m.	2023-01-0594	Thermomechanical Life Predictions of A356-T6 Aluminium Cylinder Heads Considering Defect Distribution Radwan Hazime, ADACS Inc.; Cherng-Chi Chang, Qigui Wang, Scott Sochor, General Motors LLC
3:00 p.m.		BREAK
3:30 p.m.	2023-01-0596	Thermomechanical Fatigue Crack Growth Simulation in a Turbo-Housing Model Using Nonlinear Fracture Mechanics Ali Hassan Makke, Abdallah Kassir, Heni Boughanmi, ADACS Inc.; Thomas Seifert, Offenburg University of Applied Sciences; Cherng-Chi Chang, Ravi Kallepalli, General Motors LLC

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Time	Paper No.	Title
4:00 p.m.	2023-01-0597	Electric Vehicle Battery Safety and Compliance Kyle Murray, Sneha Lele, Exponent Inc.

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Tuesday, April 18

Vehicle Thermal Systems for Hybrid & Electric

Session Code HX105

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 topics covering both testing and simulation of hybrid and electric vehicle thermal systems.

Organizers - Bashar AbdulNour, Kettering Univ.; Alaa El-Sharkawy, FCA US LLC; Sowmyalatha Jayaraman, General Motors LLC; Kumar Srinivasan, FCA US LLC; Andrew Sutherland, TI Fluid Systems; Arpit Tiwari, Rivian Automotive; Sudhi Uppuluri, Siemens Digital Industries Software; Bing Shuttlewood, General Motors LLC; Gursaran Mathur, Highly-Marelli North America

Chairperson - Bashar AbdulNour, Kettering Univ.; Bing Shuttlewood, General Motors Corporation; Sowmyalatha Jayaraman, General Motors LLC

Time	Paper No.	Title
9:30 a.m.	2023-01-0132	Variable-Efficiency Traction Inverter Provides Low Cost Multi-kW Coolant Heating Andy Turudic, Rancho del I.P.
10:00 a.m.	2023-01-0134	Neural Network Model to Predict the Thermal Operating Point of an Electric Vehicle Srikanth Kolachalama, Hafiz Malik, University of Michigan
10:30 a.m.	2023-01-0135	Three-Dimensional Thermal Simulation of a Hybrid Vehicle with Energy Consumption Estimation and Prediction of Battery Degradation under Modern Drive-Cycles Alaa El-Sharkawy, FCA US LLC; Amr Sami, Optumatics LLC; Dipan Arora, FCA US LLC; Salaheldin Gaffar, Mosaad Bakr, Optumatics LLC
11:00 a.m.	2023-01-0130	Study of Phase Change Thermal Management Architecture for Series-Hybrid Powertrain in Unmanned Aerial Vehicles Rohan Kokate, Akashdeep Singh Virk, Chanwoo Park, University of Missouri; Constandinos Mitsingas, Matthew Johnson, US Army DEVCOM Army Research Laboratory; Chol-Bum Kweon, US Army
11:30 a.m.	ORAL ONLY	Computational Investigation on Radiation Induced Thermal Runaway Propagation Liwen Zhang, The University of Tennessee; Haiwen Ge, Texas Tech University; Peng Zhao, University of Tennessee

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Planned by Thermal Management Activity / Ground Vehicle Advisory Group

Tuesday, April 18

Recent Developments in Propulsion Technologies for Ground Transportation

Session Code PFL180

Room 321 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, Stellantis NV; Chuanli Liu, General Motors Corporation; Qilong Lu, Southwest Research Institute; Shakti Saurabh, Cummins Inc.; Andrea Strzelec, University of Wisconsin-Madison; Peng Zhao, University of Tennessee

Chairperson - Peng Zhao, University of Tennessee

Time	Paper No.	Title
9:30 a.m.	ORAL ONLY	Solve the challenges for a sustainable future and how Envision AESC achieves that Solve the challenges for a sustainable future" is the mission statement of Envision Group, which is also the parent company of Envision AESC, a world leading Japanese electric vehicle battery technology company. As part of the company's global commitment to sustainability, Envision AESC will leverage leading net-zero system solutions from across the business, including renewable energy generation, carbon reduction through AIoT energy management systems and battery recycling to accelerate carbon neutrality across the whole battery value chain. Envision AESC has established a green ecosystem to provide a catalyst for further investment in the local supply chain and whole battery life cycle to achieve the decarbonization target. Juanjuan Zhou, Envision AESC Japan Led.
9:50 a.m.	ORAL ONLY	Status and Trend of PHEV in China PHEV includes Plug-in HEV and REEV in China, since some REEV engine can directly drive vehicle in middle-high speed to achieve best energy efficiency. PHEV sales volume in Chinese market are flourishing in recent three years. Several domestic brand companies release a number of excellent PHEVs with first class technologies, Japanese TOYATA and HONDA with outstanding HEV technologies are also promoting their PHEVs in China. European luxury car makers Benz and BMW have sold PHEV for years. This presentation fully and systematically analyzes the reasons for selling well in China, It comparatively analyzes main technical features and parameters including engine, battery, fuel consumption, power consumption, acceleration of several typical PHEVs for sale. The presentation predicts the PHEV trends based on Chinese market demand and policies. Maodong Fang, China Automotive Technology and Research

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Technical Session Schedule

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Time	Paper No.	Title
10:10 a.m.	ORAL ONLY	Energy supplement solution for China's new energy trucks, charging or battery swap Current development status of charging and battery swap of trucks in China: Currently,charging and battery swap of trucks are parallel,and battery swap accounts for a large proportion,but the cost of battery swap is high and the standards are not uniform. Long charging time and other problems. Comparison of the Pros and cons of charging and battery swap: charging and battery swap have their Pros and cons, and it is not yet possible to determine which way is more appropriate. Opportunities and challenges for charging development: The main problem facing charging is how to shorten charging time and improve charging efficiency. Opportunities and challenges of battery swap development: battery swap mainly involves how to reduce the cost of battery swap and how to choose the right scene. Future development: Charging and battery swap are still parallel processes,and it is difficult to achieve the national unification of battery swap standards,which are mainly applied in scenes. With the development of high-rate battery and super charger technology, charging will expand its market share. Wang Yi, Sany
10:30 a.m.	ORAL ONLY	Challenges and Opportunities for Achieving Near Zero Emissions from the Transportation Sector Tailpipe emissions from passenger cars and heavy-duty trucks are linked with an adverse impact on the climate and human health. To address both issues, there is clearly a trend towards decarbonization of the fuels used in these sectors. The objective is to get as close as possible to near zero or zero impact emitting vehicles. Technologies exist but there are various hurdles to be overcome with feasibility and cost implications. We will review the various pathways: electrification, hydrogen, renewable fuels, and outline some of their respective challenges – and therefore opportunities – as we try to navigate this messy middle between conventional fossil fuel and low carbon transportation. Ameya Joshi, Corning Inc.

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Technical Session Schedule

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Time	Paper No.	Title
10:50 a.m.	2023-01-0234	Techno-Economic Assessment of Future Fuels and Vehicle Technologies: Fuel Cell, Batteries, and Natural Gas Prospects in India This study investigates the techno-economic feasibility of India's evolving transportation technology. Country's progressive renewable energy targets (energy independent by 2047) and incentivized policies on lower carbon footprint fuels are accelerating focus on green transport solutions. A bottom-up approach is utilized to demystify the techno-commercial viability of new technologies. Total cost of ownership (TCO) is an important metric for economic analysis. However, generalised data applications and simplified cost assumptions render inapplicability to local markets. In this study, the TCO model compares the vehicle technology's energy, emissions, and cost, based on scientific co-relations. A 12 meter-bus market is used to compare Battery-powered Electric Bus (BEB), Fuel Cell Electric Bus (FCEB) and prevalent Compressed Natural Gas Engine Bus (CNGB) for a service life of 12 years. The analysis has two segments: Static analysis depicts the influencing factors (fuel production cost, maintenance, module life) while dynamic simulation shows the effect of technological innovation, carbon incentives and value of money (employs doubling declining balance method). In the model, TCO for FCEB's ($140/100km) is higher compared to BEB's ($87/100km) and CNGB's ($93/100km) primarily due to energy-infrastructure cost ($5.7/kg) and module maintenace. However, in dynamic analysis, the study quantified crucial conditions (e.g., fuel cost, carbon tax, module innovations) for FCEBs commercial acceptability, synchronous with the country's energy and emission targets. Sankhadeep Sarkar, Texas A&M University, College Station; Xin He, Aramco Americas, Detroit; Faisal khan, Texas A&M University, College Station
11:10 a.m.	ORAL ONLY	Studies on Ammonia Combustion and Its Emission Aftertreatment Ammonia is widely considered as a promising green alternative fuel for internal combustion engines. However, the combustion inertness (high minimum ignition energy and low laminar flame speed) and large amount of pollutant emissions (NOx, unburnt NH3 and N2O) of ammonia bring technical challenges to the application of ammonia on internal combustion engines. This presentation first overviews the background and research status of ammonia on internal combustion engines, based on which an ammonia-hydrogen hybrid combustion strategy is proposed to overcome the combustion inertness of ammonia. Then, the progress in this combustion strategy and the fundamental research on ammonia combustion, such as the measurements of laminar flame speed and ignition delay time and the reaction mechanism, at Tsinghua University is presented. At last, the achievements in the aftertreatment technology of NOx, NH3 and N2O at Tsinghua University is introduced. Yunliang Qi, Tsinghua Univ.

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Time	Paper No.	Title
11:30 a.m.	ORAL ONLY	Dual Fuel Intelligent Charge Combustion Ignition: The next generation combustion technology to achieve ultra-low carbon emissions for engines The need for reducing environmental pollution and relieving the energy crisis have generated a strong interest in developing next generation internal combustion engine technology with a high efficiency and carbon-neutrality. Here, we report the dual fuel intelligent charge compression ignition (ICCI) combustion with low emissions and a suitable efficiency to address the above issues. This presentation will discuss the work mechanism of ICCI technology by the independent design and management of in-cylinder mixtures to improve the engine efficiency and emissions over the full operation range. Most importantly, it can fully realize carbon neutrality and reduce the greenhouse gas effect. Moreover, smoothing transient transition between various combustion modes within a cycle can be achieved under the ICCI technology. Hence, it can be directly applied to commercial engines and promotes the virtuous cycle of the ecosystem. Xingcai Lu, Shanghai Jiao Tong Univ.
11:50 a.m.	2023-01-0233	The Development of a Zeolite-Based Cold-Start Catalyst (CSC) for a Conventional China 6b Vehicle in Meeting the Next More Stringent Chinese Vehicle Emission Standards A state of art zeolite based cold-start catalyst (CSC) or hydrocarbon trap (HCT) was codeveloped between Geely Automotive Company and Ningbo Kesen Exhaust Gas Cleaner Manufacturing CO. LTD. The addition of this CSC catalyst to the down-stream of an existing catalyst system (TWC+CGPF) significantly reduced cold-start tailpipe emissions of a China 6b conventional passage car equipped with an 1.5L turbo charge direct injection(1.5LTD) engine. The vehicle tailpipe emission results with either fresh or laboratory aged CSC met the engineering required levels of the projected China future more stringent vehicle tailpipe emission standards (CO: 350mg/km; NMHC: 25mg/km and NOx: 25mg/km; N2O: 10mg/km and NH3: 10mg/km) in WLTC cycles. Both vehicle and laboratory results demonstrated the excellent ammonia adsorption and oxidation function of this CSC catalyst as a very efficient ammonia slip catalyst (ASC), which enabled the vehicle to meet the future lower tailpipe NH3 standard without an ASC catalyst. CSC is a more cost effective and flexible (independent of battery power) technology in reducing both the tailpipe cold-start emissions and eliminating ammonia slip over a TWC catalyst system with both electric heating catalyst (EHC) and ASC catalyst for meeting the emission standards. Lifeng Xu, Geely Powertain Research Institute; Fucheng Zhao, Hong Wei, Pengfei Zhao, Geely Powertrain Research Institute; Wangmu Qian, Menghan Qian, Ningbo Kesen Exhaust Gas Cleaner MFG Co.

Planned by General Powertrain Development / Energy and Propulsion Activity

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Tuesday, April 18

Exhaust Emission Control Systems

Session Code PFL420

Room 321 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 - Brad Adelman, Navistar; Kirby Baumgard, Baumgard Technologies; Rasto Brezny, Kevin Brown, MECA; Kevin Brown, Manufacturers of Emission Controls Assoc.; Galen Fisher; Michael Geller, MECA: Supplying Clean Mobility; Cary Henry, Southwest Research Institute; Krishna Kamasamudram, Cummins Inc.; Mansour Masoudi, Emissol; Rahul Mital, General Motors LLC; Vitaly Prikhodko, Oak Ridge National Laboratory; Gongshin Qi, General Motors LLC; Andrea Strzelec, University of Wisconsin-Madison; Julian Tan, Stellantis NV

Chairperson - Krishna Kamasamudram, Cummins Inc.; Mansour Masoudi, Emissol

Time	Paper No.	Title
1:30 p.m.	2023-01-0359	High Cell Density Flow Through Substrate for New Regulations Hayaki Nakasumi, NGK Insulators, Ltd.; Akifumi Kawakami, NGK Automotive Ceramics USA Inc; Etsuji Ohara, Kentaro sugimoto, Noriyuki Hibi, NGK Insulators Ltd; Tsuyoshi Asako, NGK Insulators, Ltd.; Kyohei Kato, Reghunathan-Nair Anoop, Syed Affan, NGK Automotive Ceramics USA Inc; Eva Thanasiu, Christine K. Lambert, Carolyn Hubbard, Ford Motor Company
2:00 p.m.	2023-01-0358	Development of Three-Way Catalysts with Enhanced Cold Performance Takumi Tojo, Shogo Shirakawa, Seiji Nakahigashi, Toyota Motor Corporation; Sho Hoshino, Takashi Onozuka, Takahiro Noguchi, Tomomasa Aikawa, Cataler Corporation
2:30 p.m.	2023-01-0361	Low Ambient Temperature Impact on a Low NO_X Demonstration System Bryan Zavala, Christopher Sharp, Southwest Research Institute
3:00 p.m.		BREAK
3:30 p.m.	ORAL ONLY	The DAAAC Protocol: A Procedure for Developing Accelerated Aging Cycles for Diesel Aftertreatment Scott Eakle, Bryan Zavala, Christopher Sharp, Grant Seuser, Southwest Research Institute
4:00 p.m.	ORAL ONLY	DAAAC Protocol for Durability Demonstration of Diesel Aftertreatment Systems: Comparing Accelerated and non-Accelerated Aftertreatment System Performance Results Bryan Zavala, Southwest Research Institute
4:30 p.m.	2023-01-0360	Impact of hydrothermal and chemical aging on SCR storage characteristics and NOx reduction performance in an ultra-low NOx system Venkata Rajesh Chundru, SouthWest Research Institute; Chintan Desai, Vaibhav Kadam, Isuzu Technical Center of America Inc; Sankar Rengarajan, Sandesh Rao, Christopher Sharp, Southwest Research Institute; Bruce Vernham, Isuzu Technical Center of America Inc; Jayant Sarlashkar, Southwest Research Institute

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Planned by Mobile Emissions Committee / Energy and Propulsion Activity

Tuesday, April 18

Multi-Dimensional Engine Modeling, Part 1

Session Code PFL120

Room 330 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, Virtual Thermal Fluids LLC; Yuanjiang Pei, Aramco Research Center - Detroit; Andrea Strzelec, University of Wisconsin-Madison

Time	Paper No.	Title
9:30 a.m.	2023-01-0202	A Predictive Model for Spark Stretch and Mixture Ignition in SI Engines Thomas Briggs, Graham Conway, Southwest Research Institute
10:00 a.m.	2023-01-0205	Multi-Dimensional Spark Ignition Model for Arc Propagation and Thermal Energy Deposition with Crossflow Matthew Hall, Kyeongmin Kim, Corey Tambasco, Ron Matthews, Univ. of Texas-Austin
10:30 a.m.	2023-01-0207	A 3D-CFD Numerical Approach for Combustion Simulations of Spark Ignition Engines Fuelled with Hydrogen: A Preliminary Analysis Stefano Sfriso, Fabio Berni, Stefano Fontanesi, Alessandro D'Adamo, Università di Modena e Reggio Emilia; Marco Antonelli, Stefano Frigo, UNIVERSITA' DI PISA
11:00 a.m.	2023-01-0197	Thermo-Diffusive Flame Speed Adjustment and its Application to Hydrogen Engines Ignacio Hernandez, Realis Simulation s.r.o.; Charles Turquand d'Auzay, Realis Simulation Ltd.; Richard Penning, Ricardo UK Ltd; Evgeniy Shapiro, Realis Simulation Ltd.; John Hughes, Ricardo UK Ltd
11:30 a.m.	2023-01-0203	CFD Modeling of a DME Compression Ignition Engine in Late-PCCI Operating Conditions Andrea Schirru, Politecnico di Milano; Gilles Hardy, Sursum-MI; Yuri M. Wright, Empa, Switzerland; Tommaso Lucchini, Gianluca D'Errico, Politecnico di Milano; Patrik Soltic, Thomas Hilfiker, Empa, Switzerland

Planned by General Powertrain Development / Energy and Propulsion Activity

Tuesday, April 18

Multi-Dimensional Engine Modeling, Part 2

Session Code PFL120

Room 330 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.

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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, Virtual Thermal Fluids LLC; Yuanjiang Pei, Aramco Research Center - Detroit; Andrea Strzelec, University of Wisconsin-Madison

Time	Paper No.	Title
1:30 p.m.	2023-01-0206	Numerical Analysis of Combustion Process in the Dual Fuel Internal Combustion Engine Marija Stipic, Branislav Basara, AVL LIST GmbH; Steffen Schmidt, Nikolaus Adams, Technische Universitat Munchen
2:00 p.m.	2023-01-0200	AI Super-Resolution-Based Subfilter Modeling for Finite-Rate-Chemistry Flows: A Jet Flow Case Study Mathis Bode, Forschungszentrum Julich GmbH
2:30 p.m.	2023-01-0204	An Updated Comprehensive Chemical Kinetic Mechanism for Ammonia and its Blends with Hydrogen, Methanol, and N -Heptane Mohamed Hamdy, National University of Ireland, Galway; Ravi Fernandes, Physikalisch-Technische Bundesanstalt; Shijun Dong, Huazhong University of Science and Tech; Chongwen Zhou, Beihang University; Kelly Senecal, Shuaishuai Liu, Convergent Science Inc.; Ahmed Mohamed, University of Galway; Yuxiang Wu, Beihang University; Solmaz Nadiri, Physkalisch Technische Bundesanstalt; Henry Curran, National University of Ireland, Galway; Kuiwen Zhang, Convergent Science Inc.
3:00 p.m.		BREAK
3:30 p.m.	2023-01-0198	Computational Modeling of the Flow and Heat Transfer in an Internal Combustion Engine-Relevant Cooling Channel Sebastian Wegt, Focused Energy GmbH, Darmstadt, Germany; Maximilian Bopp, Louis Krüger, Artur Klink, Ruediger Reitz, Jeanette Hussong, Suad Jakirlic, Technical Univeristy of Darmstadt
4:00 p.m.	2023-01-0199	A Conjugate Heat Transfer Analysis of a Rotary Combustion Engine with a Focus on the Effect of Thermal Barrier Coatings Shimon Pisnoy, Steven Frankel, Leonid Tartakovsky, Technion Israel Inst. of Technology
4:30 p.m.	ORAL ONLY	CFD Simulations of an Optical Rapid Compression Machine (RCM) for Simultaneous Validation of Ignition Chemistry and Soot Formation Using Gasoline/Ethanol Blends Musharrat Chowdhury, Joseph Gross, Adam Dempsey, Casey Allen, Marquette University

Planned by General Powertrain Development / Energy and Propulsion Activity

Tuesday, April 18

Panel Discussion: Building Blocks for Decarbonizing Transport and Attaining Near Zero Emissions

Session Code PFL499

Room 330 B Session 9:30 a.m.

Organizers - Holmes Ahari, FCA US LLC; Sumanth Reddy Dadam, Ford Motor Company; Danan Dou, Deere & Company; Ron Silver, Caterpillar Inc.; Anand Srinivasan, Cummins Inc.; Andrea Strzelec, University of Wisconsin-Madison

Moderators - Ron Silver

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Panelists - Wole Akinyemi, Cummins; Ameya Joshi, Corning Inc.; Christopher Sharp, Southwest Research Institute;

Time	Paper No.	Title
	2023-01-0357	An Update on Continuing Progress Towards Heavy-Duty Low NO_X and CO_2 in 2027 and Beyond Christopher Sharp, Bryan Zavala, Gary Neely, Sandesh Rao, Southwest Research Institute
	2023-01-0396	Year in Review: Progress towards Decarbonizing Transport and Near-Zero Emissions Ameya Joshi, Corning Inc.

Tuesday, April 18

Panel Discussion: Future of Emission Measurement and Testing

Session Code PFL498

Room 330 B Session 1:30 p.m.

The goal of this panel is to explore the ongoing challenges of internal combustion engine emission measurements in an industry that is moving towards more electrification. Experts from industry, academia, and applied research & development will focus on industry response to meet upcoming changes in more stringent global regulations: from improvements in test cells to in-use emission measurements as well as the impact of Electronic Control Unit software emissions controls to emissions measurement

Organizers - Svitlana Kroll, Southwest Research Institute; Mert Zorlu, Cummins Inc; Mahmoud Yassine, FCA US LLC; J. Felipe Rodriguez, International Council On Clean Transport

Chairperson - Svitlana Kroll, Southwest Research Institute

Moderators - Svitlana Kroll, Southwest Research Institute

Panelists - Imad Khalek, Southwest Research Institute; Tom Durbin, University Of California Riverside; Michael Akard, Horiba Ltd; Mert Zorlu, Cummins Inc;

Tuesday, April 18

Emission Control Modeling, Part 1

Session Code PFL430

Room 330 B Session 3:30 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 power plants 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.; Christopher Depcik, Univ. of Kansas; Jian Gong, Cummins Inc.; Vincenzo Mulone, Univ. Of Roma Tor Vergata; Achuth Munnannur, Cummins Inc.

Chairperson - Christopher Depcik, Univ of Kansas

Moderators - Christopher Depcik, Univ of Kansas

Time	Paper No.	Title

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Time	Paper No.	Title
3:00 p.m.		BREAK
3:30 p.m.	2023-01-0366	CFD Assessment of an After-Treatment System equipped with Electrical Heating for the Reduction of the Catalyst Light-off Time Loris Barillari, Augusto Della Torre, Gianluca Montenegro, Angelo Onorati, Politecnico di Milano; Vincenzo Rossi, Stefano Paltrinieri, Fabrizio Gullino, Ferrari S.p.A.
4:00 p.m.	2023-01-0369	Analysis and optimization of metallic based substrates for after-treatment system by means of full-scale CFD simulations and experiments Andrea Sartirana, Gianluca Montenegro, Augusto Della Torre, Angelo Onorati, Politecnico di Milano; Lorenzo Pace, Naroa Zaldua-Moreno, Vitesco Technologies Emitec GmbH

Planned by Mobile Emissions Committee / Energy and Propulsion Activity

Tuesday, April 18

0-D and 1-D Modeling and Numerics: CI Combustion & emissions

Session Code PFL114

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

CI ICE thermodynamics, combustion and pollutant formation (in combination with 0-D/1-D CFD approach) is the main focus of this session.

Organizers - Federico Millo, Politecnico di Torino; Angelo Onorati, Politecnico di Milano; Chandan Paul, Gamma Technologies LLC; Oldrich Vitek, Czech Technical Univ.

Time	Paper No.	Title
9:30 a.m.	2023-01-0188	Zero Dimension Heat Release Modeling for Gasoline, Ethanol, Isobutanol and Diisobutylene Operating in Compression Ignition with Varying Injection Strategies Qian Peng, Illinois Institute of Technology; Toby Rockstroh, Argonne National Laboratory; Carrie Hall, Illinois Institute of Technology; Michael Pamminger, Argonne National Laboratory
10:00 a.m.	ORAL ONLY	Approaches to improve engine-out emissions prediction of diesel engines using a reduced order model Chandan Paul, Gamma Technologies LLC; Yifan Wei, Isuzu Motors Ltd; Jian Gao, General Motors LLC; Kai Jin, Navin Fogla, Kevin Roggendorf, Syed Wahiduzzaman, Gamma Technologies LLC; Scott Parrish, General Motors LLC

Planned by General Powertrain Development / Energy and Propulsion Activity

WCX SAE World Congress Experience

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Tuesday, April 18

Powertrain Adaptation for Connectivity and Automation, Part 1

Session Code PFL150

Room 331 A/B Session 10:30 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, Ohio State University; Bharatkumar Hegde, General Motors LLC; Scott Hotz, Southwest Research Institute

Chairperson - Scott Hotz, Southwest Research Institute

Time	Paper No.	Title
10:30 a.m.	2023-01-0220	Predicting Lead Vehicle Velocity for Eco-Driving in the Absence of V2V Information Vinith Kumar LAKSHMANAN, IFP Energies Nouvelles; Shobhit Gupta, Stefano D'Alessandro, Matteo Spano, Dennis Kibalama, Stephanie Stockar, Marcello Canova, Ohio State University; Ouafae El Ganaoui-Mourlan, Antonio Sciarretta, IFP Energies Nouvelles
11:00 a.m.	2023-01-0218	Flexible Architecture for Testing Connected Vehicles in Realistic Traffic William Buller, Richard Chase, Joseph E. Paki, Ahammad Basha Dudekula, Jeffrey Naber, Michigan Technological University; Reuben Sarkar, American Center for Mobility
11:30 a.m.	2023-01-0219	Demonstration of Ego Vehicle and System Level Benefits of Eco-Driving on Chassis Dynamometer Piyush Bhagdikar, Jayant Sarlashkar, Stanislav Gankov, Sankar Rengarajan, Southwest Research Institute

Planned by General Powertrain Development / Energy and Propulsion Activity

Tuesday, April 18

0-D and 1-D Modeling and Numerics: Hydrogen, Ammonia & Alternative Fuels

Session Code PFL115

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

Organizers - Federico Millo, Politecnico di Torino; Angelo Onorati, Politecnico di Milano; Lalit Patidar, Gamma Technologies LLC

Time	Paper No.	Title
1:30 p.m.	2023-01-0189	Computational Investigation of Combustion Phasing and Emission of Ammonia and Hydrogen Blends under HCCI Conditions Ahmad Bakir, The University of Tennessee; Haiwen Ge, Texas Tech University; Peng Zhao, The University of Tennessee
2:00 p.m.	2023-01-0190	Zero-dimensional Modeling of Flame Propagation During Combustion of Natural Gas/Hydrogen Mixtures

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Time	Paper No.	Title
		Thomas Oppl, Gerhard Pirker, LEC Gmbh; Andreas Wimmer, Graz University of Technology; Michael Wohlthan, LEC Gmbh
2:30 p.m.	2023-01-0193	Extension and Validation of a Constant Equivalence Ratio Multi-Zone Approach to DME Combustion in Vessels and CI Engines
		Alberto Ballerini, Gianluca D'Errico, Angelo Onorati, Matteo Tamborski, Politecnico di Milano
3:00 p.m.		BREAK
3:30 p.m.	ORAL ONLY	3D-CFD driven development of a 0D empirical model to capture fuel stratification in Direct-Injected Hydrogen engines
		Navin Fogla, Kevin Roggendorf, Gamma Technologies LLC; Salvatore Roggio, Andrea Piano, Federico Millo, Politecnico di Torino
4:00 p.m.	ORAL ONLY	Experimental assessment of the predictive capabilities of a combustion model for hydrogen-fueled internal combustion engines
		Federico Millo, Andrea Piano, Gianpaolo Quattrone, Politecnico di Torino; Francesco Pesce, Alessandro Gallone, Punch Torino SpA; Davide Gessaroli, punch torino spa

Planned by General Powertrain Development / Energy and Propulsion Activity

Tuesday, April 18

Advanced Analysis, Design, and Optimization of Materials, Restraints, and Structures for Enhanced Automotive Safety and Weight Reduction

Session Code M202

Room 338 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 LLC; Wei Li, Autoliv; Jwo Pan, University of Michigan

Chairperson - William Altenhof, Univ. of Windsor

Time	Paper No.	Title
9:30 a.m.	2023-01-0080	The Jetq-Family - New Highly Ductile AHSS Steel Grades with Improved Technological Properties
		Manuela Irnich, Richard Thiessen, Adrian Paton, thyssenkrupp Steel Europe AG; Kentaro Sato, Yuki Toji, Hidekazu Minami, JFE Steel Corp.
10:00 a.m.	2023-01-0081	Effect of Local Ductility of Advanced High Strength Steels in 980MPa and 1180MPa Grades on Crash Performance of Automotive Structures
		Kentaro Sato, Tomohiro Sakaidani, Yuki Toji, Shigehiro Takajo, JFE Steel Corp.; Adrian Paton, Irnich Manuela, Richard Thiessen, thyssenkrupp Steel Europe AG
10:30 a.m.	ORAL ONLY	Modeling of Silicone Sealant Material Behavior under High-Speed Tensile, Shear and Combined Loading for Automobile Application
		Sze-Sze Ng, William Johnson, Jie FENG, Dow

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Time	Paper No.	Title
11:00 a.m.	ORAL ONLY	Weight Reduction of a Selective Laser Melted Titanium Alloy Conrod: Project Development, Experimental Characterization and Full-Scale Fatigue Investigation
		Silvia Cecchel, Francesco Mega, Streparava Spa; Seyed Mohammad Razavi, Norwegian University of Science and Tech; andrea Avanzini, davide Battini, University of Brescia; filippo berto, Norwegian University of Science and Tech; Giovanna Cornacchia PhD, Univ. of Brescia

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Tuesday, April 18

Automotive Engineering Testing and Test Methods

Session Code M203

Room 338 Session 1:30 p.m.

The focus of this session are the tests and test methods employed in the evaluation of the performance and durability of powertrain (engines, transmissions), driveline (4WD systems, driveshafts, axles), chassis (frame, suspensions, brakes, etc.) and body components, subsystems, and full vehicle systems. We also have a particular interest in vibration fatigue testing (ED shaker, 4 post shaker etc), vibration profile development and testing vs CAE correlation improvements.

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

Chairperson - Liang Wang, Stellantis NV

Time	Paper No.	Title
1:30 p.m.	2023-01-0733	Low Friction Coating for High Temperature Bolted Joints in IC Engines
		Wensheng Zhang, Stellantis N.V.; Bingxu Wang, Gary Barber, Oakland University; Gianni Lamonaca, Stellantis N.V.
2:00 p.m.	2023-01-0732	High Speed Data Acquisition for Real Time Feedback in a Light Duty Engine Combustion-Mode Switching Application
		William De Ojeda, Simon (Haibao) Wu, WM International Engineering

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Tuesday, April 18

Load Simulation and Vehicle Performance: Nonlinear Components/Systems

Session Code M206

Room 338 Session 2:30 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, Tenneco Inc.

Chairperson - Fulun Yang, Tenneco Inc.

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Time	Paper No.	Title
2:30 p.m.	2023-01-0121	Data-driven Estimation of Tire Cornering Stiffness: A Dynamic Mode Decomposition Approach Hao Chen, Chen Lv, Nanyang Technological University
3:00 p.m.	2023-01-0127	The Multi-Objective Optimization Design of Hard Point Parameters for Double Wishbone Independent Suspension Suo Zhang, YK Gao, Tongji University; De Gao, Ting Pan, Beiben Trucks Group Co. Ltd.

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Tuesday, April 18

Intelligent Manufacturing / Industry 4.0 - Part 1

Session Code MFG200

Room 353 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 Texas at Arlington; Ali Ahmad Malik, Oakland University; Monika Minarcin, Accenture; Yu Teng, BAIC Motor Corporation, Ltd.

Chairperson - Monika Minarcin, Accenture; Vijitashwa Pandey, Oakland University

Time	Paper No.	Title
9:30 a.m.	~~2023-01-0100~~ ORAL ONLY	Digitalization of Automotive Manufacturer’s Core Processes to Increase their Efficiency, Process Optimization, Visualization and Management Transparency Aneesh Nabar, P3 USA
10:00 a.m.	2023-01-0093	Developing Equipment Condition Prediction and Monitoring System Using Deep Learning Models in Automotive Production Factory Deog Hyeon Kim, Hyundai & Kia Corp.
10:30 a.m.	2023-01-0095	Analysis of a Full-Stack Data Analytics Solution Delivering Predictive Maintenance Nathan Hoyt, Nathaniel Smith, Brigham Young University; Joe Tenny, Northrop Grumman Corporation; Yuri Hovanski, Brigham Young University
11:00 a.m.	ORAL ONLY	Machine Characterization - Bring Simulation and Reality Closer Anthony Yang
11:30 a.m.	2023-01-0098	Assessing Enterprise Level, Augmented Reality Solutions for Electronics Manufacturing Elijah James Becerra, Yuri Hovanski, Brigham Young University; Joe Tenny, Rebecca Peterson, Northrop Grumman Corporation

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Planned by Integrated Design and Manufacturing Activity / Ground Vehicle Advisory Group

Tuesday, April 18

Intelligent Manufacturing / Industry 4.0 - Part 2

Session Code MFG200

Room 353 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, Univ. of Texas; Ali Ahmad Malik, Oakland University; Monika Minarcin, Accenture; Yu Teng, BAIC Motor Corporation, Ltd.

Chairperson - Monika Minarcin, Accenture; Vijitashwa Pandey, Oakland University

Time	Paper No.	Title
1:30 p.m.	2023-01-0096	Real Time Bearing Defect Classification Using Time Domain Analysis and Deep Learning Algorithms Anish Gorantiwar, Saied Taheri, Virginia Tech; Feraidoon Zahiri, US Airforce; Bijan Moslehi, IFOS
2:00 p.m.	ORAL ONLY	Interpretation of Ultrasonic NDE Data for Automotive Body-in-White Assembly Using Deep Learning Ryan Scott, Danilo Stocco, Andriy Chertov, Roman Maev, Tessonics Inc.
2:30 p.m.	ORAL ONLY	Ultrasound-Based Real-Time Resistance Spot Weld Analysis for Process Monitoring and Adaptive Control Danilo Stocco, Andriy Chertov, Ryan Scott, Roman Maev, Tessonics Inc; Sung-Hoon Jung, Yang-Woo Noh, Sang-Hyun Yoo, Obara Korea
3:00 p.m.		BREAK
3:30 p.m.	~~2023-01-0099~~ ORAL ONLY	Implementing and Analyzing a Factory Closed Loop Digital Twin Andrew Stuart Eyring, Yuri Hovanski, Brigham Young University
4:00 p.m.	ORAL ONLY	Using Augmented Reality with Embedded, Real-time Quality Inspection on Mobile Devices James Frandsen, Brigham Young University; Yuri Hovanski, Brigham Young Univ.; Joe Tenny, Northrop Grumman Corporation
4:30 p.m.	2023-01-0094	Development of a New PVC-Gel Actuator for Implementing Emotional Vibration Kyoung-Jin Chang, Hyundai Motor Group; Ki-Uk Kyung, Hyunwoo Kim, The Korea Advanced Institute of Science; Sangjin Hong, Dong Chul Park, Hyundai Motor Group

Planned by Integrated Design and Manufacturing Activity / Ground Vehicle Advisory Group

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Tuesday, April 18

Load Simulation and Vehicle Performance: Handling and Dynamics - Part 1

Session Code M210

Room 356 Session 9:30 a.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 the impact of system hybridization, electrification, and autonomous systems on vehicle dynamics and controls will be discussed.

Organizers - Jennifer Bastiaan, Kettering Univ.; Xuewu Ji, Tsinghua Univ.; Ken Kang, Honda R & D; Bin Li, Aptiv PLC

Chairperson - Jennifer Bastiaan, Kettering University

Time	Paper No.	Title
9:30 a.m.	2023-01-0903	Predictive Model of Driver's Perception of Vehicle Stability under Aerodynamic Excitation Arun Kumar, Chalmers University of Technology; Erik Sallstrom, Volvo Group; Simone Sebben, Bengt Jacobson, Chalmers University of Technology
10:00 a.m.	2023-01-0906	Interconnected Roll Stability Control System for Semitrucks with Double Trailers Xiaohan Zheng, Yang Chen, Mehdi Ahmadian, Virginia Tech
10:30 a.m.	2023-01-0908	Light Commercial Vehicle ADAS-Oriented Modelling: An Optimization-Based Conversion Tool from Multibody to Real-Time Vehicle Dynamics Model Luca Zerbato, Enrico Galvagno, Antonio Tota, Lorenzo Mancardi, Mauro Velardocchia, Politecnico di Torino; Vladi Nosenzo, Gianpiero Verrilli, Alberto Voglino, Iveco Group N.V.
11:00 a.m.	2023-01-0901	An Analysis of the Vehicle Dynamics Behind Pure Pursuit and Stanley Controllers Jacinth Gudetti, Tanmay Panchal, Jennifer Bastiaan, Kettering University

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Tuesday, April 18

Load Simulation and Vehicle Performance: Handling and Dynamics - Part 2

Session Code M210

Room 356 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 Univ.; Xuewu Ji, Tsinghua Univ.; Ken Kang, Honda R & D; Bin Li, Aptiv PLC

Chairperson - Jennifer Bastiaan, Kettering University

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Time	Paper No.	Title
1:30 p.m.	2023-01-0905	Commercial Vehicle - Development and Validation of Vehicle Dynamics Model to Aid in Handling Evaluation Lukas Obel, Nitin Edla, Santhosh Pasupathi, Gerald Bergsieker, Isuzu Technical Center of America Inc.
2:00 p.m.	2023-01-0902	Simulation Study of Vehicle Handling Characteristics on Snowy and Icy Terrain Shantanu Gajanan Tekade, Criston Sequeira, Jennifer Bastiaan, Kettering University
2:30 p.m.	2023-01-0900	The Potential of a Hybrid Powertrain in Fuel Consumption and Thermal Drive-Off Element Load for Drive-Off Procedures regarding Driving Styles Ping He, Aaron Kappes, Yi Cui, Stephan Rinderknecht, Technical University of Darmstadt

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Tuesday, April 18

Vehicle Thermal Systems & Climate Control - Part 1

Session Code HX104

Room 359 Session 9:30 a.m.

Climate control is a defining vehicle attribute and is associated with brand image. Thermal performance and quality of climate control are both critical to customer satisfaction. The system has strong design interaction with other vehicle systems, while its primary objective is to deliver thermal comfort and occupant safety with low energy consumption. Localized Comfort, Secondary Fluids, Air Quality, Controls, System Sizing and HVAC consumer interface are just a few of the recent advances.

Organizers - Bashar AbdulNour, Kettering Univ.; Jeffrey Bozeman, Retired; Gursaran Mathur, Highly-Marelli North America; Jie Zeng, Denso; Bing Shuttlewood, General Motors LLC

Chairperson - Bashar AbdulNour, Kettering Univ.; Jeffrey Bozeman, Retired; Gursaran Mathur, Highly-Marelli North America; Bing Shuttlewood, General Motors Corporation

Time	Paper No.	Title
9:30 a.m.	2023-01-0142	Transient Oil Migration and Flow Behavior during Automotive Compressor Startup Xin Wang, Syed Angkan Haider, Stefan Elbel, University of Illinois, Urbana-Champaign
10:00 a.m.	2023-01-0138	Measurements of Oil Circulation Rate using Flow-through and Evacuated Type Sampling Cylinders for an Automotive Air Conditioning System Syed Angkan Haider, Xin Wang, Stefan Elbel, University of Illinois, Urbana-Champaign
10:30 a.m.	2023-01-0141	Oil Droplet vs. Film Flow at Discharge and Suction after Shutdown of Automotive Compressor Xin Wang, Syed Angkan Haider, Stefan Elbel, University of Illinois, Urbana-Champaign
11:00 a.m.	2023-01-0143	Energy Consumption of Titanium Dioxide & Ultraviolet Germicidal (UV-C) Photocatalytic Air Purification System for Automotive Cabins Gursaran Mathur, Highly-Marelli North America

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Time	Paper No.	Title
11:30 a.m.	2023-01-0140	Study of Flashing Flows Entering Evacuated Sampling Cylinders for Oil Circulation Rate Measurement in an Automotive Air Conditioning System Syed Angkan Haider, Xin Wang, Stefan Elbel, University of Illinois, Urbana-Champaign

Planned by Thermal Management Activity / Ground Vehicle Advisory Group

Tuesday, April 18

Vehicle Thermal Systems & Climate Control - Part 2

Session Code HX104

Room 359 Session 1:30 p.m.

Climate control is a defining vehicle attribute and is associated with brand image. Thermal performance and quality of climate control are both critical to customer satisfaction. The system has strong design interaction with other vehicle systems, while its primary objective is to deliver thermal comfort and occupant safety with low energy consumption. Localized Comfort, Secondary Fluids, Air Quality, Controls, System Sizing and HVAC consumer interface are just a few of the recent advances.

Organizers - Bashar AbdulNour, Kettering Univ.; Jeffrey Bozeman; Gursaran Mathur, Highly-Marelli North America; Bing Shuttlewood, General Motors Corporation; Jie Zeng, Jie Zeng, Denso

Chairperson - Bashar AbdulNour, Kettering Univ.; Jeffrey Bozeman; Gursaran Mathur, Highly-Marelli North America; Bing Shuttlewood, General Motors Corporation

Time	Paper No.	Title
1:30 p.m.	2023-01-0137	Application of Model Predictive Control to Cabin Climate Control Leading to Increased Electric Vehicle Range Peter Fussey, He Ma, Ricardo; Nilabza Dutta, Jaguar Land Rover
2:00 p.m.	2023-01-0139	Reduction of Exposure to Air Pollutants with Map-Based Cabin Air Control Herve Borrel, Airlib Inc.; Heejung Jung, University Of California Riverside; Paolo Taddonio, Airlib Inc.
2:30 p.m.	2023-01-0144	Feedback Linearization-based Thermal Control Strategy for Electrified Vehicles Muzamil Rashid, Sina Shojaei, Fabio Toriumi, Milad Karimshoushtari, Mateo Restrepo, Feisel Weslati, Kamal Bouyoucef, Stellantis N.V.

Planned by Thermal Management Activity / Ground Vehicle Advisory Group

Tuesday, April 18

Thermal System Components

Session Code HX101

Room 359 Session 3:30 p.m.

Thermal Management represents 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; Gursaran Mathur, Highly-Marelli North America; Ales Alajbegovic, Four Elements Technologies; Alaa El-Sharkawy, FCA US LLC

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Chairperson - Gursaran Mathur, Highly-Marelli North America; Ronald Semel, Ford Motor Company

Time	Paper No.	Title
3:30 p.m.	2023-01-0813	New Radiant Heater Structure which Combines Warmth and Safety for EV Range Extension Yasuhiro Sago, Kimitake Ishikawa, Hideki Seki, Yusuke Tanaka, DENSO Corporation
4:00 p.m.	2023-01-0814	Prediction of Water Diffusivity in Hollow Fiber Membranes in a Humidifier used for a Vehicular Fuel Cell System Xuan Linh Nguyen, Sangseok Yu, Chungnam National University

Planned by Thermal Management Activity / Ground Vehicle Advisory Group

Tuesday, April 18

Learning Lab: Day 1

Session Code LL100

Room Learning Lab Session ALL DAY

Get unprecedented interaction and go one-on-one with new technology from exhibitors in the Learning Lab. You'll hear discussions on the latest innovations in mobility products with engineers and suppliers in an intimate theater venue, to ask questions and experience hands-on demonstrations. As a bonus – There will be a critical panel discussion moderated by CADIA and the Mobile History Committee will give special presentations on Thursday Morning.

Time	Paper No.	Title
11:30 a.m.	ORAL ONLY	Title TBD John Jennings, Amsted Automotive

Tuesday, April 18

Written Only: Heavy Duty Diesel Lubricants

Session Code PFL350

Room TBD Session

This session reviews advancements in heavy-duty engine oil technology and test methodology, focusing on achieving future emissions, durability and fuel efficiency expectations both in North America and Europe.

Organizers - Jason Andersen, PACCAR Inc.; Elana Chapman, General Motors LLC; Caroline Laufer, Infineum International, Ltd.; Derek Splitter, Oak Ridge National Laboratory

Planned by Fuels and Lubricants / Energy and Propulsion Activity

WCX SAE World Congress Experience

Technical Session Schedule

As of March 16, 2023 19:49:53 PM

Tuesday, April 18

Occupant Protection: Accident Reconstruction (Written Only Session)

Session Code SS500

Room TBD Session

For 2023, the AR session will be only accepting abstracts for a written only paper. We are asking that these papers focus on the latest research related to methods and techniques for reconstructing vehicular crashes involving wheeled and tracked vehicles, pedestrians, and roadside features. Emphasis is placed on experimental data and theoretical methods that will enable reconstructionists to identify, interpret and analyze physical evidence from vehicular crashes.

Organizers - Christopher Armstrong, Armstrong Forensic Reconstruction Corp.; Alan Asay, Asay Engineering; Dean Beaumont, TRL; Jarrod Carter, Origin Forensics LLC; Edward Fatzinger, Momentum Engineering Corp.; David Plant, D P Plant & Associates; Nathan Rose, Explico Engineering Co.; John Sprague; John Christopher Steiner, Mecanica Scientific Svcs Corp.; James White, JP White Engineering; Craig Wilkinson, MEA Forensic Engineers & Scientists

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

Tuesday, April 18

Occupant Protection: Event Data Recorders (EDR) - Written Only Session

Session Code SS502

Room TBD Session

This session includes the latest research on Event Data Recorders (EDRs) equipped in passenger cars, light trucks, and commercial vehicles (heavy trucks and motorcoaches). Emphasis is placed on the application, interpretation and use of EDRs in the investigation of motor vehicle crashes.

Organizers - David Plant, D P Plant & Associates; John Sprague; John Christopher Steiner, Mecanica Scientific Svcs Corp.; James White, JP White Engineering; Craig Wilkinson, MEA Forensic Engineers & Scientists

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

Wednesday, April 19

Body Engineering and Design

Session Code SS100

Room 140 A Session 9:30 a.m.

Body Engineering & Design 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; Ramakrishna Koganti, University Of Texas at Arlington; Anahita Rastkar, General Motors; Vesna Savic, General Motors LLC; Raghu Echempati, Kettering Univ

Time	Paper No.	Title
9:30 a.m.	2023-01-0600	Comprehensive Design Methodology of a Vehicle Monocoque: From Vehicle Dynamics to Manufacturing Alessandro Messana, Luca Bianco, Massimiliana Carello, Politecnico di Torino
10:00 a.m.	2023-01-0603	Full Aluminum Body Design Considering Part-Specific Requirements

WCX SAE World Congress Experience

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Time	Paper No.	Title
		Byeongdo An, Munsoo Cha, Yongdok An, Heeju Kim, Heedae Oh, Kyungbo Kim, Younghoon Jang, Byeunggun Nam, Yunbae Chun, Hunky Lee, Hyundai Motor Company
10:30 a.m.	2023-01-0605	Invest in Adhesive Dispensing to Reduce Design, Capital, and Operational Costs
		Michael J. Lee, MJ Lee Technical Insight LLC
11:00 a.m.	2023-01-0604	Optimization of Body D-Pillar Ring Structure
		Hyungtae Kim, YoungHo Lee, Jungwoo Hur, Jeehwan Choi, Hyundai Motor Company
11:30 a.m.	2023-01-0602	Quantitative Multi-Physics Tools for Automotive Wiper Design
		Bradley Graham, James Knowles, George Mavros, Loughborough University
12:00 p.m.	2023-01-0599	Analysis and Redesign of Connection Part in Cargo Truck Chassis for Fatigue Durability Performance
		Furong Xie, Yunkai Gao, Yanan Xu, Tongji University; De Gao, Ting Pan, Beiben Trucks Group Co., Ltd.

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

Wednesday, April 19

Human Factors in Driving and Automotive Telematics

Session Code SS302

Room 140 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 - Derek F. Fraser, Stellantis; Shantha Rajendran, General Motors LLC

Chairperson - Derek F. Fraser, General Motors LLC; Shantha Kumari Rajendran, General Motors

Time	Paper No.	Title
3:00 p.m.	2023-01-0788	Development and Evaluation of Comfort Assessment Approaches for Passengers in Autonomous Vehicles
		Haotian Su, Johnell Brooks, Yunyi Jia, Clemson University
3:30 p.m.	2023-01-0789	Estimates of In-Vehicle Task Element Times for Usability and Distraction Evaluations
		Paul Green, Ekim Koca, Collin Brennan-Carey, University of Michigan
4:00 p.m.	2023-01-0790	Evaluating Drivers' Understanding of Warning Symbols Presented on In-Vehicle Digital Displays Using a Driving Simulator
		Breno Schwambach, Johnell Brooks, Casey Jenkins, Clemson University

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Time	Paper No.	Title
4:30 p.m.	2023-01-0791	Assessing Driver Distraction: Enhancements of the ISO 26022 Lane Change Task to Make its Difficulty Adjustable Hongxiao Zheng, Fengyuan Hu, Paul Green, University of Michigan

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

Wednesday, April 19

Homogenous Charge & Partially Premixed Compression Ignition (HCCI & PPCI)

Session Code PFL230

Room 140 B Session 9:30 a.m.

Classical HCCI combustion with temperature controlling combustion onset and only a modest effect of fuel injection. Papers describing experiments and test data, simulation results focused on applications, fuel/additive effects, combustion control, and mode change are invited and will be placed in appropriate sub-sessions. Papers with an emphasis on the modeling aspects of combustion are in sessions PFL 110 or PFL120.

Organizers - Vincent Costanzo; Vickey Kalaskar, Southwest Research Institute; Darko Kozarac, Univ. of Zagreb; Antowan Zyada, General Motors

Chairperson - Vickey Kalaskar, Southwest Research Institute

Time	Paper No.	Title
9:30 a.m.	2023-01-0274	Numerical Simulations of Pre-Chamber Induced HCCI Combustion (PC-HCCI) Josip Krajnovic, Viktor Dilber, Rudolf Tomic, Momir Sjeric, Petar Ilincic, Darko Kozarac, Univ of Zagreb
10:00 a.m.	ORAL ONLY	Onboard cetane enhancement for improving gasoline compression ignition under cold start conditions Kaustav Bhadra, Alexander Voice, Aramco Americas; Andre Boehman, University of Michigan
10:30 a.m.	2023-01-0275	A Computational Investigation of Piston Bowl Geometry Effects on PPCI-Diffusion Combustion in a Light-Duty GCI Engine Yu Zhang, Anqi Zhang, Mark Sellnau, Aramco Research Center - Detroit
11:00 a.m.	ORAL ONLY	Implosion Combustion Technology and the CIBC concept Tyler Erickson, Micro-Combustion LLC

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WCX SAE World Congress Experience

Technical Session Schedule

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Wednesday, April 19

Powertrain NVH, Part 1

Session Code PFL550

Room 140 B Session 1:30 p.m.

This session sets out to reflect the recent advances on the research, development and practices of Powertrain NVH treatment. The technical papers are of interest to powertrain system designers, testing specialists, NVH experts, and other individuals who evaluate and develop technologies to control powertrain NVH. The coverage includes: engine, engine subsystem and components noise and vibration; powertrain systems noise measurement and instrumentation; powertrain systems noise analysis.

Organizers - Sanjib Chowdhury, The Ohio State University; Sumanth Reddy Dadam, Ford Motor Company; Yashodhan Joshi, MIT; Andrea Strzelec, University of Wisconsin-Madison

Time	Paper No.	Title
1:30 p.m.	2023-01-0432	Relation between Vertical, Longitudinal and Transverse Vibration in the Engine Block and Performance Parameters of an Otto Cycle Internal Combustion Engine Operated with Gasoline and Ethanol Fuel Claudio Marcio Santana, Universidade Federal de Ouro Preto
2:00 p.m.	2023-01-0420	Cross-domain fault diagnosis of powertrain system using Sparse Representation Pengfei Shen, Tianjin Univ.; Fengrong Bi, Daijie Tang, Xiao Yang, Meng Huang, Mingzhi Guo, Tianjin Univ; Xiaoyang Bi, Hebei Univ of Technology
2:30 p.m.	2023-01-0430	Experimental Study on the Relationship between Combustion and Vibration in a Gasoline Engine Hironao Sato, Masahiro Oba, Takashi Hiromoto, Kiyofumi Sato, Toshiyuki Sonobe, SUBARU Corporation; Satoru Hayakawa, Koji Morikawa, Yasuo Moriyoshi, Chiba University; Noriaki Sekine, SUBARU Techno Corporation
3:00 p.m.		BREAK

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

Wednesday, April 19

Small Engine Technology

Session Code PFL540

Room 140 B Session 3:30 p.m.

In this session, research and development of small engine technology will be covered.

Organizers - Simona Silvia Merola, CNR; Leonid Tartakovsky, Technion Israel Inst. of Technology; Adrian Irimescu, CNR Consiglio Nazionale delle Ricerche; Cinzia Tornatore, Italian National Research Council

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

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Time	Paper No.	Title
3:30 p.m.	2023-01-0416	Experimental Characterization of the Mechanical Loss Components of a Single-Cylinder Spark-Ignition Engine by Progressive Disassembly Method Carlos Alberto Romero, Universidad Tecnologica de Pereira; Juan David Ramírez, Universidad Tecnológica de Pereira; Edison de Jesús Henao Castañeda, Universidad Tecnologica de Pereira

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

Wednesday, April 19

CI Combustion Emissions

Session Code PFL222

Room 140 C Session 9:30 a.m.

Organizers - Giacomo Belgiorno, Punch Torino SpA; Brian Kaul, US Dept. of Energy; Raul Payri, Universitat Politecnica de Valencia; Lu Qiu, Cummins Inc.

Chairperson - Giacomo Belgiorno, Punch Torino SpA; Chad Koci, Caterpillar Inc.; Lu Qiu, Cummins Inc.

Time	Paper No.	Title
9:30 a.m.	2023-01-0269	Meeting Phase-2 GHG and Ultra-Low NOx Emissions with Conventional Engine Design for Light Heavy-Duty Applications Vaibhav Kadam, Arvind Mayilvaganan, Chintan Desai, Bruce Vernham, Isuzu Technical Center of America Inc
10:00 a.m.	2023-01-0266	Effects on Performance, Efficiency, Emissions, Cylinder Pressure, and Injection of a Common-Rail Diesel Engine When Using a Blend of 15% Biodiesel (B15) or 15% Hydrotreated Vegetable Oil (HVO15) Luis Serrano, Paulo Carvalho, Daniela Bastos, Nuno Pires, Polytechnic Institute of Leiria
10:30 a.m.	2023-01-0267	Soot and Gaseous Emissions Characterization of Butyl-Acetate/Diesel Blend in a Heavy-Duty Engine Spencer L. Hall, Joshua A. Bittle, University of Alabama
11:00 a.m.	2023-01-0268	Emission Characteristics of a Light Diesel Engine with PNA under Different Coupling Modes of EHC and Aftertreatment System Lulu Kang, Liang Fang, Tongji University; Yunkun Zhao, Kunming Sino-platinum Metals Catalyst; Diming Lou, Yunhua Zhang, Chagen Luo, Tongji University

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Wednesday, April 19

Basic CI Combustion, Part 1

Session Code PFL221

Room 140 C Session 1:30 p.m.

Organizers - Gurneesh S. Jatana, US Dept. of Energy; Ezio Mancaruso, STEMS - CNR; Rafael Lago Sari, Aramco Services Co.; Yu Zhang, Aramco Research Center

Chairperson - Gurneesh S. Jatana, US Dept. of Energy; Yu Zhang, Cummins

Time	Paper No.	Title
1:30 p.m.	ORAL ONLY	Assessment of Design and Location of an Active Prechamber Igniter to Enable Mixing Controlled Combustion of Ethanol in Heavy-Duty Engines Jared Zeman, Adam Dempsey, Marquette University; Michael Bunce, Ziming Yan, MAHLE Powertrain LLC
2:00 p.m.	ORAL ONLY	Optical-Engine Study of Ducted Fuel Injection with Low-Net-Carbon Fuels at Idle and Mid-Load Conditions Gustav Nyrenstedt, Sandia National Laboratories; Drummond Biles; Christopher Nilsen; Charles J. Mueller, Sandia National Laboratories
2:30 p.m.	2023-01-0263	Combined Impacts of Engine Speed and Fuel Reactivity on Energy-Assisted Compression-Ignition Operation with 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
3:00 p.m.		BREAK
3:30 p.m.	ORAL ONLY	Numerical and optical soot characterization through 2-color pyrometry technique for an innovative diesel piston bowl design Federico Millo, Andrea Piano, Salvatore Roggio, Politecnico di Torino; Antonio Garcia, Carlos Micó, Felipe Lewiski, Universitat Politecnica de Valencia; Francesco Pesce, Giacomo Belgiorno, Punch Torino SpA; Andrea Bianco, Powertech Engineering SRL
4:00 p.m.	2023-01-0261	An Optical Study of the Effects of Diesel-like Fuels with Different Densities on a Heavy-duty CI Engine with a Wave-shaped Piston Bowl Geometry Miaoxin Gong, Saeed Derafshzan, Mattias Richter, Lund University; Stina Hemdal, Jan Eismark, Volvo Group Trucks Technology; Oivind Andersson, Marcus Lundgren, Lund University
4:30 p.m.	2023-01-0260	Operation of a Natural Gas Direct Injection Compression Ignition Single Cylinder Research Engine Tyler White, Brian Eggart, Jeffrey Naber, Michigan Technological University; Marco Turcios, Ashish Singh, Sandeep Munshi, Westport Fuel Systems

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Wednesday, April 19

Panel Discussion: What will future engines look like?

Session Code PFL299

Room 140 D Session 9:30 a.m.

The recent shift in multiple vehicle markets towards a focus on electrification has put in question the future of the internal combustion (IC) engine. Diversification of powertrain alternatives will continue and perhaps accelerate in the next decade. This diversification is motivated by aggressive greenhouse gas emissions reductions expected in the next 20 years to combat climate change. This panel of experts will discuss what lies on the road ahead for IC engines. Learn more about the Panelists

Organizers - Vincent Costanzo; Flavio Dal Forno Chuahy, Oak Ridge National Laboratory; Justin Ketterer, General Motors LLC; Riccardo Scarcelli, Argonne National Laboratory; Andrea Strzelec, University of Wisconsin-Madison; John Wright, Cummins Inc.; Xin Yu, Aramco Research Center

Moderators - Flavio Dal Forno Chuahy, Oak Ridge National Laboratory

Panelists - Mark Case, FEV North America Inc.; Cathy Y. Choi, Clearflame Engines Inc.; Eric Dillen, Wabtec; Sebastian Verhelst, Ghent University; Brian West, West Energy And Environment Associates;

Planned by Engine Combustion / Energy and Propulsion Activity

Wednesday, April 19

Combustion in Gaseous-Fueled Engines

Session Code PFL270

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 - Vincent Costanzo; Haiwen Ge, Texas Tech. University; Gordon McTaggart-Cowan, Simon Fraser University; Jun Peng, University of Lincoln; A S Ramadhas, Indian Oil Corporation; Ashish Shah, Aramco Americas; James Turner, KAUST

Chairperson - Gordon McTaggart-Cowan, Simon Fraser University

Time	Paper No.	Title
1:30 p.m.	2023-01-0287	Challenges and Opportunities with Direct-Injection Hydrogen Engines
		Vickey Kalaskar, Graham Conway, Gaurav Handa, Shinhyuk Joo, Daniel Williams, Southwest Research Institute
2:00 p.m.	2023-01-0284	Effect of Standard Tuning Parameters on Mixture Homogeneity and Combustion Characteristics in a Hydrogen Direct Injection Engine
		Jean LOW-KAME, Richard Oung, Universite D'Orleans; Guillaume Meissonnier, Mathieu Da Graca, Laurent Doradoux, BorgWarner; Fabrice Foucher, Universite D'Orleans
2:30 p.m.	2023-01-0290	Combustion Cycle-To-Cycle Variation Analysis in Diesel Baseline Hydrogen-Fueled Spark-Ignition Engines
		Caio Ramalho Leite, Richard Oung, Pierre BREQUIGNY, Université d'Orléans; Jacques Borée, ENSMA (Mecanique et Aerotechnique); Fabrice Foucher, Université d'Orléans
3:00 p.m.		BREAK
3:30 p.m.	2023-01-0286	Lambda Determination Challenges for Ultra-Lean Hydrogen-Fueled Engines and the Impact on Engine Calibration

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Time	Paper No.	Title
		Nathan Peters, Michael Bunce, MAHLE Powertrain LLC
4:00 p.m.	2023-01-0289	Experimental Investigations of Methane-Hydrogen Blended Combustion in a Heavy-Duty Optical Diesel Engine Converted to Spark Ignition Operation
		Niraj Panthi, King Abdullah Univ. of Science & Tech.; Junseok Chang, Abdullah AlRamadan, Saudi Aramco; Gaetano Magnotti, King Abdullah Univ. of Science & Tech.
4:30 p.m.	2023-01-0288	Innovative Piston Design Performance for High Efficiency Stoichiometric Heavy Duty Natural Gas Engine
		Juan Felipe rodriguez, Colorado State University; Hui Xu, Cummins Inc; Gregory Hampson, Woodward; Diego Bestel, Bret Windom, Daniel Olsen, Colorado State University

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Wednesday, April 19

Electric Motor & Power Electronics, Part 2

Session Code PFL740

Room 140 E 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 - Ted Bohn, Intercim LLC; Elana Chapman, General Motors LLC; Yilun Luo, General Motors; Saeed Siavoshani, Saeed Siavoshani, Eaton; Andrea Strzelec, University of Wisconsin-Madison; Hongming Xu, Birmingham Univ.

Chairperson - Yilun Luo, General Motors LLC

Time	Paper No.	Title
9:30 a.m.	2023-01-0533	Modeling Electric Motors with High Fidelity for Accurate eDrive NVH Simulation
		Walter Z. Nie, Nurani Chandrasekhar, Wei Wu, Ford Motor Company
10:00 a.m.	2023-01-0529	Rotor Durability Optimization by Means of Finite Element Multiphysics Analysis for High-Speed Surface Permanent Magnet Electric Machines
		Akshay Manikandan, McMaster Automotive Res. Centre (MARC); Mohamed Abdalmagid, Giorgio Pietrini, McMaster Automotive Res Centre (MARC); Mikhail Goykhman, Eaton Aerospace; Ali Emadi, McMaster Automotive Res Centre (MARC)
10:30 a.m.	2023-01-0530	Motor Stator Modeling and Equivalent Material Parameters Identification for Electromagnetic Noise Calculation
		Shuguang Zuo, Bin Yin, Xiaorui Hu, Panxue Liu, Tongji University
11:00 a.m.	2023-01-0527	Current and Torque Harmonics Analysis of Dual Three-Phase Permanent-Magnet Synchronous Machines with Arbitrary Phase Shift Based on Model-in-the-Loop
		Bufan Shi, Jakob Andert, Haoran Wang, RWTH Aachen University

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Time	Paper No.	Title
11:30 a.m.	2023-01-0531	Mechanical Design Considerations for Electric Vehicle Power Electronics
		Dawud Abu-Zama, Ranya Badawi, Mehrdad Teimor, Ioan Suciu, General Motors LLC

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Wednesday, April 19

Electric Motor & Power Electronics, Part 3

Session Code PFL740

Room 140 E 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 - Ted Bohn, Intercim LLC; Elana Chapman, General Motors LLC; Yilun Luo, General Motors; Saeed Siavoshani, Saeed Siavoshani, Eaton; Andrea Strzelec, University of Wisconsin-Madison; Hongming Xu, Birmingham Univ.

Chairperson - Yilun Luo, General Motors LLC

Time	Paper No.	Title
1:30 p.m.	ORAL ONLY	Flame Retardant Polyamide for HV Electrical Connectors
		Kim White, Kai Becker, Ascend Performance Materials
2:00 p.m.	2023-01-0540	Rotor Optimization to Reduce Electric Motor Noise
		Song He, Peng Zhang, Michael Muir, Benjamin Koch, General Motors LLC
2:30 p.m.	ORAL ONLY	Next-gen EDUs pushing for increased continuous power and overall efficiency with form-litz-wiring technology, 800V GaN 3 Level Inverter and HV booster function
		Thomas Hackl, hofer powertrain
3:00 p.m.		BREAK

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Wednesday, April 19

Panel Discussion: The Failures and Challenges of Computer-augmented Engineering (CAE) in the development of Future Advanced Engine and Powertrain Components

Session Code PFL599

Room 140 F Session 9:30 a.m.

Organizers - Anand Nageswaran Bharath, Cummins Inc.; Aaron W. Costall, Costall Engineering Limited; Eric Krivitzky, Thermofluid Research Laboratory; Shakti Saurabh, Cummins Inc.

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Moderators - Anand Nageswaran Bharath, Cummins Inc.

Panelists - Sam Akehurst, University Of Bath; Graham Conway, Southwest Research Institute; Thomas Howell, AVL Mobility Tech. Inc.; Michael Hughes, Cummins;

Wednesday, April 19

Advanced Fuel Cell Vehicle Applications, Part 2

Session Code PFL720

Room 140 F 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; Di Zhu, Ford Motor Company; Yi Ding; Rafael Lago Sari, Aramco Services Co.; Saeed Siavoshani, Eaton; Hongming Xu, Birmingham Univ.

Chairperson - Santhosh Gundlapally, Gamma Technologies LLC; Ashok Kumar, Cummins Inc.

Time	Paper No.	Title
1:30 p.m.	2023-01-0497	Dynamic Simulation using ECMS Controller to Optimize the Fuel Economy of a Fuel Cell based HD Commercial Vehicle Sujeet Nagaraj Vankayala, Garrett Motion Engineering Solutions; Philippe De Araujo, Garrett Motion France; Michael Zagun, Gamma Technologies GmbH; Marcin Okarmus, Jake HOW, Jonathan Zeman, Gamma Technologies LLC
2:00 p.m.	2023-01-0178	Hierarchical Decentralized Model Predictive Control for Multi-Stack Fuel Cell Vehicles Using Driving Cycle Data Arash Khalatbarisoltani, Xiaosong Hu, Chongqing University
2:30 p.m.	ORAL ONLY	ECCV - A Simulation Platform for Commercial Long-Haul Vehicles with Fuel Cell and Electric Powertrains Lars Eriksson, Linkoping Univ.; Robin Holmbom, Max Johansson, Linkoping Univ; Oskar Lind Jonsson, Linkopings Univ
3:00 p.m.		BREAK
3:30 p.m.	2023-01-0495	A Methodology to Design the Flow Field of PEM Fuel Cells Giuseppe Corda, Antonio Cucurachi, Martino Diana, Stefano Fontanesi, Alessandro D'Adamo, Università di Modena e Reggio Emilia
4:00 p.m.	2023-01-0493	CFD Analysis of Fuel Cell Humidification System for Automotive Application Massimiliana Carello, Silvio Landolfi, Alessandro Rizzello, Politecnico di Torino; Sumit Khadilkar, UFI CELL Srl
4:30 p.m.	2023-01-0499	Design and Structural Parameters Analysis of the Centrifugal Compressor for Automotive Fuel Cell System Based on CFD Method Haoyu mao, Tongji University; Rongchao Zhao, South China University of Technology; Chaodong Hang, Sichuan Xu, Tongji University

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Wednesday, April 19

Advanced Hybrid and Electric Vehicle Powertrains, Part 3

Session Code PFL710

Room 140 G Session 9:30 a.m.

This session covers new production and near-production hybrid propulsion, hybrid architecture, testing, analysis and new concepts.

Organizers - Norman Bucknor, Elana Chapman, General Motors LLC; Sumanth Reddy Dadam, Ford Motor Company; Michael Duoba, Argonne National Laboratory; Vivek Kumar, Ford Motor Co.; Saeed Siavoshani, Eaton; Hongming Xu, Birmingham Univ.

Chairperson - Norman Bucknor, General Motors LLC

Time	Paper No.	Title
9:30 a.m.	ORAL ONLY	Building Redundancy in an Electrical Systems that Powers an 400V or 800VElectric Vehicles Patrick Kowalyk, Vicor Corporation
10:00 a.m.	2023-01-0474	Development of the New 2.0L Hybrid System for Prius Satoshi Hirota, Takaji Kikuchi, Tomoya Katanoda, Toyota Motor Corporation
10:35 a.m.	2023-01-0473	Multi-Objective Optimization of the Fuel Cell Hybrid Electric Powertrain for a Class 8 Heavy-Duty Truck Farhad Salek, Oxford Brookes University; Eyad Abouelkhair, AVL Powertrain UK Ltd; Meisam Babaie, University Of Leeds; Frank Cunliffe, Involution Technologies Ltd; William Nock, Bramble Energy Ltd
11:00 a.m.	2023-01-0471	Hydrogen Hybrid ICE Powertrains with Ultra-Low NO_x Emissions in Non-Road Mobile Machinery Thomas Aschauer, Sebastian Roiser, Eberhard Schutting, Helmut Eichlseder, Graz University of Technology; David Lindenthaler, Florian Falbesoner, Josef Ratzinger, Ulrich Hammerle, Liebherr-Werk Telfs GmbH
11:30 a.m.	2023-01-0478	Light Duty Battery Electric Vehicle – Battery Degradation Vehicle Modeling Sparsh Saxena, Bharat Kudachi, Santhosh Pasupathi, Gerald Bergsieker, Isuzu Technical Center of America Inc

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

Wednesday, April 19

Advanced Battery Technologies, Part 2

Session Code PFL730

Room 141 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 - Elana Chapman, General Motors LLC; Curtis Collar, Nanotech Energy; Matilde D'Arpino, Ohio State University; Yi Ding; Santhosh Gundlapally, Gamma Technologies LLC; Xianke Lin, Ontario Tech. University; James Miller, Argonne National Laboratory; Satyam Panchal, Stellantis NV;

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Eugene Saltzberg; Saeed Siavoshani, Eaton; Hongming Xu, Birmingham Univ.; Di Zhu, Ford Motor Company

Chairperson - Di Zhu, Ford Motor Company

Time	Paper No.	Title
9:30 a.m.	2023-01-0505	Low Frequency Impedance Spectroscopy – Modeling Study on the Transferability of Solid Diffusion Coefficients Johann C. Wurzenberger, Christoph Lechner, Chao Chen, AVL LIST GmbH; Michael Kolmbauer, Mathconsult GmbH; Igor Mele, Tomaz Katrasnik, Univ of Ljubljana
10:00 a.m.	2023-01-0519	A new solid electrolyte with a high lithium ionic conductivity for solid-state lithium-ion batteries Qifeng Zhang, North Dakota State Univ; Yi Ding, RDECOM-GVSC
10:30 a.m.	ORAL ONLY	Cell variation in thermal runaway behavior Liwen zhang, Lu Liu, The University of Tennessee; Xia Wang, Oakland University; Peng Zhao, The University of Tennessee
11:00 a.m.	2023-01-0513	Transient Electrochemical Modeling and Performance Investigation Under Different Driving Conditions for 144Ah Li-ion Cell with Two Jelly Rolls Raphael Braga, Anosh Mevawalla, Stellantis NV; Soumya Gudiyella, FCA US LLC; Satyam Panchal, Stellantis NV; Mattia Giuliano, Giovanna Nicol, CRF Italy; Yi Zheng, Stellantis NV
11:30 a.m.	ORAL ONLY	BATTERY PERFORMANCE IMPROVEMENT AT LOW TEMPERATURE BY USING PULSE CHARGING Jiahao Liu, Oakland University; Peng Zhao, The University of Tennessee; Xia Wang, Oakland University

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

Wednesday, April 19

Advanced Battery Technologies, Part 3

Session Code PFL730

Room 141 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 - Elana Chapman, General Motors LLC; Curtis Collar, Nanotech Energy; Matilde D'Arpino, Ohio State University; Yi Ding; Santhosh Gundlapally, Gamma Technologies LLC; Xianke Lin, Ontario Tech. University; James Miller, Argonne National Laboratory; Satyam Panchal, Stellantis NV; Eugene Saltzberg; Saeed Siavoshani, Eaton; Hongming Xu, Birmingham Univ.; Di Zhu, Ford Motor Company

Chairperson - Xianke Lin, Ontario Tech University

Time	Paper No.	Title

WCX SAE World Congress Experience

Technical Session Schedule

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Time	Paper No.	Title
1:30 p.m.	2023-01-0503	Development and Validation of Cycle and Calendar Aging Model for 144Ah NMC/Graphite Battery at Multi Temperatures, DODs, and C-Rates Satyam Panchal, Vinicius Pierre, Stellantis NV; Massimo Cancian, Maserati; Oliver Gross, Stellantis NV; Fadi Estefanous, Stellantis; Tamer Badawy, Stellantis NV
2:00 p.m.	2023-01-0522	Estimating Battery State-of-Charge using Machine Learning and Physics-Based Models Harsh Darshan Sapra, Michael Wagner, University of Wisconsin-Madison; Sage Kokjohn, Univ of Wisconsin-Madison; Lukas Desorcy, Sahana Upadhya, University of Wisconsin-Madison; Chol-Bum Kweon, US Army DEVCOM Army Research Laboratory; Shivaram Venkataraman, University of Wisconsin-Madison; Justin Shumaker, US Army Research Laboratory; Olesia Elfimova, University of Wisconsin-Madison
2:30 p.m.	2023-01-0508	Real-World Aging Prediction of a Lithium-Ion Battery Using a Simulation-Driven Approach Ujjwal Chopra, Gamma Cae Technologies Pvt , Ltd.; Nikhil Biju, Gamma Technologies, LLC
3:00 p.m.		BREAK
3:30 p.m.	2023-01-0511	A New Safety-Oriented Multi-State Joint Estimation Framework for High-Power Electric Flying Car Batteries Wenxue Liu, Arash Khalatbarisoltani, Chongqing University; Cong Hou, XPENG AEROHT; Xiaosong Hu, Chongqing University
4:00 p.m.	ORAL ONLY	Prediction of SOC and SOH of Li-ion battery Using Reduced-order Physics-based Model Zhibang Xu, Jun Chen, Xia Wang, Oakland University

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

Wednesday, April 19

Alternative and Advanced Fuels, Part 3

Session Code PFL330

Room 142 A 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; Elana Chapman, General Motors LLC; Elisa Toulson, Michigan State University; Cinzia Tornatore, Italian National Research Council; Derek Splitter, Oak Ridge National Laboratory; Vickey Kalaskar, Southwest Research Institute; George Karavalakis, University Of California Riverside; Andrew Ickes, Chevron

Chairperson - Brian Gainey, Clemson University

Time	Paper No.	Title

WCX SAE World Congress Experience

Technical Session Schedule

As of March 16, 2023 19:49:54 PM

Time	Paper No.	Title
9:30 a.m.	ORAL ONLY	Experimental evaluation of the potentiality of drop-in and recalibrating scenarios for neat HVO application as a fuel in a Euro 6 LD diesel engine Federico Millo, Andrea Piano, Mohammadjavad Jafari Mahmoudabadi, Politecnico di Torino; Francesco Pesce, Alberto Vassallo, Punch Torino SpA
10:00 a.m.	2023-01-0340	Comparative analysis of different methodologies to calculate Lambda () based on extensive and systemic experimentation on a Hydrogen Internal Combustion Engine Naqash Azeem, Parthenope Uni of Naples,CNR STEMS,PUNCH; Carlo Beatrice, CNR STEMS; Alberto Vassallo, Francesco Pesce, Gessaroli Davide, Punch Torino SpA; Chiara Guido, CNR STEMS; Riccardo Rossi PhD, Punch Hydrocells
10:30 a.m.	2023-01-0320	Experimental and Numerical Study of a Low-Pressure Hydrogen Jet under the Effect of Nozzle Geometry and Pressure Ratio Maryam Yeganeh, Samuel Rabensteiner, Shervin Karimkashi, Qiang Cheng, Ossi Kaario, Martti Larmi, Aalto University
11:00 a.m.	2023-01-0331	Laminar Burning Velocities of Diluted Stoichiometric Hydrogen/Air Mixtures Ahmed Barain, Grace Trombley, Michigan State University; Berk Can Duva, Rolls-Royce North America; Elisa Toulson, Michigan State University
11:30 a.m.	2023-01-0332	Measurement of Hydrogen Direct Injection Jet Equivalence Ratio under Elevated Ambient Pressure Condition Sanguk Lee, Jungho Justin Kim, Youngmin Ki, KAIST; Yeseung Kwak, Jeonbuk National University; Seong-Young Lee, Michigan Technological Univ

Planned by Fuels and Lubricants / Energy and Propulsion Activity

Wednesday, April 19

Fuel Injection and Sprays, Part 1

Session Code PFL320

Room 142 B 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 - Tarek Abdel-Salam, East Carolina University; Michele Battistoni, Universita degli Studi di Perugia; Thomas Briggs, Southwest Research Institute; Elana Chapman, General Motors LLC; Essam El-Hannouny, Argonne National Laboratory; Felix Leach, University of Oxford; Gerald Micklow, Florida Institute of Technology; Alessandro Montanaro, STEMS - CNR; Derek Splitter, Oak Ridge National Laboratory

Chairperson - Michele Battistoni, Universita degli Studi di Perugia; Alessandro Montanaro, STEMS - CNR

Time	Paper No.	Title
9:30 a.m.	2023-01-0304	Experimental Study on Flash Boiling of Ammonia Fuel Sprays – A Potential Alternative Fuel Muhammad Saad Akram, Maryam Yeganeh, Qiang Cheng, Ossi Kaario, Martti Larmi, Aalto University

WCX SAE World Congress Experience

Technical Session Schedule

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Time	Paper No.	Title
10:00 a.m.	2023-01-0299	Effects of Ultra-High Injection Pressure and Flash Boiling Onset on GDI Sprays Morphology
		Francesco Duronio, Universita degli Studi dell Aquila; Luigi Allocca, Alessandro Montanaro, STEMS - CNR; Stefano Ranieri, Angelo De Vita, Universita degli Studi dell Aquila
10:30 a.m.	2023-01-0311	GDI Ammonia Spray Numerical Simulation by Means of OpenFOAM
		Adrian Pandal, Universidad de Oviedo; Jacopo Zembi, Michele Battistoni, Universita degli Studi di Perugia; Camille Hespel, Ronan Pele, Pierre BREQUIGNY, Christine Rousselle, Universite D'Orleans
11:00 a.m.	2023-01-0301	Hydrogen Jet Characterization of an Internal Combustion Engine Injector Using Schlieren Imaging
		Alexis Tinchon, Fabrice Foucher, University of Orleans; Laurent Doradoux, Borgwarner

Planned by Fuels and Lubricants / Energy and Propulsion Activity

Wednesday, April 19

Fuel Injection and Sprays, Part 2

Session Code PFL320

Room 142 B 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 - Tarek Abdel-Salam, East Carolina University; Michele Battistoni, Universita degli Studi di Perugia; Thomas Briggs, Southwest Research Institute; Elana Chapman, General Motors LLC; Essam El-Hannouny, Argonne National Laboratory; Felix Leach, University of Oxford; Gerald Micklow, Florida Institute of Technology; Alessandro Montanaro, STEMS - CNR; Derek Splitter, Oak Ridge National Laboratory

Chairperson - Thomas Briggs, Southwest Research Institute; Alessandro Montanaro, STEMS - CNR

Time	Paper No.	Title
1:30 p.m.	2023-01-0305	Ignition and Combustion Characteristics of OME_{3-5} and N-Dodecane: A Comparison Based on CFD Engine Simulations and Optical Experiments
		Frederik Wiesmann, TU Wien; Esra Bauer, Sebastian A. Kaiser, University of Duisburg-Essen; Thomas Lauer, TU Wien
2:00 p.m.	2023-01-0302	Optical Investigation of the Diesel Spray Characteristics and Spray Geometry Prediction Model by Artificial Neural Network
		Qiang Cheng, Aalto University; Zeeshan Ahmad, Viljam Grahn, Jari Hyvonen, Wartsila Finland Oy; Ossi Kaario, Martti Larmi, Aalto University
2:30 p.m.	2023-01-0312	Investigations on Hydrogen Injections Using a Real-Fluid Approach
		Faniry Rahantamialisoa, Michele Battistoni, Alessio Miliozzi, Nasrin Sahranavardfard, Jacopo Zembi, Universita degli Studi di Perugia

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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	Assessment of Lagrangian Spray Simulation Procedure using Realistic GDI Injector and Fuel under Flash-Boiling Condition Francesco Duronio, Universita degli Studi dell Aquila; Anqi Zhang, Le Zhao, Aramco Research Center; Angelo De Vita, Universita degli Studi dell Aquila
4:00 p.m.	2023-01-0310	Numerical Analyses of Spray Penetration and Evaporation in a Direct Injection Engine Tim Wegmann, Matthias Meinke, Wolfgang Schröder, Institute of Aerodynamics, RWTH Aachen

Planned by Fuels and Lubricants / Energy and Propulsion Activity

Wednesday, April 19

Multi-Dimensional Engine Modeling, Part 3

Session Code PFL120

Room 142 C 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, Virtual Thermal Fluids LLC; Yuanjiang Pei, Aramco Research Center - Detroit; Andrea Strzelec, University of Wisconsin-Madison

Time	Paper No.	Title
9:30 a.m.	2023-01-0201	Model Based Development for Super Lean Burn Gasoline Engine Using Kolmogorov Microscales Hiroyuki SAKAI, Koshiro Kimura, Tetsuo Omura, Daishi Takahashi, Toyota Motor Corporation
10:00 a.m.	ORAL ONLY	Numerical Investigation of Turbulent Combustion in a Pre-Chamber Natural Gas Engine Over Wide-Range EGR-Diluted Operations Joohan Kim, Argonne National Laboratory; Anqi Zhang, Yuanjiang Pei, Aramco Research Center
10:30 a.m.	ORAL ONLY	Numerical Investigation on Spray and Fuel-Film Evolution in a Direct-Injection Spark-Ignition Engine Joohan Kim, Argonne National Laboratory; Le Zhao, Anqi Zhang, Ji-Woong Park, Yuanjiang Pei, Aramco Research Center; Krishna Kalvakala, Diego Bestel, Hengjie Guo, Roberto Torelli, Muhsin Ameen, Argonne National Laboratory; Fabien Tagliante, Lyle Pickett, Sandia National Laboratories
11:00 a.m.	ORAL ONLY	3D-CFD analysis of the influence of nozzle geometrical features on the combustion characteristics of a passive pre-chamber turbulent jet ignition engine Federico Millo, Andrea Piano, Andrea Scalambro, Politecnico di Torino; Andrea Bianco, Powertech Engineering SRL; Paolo Sementa, Francesco Catapano, Silvana Di Iorio, Istituto Motori CNR

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Technical Session Schedule

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Planned by General Powertrain Development / Energy and Propulsion Activity

Wednesday, April 19

Driveline NVH and Launch Devices

Session Code PFL660

Room 142 C Session 1:30 p.m.

This session features papers on transmission noise, vibration, rattle issues and design solutions.

Organizers - Michael Fingerman, FCA US LLC; Darrell Robinette, Michigan Technological Univ.

Chairperson - Michael Fingerman, FCA US LLC; Darrell Robinette, Michigan Technological University - APS

Time	Paper No.	Title
1:30 p.m.	2023-01-0458	Tooth Mesh Characterization of Spur Gear Pairs with Surface Pitting Damage Suhas Gupta Thunuguntla, Oakland University; Adrian Hood, DEVCOM Army Research Laboratory; Christopher Cooley, Oakland University
2:00 p.m.	2023-01-0457	Correlated Simulation of Pseudo Transient Torque Converter Clutch Engagement Using Coupled Fluid Structure Interaction Aniket Beldar, Darrell Robinette, Jason Blough, Michigan Technological Univ
2:30 p.m.	2023-01-0459	Development of Rumble Noise Analysis Method for Electric Powertrain JAEHYUK CHOI, Tae-Won Ha, Eui Cheol Chung, Hye Sung Jeong, KUNSOO JUNG, Hyundai Motor Company; Owen Harris, Andy Gale, Tom Harvey, Sungho Kim, SMT Ltd
3:00 p.m.		BREAK
3:30 p.m.	ORAL ONLY	A Development and Application of Anti-Judder Logic using Adaptive Feed-Forward Control Jangwon Lee, Sung Yeol Kim, Seung Min Lee, Dong Ho Lee, Suk Il Oh, CHANGKOOK CHAE, Hyundai Motors R&D Division; Young-Sup Lee, Jihea Lim, Incheon National University
4:00 p.m.	2023-01-0456	Study on the Effect of Gravity on the Performance of CPVA Yi Zhang, Tongji University; Weirong Fang, SAIC Motor Technical Center; Guangqiang Wu, Tongji University.The Universityof Tokyo

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

Wednesday, April 19

Occupant Protection for Multiple Crash Modes

Session Code SS506

Room 250 A Session 9:30 a.m.

This session will feature occupant protection considerations in rear, front and rollover crash modes featuring vehicle structures, seat design and restraints.

Organizers - Saeed Barbat, Jamel Belwafa, Ford Motor Company; Jason Jenkins, Transportation Research Center Inc.; Harry Pearce, Exponent Inc.; Rakshit Ramachandra, Transportation Research Center

Inc.

Chairperson - Jamel Belwafa, Ford Motor Company; Jason Jenkins, Transportation Research Center Inc.; Harry Pearce, Exponent Inc.; Saeed Barbat, Ford Motor Company

Time	Paper No.	Title
9:30 a.m.	2023-01-0637	Design of a Crease Pattern for Pre-Folded Origami Structures to Improve Vehicle Crashworthiness Prathamesh Chaudhari, IUPUI; Homero Valladares, Purdue University West Lafayette; Andres Tovar, IUPUI
10:00 a.m.	2023-01-0647	Aggregation of Lumbar Loads in Rear Impact Crash Tests Aryeh Kashdan, Sagar Umale, Alex Kazmierczak, Joseph Kasselik, Bryan Randles, Christopher Furbish, Judson Welcher, Aperture
10:30 a.m.	2023-01-0648	Dynamic Testing and Modeling of a Variable Stiffness Seatback Wyatt Warner, Brigham Young University; Mark Warner, Collision Safety Engineering, LC
11:00 a.m.	2023-01-0649	Evaluation of Drivers of Very Large Pickup Trucks: Size, Seated Height and Biomechanical Responses in Drop Tests Roger Burnett, Chantal Parenteau, Michelle Vogler, Daniel Toomey, Design Research Engineering; Kenneth Orlowski, Safety Analysis, Inc.; Ram Krishnaswami, Ford Motor Company

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

Wednesday, April 19

Occupant Protection: Biomechanics

Session Code SS501

Room 250 A 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.; Kerry Danelson, Wake Forest Univ. School of Medicine; Jacob Fisher, Exponent Inc.; Warren Hardy, Virginia Tech.; Elizabeth McNeil, Walter Reed Army Inst. Res.

Chairperson - Devon Albert, Virginia Tech.; Jacob Fisher, Exponent Inc.; Warren Hardy, Virginia Tech.

Time	Paper No.	Title
1:30 p.m.	ORAL ONLY	Comparison of Hybrid III 50th-Percentile Male Head, Neck, and Thorax Injury Risks between the Front and Rear Seat in Matched Frontal NCAP Tests Samuel Bianco, Andrew Kemper, Devon Albert, Allison Guettler, Warren Hardy, Virginia Tech
2:00 p.m.	2023-01-0559	Evaluation of Occupant Kinematics and Kinetics during Moderate Severity Simulated Frontal Impacts with and without Frontal Airbag Deployment

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Time	Paper No.	Title
		Sarah S. Sharpe, Sandra Grijalva, Leigh Allin, Amy Courtney, Megan Toney-Bolger, Anastassia Pokutta-Paskaleva, Charles L. Crosby, Michael Carhart, Exponent Inc.
2:30 p.m.	ORAL ONLY	Occupant Kinetics and Muscle Responses of Relaxed and Braced 5th Percentile Female and 50th Percentile Male Volunteers in Low-Speed Frontal Sled Tests
		Hana Chan, Devon Albert, Virginia Tech; Scott Gayzik, Wake Forest Univ School of Medicine; Andrew Kemper, Virginia Tech
3:00 p.m.		BREAK
3:30 p.m.	2023-01-0558	ES2re, WS50M, and Human Body Models in Far-Side Pole Impacts
		Raed E. El-Jawahri, Ford Motor Company
4:00 p.m.	2023-01-0557	Development and Calibration of the Large Omnidirectional Child ATD Head and Neck Complex Finite Element Model
		Peiyu Yang, Divya Reddy Katangoori, Scott Noll, Ohio State University
4:30 p.m.	ORAL ONLY	Validation of a Mid-Sized Male Finite Element Model during Ramping Up in Rear-Loading Conditions
		Yogesh Surkutwar, Virginia Tech

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

Wednesday, April 19

CAD/CAM/CAE Technology - Part 1

Session Code SS101

Room 250 B 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; Yu Teng, BAIC Motor Corporation, Ltd.

Chairperson - RANDY Gu, Oakland University

Time	Paper No.	Title
9:30 a.m.	ORAL ONLY	CFD Modeling of the Lubrication of a Cam Roller Follower System in a VVT Engine
		Rayhan Ahmed, Simerics Inc.; Zhe Liu, General Motors LLC; Yawei Chen, Simerics Inc
10:00 a.m.	2023-01-0158	On the Development of CFD Methodology for Free-Falling Varnish Stream Modeling to Support EV Motor Manufacturing
		James Jan, Ben Petersen, Xionghui Huang, Ajaicimhan Vijayan, Ford Motor Company; Jun Li, AVL

WCX SAE World Congress Experience

Technical Session Schedule

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Time	Paper No.	Title
10:30 a.m.	2023-01-0166	Conducting Comparisons of Multi-Body Dynamics Solvers with a Goal of Establishing Future Direction Raymond Renaud, Joseph Schudt, Daniel Vilela, General Motors LLC
11:00 a.m.	2023-01-0164	Perspectives on the Transition from Hardware-Based Validation and Product Evaluation to Virtual Processes Joseph Schudt, Brian Schell, General Motors LLC
11:30 a.m.	2023-01-0161	Design and Optimization of Steering Assembly for Baja ATV Vehicle Vasu Bhardwaj, Michigan Technological University; Ojasvi Chauhan, Innovante Engineering Solutions; Rishabh Arora, Technische Universität Braunschweig

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

Wednesday, April 19

CAD/CAM/CAE Technology - Part 2

Session Code SS101

Room 250 B 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.

Chairperson - RANDY Gu, Oakland University

Time	Paper No.	Title
1:30 p.m.	2023-01-0167	Type the Title of Your Paper Here Paranthaman Krishnan, Valeo India Private Limited; Zane Yang, Vijayakumar Velayudham, Valeo North America Inc.; Arumuga Pandian Duraipandi, Valeo India Private Limited
2:00 p.m.	2023-01-0157	Virtual Validation of Automotive Electronic Products for Climatic Test Conditions Vinay Kumar, Swaminathan Viswanathan, Aptiv PLC
2:30 p.m.	2023-01-0920	Vehicle Class Based Validation Program for Electrified Powertrain Vibration Testing Michael Leighton, AVL LIST GmbH

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WCX SAE World Congress Experience

Technical Session Schedule

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Wednesday, April 19

Vehicle Aerodynamics: Surface Contamination

Session Code SS806

Room 250 C Session 9:30 a.m.

This collection of Vehicle Aerodynamics sessions are focused on the following topics: Commercial Vehicle Aerodynamics, Wheel and Tire Aerodynamics, Vehicle Aerodynamic Fundamentals, CFD Methods, Surface Contamination & Soiling, Experimental Technologies & Correlation, Platooning & Vehicle Interactions, and Aerodynamic Development.

Organizers - Adrian P. Gaylard, Jaguar Land Rover Limited; Jonathan Jilesen, Dassault Systemes; Timo Kuthada, FKFS; Kurt Zielinski, American Honda Motor Co. Inc.

Time	Paper No.	Title
9:30 a.m.	2023-01-0792	Impact of Precipitation Drag on a Road Vehicle Arash Raeesi, Brian McAuliffe, Joshua Galler, National Research Council Canada
10:00 a.m.	2023-01-0793	Experimental Analysis of Spray Topology in the Wake of an Automotive Body Conor James Crickmore, Andrew Garmory, Daniel Butcher, Loughborough University

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

Wednesday, April 19

Vehicle Aerodynamics: Experimental Technologies & Correlation

Session Code SS804

Room 250 C Session 10:30 a.m.

This collection of Vehicle Aerodynamics sessions are focused on the following topics: Commercial Vehicle Aerodynamics, Wheel and Tire Aerodynamics, Vehicle Aerodynamic Fundamentals, CFD Methods, Surface Contamination & Soiling, Experimental Technologies & Correlation, Platooning & Vehicle Interactions, and Aerodynamic Development.

Organizers - Timo Kuthada, FKFS; Todd Lounsberry, Stellantis NV; Mesbah Uddin, Univ. of North Carolina Charlotte; H. Robert (Bob) Welge; Felix Wittmeier, FKFS; Kurt Zielinski, American Honda Motor Co. Inc.

Time	Paper No.	Title
10:30 a.m.	2023-01-0654	The Ford Rolling Road Wind Tunnel Facility Paul Nagle, Tyler Brooker, Ghazi Bari, Joel Walter, Jacobs; John Toth, Shaun Skinner, Ford Motor Company
11:00 a.m.	2023-01-0656	The Honda Automotive Laboratories of Ohio Wind Tunnel Scott Best, Ghazi Bari, Tyler Brooker, Guy Flynt, Joel Walter, Edward Duell, Jacobs
11:30 a.m.	2023-01-0657	Influence of Wheel Drive Unit Belt Width on the Aerodynamics of Passenger Vehicles Erik Josefsson, Chalmers University of Technology; Magnus Urquhart, Volvo Cars; Simone Sebben, Chalmers University of Technology

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

Wednesday, April 19

Vehicle Aerodynamics: Platooning & Vehicle Interactions

Session Code SS809

Room 250 C Session 1:30 p.m.

This collection of Vehicle Aerodynamics sessions are focused on the following topics: Commercial Vehicle Aerodynamics, Wheel and Tire Aerodynamics, Vehicle Aerodynamic Fundamentals, CFD Methods, Surface Contamination & Soiling, Experimental Technologies & Correlation, Platooning & Vehicle Interactions, and Aerodynamic Development.

Organizers - Edward Duell, Jacobs; Timo Kuthada, FKFS; Raymond Leto, TotalSim LLC; Kurt Zielinski, American Honda Motor Co. Inc.

Time	Paper No.	Title
1:30 p.m.	2023-01-0950	Simulating Traffic-Wake Effects in a Wind Tunnel Brian McAuliffe, Hali Barber, National Research Council Canada
2:00 p.m.	2023-01-0952	Aerodynamic Drag of Road Vehicles in Close Lateral Proximity Brian McAuliffe, Hali Barber, National Research Council Canada
2:30 p.m.	2023-01-0953	The Introduction of MultiWake - An Adaptable Bluff-Body Wake Emulator for Ground Vehicle Studies Renan F Soares, University of Southampton; Kevin P Garry, Cranfield University

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

Wednesday, April 19

Vehicle Aerodynamics: Development

Session Code SS801

Room 250 C Session 3:30 p.m.

This collection of Vehicle Aerodynamics sessions are focused on the following topics: Commercial Vehicle Aerodynamics, Wheel and Tire Aerodynamics, Vehicle Aerodynamic Fundamentals, CFD Methods, Surface Contamination & Soiling, Experimental Technologies & Correlation, Platooning & Vehicle Interactions, and Aerodynamic Development.

Organizers - Gregory Fadler, FCA US LLC; Mark Gleason, Gleason Aero LLC; Timo Kuthada, FKFS; Kurt Zielinski, American Honda Motor Co. Inc.

Time	Paper No.	Title
3:00 p.m.	2023-01-0841	Influence of Roof Sensor System on Aerodynamics and Aero-Noise of Intelligent Vehicle Zhuoming Li, Qiliang Li, Yu Shao, Tongji University; Yanruiqi Yang, École Polytechnique Fédérale de Lausanne

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

WCX SAE World Congress Experience

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Wednesday, April 19

Tire and Wheel Technology

Session Code SS700

Room 251 A Session 9:30 a.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 - Volker Hildebrand, Continental Tire North America Inc.; David Howland, General Motors LLC; Timothy A. Marantis, Bridgestone Americas Tire Operations LLC

Time	Paper No.	Title
9:30 a.m.	2023-01-0018	A Comprehensive Study of the Impact of Tread Design on the Tire-Terrain Interaction using Advanced Computational Techniques Alfonse Ly, Zeinab El-Sayegh, Moustafa El-Gindy, Ontario Tech University; Fredrik Oijer, Inge Johansson, Volvo Group Trucks Technology
10:00 a.m.	2023-01-0019	A Physics Based Methodology for the Estimation of Tire Performance on Ice and Snow Changsu Kim, Hyundai Motor Group; Carlo Lugaro, Alexander O'Neill, Siemens Digital Industries Software; Kisoo Park, Hyundai Motor Group; Seungryul Choi, Hyundai Mobis; Gibin Gil, Hankook Rubber Co.
10:30 a.m.	2023-01-0020	Rolling Resistance and Wet/Snow Traction Performance of Commercially Available Light-Duty Vehicle Tires in North America (Canada) Pt.II Hamza Shafique, Aaron Conde, Anthony Beaupre-Jacques, Transport Canada
11:00 a.m.	2023-01-0022	Non-pneumatic Tire-Mars Soil Interaction Using Advanced Computational Techniques Charanpreet Singh Sidhu, Zeinab El-Sayegh, Alfonse Ly, Ontario Tech University

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

Wednesday, April 19

Vehicle Dynamics, Electric Vehicle Drivetrain Dynamics, and Advanced Wheel Corner Concepts - Part 1

Session Code SS900

Room 251 A Session 1:30 p.m.

This session is focused on vehicle dynamics and controls using modeling and simulation, and experimental analysis of 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 - Timothy Drotar, Stellantis; Gary Heydinger, SEA, Ltd.; Giampiero Mastinu, POLITECNICO DI MILANO; Jian Jun Zhu, Cruise LLC.; Scott Zagorski, SEA, Ltd.

Chairperson - Timothy Drotar, Stellantis; Scott Zagorski, SEA, Ltd.

Time	Paper No.	Title

WCX SAE World Congress Experience

Technical Session Schedule

As of March 16, 2023 19:49:55 PM

Time	Paper No.	Title
1:30 p.m.	2023-01-0665	Vehicle Dynamics Modeling of Commercial Vehicle Steer Axle Tire Disablements at Highway Speeds Ashley L. Dunn, Thomas A. Timbario, SEA, Ltd.
2:00 p.m.	2023-01-0661	Development of an Electronic Stability Control Algorithm for All-Terrain Vehicles Scott Zagorski, Gary Heydinger, SEA, Ltd.
2:30 p.m.	2023-01-0671	Test Results of Tires for All-Terrain Vehicles from a Flat-Trac® Machine Scott Zagorski, Gary Heydinger, SEA, Ltd.
3:00 p.m.		BREAK
3:30 p.m.	2023-01-0662	Driveline Control Influence when ABS Active Xing Xing, Mark Clark, Robert Morris, General Motors LLC
4:00 p.m.	2023-01-0664	Road Parameter Estimation with Drone-Vehicle Communication Viktar Beliautsou, Aleksandra Beliautsou, Valentin Ivanov, Technische Universitat Ilmenau
4:30 p.m.	2023-01-0663	Electronically Controlled Brake System with Two-Channel Pressure Control for Electric Vehicles Shunya Watanabe, Takayuki Yamamoto, Yoshio Masuda, Hiroki Yamakita, ADVICS Co. ,Ltd.

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

Wednesday, April 19

Military Ground Vehicles - Part 2

Session Code MIL400

Room 251 B Session 9:30 a.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. Part 3 includes presentations on vehicle communications, controls, V&V, and trade space exploration.

Organizers - Matthew P. Castanier, David J. Gorsich, Vamshi Korivi, Denise M. Rizzo, Michael Tess, US Army DEVCOM GVSC

Chairperson - Matt Castanier, Denise Rizzo, US Army DEVCOM GVSC

Time	Paper No.	Title
9:30 a.m.	2023-01-0110	Enabling Robust Communication Among Military Ground Vehicles Using Multi-Connectivity Prabodh Kumar Mishra, Snigdhaswin Kar, Chun-Chih Lin, Kuang-Ching Wang, Linke Guo, Clemson University

WCX SAE World Congress Experience

Technical Session Schedule

As of March 16, 2023 19:49:55 PM

Time	Paper No.	Title
10:00 a.m.	2023-01-0104	Access Control Requirements for Autonomous Robotic Fleets Nathan Tusing, Richard Brooks, Clemson University
10:30 a.m.	2023-01-0116	Formal Verification of Autonomous Vehicles: Bridging the Gap between Model-Based Design and Model Checking Ananya Rao, Yue Wang, Clemson University
11:00 a.m.	2023-01-0113	Safety Verification of Autonomous Vehicles based on Signal Temporal Logic (STL) constraints Aditya Parameshwaran, Yue Wang, Clemson University
11:30 a.m.	2023-01-0117	Exploration of Support Methods for Tradespace Exploration Meredith Sutton, John Wagner, Cameron Turner, Clemson University; Gregory Hartman, US Army GVSC; David Gorsich, US Army Futures Command; Annette Skowronska, Stephen Rapp, US Army GVSC

Planned by Integrated Design and Manufacturing Activity / Ground Vehicle Advisory Group

Wednesday, April 19

Military Ground Vehicles - Part 3

Session Code MIL400

Room 251 B 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. Part 4 includes presentations on digital twin technology, surrogate model selection, high-fidelity aerodynamic and terramechanics simulations, and multi-axle steering control.

Organizers - Matthew P. Castanier, David J. Gorsich, Vamshi Korivi, Denise M. Rizzo, Michael Tess, US Army DEVCOM GVSC

Chairperson - Michael Tess, Vamshi Korivi, US Army DEVCOM GVSC

Time	Paper No.	Title
1:30 p.m.	2023-01-0111	Usefulness and Time Savings Metrics to Evaluate Adoption of Digital Twin Technology Conner Eddy, Clemson University; Matthew Castanier, US Army DEVCOM GVSC; John Wagner, John Morris, Benjamin Moss, Clemson University
2:00 p.m.	ORAL ONLY	Surrogate Models - Optimal Model Selector Akash Srinivasan, Cameron Turner, Atul Kelkar, Behnaz Papari, Clemson University
2:30 p.m.	2023-01-0118	Aerodynamics of Landing Maneuvering of an Unmanned Aerial Vehicle in Close Proximity to a Ground Vehicle Mesbah Uddin, Spencer Nichols, Cortney Hahn, Adit Misar, Shishir Desai, University of North Carolina Charlotte; Nathan Tison, Vamshi Korivi, US Army DEVCOM GVSC

WCX SAE World Congress Experience

Technical Session Schedule

As of March 16, 2023 19:49:56 PM

Time	Paper No.	Title
3:00 p.m.		BREAK
3:30 p.m.	2023-01-0105	Containerization Approach for High-Fidelity Terramechanics Simulations Sanskruti Deepak Jadhav, Ameya Salvi, Krishna Chaitanya Kosaraju, Clemson University; Jonathon Smereka, Mark Brudnak, US Army GVSC; Venkat N Krovi, Clemson University; David Gorsich, US Army GVSC
4:00 p.m.	2023-01-0109	Actively Articulated Wheeled Architectures for Autonomous Ground Vehicles - Opportunities and Challenges Dhruv Mehta, Krishna Chaitanya Kosaraju, Venkat N Krovi, Clemson University
4:30 p.m.	2023-01-0106	Development of Novel Steering Scenarios for an 8X8 Scaled Electric Combat Vehicle Junwoo Kim, Moustafa El-Gindy, Zeinab El-Sayegh, Ontario Tech. University

Planned by Integrated Design and Manufacturing Activity / Ground Vehicle Advisory Group

Wednesday, April 19

Foundations of Automobile Electronics: Cybersecurity - Part 3

Session Code AE302

Room 251 C Session 9:30 a.m.

This session focuses on cybersecurity for cyber-physical vehicle systems. Topics include: design, development and implementation of security-critical cyber-physical vehicle systems, cybersecurity design, development, and implementation strategies, analysis methodologies, process and life-cycle management, comparisons of system safety and cybersecurity, etc. Application areas include: security-critical automotive systems as well as other security-critical ground vehicle and aviation systems.

Organizers - Amit Choudhury, Robert Bosch; Sumanth Reddy Dadam, Ford Motor Company; John Krzeszewski, Eaton; Christopher Lupini, ETAS Inc.; Mark Monohon, DG Tech; Mert D. Pese, Clemson University; Mark Pope, DG Tech

Chairperson - John Krzeszewski, Eaton; Christopher Lupini, ETAS Inc.; Mark Monohon, DG Technologies; Mert D. Pese, Clemson University; Mark Pope, DG Technologies

Time	Paper No.	Title
9:30 a.m.	2023-01-0039	Processing Fuzz Testing Results into an Evidence Report Nico Vinzenz, ZF Friedrichshafen AG; Dennis Kengo Oka, Synopsys
10:00 a.m.	2023-01-0041	Evaluation of Vehicle System Performance of an SAE J1939-91C Network Security Implementation Mohomad Mokhadder, Mark Zachos, John Potter, DG Technologies
10:30 a.m.	2023-01-0040	Cybersecurity Vulnerabilities for Off-Board Commercial Vehicle Diagnostics Sharika Kumar, Cummins Inc.; Jeremy Daily, Colorado State University; Qadeer Ahmed, Anish Arora, Ohio State University

WCX SAE World Congress Experience

Technical Session Schedule

As of March 16, 2023 19:49:56 PM

Time	Paper No.	Title
11:00 a.m.	2023-01-0046	Cybersecurity in EV's: Approach for Systematic Secured SW Development through ISO/SAE 21434 & ASPICE Sandeep Ambesange, Ashwin Patwekar, Eaton India Innovation Center
11:30 a.m.	ORAL ONLY	How to Navigate Today and Tomorrow's Automotive Cyberthreats Gloria Chen, Aaron Luo, Shin Li, Kenney Lu, Ziv Chang, Spencer Hsieh, VicOne Inc.

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Wednesday, April 19

Panel Discussion: Hardware Based Cybersecurity: The Foundational Element

Session Code AE302A

Room 251 C Session 1:30 p.m.

Since UNECE regulation 155 on Cybersecurity Management Systems and 156 on Software Updates came into effect at the beginning of 2021, cybersecurity has become more relevant than ever before. These internationally applicable regulations take a holistic position with regards to the cybersecurity management of vehicle planning, production, operation, and decommissioning. One of the key building blocks for cybersecurity management in vehicles focuses on the cybersecurity specifications on the controls selected for implementation, including trust anchors, roots of trust, key store functionality, authentication infrastructures, deactivation of debug interfaces, management of personally identifiable information, and beyond. In fact, Trust Anchors and Roots of Trust form the basis of building cybersecurity components in vehicles with over 1400 semiconductors in an average car controlling everything from airbags to the engines.[1] This panel will discuss the primary strategies for ensuring hardware protected security environments including the motivations behind different implementation strategies and the successive implications from these decisions. Learn more about the Participants

Moderators - Bill Mazzara, Chair SAE J3101

Panelists - Gil Bernabeu, GlobalPlatform; Richard Hayton, Trustonic Ltd.; John Krzeszewski, Eaton; Philip Lapczynski, Renesas Electronics America Inc.; Darryl Parisien, Integrity Security Services Inc.;

Wednesday, April 19

Panel Discussion: Implementation of the Automated Vehicle Safety Consortium (AVSC) Safety Best Practices

Session Code AE108

Room 251 C Session 3:30 p.m.

AVSC Members believe in the importance of pre-competitive collaboration on automated vehicle safety best practices. To date, the AVSC has published 8 best practices and continue to work toward consensus on important safety principles. While AVSC members reach 100% consensus on the best practices, they have their own unique way of implementing them.
This session will share the implementation stories where AVSC members will share their experience putting the best practices to practical use, and the lessons they have learned along the way. We look forward to this interactive, in-person discussion to share information, define needs, and identify future research topics. Learn more about the Participants

Organizers - Edward Straub, SAE ITC; Darcyne Foldenauer, SAE Industry Technologies Consortia

Chairperson - Edward Straub, SAE ITC

Moderators - Darcyne Foldenauer, SAE Industry Technologies Consortia

Panelists - Ivan Allier, Aurora; Sue Bai, Honda; Jeremiah Reed Robertson, Motional Inc.;

WCX SAE World Congress Experience

Technical Session Schedule

As of March 16, 2023 19:49:56 PM

Wednesday, April 19

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

Session Code AE103

Room 252 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, Locomation Inc.; Xin Wang, Ford Motor Company

Chairperson - Xin Wang, Ford Motor Company

Time	Paper No.	Title
9:30 a.m.	2023-01-0677	Adaptive Actuator Delay Compensation for a Vehicle Lateral Control System William Thomas Kennedy, David M. Bevly, Auburn University
10:00 a.m.	2023-01-0679	An Ultra-Light Heuristic Algorithm for Autonomous Optimal Eco-Driving Aaron I. Rabinowitz, Colorado State University; Farhang Motallebiaraghi, Rick Meyer, Zachary Asher, Western Michigan University; Ilya Kolmanovsky, University of Michigan; Thomas Bradley, Colorado State University
10:30 a.m.	2023-01-0685	Utilizing Speed Information Forecast in Energy Optimization of an Electric Vehicle with Adaptive Cruise Controller Shahriar Shahram, Yaser Pourmohammadi Fallah, University of Central Florida
11:00 a.m.	2023-01-0686	Operational Design Domain Feature Optimization Route Planning Tool for Automated Vehicle Open Road Testing Pedro Rodriguez Zarazua, Qusay Alrousan, Hamzeh Alzu'bi, Tom Tasky, FEV North America Inc.
11:30 a.m.	2023-01-0693	3D Coverage Control and Target Orientation Alignment using Unmanned Ground Vehicle with Onboard Camera Sensor Aayush Rai, Yue Wang, Clemson University

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Wednesday, April 19

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

Session Code AE103

Room 252 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, Oakland University; Samer Rajab; Xin Wang, Ford Motor Company

Chairperson - Xin Wang, Ford Motor Company

WCX SAE World Congress Experience

Technical Session Schedule

As of March 16, 2023 19:49:56 PM

Time	Paper No.	Title
1:30 p.m.	2023-01-0692	Vehicle Path-Tracking Control with Dual-Motor SBW System Meng Li, FCA US LLC
2:00 p.m.	2023-01-0678	Model-Based Coordinated Steering and Braking Control for a Collision Avoidance Driver Assist Function Yiquan Li, KTH Royal Institute of Technology; Simon Petrovich, CEVT AB; Mikael Nybacka, KTH Royal Institute of Technology
2:30 p.m.	2023-01-0680	Study on a Vehicle-Type-Based Car-Following Model using the Long Short-Term Memory Method Tasuku Yamazaki, Shoko Oikawa, Toshiya Hirose, Shibaura Institute of Technology
3:00 p.m.	2023-01-0689	MPC-Based Cooperative Longitudinal Control for Vehicle Strings in a Realistic Driving Environment Alessia Musa, Federico Miretti, Daniela Misul, Politecnico di Torino
3:00 p.m.		BREAK

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Wednesday, April 19

Powertrain/Propulsion Thermal Management

Session Code HX106

Room 252 B Session 9:30 a.m.

This session considers thermal-fluids modeling (zero-D, 1D, 3D CFD) and experimental papers. 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 - Ronald Semel, Ford Motor Company; Sowmyalatha Jayaraman, General Motors LLC; Gursaran Mathur, Highly-Marelli North America; Srinivasa Vaddiraju, Zoox

Chairperson - Srinivasa Vaddiraju, Zoox; Jeff Schlautman, GM

Time	Paper No.	Title
9:30 a.m.	2023-01-0949	A Transient 3D CFD Thermal Model of the Complete DI Diesel Engine Fuel System Zhuoyu Zhou, Simerics Inc.; Frank Husmeier, Cummins Fuel Systems; Varun Nichani, Rayhan Ahmed, Raj Ranganathan, Simerics Inc.
10:00 a.m.	2023-01-0948	Study on Surface Insulation Structure to Reduce Cooling Loss of Heavy-Duty Diesel Engines Fumihiro Kawaharazuka, Noboru Uchida, New ACE Institute Co. Ltd.
10:30 a.m.	2023-01-0946	Study to Improve Engine Efficiency by Reducing Backpressure Sandip Sahoo, Maruti Suzuki India, Ltd.; S Vineeth, Manas Tripathi, Abhinav Kuchhal, Maruti Suzuki India Ltd.

WCX SAE World Congress Experience

Technical Session Schedule

As of March 16, 2023 19:49:56 PM

Time	Paper No.	Title
11:00 a.m.	2023-01-0947	Injector Deposition and Behavior Change of Diesel Engine Fueled with Calophyllum Oil Biodiesel Blend under 150 Hrs Endurance Test
		Rahul Krishnaji Bawane, PCCOER; Nilima Gadge, NCER Pune; Gajanan N Shelke, SIEM Nashik; Dinesh Bawane, Government Polytechnic Washim
11:30 a.m.	ORAL ONLY	Advanced Low Electrical Conductivity Coolants for the Battery Thermal Management of Electrical Vehicles
		Govind Khemchandani, DOBER

Planned by Thermal Management Activity / Ground Vehicle Advisory Group

Wednesday, April 19

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

Session Code AE106

Room 252 B 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 for these systems. This session examines the opportunities and challenges of simulation, especially the use of simulation

Organizers - Jace Allen, dSPACE Inc.; Yixin Chen, Stellantis; Amit Choudhury, Visteon Corp.; Joseph D'Ambrosio, General Motors LLC; Benjamin Hager, dSPACE Inc.; Bin Li, Aptiv PLC

Chairperson - Joseph D'Ambrosio, General Motors LLC

Time	Paper No.	Title
1:30 p.m.	2023-01-0823	Virtual Testing of Front Camera Module
		Moataz Elbaz Elsaiid, Samuel Kalliman, Jiri Kral, General Motors LLC
2:00 p.m.	2023-01-0826	Track, GoPro, and Prescan Testing of an ADAS Camera
		Meredith Bartholomew, Shawn Midlam-Mohler, Dennis Guenther, Ohio State University; Gary Heydinger, SEA Ltd.; Garrick Forkenbrock, Devin Elsasser, NHTSA; Sughosh Rao, Transportation Research Center Inc.
2:30 p.m.	2023-01-0831	Prescan Extension Testing of an ADAS Camera
		Meredith Carol Bartholomew, Dennis Guenther, Shawn Midlam-Mohler, Ohio State University; Gary Heydinger, SEA Ltd.; Garrick Forkenbrock, Devin Elsasser, NHTSA; Sughosh Rao, Transportation Research Center Inc.
3:00 p.m.		BREAK
3:30 p.m.	2023-01-0827	Drive-Thru Climate Tunnel: A Proposed Method to Study ADAS Performance in Adverse Weather
		Wing Yi Pao, Long Li, Martin Agelin-Chaab, Ontario Technical University; John Komar, Ace Climatic Wind Tunnel
4:30 p.m.	2023-01-0825	Automatic Scenario Generation for Simulation-Based Testing of AD/ADAS

WCX SAE World Congress Experience

Technical Session Schedule

As of March 16, 2023 19:49:56 PM

Time	Paper No.	Title
		Kaoru Shibuya, Akihiko Hyodo, Akihito Akai, Hitachi, Ltd.; Tetsuya Yamada, Hitachi Astemo, Ltd.

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Wednesday, April 19

ADAS and Autonomous Vehicle System: Safety, Fundamentals, and Driver Interface - Part 2

Session Code AE101

Room 258 Session 9:30 a.m.

This session addresses technical research related to ADAS and AVS safety, 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 - Sue Bai, Honda; Yixin Chen, Stellantis; Amit Choudhury, Robert Bosch; Joseph D'Ambrosio, General Motors LLC; Sumanth Reddy Dadam, Ford Motor Company; Bin Li, Aptiv PLC; Danyang Tian, Honda

Chairperson - Sue Bai, Honda; Samer Rajab, Locomation

Time	Paper No.	Title
9:30 a.m.	2023-01-0577	Design Evolution of Vehicle Dynamics and Controls from Mechanization, Electrification to Autonomy
		Sanjay Singh, New Eagle; Iyad Mansour, Arriver Software LLC
10:00 a.m.	2023-01-0579	An Adaptable Security-By-Design Approach for Addressing Secured Remote Monitoring Teleoperation (RMTO) of an Autonomous Vehicle
		Victormills Iyieke, Jeremy Bryans, Coventry University; Tom Robinson, Odysseas Kosmas, Alastair Shipman, Conigital Ltd.; Hesamaldin Jadidbonab, Coventry University
10:30 a.m.	2023-01-0575	Construction of Driver Models for Cut-in of Other Vehicles in Car-Following Situations
		Kaisei Honda, Shoko Oikawa, Toshiya Hirose, Shibaura Institute of Technology
11:00 a.m.	2023-01-0576	Quantitative Resilience Assessment of GPS, IMU, and LiDAR Sensor Fusion for Vehicle Localization Using Resilience Engineering Theory
		Johan Fanas Rojas, Parth Kadav, Nicolas Brown, Rick Meyer, Western Michigan University; Thomas Bradley, Colorado State University; Zachary Asher, Western Michigan University

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Wednesday, April 19

ADAS and Autonomous Vehicle System: Safety, Fundamentals, and Driver Interface - Part 3

Session Code AE101

Room 258 Session 1:30 p.m.

WCX SAE World Congress Experience

Technical Session Schedule

As of March 16, 2023 19:49:56 PM

This session addresses technical research related to ADAS and AVS safety, 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 - Sue Bai, Honda; Yixin Chen, Stellantis; Amit Choudhury, Robert Bosch; Joseph D'Ambrosio, General Motors LLC; Sumanth Reddy Dadam, Ford Motor Company; Bin Li, Aptiv PLC; Danyang Tian, Honda

Chairperson - Sue Bai, Honda; Samer Rajab, Locomation

Time	Paper No.	Title
1:30 p.m.	2023-01-0580	Generic X-Domain Hazard Analysis and Risk Assessment Simon Schrade, Xi Nowak, Armin Verhagen, Robert Bosch GmbH; Dieter Schramm, University of Duisburg-Essen
2:00 p.m.	2023-01-0582	Strategies to Define Reasonable Acceptance Criteria and Validation Targets for SOTIF Assurance Kaushik Madala, David Erdos, Jayalekshmi Krishnamoorthy, Zihao Wang, Carlos Avalos Gonzalez, Abhishek Shivkumar, Melody Chang, UL Solutions
2:30 p.m.	~~2023-01-0585~~ ORAL ONLY	Evolution of the Regulatory Environment for Advanced Driver Assistance Systems (ADAS) Michelle L. Kuykendal, Chris Monk, Marc Paradiso, Narayanan Kidambi, Sean Scally, Exponent Inc.
3:00 p.m.		BREAK

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Wednesday, April 19

Electrification: Charging Architecture/Design and Electric Infrastructure - Part 1

Session Code AE600

Room 259 Session 9:30 a.m.

As the automotive industry has moved to Electrified Vehicles, the need for chargers and Charging Stations have been increasing almost exponentially. The need to manage the charging architecture and its impact to the grid has become a critical path for the electrification future. This session will answer some of those concerns. The presentations and papers will cover Charging Optimization, Design, Controls and Testing. There are presentations about Wireless Charging Design, Impact to the Grid and Standards SAE J2954/2. Heavy Duty Truck Electrification is just starting but moving at a fast pace, there are presentations about Heavy Duty Electric Truck Charging Design, Controls and Standard SAE J3271.

Organizers - Theodore Bohn, Argonne National Laboratory; Fabian Koark, Cariad; Phares Noel, Diversified Engineering Concepts LLC; Eugene Saltzberg, University of Detroit Mercy; Vincent Socci, National Instruments; Di Zhu, Ford Motor Company

Chairperson - Gene Saltzberg, University of Detroit Mercy

Time	Paper No.	Title
9:30 a.m.	2023-01-0702	Creation of the SAE J3271 Megawatt Charging Standard for any Large Vehicle that Roles, Flies or Floats Theodore Bohn, Argonne National Laboratory

WCX SAE World Congress Experience

Technical Session Schedule

As of March 16, 2023 19:49:56 PM

Time	Paper No.	Title
10:00 a.m.	2023-01-0708	Development of a Heavy-Duty Electric Vehicle Integration and Implementation (HEVII) Tool Aaditya Badheka, Matthew John Eagon, University of Minnesota Twin Cities; Setayesh Fakhimi, National Renewable Energy Laboratory; Peter Wiringa, U-Spatial at University of Minnesota; Eric Miller, Andrew Kotz, National Renewable Energy Laboratory; William Northrop, University of Minnesota Twin Cities
10:30 a.m.	2023-01-0706	Impact of Event-Based EV Charging Power Profile on Design and Control of Multi-Source DCFC Stations Matilde D'Arpino, Gurpreet Singh, Myung Bae Koh, Ohio State University
11:00 a.m.	2023-01-0704	Development of 2nd-Generation Solar Charging System and Generating Performance in the USA Yuma Miyamoto, Takashi Nakado, Yukinori Murakami, Taisuke Hayashi, Toyota Motor Corporation
11:30 a.m.	2023-01-0705	Dynamic Charge System Verified in Application under Various Road Conditions Takamitsu Tajima, Wataru Noguchi, Tomohisa Aruga, Hiroyuki Abe, Kouichi Sato, Hiroyuki Togami, Hiroka Shigi, Honda R&D Co. Ltd.

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Wednesday, April 19

Electrification: Charging Architecture/Design and Electric Infrastructure - Part 2

Session Code AE600

Room 259 Session 1:30 p.m.

As the automotive industry has moved to Electrified Vehicles, the need for chargers and Charging Stations have been increasing almost exponentially. The need to manage the charging architecture and its impact to the grid has become a critical path for the electrification future. This session will answer some of those concerns. The presentations and papers will cover Charging Optimization, Design, Controls and Testing. There are presentations about Wireless Charging Design, Impact to the Grid and Standards SAE J2954/2. Heavy Duty Truck Electrification is just starting but moving at a fast pace, there are presentations about Heavy Duty Electric Truck Charging Design, Controls and Standard SAE J3271.

Organizers - Theodore Bohn, Argonne National Laboratory; Fabian Koark, Cariad; Phares Noel, Oakland Univerity; Eugene Saltzberg, University of Detroit Mercy; Vincent Socci, National Instruments; Di Zhu, Ford Motor Company

Chairperson - Gene Saltzberg, University of Detroit Mercy

Time	Paper No.	Title
1:30 p.m.	ORAL ONLY	Wireless Charging Can Make a Difference in the Future Grid • V2G technology keeps evolving (The worldwide market for V2G technology was estimated to be worth $2.78 billion last year and is expected to increase at a CAGR of 16.45% to $12.75 billion through 2031.) • Wireless charging simplifies connection to the grid for V2G purposes – nobody has to remember to plug in • Altering time when vehicles are charged can save a lot of money and unburden the grid (power snacking plus charging at night instead of at peak of grid demand)

WCX SAE World Congress Experience

Technical Session Schedule

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Time	Paper No.	Title
		Milisav Danilovic, WiTricity Corporation
2:00 p.m.	ORAL ONLY	Wireless Charging Powers Transport through Enabling Autonomy • No need for a human to plug in • Wirelessly charged autonomous transport vehicles can operate 24/7 • Wireless charging can extend battery life through power snacking (avoiding charging to 100%) and draining to empty • Wireless charging can help increase safety, security, reliability, and comfort of our transportation • Helps achieving green transportation by accelerating EV and AV adoption • Improves functioning of the entire transport system and contributes to global sustainability and safety goals Milisav Danilovic, WiTricity Corporation
2:30 p.m.	2023-01-0703	Designing Dynamic Wireless Power Transfer Corridors for Heavy Duty Battery Electric Commercial Freight Vehicles Vivek Anand Sujan, Adam Siekmann, Sarah Tennille, Eve Tsybina, Oak Ridge National Laboratory
3:00 p.m.	ORAL ONLY	SAE TIR J2954/2 First Ever High Power Wireless Power Transfer to 500kW Standardization and Validation Testing Plans The published SAE J2954 standard established an industry-wide specification that defines acceptable criteria for interoperability, electromagnetic compatibility, EMF, minimum performance, safety, and testing for wireless power transfer (WPT) for light-duty plug-in electric vehicles. SAE Technical Information Report, SAE J2954/2, defines new power transfer levels in the higher power ranges needed for heavy-duty electric vehicles up to 500kW. This document addresses the requirements based on these charge levels and different vehicle applications as a first step in the process of completing a standard that the industry can use, both for private (fleet) and public wireless charging, including for Trucks and Busses. Included in the presentation will be plans for EMC/EMF testing in 2023 for validate of HD WPT. Jesse Schneider, ZEV Station

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Wednesday, April 19

Smart Transportation and Infrastructure: V2X-Interactions among Vehicles and Others - Part 1

Session Code AE404

Room 260 Session 9:30 a.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, Ohio State Univ.; Jan-Mou Li, Metropolitan Washington Council of Gover; Xin Wang, Ford Motor Company

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Time	Paper No.	Title
9:30 a.m.	2023-01-0713	An Assessment of Current Barriers to Accessibility in Public Transportation Pick Up/Drop Off Zones and How Solutions may be Applied to Autonomous Vehicles Justin Scott, Michigan State University; Micah D'Arcangelo, Valparaiso University; Benjamin Olness, University of Texas; Michele Grimm, University at Albany; Tamara Bush, Michigan State University
10:00 a.m.	2023-01-0714	A Method for Building Vehicle Trajectory Datasets Based on Aerial Videos Zhenyu Wang, Zhuoping Yu, Wei Tian, Lu Xiong, Chen Tang, Tongji University
10:30 a.m.	2023-01-0715	Autonomous Eco-Driving Evaluation of an Electric Vehicle on a Chassis Dynamometer Farhang Motallebiaraghi, Western Michigan University; Aaron Rabinowitz, Colorado State University; Johan Fanas Rojas, Parth Kadav, Damon A. Miller, Western Michigan University; Thomas Bradley, Colorado State University; Rick Meyer, Zachary Asher, Western Michigan University
11:00 a.m.	2023-01-0717	Deliver Signal Phase and Timing (SPaT) for Energy Optimization of Vehicle Cohort Via Cloud-Computing and LTE Communications Jingtao Ma, Thomas Bauer, Kiel Ova, Kyle Hatcher, Traffic Technology Services, Inc.; Darrell Robinette, Frederic Jacquelin, Pruthwiraj Santhosh, Michigan Technological University
11:30 a.m.	2023-01-0718	Dynamic Speed Harmonization (DSH) as Part of an Intelligent Transportation System (ITS) Ozgenur Kavas-Torris, Levent Guvenc, Ohio State University

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Wednesday, April 19

Smart Transportation and Infrastructure: V2X-Interactions among Vehicles and Others - Part 2

Session Code AE404

Room 260 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, Ohio State Univ.; Jan-Mou Li, Metropolitan Washington Council of Gover; Xin Wang, Ford Motor Company

Time	Paper No.	Title
1:30 p.m.	2023-01-0719	Road Anomaly Detection and Localization for Connected Vehicle Applications Xiaoliang Zhu, Subrata Kumar Kundu, Hitachi America, Ltd. R&D
2:00 p.m.	~~2023-01-0720~~	Application of UWB Technology to Improve Vulnerable Road Users Awareness in V2X Communication Systems ORAL ONLY

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Time	Paper No.	Title
		András Wippelhauser, Commsignia Inc.; Áron Kovács, Péter Lövei, Commsignia Inc
2:30 p.m.	ORAL ONLY	Cellular-Vehicle-to-Everything (C-V2X) Applications Can Help Save Lives - Standards are Ready Now
		Sunni Tweet, Qualcomm Technologies Inc.
3:00 p.m.		BREAK

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Wednesday, April 19

Smart Transportation and Infrastructure - Part 1

Session Code AE400

Room 260 Session 3:30 p.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, Ohio State Univ.; Jan-Mou Li, Metropolitan Washington Council of Gover; Phares Noel, Oakland University; Xin Wang, Ford Motor Company; Xiangrui Zeng, Huazhong University of Science and Tech.

Chairperson - Ozgenur Kavas-Torris, Ohio State Univ.

Time	Paper No.	Title
3:30 p.m.	ORAL ONLY	Safe Infrastructure for Connected and Automated Vehicles - The Role of Codes and Standards
		Mahmood Nesheli, CSA Group
4:00 p.m.	2023-01-0854	An Approach to Model a Traffic Environment by Addressing Sparsity in Vehicle Count Data
		Mayur Patil, Punit Tulpule, Shawn Midlam-Mohler, Ohio State University
4:30 p.m.	ORAL ONLY	goMARTI - A Rural ADA Self-driving Shuttle Case Study
		Justin Johnson, Tammy Meehan Russell, The PLUM Catalyst

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Wednesday, April 19

Fatigue Analysis and Design - Part 2

Session Code M200

Room 311 A/B 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 application on fatigue and durability 12 battery pack and electrical motor fatigue and durability.

Organizers - Guofei Chen, General Motors LLC; Mingchao Guo, FCA US LLC; Jeong Hong, Thornton Tomasetti; Hong Tae Kang, Univ. of Michigan-Dearborn; Yung-Li Lee, FCA US LLC; Paul Lubinski, Thermo King Corp.; Sean McKelvey, Stellantis NV; Gavin Song, Ford Motor Company; Xuming Su; Zhigang Wei, University of Michigan; Xijia Wu, National Research Council Canada

Chairperson - Paul Lubinski, Thermo King Corp.; Gavin Song, Ford Motor Company

Time	Paper No.	Title
9:30 a.m.	2023-01-0725	Fatigue Analysis of Automotive Components of Inhomogeneous Material under Variable-Amplitude Cyclic Loads Zane Yang, Valeo-Kapec
10:00 a.m.	2023-01-0724	Frequency Domain Properties and Applications of the Effective Second Moment of Load Path for Multiaxial Fatigue Damage and Life Assessment Zhigang Wei, Pingsha Dong, University of Michigan; Xianjun Pei, Southeast University
10:30 a.m.	2023-01-0723	Automotive Applications Multiaxial Proving Grounds and Road Test Simulator: Durability Prediction Methodology Development and Correlation for Rubber Components Touhid Zarrin-Ghalami, Sandip Datta, FCA US LLC
11:00 a.m.	2023-01-0804	Fatigue Behavior of Stamped Electrical Steel Sheet at Room and Elevated Temperatures Gurmeet Gill, Behzad Behravesh, Dulal Saha, University of Waterloo; Wensheng Zhang, Jim Chen, Gianni Lamonaca, Marie Mills, Stellantis N.V.; Hamid Jahed, University of Waterloo
11:30 a.m.	2023-01-0803	Effect of Edge Finish on Fatigue Behavior of Thin Electrical Steel Sheets Gurmeet Gill, Behzad Behravesh, Dulal Saha, University of Waterloo; Wensheng Zhang, Jim Chen, Gianni Lamonaca, Marie Mills, Stellantis N.V.; Hamid Jahed, University of Waterloo

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Wednesday, April 19

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

Session Code M200A

Room 311 A/B Session 1:30 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. BEV electrification is most trending topics, like electric motor involving electro-magnetic and vibro-acoustic analysis. How to fundamentally understand the BEVs battery and electric motor, and what CAE process can aid and optimize

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engineering design are interesting topics by the technical experts in this panel. Learn more about the Participants

Organizers - Gavin Song, Ford Motor Company

Chairperson - Yung-Li Lee, FCA US LLC

Moderators - Gavin Song, Ford Motor Company

Panelists - Jon Aldred, HBK Hottinger Bruel & Kjaer Inc; Chris Hughes, Our Next Energy; Satheesh Kandasamy, Dassault Systemes of America Corp; Victor Oancea, Dassault Systemes Simulia Corp; Mikhail Ejakov, Ford Motor Company; Anup Paul, Hexagon Manufacturing Intelligence;

Wednesday, April 19

Fatigue Analysis and Design - Part 3

Session Code M200

Room 311 A/B 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 application on fatigue and durability 12 battery pack and electrical motor fatigue and durability.

Organizers - Guofei Chen, General Motors LLC; Mingchao Guo, FCA US LLC; Jeong Hong, Thornton Tomasetti; Hong Tae Kang, Univ. of Michigan-Dearborn; Yung-Li Lee, FCA US LLC; Paul Lubinski, Thermo King Corp.; Sean McKelvey, Stellantis NV; Gavin Song, Ford Motor Company; Xuming Su; Zhigang Wei, University of Michigan; Xijia Wu, National Research Council Canada

Chairperson - Paul Lubinski, Thermo King Corp; Mingchao Guo, FCA US LLC

Time	Paper No.	Title
3:30 p.m.	2023-01-0802	Compatibility of Rupp's Structural Stress Method for Fatigue Life Prediction of Self-Piercing Rivets Alan Woo, Behzad Behravesh, University of Waterloo; Amelie Malpot, Saeid Rezaee, Christine Royer, Renault Technocentre; Hamid Jahed, University of Waterloo
4:00 p.m.	2023-01-0805	Fatigue Behaviour of Thin Electrical Steel Sheets at Room Temperature Tamuno-Ibim Tolofari, Behzad Behravesh, Dulal Saha, University of Waterloo; Jim Chen, Stellantis N.V.; Marie Mills, Stellantis Canada; Wensheng Zhang, Gianni Lamonaca, Stellantis N.V.; Hamid Jahed, University of Waterloo
4:30 p.m.	2023-01-0722	Virtual Accelerometer Approach to Create Vibration Profile for Automotive Component Shake Test Weidong Zhang, Liang Wang, FCA US LLC; Guanmin Feng, FCA Canada; Chandramouli Tangella, Vivek Kirtane, John Morley, FCA US LLC

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

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Wednesday, April 19

Motorsports Engineering

Session Code MSEC100

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

This session focusses on the links between motorsports, the mainstream automotive industry and academia. As such, it is the forum at the WCX where ideas and knowledge involving motorsports can be exchanged between the three communities. This exchange will be accomplished by the use of featured speakers from motorsports, and presentations, both written and oral, of topics deemed to be of relevant interest to the motorsports community in general, and to students and faculty involved in engineering education.

Organizers - Gregory Fadler, Stellantis; Daniel B. Honeycutt, Engineering Systems Inc.; Raymond Leto, TotalSim LLC; Wiley McCoy, McLaren Performance Technologies; Sriram S. Pakkam, Ford Performance Vehicles; Michael Royce, H. Robert (Bob) Welge, Retired; Dwight Woodbridge, Knowledge Power; Peter Tkacik, Retired

Chairperson - Gregory Fadler, Stellantis

Time	Paper No.	Title
9:30 a.m.	ORAL ONLY	Keynote: Driving. Performance. Together. Alba L. Colon, Hendrick Motorsports
10:30 a.m.	2023-01-0735	Scale-Resolved and Time-Averaged Simulations of the Flow over a NASCAR Cup Series Racecar Adit Sunil Misar, Mesbah Uddin, University of North Carolina Charlotte; Ted Pandaleon, Josh Wilson, Chip Ganassi Racing
11:00 a.m.	2023-01-0736	Development of a Baja SAE Data Acquisition System Nicholas Hubbard, American Axle & Manufacturing; James A. Mynderse, Lawrence Technological University
11:30 a.m.	2023-01-0737	Combustion Chamber Development to Maximize the Performance of the Hydrogen Combustion Engine for the T1 Ultimate Category of the Dakar Rally Competition Thomas Durand, Philipp Adomeit, FEV Europe GmbH; Michael Blomberg, RWTH Aachen University (TME); Yousef Jeihouni, FEV North America Inc.; Francois Michelet, FEV France S.A.; Loic Combemale, Serge Meyer, Oreca Magny-Cours

Planned by Motorsports Engineering Activity / Ground Vehicle Advisory Group

Wednesday, April 19

Panel Discussion: Polymer Composite Materials for EV Structures and EVSE Components

Session Code M302A

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

Panel would discuss –
o the need for lightweight polymeric based composite materials to enhance the range, safety and manufacturability for high volume production of EV battery components and EV charging equipment.
o Discuss present trend and existing challenges for battery structures with incumbent solutions and need for alternative materials for higher production rates while minimizing secondary operations
o For EV charging equipment, need for high performance materials to with stand high voltage charging thus to reduce charging times
o Need for sustainable materials and safety regulatory requirements while using polymeric composites for EV battery and EVSE equipment. Learn more about the Participants

Organizers - Somasekhar Bobba, SABIC

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Moderators - Somasekhar Bobba, SABIC

Panelists - Dan Bechlem, Ford Motor Company; Mason Kouhi, IAC; Andrew Oury, General Motors LLC; Jian Tao, Stellantis NV;

Wednesday, April 19

University Student Competitions/Project Results - Formula SAE and Other Work

Session Code MSEC101

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

This oral presentation session is specifically designed for students involved in SAE Collegiate Design Series (CDS) competitions or other university projects/competitions such as Formula SAE, Baja SAE, SAE Aero Design and SAE Clean Snowmobile Challenge. Students are invited to present their required Cost, Design, or Business presentations (or similar project reports) to those from industry attending WCX. The focus of the session is to create exposure for students with leading mobility companies.

Organizers - Jennifer Bastiaan, Greg Kettering, Kettering Univ.

Chairperson - Jennifer Bastiaan, Kettering Univ.

Time	Paper No.	Title
1:30 p.m.	~~2023-01-0809~~	Formula SAE IC 2022 Lehigh Racing Business Presentation
	ORAL ONLY	
		Maria Maragkelli, Skyler Snow, Lehigh University
2:00 p.m.	ORAL ONLY	Use of Component Optimization and Unique Technology to Meet FSAE Design Goals
		Kincade Engen, Michigan Technological Univ; James De Clerck, Michigan Technological Univ.
2:30 p.m.	ORAL ONLY	Development and Characterization of an Economical Airfoil Yaw Sensor for Motorsport Applications
		Alvin Ahn, Daniel Bae, Jude Nejmanowski, Matthew Pozzi, Univ of Southern California
3:00 p.m.		BREAK
3:30 p.m.	ORAL ONLY	Kettering University Formula SAE Brake System Plausibility Circuit Design
		Braydin Jones, Kettering Univ.; Jennifer Bastiaan, Gregory Davis, Kettering Univ
4:00 p.m.	~~2023-01-0810~~	Design and Simulation of New Decoupling Suspension for Formula Racing Car Based on ADAMS
	ORAL ONLY	
		Jiahui Chen, ChenJiahui@2020.cqut.edu.cn; Bo Hu, b.hu@cqut.edu.cn

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Wednesday, April 19

Composite Materials and Structures for EV and ICE Vehicle

Session Code M302

Room 312 A/B Session 3:30 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

Chairperson - Somasekhar Bobba, SABIC

Time	Paper No.	Title
3:30 p.m.	ORAL ONLY	Sustainable Lightweight Functional Filler for Polymer Composites and Use of Recycled Plastics for Lighting Applications Ayse Ademuwagun, Plastic Omnium
4:00 p.m.	ORAL ONLY	Development and Validation of an EMI Enhanced SMC Compound for BEV Applications Michael Campbell, Technical Fibre Products Inc.
4:30 p.m.	ORAL ONLY	Next-Generation Fiber Reinforced Polymer Composite Pickup Bed Development (Pre-Recorded Only) Amanda Nummy, Hyundai Motor Co.

Wednesday, April 19

Sheet Metal Forming Technology

Session Code M105

Room 313 A/B 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, 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 - Raghu Echempati, Kettering Univ.; ZiQiang Sheng, General Motors LLC; Dajun Zhou, Stellantis NV; Xiaoming (Ming) Chen, Novelis North America; Lu Huang, General Motors LLC

Chairperson - Xiaoming (Ming) Chen, Novelis North America

Time	Paper No.	Title
9:30 a.m.	2023-01-0729	Lubrication Effects on Automotive Steel Friction between Bending under Tension and Draw Bead Test Hua-Chu Shih, United States Steel Corp.; Jatinder Singh, Tasfia Ahmed, General Motors LLC

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Time	Paper No.	Title
10:00 a.m.	2023-01-0730	Design of a Test Geometry to Characterize Sheared Edge Fracture in a Uniaxial Bending Mode Advaith Narayanan, Cliff Butcher, University of Waterloo
10:30 a.m.	2023-01-0731	Formability Analysis of Aluminum-Aluminum and AA5182/Polypropylene/AA5182 Laminates Caroline Karishma Kella, Pankaj Mallick, University of Michigan-Dearborn
11:00 a.m.	ORAL ONLY	High Strength Aluminum Alloy Forming and Springback Performance Xiaoming (Ming) Chen, Novelis North America
11:30 a.m.	ORAL ONLY	Stretch Bendability Evaluation of 3rdGen AHSS in Monolithic and TWB Forms Sobhan Nazari Tiji, Cleveland Cliffs Inc

Planned by Metallic Materials Committee / Materials Engineering Activity

Wednesday, April 19

Magnesium Technology

Session Code M109

Room 313 A/B Session 1:30 p.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

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

Time	Paper No.	Title
1:30 p.m.	ORAL ONLY	Joining Technologies for Magnesium Die Casting Parts Yousef Tabatabaei, Gerry Wang, Jonathan Weiler, Meridian Lightweight Technologies
2:00 p.m.	ORAL ONLY	Magnesium: A Critical and Strategic Mineral Resource Lee Bray
2:30 p.m.	ORAL ONLY	Wrought Magnesium Alloys for Automotive Applications: Opportunities and Challenges Alan Luo, Ohio State University

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

Planned by Metallic Materials Committee / Materials Engineering Activity

Wednesday, April 19

Magnetic Materials for EV Traction Motors

Session Code M103

Room 313 A/B Session 3:30 p.m.

Vehicle electrification has been recognized and strategically taken by almost all the developed countries as well as major developing economies as one of the most important routes to reducing GHG emissions in the transportation sector. The electrification of vehicles not only involves the development of high performance/capacity batteries to ease the range anxiety, but it also needs to reduce the costs and improve the energy efficiency of the propulsion system to enable affordable electric vehicles (EVs) for wide adoption. Like the engine in a traditional internal combustion engine (ICE) vehicle, the propulsion (electric-drive) system is the heart of an EV, and traction motor is at the center of the system. Materials optimization and the development of new materials (e.g. electrical steels, permanent magnets, soft magnetic composites, etc.) play an important role in achieving these goals. This symposium provides a platform for engineers, researchers and stakeholders to share, discuss, and collaborate in magnetic materials development for the manufacturing of EV traction motors.

Organizers - Youliang He, Natural Resources Canada; Fabrice Bernier, National Resarch Council

Chairperson - Youliang He, Govt of Canada

Time	Paper No.	Title
3:30 p.m.	2023-01-0833	Recrystallization Behavior of Non-oriented Electrical Steel Sheets after Skew Cold Rolling Youliang He, Mehdi Sanjari, Natural Resources Canada
4:00 p.m.	2023-01-0832	A Novel Interior Permanent Magnet Synchronous Motor with High Strength Soft Magnetic Composite Powders as Stator-Rotor Material for Electric Vehicle Application Vidhya B, Roopesh Shroff, Avdhut Sabnis, Tata Consultancy Services

Planned by Metallic Materials Committee / Materials Engineering Activity

Wednesday, April 19

Emission Control Modeling, Part 2

Session Code PFL430

Room 320 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 power plants 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.; Christopher Depcik, Univ. of Kansas; Jian Gong, Cummins Inc.; Vincenzo Mulone, Univ. Of Roma Tor Vergata; Achuth Munnannur, Cummins Inc.

Chairperson - Christopher Depcik, Univ of Kansas

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Moderators - Christopher Depcik, Univ of Kansas

Time	Paper No.	Title
9:30 a.m.	2023-01-0368	Experimental and Numerical Investigation of a Particle Filter Technology for NG Heavy-Duty Engines Dario Di Maio, Chiara Guido, Pierpaolo Napolitano, Carlo Beatrice, CNR - STEMS; Stefano Golini, FPT Industrial SpA
10:00 a.m.	2023-01-0364	Real-time simulation of CNG engine and after-treatment system cold start. Part 2: Tail-pipe emissions prediction using a detailed chemistry based MOC model. Larisa Leon de Syniawa, LOGE AB; Reddy Babu Siddareddy, LOGE Polska Sp. z o.o.; Johannes Oder, FEV Norddeutschland GmbH; Tim Franken, BTU Cottbus-Senftenberg; Vivien Guenther, LOGE AB; Hermann Rottengruber, Otto-Von-Guericke University Magdeburg; Fabian Mauss, BTU Cottbus-Senftenberg
10:30 a.m.	2023-01-0367	Impact of second NH3 storage site on SCR NOx conversion in an ultra-Low NOx aftertreatment system Venkata Rajesh Chundru, SouthWest Research Institute; Chintan Desai, Vaibhav Kadam, Bruce Vernham, Isuzu Technical Center of America Inc; Christopher Sharp, Sankar Rengarajan, Sandesh Rao, Jayant Sarlashkar, Southwest Research Institute
11:00 a.m.	ORAL ONLY	Dynamic Neural Network Modeling of DOC and SCR reactors Bhaskar Sarkar, Santhosh Gundlapally, Syed Wahiduzzaman, Gamma Technologies LLC

Planned by Mobile Emissions Committee / Energy and Propulsion Activity

Wednesday, April 19

High Efficiency IC Engines Concepts, Part 1

Session Code PFL170

Room 320 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 - Tarek Abdel-Salam, East Carolina University; Cosmin Dumitrescu, West Virginia Univ.; Aswin Ramesh, Cummins Inc.; David Roth, Roth Engine Science LLC; Yu Zhang, Aramco Research Center - Detroit

Chairperson - Wei Zeng, General Motors LLC

Time	Paper No.	Title
1:30 p.m.	ORAL ONLY	Updated On Road Testing Results from the Ultralow NOx and Low CO2 Heavy Duty Opposed Piston Engine Laurence Fromm, Achates Power Inc.; Fabien Redon, Achates Power Inc
2:00 p.m.	ORAL ONLY	Clean Propulsion Technologies – towards new Powertrain Solutions for Marine and Off-Road Segments: a mid-term Progress Review

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Time	Paper No.	Title
		Maciej Mikulski, Univ. Of Vaasa; Piotr Bielaczyc, Joseph Woodburn, Bosmal Automotive R & D Institute
2:30 p.m.	ORAL ONLY	Thermal Barrier Coatings in High-output Diesel Engines – Test Results from a Diversity of Material/Coating Architectures
		John Saputo, Sanjay Sampath, Stony Brook University; Eric Gingrich, Michael Tess, US Army DEVCOM GVSC
3:00 p.m.		BREAK
3:30 p.m.	2023-01-0231	Combustion Regimes in the Chrysler Multi-Air Multi-Fuel Engine, Part 1 - Diesel Assisted Spark Ignited
		William Church, WVU Tech.; Steven McConnell, Marathon Petroleum Company LLC
4:00 p.m.	2023-01-0227	Knock Inhibition in Hydrogen Fueled Argon Power Cycle Engine with a Higher Compression Ratio by Water Direct Injection at Late Exhaust Stroke
		Shaoye JIN, Jun Deng, Chenxu Wang, Weiqi Ding, Renjie Deng, Hao Yang, Liguang Li, Tongji University
4:30 p.m.	2023-01-0226	Optimizing Spark Assisted GCI Combustion with the Compression Ratio and Internal Exhaust Gas Recirculation (I-EGR) Strategies
		Vallinayagam Raman, Yoann Viollet, Junseok Chang, Saudi Aramco

Planned by General Powertrain Development / Energy and Propulsion Activity

Wednesday, April 19

Particle Emissions and Control from Combustion Sources, Part 1

Session Code PFL450

Room 321 Session 9:30 a.m.

The featured presenter for this session is Dr. Athanasios Konstandopoulos from Aristotle University and the 2022 SAE John Johnson Diesel Researcher of the Year medal winner. He received his medal award for his numerous seminal journal publications that provided the foundation for diesel particulate modeling and for his leadership in aftertreatment science and technology research, including establishing the ECST Journal. The following papers will discuss methods for improving DPF efficiency.

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

Chairperson - Kirby Baumgard, Baumgard Technologies; Ezio Mancaruso, STEMS - CNR; Andrea Strzelec, University of Wisconsin-Madison

Time	Paper No.	Title
9:30 a.m.	ORAL ONLY	Keynote: Forty Years of Particulate Filter Technology
		Athanasios G. Konstandopoulos, Aristotle University and SYNEST PC
10:30 a.m.	ORAL ONLY	Evaluation of Cordierite Filters for Secondary Filtration Applications to Reduce Tailpipe PN Emissions
		Alexander Wells, NGK Automotive Ceramics USA Inc.; Takahiro Honda, Atsushi Kaneda, Tsuyoshi Asako, Zhuqi Wang, NGK Automotive Ceramics

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Time	Paper No.	Title
		USA Inc; Katsunori Tanaka, Kazuya Mori, Yasuyuki Furuta, NGK Insulators Ltd
11:00 a.m.	2023-01-0389	New Generation Diesel Particulate Filter for Future Euro7 Regulation
		Yuta Nakagoshi, NGK Insulators, Ltd.; Kazuya Mori, Katsunori Tanaka, Yasuyuki Furuta, Takashi Aoki, NGK Insulators Ltd; Fumihiko Yoshioka, Kyohei Kato, NGK Automotive Ceramics USA Inc.
11:30 a.m.	2023-01-0384	Layer Coating on DPF for PN Emission Control
		Chuang Zhao, Tongji University; Lifeng Wang, Ruihe Environmental Technology Co. Ltd.; Diming Lou, Yedi Ren, Tongji University

Planned by Mobile Emissions Committee / Energy and Propulsion Activity

Wednesday, April 19

Engine Flows and Combustion Diagnostics

Session Code PFL140

Room 321 Session 1:30 p.m.

This session features papers that focus on extending and improving various sensors and diagnostic methods that can be employed to examine the flow and combustion processes in both production engines and research environments. Examples of diagnostics of interest include, but are not limited to: PIV, LIF, pressure sensors, ion probes, exhaust gas composition sensors, and various spectroscopic optical techniques.

Organizers - Oivind Andersson, Lund University; Cosmin Dumitrescu, West Virginia Univ.; Matthew Hall, Univ. of Texas-Austin

Chairperson - Matthew Hall, Univ. of Texas-Austin

Time	Paper No.	Title
1:30 p.m.	2023-01-0216	Effects of Fuel Injection on Turbulence Enhancement in a Spray-Guided, Gasoline Direct-Injection, Optically Accessible Engine with a High-Pressure Injection System
		Donghwan Kim, Hanyang University; Yousang Son, Hyundai Motor Group; Sungwook Park, Hanyang Univ
2:00 p.m.	2023-01-0215	Analysis of Cycle-to-Cycle Variation in In-Cylinder Flow and Combustion by Using Simultaneous PIV Measurements on Two Sections
		Yasuo Moriyoshi, Chiba Univ.; Satoshi Hokimoto, Sustainable Engine Research Center; Tatsuya Kuboyama, Makoto kaneko, Chiba Univ
2:30 p.m.	ORAL ONLY	Methanol fuelled passive pre-chamber assisted IC engine combustion visualization: Simultaneous 50 kHz Formaldehyde PLIF and OH* imaging
		Priybrat Sharma, King Abdullah Univ. of Science & Tech.; Qinglong Tang, Tianjin Univ; Manuel Echeverri Marquez, King Abdullah Univ of Science & Tech; Tao Yu PhD, McGill University; James Turner, Gaetano Magnotti, King Abdullah Univ. of Science & Te
3:00 p.m.	ORAL ONLY	Dynamic mode decomposition for the comparison of engine in-cylinder flow fields from particle image velocimetry (PIV) and Reynolds-averaged Navier-Stokes (RANS) simulations
		Samuel Baker, University of Oxford; Xiaohang Fang, University of Oxford & Calgary; Li Shen, Christopher Willman, Felix Leach, Martin Davy, University of Oxford

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Planned by General Powertrain Development / Energy and Propulsion Activity

Wednesday, April 19

Emissions Measurement and Testing, Part 1

Session Code PFL440

Room 330 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 - Michael Akard, Horiba, Ltd.; Sumanth Reddy Dadam, Ford Motor Company; Svitlana Kroll, Southwest Research Institute; Jun Peng, University of Lincoln; J. Felipe Rodriguez, International Council On Clean Transport; Andrea Strzelec, University of Wisconsin-Madison; Mert Zorlu, Cummins Inc.

Chairperson - Mert Zorlu, Cummins Inc.

Time	Paper No.	Title
9:30 a.m.	ORAL ONLY	Activity and Performance for Heavy-duty Diesel and Battery Electric Vehicles in Real-world Operations Tianyi Ma, George Karavalakis, Chengguo Li, Tom Durbin, Kent Johnson, University Of California Riverside
10:00 a.m.	2023-01-0370	Challenges in PM Measurement at 1 mg/mile and Tunnel Background Correction Mahmoud K. Yassine, FCA US LLC
10:30 a.m.	ORAL ONLY	In-use emissions testing and fuel usage profile of on-road heavy-duty vehicles – 200 Vehicle Study Tom Durbin, Hanwei Zhu, Cavan McCaffery, Jiacheng Yang, University Of California Riverside; Chengguo Li; Kent Johnson, George Scora, Univ of California-Riverside; Kanok Boriboonsomsin, George Karavalakis, University Of California Riverside
11:00 a.m.	2023-01-0376	Evaluation of the Effectiveness of Diesel Particulate Filter Cleaning Methods and their Effect on Fuel Consumption Adime Kofi Bonsi, Marius-Dorin Surcel, Gabor Szathmary, FPInnovations
11:30 a.m.	ORAL ONLY	Fourier-Transform Infra-Red Analysis of Exhaust Gas in the Era of Tending-to-Zero Exhaust Emissions Joseph Woodburn, BOSMAL Automotive R&D Institute Ltd; Piotr Bielaczyc, BOSMAL Automotive R&D Institute Lt

Planned by Mobile Emissions Committee / Energy and Propulsion Activity

Wednesday, April 19

Emissions Measurement and Testing, Part 2

Session Code PFL440

Room 330 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 - Michael Akard, Horiba, Ltd.; Sumanth Reddy Dadam, Ford Motor Company; Svitlana Kroll,

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Southwest Research Institute; Jun Peng, University of Lincoln; J. Felipe Rodriguez, International Council On Clean Transport; Andrea Strzelec, University of Wisconsin-Madison; Mert Zorlu, Cummins Inc.

Chairperson - Svitlana Kroll, Southwest Research Institute

Time	Paper No.	Title
1:30 p.m.	2023-01-0371	The Development of Engine-in-the-Loop (EIL) Testing Methodology for Front Loading Emission Investigations Zheng Xu, LinGang Wang, Haiting Yin, JinXia Yu, SAIC Motor Corporation Limited
2:00 p.m.	ORAL ONLY	Emissions and Performance Investigations of a CNG Plug-In Hybrid Electric Heavy-Duty Truck Tianyi Ma, George Karavalakis, University Of California Riverside; Zisimos Toumasatos; Kent Johnson, Tom Durbin, University Of California Riverside
2:30 p.m.	2023-01-0383	Evaluation of Indrio's Ammonia Sensor using a Diesel Fuel Based Burner Platform Vinay Premnath, Arun Balakrishnan, Southwest Research Institute; Ritobrata Sur, Indrio Technologies Inc; Imad Khalek, Scott Eakle, Southwest Research Institute
3:00 p.m.		BREAK
3:30 p.m.	2023-01-0372	The Influences of Testing Conditions on DOC Light-Off Experiments Yuanzhou Xi, Cummins Inc.; Nathan Ottinger, Daniyal Kiani, Z. Gerald Liu, Cummins Inc
4:00 p.m.	2023-01-0380	Laboratory sulfation of an ammonia slip catalyst with a real-world SO_2 concentration Nathan Ottinger, Yuanzhou Xi, Daniyal Kiani, Z. Gerald Liu, Cummins Inc.
4:30 p.m.	2023-01-0375	Experimental and Modeling Study on the Thermal Aging Impact on the Performance of the Natural Gas Three-Way Catalyst Mi-Young Kim, Cummins Inc.; Rama Krishna Dadi, Jian Gong, Krishna Kamasamudram, Cummins Inc

Planned by Mobile Emissions Committee / Energy and Propulsion Activity

Wednesday, April 19

Panel Discussion: Strategic Vision for Future Automotive Propulsion

Session Code PFL699

Room 330 B Session 9:30 a.m.

Mobility propulsion systems are transforming to integrate increasing levels of electrification and displacing conventional technologies. Over the next ten years the portfolio of propulsion systems will continue to diversify and the growth of electrification and alternative energy sources will only accelerate. A panel of mobility sector executives will provide insight and perspective on how propulsion system technologies will evolve over the next ten year horizon given current market trends and external forces.
Example discussion areas:
• 10 year horizon for electrified transmission and drivelines
o Prime mover mix drives technology development and integration
The intent is to alight on the entire spectrum of propulsive power: ICE, hybrid ICE, BEV, Fuel Cell, Organic Fuels, Hydrogen Combustion
o Tax credits vs. point of sale credits
Material sourcing, assembly location -> Inflation Reduction Act Influence/Impact on NA
New way of counting for electrification Pacifica PHEV is 0.7, VW ID4 is a 4
• Scale from 0 to 4
• All EV's or diversity mix of xHEV's per application basis
o Supply chain disruptions and available raw materials -> prices and inflation

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Will this bring back xHEV strategy
250 kWh battery vs. 50 kWh -> number of vehicles field with electrification

Organizers - Berthold Martin, FCA US LLC; Darrell Robinette, Michigan Technological Univ.

Moderators - Jeff Hemphill, Schaeffler Group USA Inc.

Panelists - Kiran Govindswamy, FEV North America Inc.; Mircea Gradu, Ballard Power Systems; Don Hillebrand, Argonne; Chris Shamie, Schaeffler Group USA Inc.;

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

Wednesday, April 19

Panel Discussion: Engineering Solutions for Future Automotive Propulsion

Session Code PFL698

Room 330 B Session 10:45 a.m.

The mobility sectors transition to electrified propulsion systems has seen a massive increase in activity over the last decade and will continue to do so for the foreseeable decades to come. With the all the new research and development, mobility products and market factors, there are no shortage of engineering challenges to solve in the creation of highly efficient, robust and well integrated electrified mobility systems. An expert engineering panel will present and discuss the challenges facing the industry over the next ten years that needs to achieve sufficiency in engineering electrified propulsion systems.
o Focus on solving specific engineering challenges at the propulsion system level, vehicle market segment or even supply chain and robust material supply.
o Number of gears?
o Torque transfer methods
o High speed electric motors – 20,000+ rpm, what about 30,000 rpm?
Bearing demands of single speed vs. multi-speed
Transmission of electricity
o Bearing technologies for high speed e-motors and electrical conductivity
o Other areas
o Etc.

Organizers - Jeff Hemphill, Schaeffler Group USA Inc.; Berthold Martin, FCA US LLC; Darrell Robinette, Michigan Technological Univ.

Moderators - Darrell Robinette, Michigan Technological Univ.

Panelists - Giorgio Rizzoni, Ohio State University; Goro Tamai, General Motors LLC; Thomas Wellmann, FEV North America Inc.;

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

Wednesday, April 19

Panel Discussion: Evolution of Driveline Fluids for EV’s

Session Code PFL399

Room 330 B Session 1:30 p.m.

Electric Vehicle hardware is changing at a rapid pace and this shapes the design of future driveline fluids. In this 90-minute session, four panelists, representing different business segments within the automotive industry, will briefly present their perspectives on the evolution of lubricants for EVs and afterward answer audience questions. Learn more about the Panelists

Organizers - Richard Butcher, BP Castrol; George S. Dodos, ELDON'S SA; Timothy Newcomb, Lubrizol Corp.

Moderators - Timothy Newcomb, Lubrizol Corp.

Panelists - Joerg Fahl, Volkswagen AG; Thomas Hellwig, Castrol Germany GmbH; Michael Leighton, AVL LIST GmbH; Mariam Shamszad, Lubrizol Corp.;

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Planned by Fuels and Lubricants / Energy and Propulsion Activity

Wednesday, April 19

Panel Discussion: Towards Net Zero and Low Carbon Fuels

Session Code PFL398

Room 330 B Session 3:30 p.m.

As the world transitions to a sustainable future, fuels with considerably reduced carbon footprints are an attractive part of the solution. Panelists will discuss aspects of current and future solutions to achieve carbon neutrality. Learn more about the Panelists

Moderators - Derek Splitter, Oak Ridge National Laboratory

Panelists - David Cleary, Aramco Americas; Jarod C. Kelly, Argonne National Laboratory; Alba Soler, Concawe; Ling Tao, National Renewable Energy Laboratory;

Planned by Fuels and Lubricants / Energy and Propulsion Activity

Wednesday, April 19

0-D and 1-D Modeling and Numerics: SI Combustion & Emissions

Session Code PFL112

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

Thermodynamic system and combustion modeling of engines for improved performance and efficiency and reduced emissions.

Organizers - Federico Millo, Politecnico di Torino; Angelo Onorati, Politecnico di Milano; Xiaofeng Yang, General Motors LLC; Kevin Hoag, Southwest Research Institute

Chairperson - Kevin Hoag, Southwest Research Institute

Time	Paper No.	Title
1:30 p.m.	ORAL ONLY	Tabulated Chemistry Method for Fast Simulation of Internal Combustion Engines Lalit Patidar, Navin Fogla, Syed Wahiduzzaman, Gamma Technologies LLC
2:00 p.m.	2023-01-0183	Real-time simulation of CNG engine and after-treatment system cold start. Part 1: Transient Engine-out emission prediction using a stochastic reactor model Reddy Babu Siddareddy, LOGE Polska Sp. z o.o.; Tim Franken, BTU Cottbus-Senftenberg; Michal Pasternak, LOGE Polska Sp. z o.o.; Larisa Leon de Syniawa, Loge AB; Johannes Oder, FEV Norddeutschland GmbH; Hermann Rottengruber, Otto-Von-Guericke University Magdeburg; Fabian Mauss, BTU Cottbus-Senftenberg
2:30 p.m.	2023-01-0181	Numerical Assessment of Port Water Injection Capabilities to Reduce CO2 Emissions of a Lambda 1 Turbocharged Spark Ignition Engine Fabrizio Gullino, Federico Millo, Luciano Rolando, Politecnico di Torino
3:00 p.m.	2023-01-0182	A Modeling Tool for Particulate Emissions in GDI Engines with Emphasis on the Injector Zone Raul Payri, Ricardo Novella, J. Javier Lopez, Rami Abboud, Universitat Politecnica de Valencia

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Planned by General Powertrain Development / Energy and Propulsion Activity

Wednesday, April 19

0-D and 1-D Modeling and Numerics: Advanced Combustion Systems (Prechamber and TJI)

Session Code PFL113

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

Organizers - Navin Fogla, Gamma Technologies LLC; Federico Millo, Politecnico di Torino; Angelo Onorati, Politecnico di Milano

Time	Paper No.	Title
1:30 p.m.	2023-01-0184	A Quasi-Dimensional Burn Rate Model for Pre-Chamber-Initiated Jet Ignition Combustion Francesco Salerno, Michael Bargende, André Kulzer, IFS, University of Stuttgart; Michael Grill, FKFS; Patrick Burkardt, Marco Günther, Stefan Pischinger, TME, RWTH Aachen University; Jonas Villforth, Dr. Ing. h.c. F. Porsche AG
2:00 p.m.	2023-01-0185	Experimental and Numerical Analysis of an Active Pre-Chamber Engine Fuelled with Natural Gas Marco Riccardi, Vincenzo De Bellis, Univ. degli Studi di Napoli Federico II; Lorenzo Sforza, Politecnico di Milano; Per Tunestal, Lund University; Fabio Bozza, Univ. degli Studi di Napoli Federico II; Carlo Beatrice, STEMS-CNR; Tommaso Lucchini, Politecnico di Milano
2:30 p.m.	ORAL ONLY	Influence of pre-chamber geometry on performance and emissions of an active pre-chamber Spark Ignition engine: an experimental and 0D/1D numerical study Fabio Bozza, Vincenzo De Bellis, Enrica Malfi, University of Naples Federico II; Momir Sjeric, Univ of Zagreb; Luigi Teodosio, University of Naples Federico II; Sara Ugrini, Univ of Zagreb

Planned by General Powertrain Development / Energy and Propulsion Activity

Wednesday, April 19

0-D and 1-D Modeling and Numerics: Air charging & Boosting

Session Code PFL111

Room 331 A/B Session 3:30 p.m.

Organizers - Fabio Bozza, Universita di Napoli Federico II; Federico Millo, Politecnico di Torino; Angelo Onorati, Politecnico di Milano

Time	Paper No.	Title
3:30 p.m.	ORAL ONLY	Evaluation of Divided Exhaust Boost (DEB) Concept in a Millerized LD Spark Ignited Gasoline Engine Praveen Kumar, Xin Yu, Anqi Zhang, Andrew Baur, Aramco Americas: Aramco Research Center
4:00 p.m.	2023-01-0179	Heat Transfer Correction Model for Turbocharger Compressor Performance Maps

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Time	Paper No.	Title
		Vittorio Usai, Silvia Marelli, Carla Cordalonga, Università Degli Studi di Genova

Planned by General Powertrain Development / Energy and Propulsion Activity

Wednesday, April 19

Sustainable Development for Automotive Industry - Part 1

Session Code SDP100

Room 338 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.

Organizers - Tarek Abdel-Salam, East Carolina University; Seyed Ali Arefifar, Oakland University; Yi Ding; Shiqi(Shawn) Ou, Oak Ridge National Laboratory; Ronald L. Williams

Chairperson - Shiqi(Shawn) Ou, Oak Ridge National Laboratory

Time	Paper No.	Title
9:30 a.m.	2023-01-0890	Probabilistic Analysis of Transport Induced Emissions in Melbourne City Roads
		Saiful Bari, Asif Iqbal, Md Mizanur Rahman, Amit Jat, University of South Australia
10:00 a.m.	ORAL ONLY	Using Perceived Ownership Cost to Determining Optimal Electric Range with Considering Electric Vehicle Lightweighting
		Shiqi(Shawn) Ou, Oak Ridge National Laboratory; Shengyong Zhang, Purdue University Northwest; Zhenhong Lin, South China University of Technology; Stacy Davis, Oak Ridge National Laboratory
10:30 a.m.	2023-01-0888	Pre-Design and Feasibility Analysis of a Magneto-Rheological Braking System for Electric Vehicles
		Henrique de Carvalho Pinheiro, Giovanni Imberti, Massimiliana Carello, Politecnico di Torino
11:00 a.m.	2023-01-0886	Admixture Evaluation for Fuel Economy and Emissions by New Indian Motorcycle Driving Cycle
		M. Sithananthan, Indian Oil Corporation; Ravindra Kumar, Central Road Research Institute; Deepak Saxena, Indian Oil Corporation
11:30 a.m.	2023-01-0884	Impact of Different LCI Modelling Scenarios on the LCA Results, A Case Study for the Automotive Sector
		Antonella Accardo, Politecnico di Torino; Giovanni Dotelli, Politecnico di Milano; Ezio Spessa, Politecnico di Torino

Planned by Sustainable Development Committee / Integrated Design and Manufacturing Activity

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Wednesday, April 19

Sustainable Development for Automotive Industry - Part 2

Session Code SDP100

Room 338 Session 1:30 p.m.

This session focuses on the electric vehicle market dynamics and industry evolutions in the United States and the global market: Advances in Alternative Energy sources; Vehicle Electrification Strategies; Charging Infrastructure, Electric Vehicle Battery and Range Design, Recycling; and Corporate Sustainability Programs.

Organizers - Tarek Abdel-Salam, East Carolina University; Seyed Ali Arefifar, Oakland University; Yi Ding; Shiqi(Shawn) Ou, Oak Ridge National Laboratory; Ronald L. Williams

Chairperson - Shiqi(Shawn) Ou, Oak Ridge National Laboratory

Time	Paper No.	Title
1:30 p.m.	2023-01-0891	Light-duty Plug-in Electric Vehicles in China: Evolution, Competition, and Outlook Xu Hao, University of Science and Technology Beijing; Shiqi (Shawn) Ou, Oak Ridge National Laboratory; Kexin Liu, China Automotive Technology & Research Center; Ruiheng Zhong, University of Science and Technology Beijing; Hong Shi, China Automotive Technology & Research Center; Hewu Wang, Tsinghua University; Xin He, Aramco Americas
2:00 p.m.	ORAL ONLY	Back to the Future! How a Technology Developed During the 1970's Energy Crisis Can Address Today's Energy Predicament The automotive industry must balance multiple initiatives, like the conversion to EV's, sustainability and environmental impact, and energy consumption that, on the surface, appear to be aligned with one another. And they are. But a changing world can change priorities. The pandemic and the subsequent war in Ukraine produced an energy crisis reminiscent of the 1970's. Nowhere is this more apparent than in Europe, where short supplies have pushed up the cost of energy to produce a vehicle by an average of 1700%! This is pressuring utilities and governments to consider abandoning environmental and clean energy initiatives in favor of traditional carbon-based supplies. But there are other options. For automotive assembly plants, the greatest opportunity to reduce energy is in the paint shop, which accounts for more than 70% of the total energy consumed. The same applies to many Tier I suppliers. In this presentation, we examine how UV/EB technology was started in the 1920s by Edwin Newton of BF Goodrich using EB to vulcanize natural rubber. It was then commercialized in the 1970s due to the OPEC oil crisis. In an effort to save natural gas resources. We also show how this "thin-film" technology supports the light-weighting and aerodynamic objectives necessary to achieve extended range for EVs! Cara Bommarito, RadTech.
2:30 p.m.	2023-01-0883	Quantifying the Sensitive Parameters of the New Energy Vehicles in China Mohamed Ali Saafi, Aramco Americas; Shiqi (Shawn) Ou, Oak Ridge National Laboratory; Xin He, Aramco Americas
3:00 p.m.		BREAK

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Time	Paper No.	Title
3:30 p.m.	ORAL ONLY	Study of Battery Management and Recycling of Electric Vehicles in India Himanshu, Rajkiya Engineering College Banda UP
4:00 p.m.	2023-01-0882	Life Cycle Climate Performance of MAC Systems in Battery Electric Vehicles James Carow, Dennis Nasuta, Michael Lippy, OTS Research & Development Inc.
4:30 p.m.	ORAL ONLY	An Evaluation of The Electrification of the Heavy-Duty Commercial Vehicle Market. Simon Buderath, Hassib Rahmanzai, Chandler Crockett, P3 USA

Planned by Sustainable Development Committee / Integrated Design and Manufacturing Activity

Wednesday, April 19

Additive Manufacturing - Part 1

Session Code MFG300

Room 353 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. We are also seeking manuscripts that addresses the economic factors affecting each element of the AM supply chain as well as justification for the investments in various AM technology applications.

Organizers - Ramakrishna Koganti, University Of Texas North Texas; Marc LeDuc, SAE International; Monika Minarcin, Accenture

Chairperson - Monika Minarcin, Monika Minarcin, Accenture; Vijitashwa Pandey, Oakland University

Time	Paper No.	Title
9:30 a.m.	2023-01-0892	Use of Additive Manufacturing in Product Design & Development Nandagopal Vaidya, Sudhir Awachar, Harpreet Singh Nagi, Tata Motors Passenger Vehicles Ltd.
10:00 a.m.	2023-01-0893	Engine O-Rings Produced Using Additive Manufacturing Dianne Luning-Prak, Brad Baker, Jim Cowart, US Navy
10:30 a.m.	2023-01-0894	Residual Stress Induced Fretting Fatigue during Fatigue Testing for Materials Produced by Laser Powder Bed Fusion Process Wei-Jen Lai, Ziang Li, Ford Motor Company
11:00 a.m.	ORAL ONLY	Non-Planar Additive Manufacturing Build Strategies for Directed Energy Deposition Tool Paths Ruth Jill Urbanic, Univ. of Windsor; Robert Hedrick, Sima Hajiaghaei Shanjani, Syamak pazireh PhD, Peter Evans, CAMufacturing Solutions Inc

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Time	Paper No.	Title
11:30 a.m.	ORAL ONLY	KEYNOTE: Laser Based Additive Manufacturing: Next Generation Materials Manipulation Technology Additive manufacturing (AM) has been in existence in various forms (coating, welding, casting, etc.) for several decades, however, it has gained visibility and importance only in last 5/6 years due to development of highly controllable and automated tools such as lasers and their manifestation into 3-D printer. Although AM existed in various forms for several years, it only received a serious attention in last few years due to its tremendous potential in advanced manufacturing of complex and near net shape components. AM is ideal for making prototypes during the early development phases of a product thereby significantly reducing the time required for product development and market launch. Whereas SM continues to hold its niche in precision fabrication. The strength of AM lies in those areas where conventional technique based subtractive manufacturing (SM) reaches its limitation in physical complexity of the component. The AM technology enables a design-driven manufacturing process - where design determines production and not the other way around. It provides a high degree of design freedom, the optimization, and integration of functional features, the manufacture of small batch sizes at reasonable unit costs, and a high degree of product customization even in serial production. For rapid prototyping (RP) and series production, AM is expected to make rapid inroad into various sectors of industry. Such sectors include but not limited to aviation and aerospace, automotive, tool-making, metal fabrication, and electronics. However, AM will have special niche in sectors such as biomedical, electronics, aerospace, and lifestyle due to the need for complex design and strategic and expensive raw material associated with the components. As the limits of performance of the components are being constantly pushed beyond their current levels, new designs, materials and manufacturing processes are explored. Considering this, AM techniques are critically evaluated in terms of machine design and performance; processes and techniques; process control and sensing, validation, verification and quantification, infrastructure; supply-chain impact, sustainability, lifecycle, testing and adaptation; rapid tooling; and development, and characterization, and performance of materials. While AM is still evolving, the discussion of fundamentals of physical processes and thermodynamics and kinetics of these physical processes and their implications on the types of materials processed using AM techniques will be the topics of discussion. Process control and monitoring during AM through experimental and computational approaches will also be discussed. Narendra Dahotre, University of North Texas

Planned by Integrated Design and Manufacturing Activity / Ground Vehicle Advisory Group

Wednesday, April 19

Additive Manufacturing - Part 2

Session Code MFG300

Room 353 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. We are also seeking manuscripts that addresses the economic factors affecting each element of the AM supply chain as well as justification for the investments in various AM technology applications.

Organizers - Ramakrishna Koganti, Univ. of Texas; Monika Minarcin, Accenture

Chairperson - Monika Minarcin, Accenture; Vijitashwa Pandey, Oakland University

Time	Paper No.	Title
1:30 p.m.	ORAL ONLY	Recipe Development of Lean Steel Alloy for Manufacturing of Transmission Element through Laser-Based Metal Additive Manufacturing Route Partha Saha PhD, Indian Institute of Technology Kharagpur; Pallav Chatterjee, Tata Motors, Ltd.; Rajib Chakraborty PhD, Indian Institute of Technology Kharagpur; Manish Gopal, Shripadraj Ponkshe, Tata Motors Ltd
2:00 p.m.	ORAL ONLY	Laser Directed Energy Deposition of H13 Tool Steel: Multiscale Experimental and Computational Approach Sameehan Shrikant Joshi, University Of North Texas
2:30 p.m.	ORAL ONLY	Non Beam Based Solid State Additive Manufacturing of Al Alloy Composites Daniel Riley, Shashank Sharma, University of North Texas; venkata mani krishna karri, University Of North Texas; Shreyash Patil, Government College Of Engineering Karad; Narendra Dahotre, University of North Texas

Planned by Integrated Design and Manufacturing Activity / Ground Vehicle Advisory Group

Wednesday, April 19

AI and ML in Vehicle-Level Applications

Session Code IDM300

Room 353 Session 3:30 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 Texas at Arlington; Monika Minarcin, Accenture; Zhenfei Zhan, Chongqing Jiaotong University

Chairperson - Monika Minarcin, Accenture; Vijitashwa Pandey, Oakland University

Time	Paper No.	Title
3:30 p.m.	ORAL ONLY	Using Edge IIoT Data for Usage-Based and Sustainable Design of Vehicle Components through AI-Based Virtual Sensors Stéphane Foulard, Rafael Fietzek, COMPREDICT
4:00 p.m.	2023-01-0741	Diagnosis and Prognosis of Chassis Systems in Autonomous Driving Conditions Kyung-Woo Lee, Dae-Un Sung, Yong Ha Han, Yeongmin Yoo, Hyundai Motor Company; Jongsoo Lee, Yonsei University
4:30 p.m.	2023-01-0742	Analytic Study of China’s Latest New Energy Vehicle Market Subsidies in Facing of the Carbon Neutrality Goal

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Time	Paper No.	Title
		Yuhong Liao, Xinyi Li, Yaya Wan, Zhenfei Zhan, Chongqing Technology and Business University

Planned by Integrated Design and Manufacturing Activity / Ground Vehicle Advisory Group

Wednesday, April 19

Load Simulation and Vehicle Performance: Ride Comfort

Session Code M207

Room 356 Session 9:30 a.m.

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

Chairperson - Jennifer Bastiaan, Kettering University

Time	Paper No.	Title
9:30 a.m.	2023-01-0175	Model-Based Design of Controlled Suspension Incorporating Ride Comfort Sensory Performance Model for Vibration during Vehicle Driving
		Hironobu Kikuchi, Kazuaki Inaba, Tokyo Institute of Technology
10:00 a.m.	2023-01-0176	Revisiting Motion Sickness Models Based on SVC Theory Considering Motion Perception
		Shota Inoue, Hailong Liu, Takahiro Wada, Nara Institute of Science & Technology

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Wednesday, April 19

Load Simulation and Vehicle Performance: Tire and Terrain

Session Code M208

Room 356 Session 10:30 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 Univ.; Emmanuel O. Bolarinwa, Revvo Technologies Inc.; Nan Xu, Jilin Univ.

Chairperson - Jennifer Bastiaan, Kettering University; Emmanuel Bolarinwa, Revvo Technologies Inc.

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Time	Paper No.	Title
10:30 a.m.	ORAL ONLY	Intelligent Tire Prototype Behavior in Longitudinal Slip Operating Conditions Jennifer Bastiaan, Kettering University
11:00 a.m.	2023-01-0751	An Investigation of Tire Inflation Pressure on Fuel Consumption for Off-Road Vehicles Alhossein Mostafa Sharaf, Egyptian Armed Forces

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Wednesday, April 19

Load Simulation and Vehicle Performance: Multi-Body and Autonomous Vehicle Dynamics

Session Code M209

Room 356 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, Civil Aviation University of China

Chairperson - Chen Lv, Nanyang Technological University

Time	Paper No.	Title
1:30 p.m.	2023-01-0776	Ansys Driver Development: A General Purpose Driver for Handling and Rough Road Simulations Hyung-Joo Hong, Hyochan Jun, Changwook Lee, ANSYS Inc.
2:00 p.m.	2023-01-0777	Experimental Analysis and Dynamic Optimization Design of Hinge Mechanism Suo Zhang, Yunkai Gao, Mengjie Chang, Tongji University
2:30 p.m.	2023-01-0778	Ground Impact Analysis of the Battery Pack Based on the Whole Vehicle Model Rongrong Zhang, Yuexing Duan, Fengli Zhang, Yangyang Liao, BYD Auto Industry Company Limited
3:00 p.m.		BREAK
4:00 p.m.	2023-01-0896	Quantifying the Energy Impact of Autonomous Platooning-Imposed Longitudinal Dynamics Evan Stegner, Philip Snitzer, John Bentley, David M. Bevly, Mark Hoffman, Auburn University
4:30 p.m.	2023-01-0895	Comparing the Performance of Different Heavy Duty Platooning Control Strategies

WCX SAE World Congress Experience

Technical Session Schedule

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Time	Paper No.	Title
		John William Bentley, Philip Snitzer, Evan Stegner, David M. Bevly, Mark Hoffman, Auburn University

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Wednesday, April 19

Thermal Systems Modeling and Simulation - Part 1

Session Code HX102

Room 359 Session 9:30 a.m.

The Thermal Systems Modeling and Simulation session focusses on state of the art simulation technologies for modeling thermal systems and their application in the development and optimization of vehicle thermal management and fuel economy. The papers in the session will range from empirical, 1D modeling methods to three dimensional CFD models as well as coupled methods.

Organizers - Ales Alajbegovic, Four Elements Technologies; Wilko Jansen, Jaguar & Land Rover; Jason Lustbader, US Dept. of Energy; Kumar Srinivasan, FCA US LLC; Arpit Tiwari, Rivian Automotive; Sudhi Uppuluri, Siemens Digital Industries Software; Jie Zeng, Denso; Bing Shuttlewood, General Motors LLC; Gursaran Mathur, Highly-Marelli North America

Chairperson - Jie Zeng, Denso; Sudhi Uppuluri, Siemens Digital Industries Software

Time	Paper No.	Title
9:30 a.m.	2023-01-0761	Sliding Mesh Fan Approach Using Open-Source Computational Fluid Dynamics to Investigate Full Vehicle Automotive Cooling Airflows
		Eloy Vilchis Contreras, FCA Mexico; Arturo Guzman, Mark Doroudian, FCA US LLC
10:00 a.m.	2023-01-0763	Effect of Cabin Insulation on the Heating Performance of Electric Vehicles in Cold Climates
		Anandh Ramesh Babu, Simone Sebben, Chalmers Tekniska Hogskola; Tore Bark, Volvo Cars Corporation
10:30 a.m.	2023-01-0766	Influence of Uncertain Factors on Automotive Electronics Thermal Simulation
		Swaminathan Viswanathan, Kesav Kumar Sridharan, Navneet Gupta, Aptiv PLC
11:00 a.m.	2023-01-0765	Analysis of the Thermodynamic Effects of a Plate based on Numerical Simulations
		Naqash Azeem, Parthenope University of Naples, STEMS CNR; Abdul Qaisar, COMSATS University Islamabad; Abdul Rab Asary, Parthenope University of Naples, STEMS CNR; Razi Khan, University of Campania Luigi Vanvitelli
11:30 a.m.	2023-01-0764	Numerical Study of the Fuel Efficiency and the Thermal Management of a Fuel Cell Powered Long-Haul Vehicle
		Martin Bauer, Thomas Lauer, Vienna University of Technology

Planned by Thermal Management Activity / Ground Vehicle Advisory Group

WCX SAE World Congress Experience

Technical Session Schedule

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Wednesday, April 19

Thermal Systems Modeling and Simulation - Part 2

Session Code HX102

Room 359 Session 1:30 p.m.

The Thermal Systems Modeling and Simulation session focusses on state of the art simulation technologies for modeling thermal systems and their application in the development and optimization of vehicle thermal management and fuel economy. The papers in the session will range from empirical, 1D modeling methods to three dimensional CFD models as well as coupled methods.

Organizers - Ales Alajbegovic, Four Elements Technologies; Wilko Jansen, Jaguar & Land Rover; Jason Lustbader, US Dept. of Energy; Gursaran Mathur, Highly-Marelli North America; Bing Shuttlewood, General Motors Corporation; Kumar Srinivasan, Cadence Design Systems Inc.; Arpit Tiwari, Rivian Automotive; Sudhi Uppuluri, Siemens Digital Industries Software; Jie Zeng, Denso

Chairperson - Gursaran Mathur, Highly-Marelli North America; Sudhi Uppuluri, Siemens Digital Industries Software

Time	Paper No.	Title
1:30 p.m.	2023-01-0760	A CFD-Based Numerical Evaluation, Assessment and Optimization of Conjugate Heat Transfer for Aerodynamic Cooling of a Wheel-Hub-Motors in Micro-Mobility Vehicles
		Arun Mambazhasseri Divakaran, Evangelos Gkanas, Simon Shepherd, Coventry University; James Jewkes, Essam Abo-Serie, University of Leicester
2:00 p.m.	2023-01-0757	Simulation Based Sensitivity Study of Piston Cooling Performance Parameters in Automotive Diesel Engines
		Shirdi Dilipkumar Chakkamadathil, Shrirang Gombi, Abhay Kumar Sahu, Cummins Technologies India Pvt. Ltd.
2:30 p.m.	2023-01-0759	Numerical Modeling and Simulation to Predict Thermal Runaway Propagation in an EV Battery Pack
		Reghunath U, Abhay Gudi, Sastry Bonala, Tata Consultancy Services

Planned by Thermal Management Activity / Ground Vehicle Advisory Group

Wednesday, April 19

Energy Efficiency of Thermal Systems and Components

Session Code HX103

Room 359 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; Gursaran Mathur, Highly-Marelli North America; Jeffrey Bozeman, Retired GM; Wilko Jansen, Jaguar & Land Rover; Bing Shuttlewood, General Motors LLC; Jason Lustbader, US Dept. of Energy

Chairperson - Gursaran Mathur, Highly-Marelli North America; Ronald Semel, Ford Motor Company; Bing Shuttlewood, General Motors Corporation

Time	Paper No.	Title

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Technical Session Schedule

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Time	Paper No.	Title
3:30 p.m.	2023-01-0944	Waste Exhaust Heat Recovery in Diesel Engine by Using Optimum Design and Rankine Cycle Saiful Bari, Tejpal Randhawa, University of South Australia
4:00 p.m.	2023-01-0943	Analysis of Techniques to Improve Sustainable Performance of Gas-Turbine Based Combined Cycle System Sabyasachi Sahu, Dhirendranath Thatoi, Siksha 'O' Anusandhan University; Alok Mohapatra, GIFT Autonomous College

Planned by Thermal Management Activity / Ground Vehicle Advisory Group

Wednesday, April 19

Learning Lab: Day 2

Session Code LL200

Room Learning Lab Session ALL DAY

Get unprecedented interaction and go one-on-one with new technology from exhibitors in the Learning Lab. You'll hear discussions on the latest innovations in mobility products with engineers and suppliers in an intimate theater venue, to ask questions and experience hands-on demonstrations. As a bonus – There will be a critical panel discussion moderated by CADIA and the Mobile History Committee will give special presentations on Thursday Morning.

Time	Paper No.	Title
11:00 a.m.	ORAL ONLY	Nira Dynamics .. TBD
2:30 p.m.	ORAL ONLY	Competitiveness of Electric Vehicles in China Paul Haelterman, AUTODATAS (NA)
3:00 p.m.	ORAL ONLY	Battery Battles There is a global battle to develop the ultimate battery that is safe, cheaper to produce, fast charging, and able to hold more energy. The choices made regarding battery chemistry, form factors, and adoption of emerging technologies like solid-state and 3-D printing will ultimately establish if automakers are future focused innovators or doomed to be stuck in the ICE age. Sandy Munro, Munro & Associates

WCX SAE World Congress Experience

Technical Session Schedule

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Wednesday, April 19

SAE EDGE Reports Knowledge Bar - Wednesday, April 19

Session Code KB200

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

This Chat with Expert format is located on the exhibit floor and is designed for you to get questions answered or do some problem solving with in a casual, small group environment FORMAT: Each 40 minute activity begins with the SME presenting an opening statement on challenges or opportunities in their respective field of expertise followed by 35 minutes of dialogue with the audience. Your participation is critical so come prepared to discuss specific issues or concerns you are having.

Time	Paper No.	Title
10:00 a.m.	ORAL ONLY	100% (Renewable) Ethanol
		Julie Blumreiter, Clearflame Engines Inc.
10:45 a.m.		Networking Break
11:00 a.m.	ORAL ONLY	Hydrogen Diesel
		The Expert will engage with the audience on the potential for hydrogen engines to achieve or beat the efficiencies we see with modern diesel engines. While initial engines coming to market are port fuel injected with conventional spark ignition approaches, there are many exciting technologies which could bring dramatic efficiency and performance gains. Tom will review the technology development roadmap that the industry is working to and some simulation results which show how the hydrogen engine could not only keep pace with a diesel engine in terms of efficiency, but could meet or exceed the in-use efficiency of fuel cells while retaining a conventional powertrain.
		Thomas Briggs, Southwest Research Institute
11:45 a.m.		Networking Break
1:00 p.m.	ORAL ONLY	Next-Gen Automated Road Vehicle Sensors
		This chat with expert is related to a recently published EDGE Research Report that summarizes the current trends and debate, as well as future directions and needs regarding sensors for automated road vehicles. Camera, radar, and LiDAR are the primary focus of the report, ultrasound units are also considered when the different strengths, challenges, specifications, and applications are discussed.
		Sven Beiker, Stanford Univ.
1:45 p.m.		Networking Break

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Technical Session Schedule

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Time	Paper No.	Title
2:00 p.m.	ORAL ONLY	Battery Recycling
		This SME will engage the audience in conversation around the lithium-ion battery industry and how it is experiencing a significant increase in demand as manufacturers look to scale up EV production over the next decade. Conversation around the growth in the EV market and the demand for raw materials Continuing to rise. Conversations on establishing a domestic recycling industry that would allow for the recovery of critical materials used in lithium-ion battery production would reduce dependence on imports and limit the risk of supply chain shortages. Finally, the SME will engage the audience on the how domestic recycling can reduce the environmental and social impact of raw material production and the challenges remaining around the availability of feedstock for recyclers, transportation of spent batteries, and safety and bottleneck concerns in the disassembly process.
		Julia Bush, Center For Automotive Research
2:45 p.m.		Networking Break
3:00 p.m.	ORAL ONLY	ADAS Vision Systems - How Clean is Clean?
		A framework for establishing design requirements and evaluation criteria for sensor cleaning systems is a key topic for the successful deployment of ADAS-equipped cars. To do so, a new understanding is needed regarding the dependency between perception, weather, and resource (water & power) efficiency.
		David Menicovich, Actasys inc.

Thursday, April 20

CI & SI Power Cylinder Systems

Session Code PFL530

Room 140 A Session 9:30 a.m.

This session covers the Power Cylinder: piston, piston rings, piston pins, and connecting rods. The papers include information on reducing friction and increasing fuel economy, improving durability by understanding wear, and decreasing oil consumption and blow-by.

Organizers - Sadiyah Sabah Chowdhury, William McNulty, Cummins Inc.; Dan Richardson; Shakti Saurabh, Cummins Inc.; Andrea Strzelec, University of Wisconsin-Madison

Chairperson - Sadiyah Chowdhury, Cummins Inc.

Time	Paper No.	Title
9:30 a.m.	ORAL ONLY	Development of Rotary Friction Welding Processes for Dissimilar Steels to Enable Manufacturing of Higher Temperature Capable Pistons for Diesel Engines
		Dean Pierce, Oak Ridge National Laboratory; Michael Tess, Eric Gingrich, US Army DEVCOM GVSC

WCX SAE World Congress Experience

Technical Session Schedule

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

Thursday, April 20

Advanced Boosting & Heat Recovery Systems

Session Code PFL520

Room 140 A Session 10:00 a.m.

This session addresses research and development of advanced boosting and heat recovery technologies for downsized, hybridized, and electrified propulsion systems. Contributions cover model-based and experimental studies of components (e.g., superchargers, turbochargers, turbomachine and positive displacement compressors and expanders), and their system-level integration, optimization and control in vehicle applications (e.g., engines, fuel cells, and ancillary systems in electric powertrains).

Organizers - Marcello Canova, Ohio State University; Aaron W. Costall, Costall Engineering Limited

Chairperson - Marcello Canova, Ohio State University

Time	Paper No.	Title
10:00 a.m.	2023-01-0410	Investigation of Compressor Deposit in Turbocharger for Gasoline Engines (Part 1: Research on Deposit Formation Mechanism) Noriya Ishizaki, Satoshi Hirano, Hiroshi Kuma, Haruto Ura, Toyota Motor Corp.
10:30 a.m.	2023-01-0412	Investigation of Compressor Deposit in Turbocharger for Gasoline Engines (Part 2: Practical Application to Turbocharger) Haruto Ura, Hiroshi Kuma, Satoshi Hirano, Noriya Ishizaki, Toyota Motor Corporation
11:00 a.m.	2023-01-0411	Analysis of Boosting Architectures for Hydrogen Internal Combustion Engines Jared Brin, SuperTurbo Technologies Inc; Thomas Waldron, SuperTurbo Technologies Inc.

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

Thursday, April 20

Powertrain NVH, Part 2

Session Code PFL550

Room 140 B Session 9:30 a.m.

This session sets out to reflect the recent advances on the research, development and practices of Powertrain NVH treatment. The technical papers are of interest to powertrain system designers, testing specialists, NVH experts, and other individuals who evaluate and develop technologies to control powertrain NVH. The coverage includes: engine, engine subsystem and components noise and vibration; powertrain systems noise measurement and instrumentation; powertrain systems noise analysis.

Organizers - Sanjib Chowdhury, The Ohio State University; Sumanth Reddy Dadam, Ford Motor Company; Yashodhan Joshi, MIT; Andrea Strzelec, University of Wisconsin-Madison

Chairperson - Song He, General Motors LLC

Time	Paper No.	Title
9:30 a.m.	2023-01-0424	NVH Simulation and Validation of a P3 Hybrid Driveline

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Technical Session Schedule

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Time	Paper No.	Title
		Jing Ba, Zhaohui Sun, American Axle & Manufacturing
10:00 a.m.	2023-01-0431	Research on Intake System Noise Prediction and Analysis for a Commercial Vehicle with Air Compressor Model
		Yongnan Zhao, Yaoyu Cai, Zhengdao Zhou, Zhicheng Xu, Shuming Chen, Jilin University
10:30 a.m.	2023-01-0433	Acoustic and Aerodynamic Performances of One Phononic Crystal Duct with Periodic Mufflers
		Panxue Liu, Shuguang Zuo, Xudong Wu, Bin Yin, Shanran Li, Tongji University
11:00 a.m.	2023-01-0427	Development of Automated Driveability Rating System
		Stanislav Gankov, Southwest Research Institute; Garry Gunter, Phillips 66 Co.; CeCe Kyler, Sankar Rengarajan, Sandesh Rao, Southwest Research Institute
11:30 a.m.	~~2023-01-0428~~	Energy Harvesting from the Vibrations of Automotive Engines
	ORAL ONLY	
		Christopher Cooley, Joshua kobus, Dan DelVescovo, Oakland University; Daniel Lantz, LeTourneau University

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

Thursday, April 20

Basic CI Combustion, Part 2

Session Code PFL221

Room 140 C Session 9:30 a.m.

Organizers - Gurneesh S. Jatana, US Dept. of Energy; Ezio Mancaruso, STEMS - CNR; Rafael Lago Sari, Aramco Services Co.; Yu Zhang, Aramco Research Center

Chairperson - Ezio Mancaruso, STEMS - CNR; Rafael Lago Sari, Aramco Services Co.

Time	Paper No.	Title
9:30 a.m.	2023-01-0262	Understanding Hydrocarbon Emissions to Improve the Performance of Catalyst-Heating Operation in a Medium-Duty Diesel Engine
		Seokwon Cho, Mississippi State University; Angela Wu, Dario Lopez Pintor, Sandia National Laboratories
10:00 a.m.	2023-01-0264	Exploration of Fuel Property Impacts on the Combustion of Late Post Injections Using Binary Blends and High-Reactivity Ether Bioblendstocks
		Srinath Subramanian, David Rothamer, University of Wisconsin-Madison
10:30 a.m.	ORAL ONLY	Fundamental Considerations in Assessing Critical Thermal Properties for Thermal Barrier Coating Material Selection for Heavy Duty Diesel Engines

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Technical Session Schedule

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Time	Paper No.	Title
		Sean Moser, Zoran Filipi, Clemson University

Planned by Engine Combustion / Energy and Propulsion Activity

Thursday, April 20

CI Combustion: Alternative Fuels, Part 1

Session Code PFL223

Room 140 C Session 11:00 a.m.

Organizers - Pinaki Pal; Yongli Qi, Caterpillar Inc.; John Wright, Cummins Inc.

Chairperson - John Wright, Cummins Inc.

Time	Paper No.	Title
11:00 a.m.	ORAL ONLY	Experimental Investigation of Fuel Cutout Strategies in a Heavy-Duty Gasoline Compression Ignition Engine
		Aravindh Babu Viswanathan, Univ. of Wisconsin Madison; Brock Merritt, Yu Zhang, Aramco Americas Research Center
11:30 a.m.	ORAL ONLY	Numerical Investigation of Cylinder Deactivation Strategies in a Heavy-Duty Gasoline Compression Ignition Engine
		Aravindh Babu Viswanathan, Univ. of Wisconsin Madison; Praveen Kumar, Rafael Lago Sari, Yu Zhang, Aramco Americas Research Center

Planned by Engine Combustion / Energy and Propulsion Activity

Thursday, April 20

CI Combustion: Alternative Fuels, Part 2

Session Code PFL223

Room 140 C Session 1:30 p.m.

Organizers - Pinaki Pal, Argonne National Laboratory; Yongli Qi, Caterpillar Inc.; John Wright, Cummins Inc.

Chairperson - John Wright, Cummins Inc.

Time	Paper No.	Title
1:30 p.m.	ORAL ONLY	Comparison of Intake Boosting and Cylinder Deactivation as Enabling Strategies for Gasoline Compression Ignition
		Aravindh Babu Viswanathan, Reed Hanson, Sage Kokjohn, Univ. of Wisconsin Madison

WCX SAE World Congress Experience

Technical Session Schedule

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Time	Paper No.	Title
2:00 p.m.	2023-01-0270	Effects of Injector Included Angle on Low-Load Low Temperature Gasoline Combustion Using LES Patrick Christopher O'Donnell, Benjamin Lawler, Clemson University; Aimilios Sofianopoulos, Mainspring Energy Inc; Dario Lopez Pintor, Sandia National Laboratories
2:30 p.m.	2023-01-0272	Combustion Characteristics of Low DCN Synthetic Aviation Fuel, IPK, in a High Compression Ignition Indirect Injection Research Engine Valentin Soloiu, Amanda Weaver, Richard Smith, Aidan Rowell, John Mcafee, James Willis, Georgia Southern University
3:00 p.m.		BREAK
3:30 p.m.	ORAL ONLY	Impact of Fuel Injection Pressure on Combustion of Cetane 25 and 35 Alcohol-to-Jet Fuel Blends in an Energy-Assisted Compression-Ignition Engine Niranjan Miganakallu Narasimhamurthy, Jacob Stafford, University of Wisconsin-Madison; Kenneth Kim, Chol-Bum Kweon, DEVCOM Army Research Laboratory; David Rothamer, University of Wisconsin-Madison
4:00 p.m.	2023-01-0273	Engine and Emissions Performance of Renewable Diesel in a Heavy-Duty Diesel Engine: A Single-cylinder Engine Experiment Khanh Cung, Gina Buffaloe, Thomas Briggs, Chris Bitsis, Edward Smith, Imad Khalek, Alexander Michlberger, Southwest Research Institute

Planned by Engine Combustion / Energy and Propulsion Activity

Thursday, April 20

SI Ignition, Part 1

Session Code PFL215

Room 140 D 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.

Organizers - Richard Davis, Michigan Technological Univ.; Xin Yu, Aramco Research Center; Matthew Bresler, Stellantis; Anand Karpatne, Esgee Technologies; William Attard, Stellantis

Chairperson - Matthew Bresler, William Attard, Stellantis; Richard Davis, Michigan Technological Univ

Time	Paper No.	Title
9:30 a.m.	2023-01-0254	An In-Cylinder Imaging Study of Pre-chamber Spark-Plug Flame Development in a Single-Cylinder Direct-Injection Spark-Ignition Engine Chenyi Zhu, Varun Chakrapani, University of Michigan; Margaret Wooldridge, Univ of Michigan
10:00 a.m.	2023-01-0256	Exploring the EGR Dilution Limits of a Pre-Chamber Ignited Heavy-Duty Natural Gas Engine Operated at Stoichiometric Conditions - An Optical Study Rajavasanth Rajasegar, Ales Srna, Sandia National Laboratories; Ricardo Novella, Ibrahim Barbery, Universitat Politecnica de Valencia

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Technical Session Schedule

As of March 16, 2023 19:49:59 PM

Time	Paper No.	Title
10:30 a.m.	2023-01-0259	Preheated Liquid Fuel Injection Concept for Lean Pre-chamber Combustion Ponnya Hlaing, King Abdullah Univ of Sci & Tech; Paul Ravenhill, Peter Larsson, Swedish Biomimetics 3000; Emre Cenker, Abdullah AlRamadan, Saudi Aramco; Hong Im, James Turner, King Abdullah Univ of Science & Tech
11:00 a.m.	ORAL ONLY	Pre-Chamber Hydrogen Injection for EGR Limit Extension in an Active Pre-Chamber Ignition Engine Tianxiao Yu, Purdue University
11:30 a.m.	ORAL ONLY	Gas-Dynamic Interactions between Pre-Chamber and Main Chamber in a Passive Pre-Chamber Ignition Gasoline Engine Tianxiao Yu, Purdue University

Planned by Engine Combustion / Energy and Propulsion Activity

Thursday, April 20

SI Ignition, Part 2

Session Code PFL215

Room 140 D 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.

Organizers - Richard Davis, Michigan Technological Univ.; Matthew Bresler, Stellantis; Anand Karpatne, Esgee Technologies; Xin Yu, Aramco Research Center; William Attard, Stellantis

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

Time	Paper No.	Title
1:30 p.m.	2023-01-0257	The Influence of Ignition Control Parameters on Combustion Stability and Spark plug Wear in a Large Bore Gas Engine Anupam Saha, Lund University; Ari-Matti Ojanperä, Jari Hyvonen, Wartsila Finland Oy; Jakob Aengeby, Johan Tidholm, SEM AB; Oivind Andersson, Per Tunestal, Lund University
2:00 p.m.	2023-01-0255	Effective Ignition of Lean Methane/Hydrogen Mixture in a Rapid Compression Machine Xiao Yu, Long Jin, Graham Reader, Meiping Wang, Ming Zheng, Univ of Windsor
2:30 p.m.	ORAL ONLY	Combustion characteristics according to the application of plasma ignition systems in a constant volume combustion chamber (CVCC) Yonghyun Choi, Mississippi State University; Joonsik Hwang, Mississippi State Univ; Kyungwon Lee, Mississippi State University
3:30 p.m.	2023-01-0258	Multiple Spark Ignition Approach to Burn Ammonia in a Spark-Ignition Engine: An Optical Study Kalim Uddeen, King Abdullah Univ. of Science & Tech.; Qinglong Tang, Tianjin University, China; Hao Shi, Cardiff University, UK; Gaetano Magnotti, James Turner, King Abdullah Univ. of Science & Tech.

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Technical Session Schedule

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Planned by Engine Combustion / Energy and Propulsion Activity

Thursday, April 20

Basic SI Combustion, Part 3

Session Code PFL211

Room 140 D Session 4:00 p.m.

This session focuses on basic SI combustion processes including studies of mixture formation, engine efficiency, flame propagation, 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 - Richard Davis, Michigan Technological Univ.; Gabriele Di Blasio, CNR STEMS; Sid Gopujkar, Michigan Technological University; Justin Ketterer, General Motors LLC; Simona Silvia Merola, CNR STEMS; Cinzia Tornatore, Italian National Research Council

Chairperson - Siddharth Gopujkar; Richard Davis, Michigan Technological Univ

Time	Paper No.	Title
4:00 p.m.	2023-01-0237	Experimental Demonstration of a High-Efficiency Split-Intake D-EGR Engine Concept Gaurav Handa, Graham Conway, Southwest Research Institute; Dennis Robertson, Linquest Corporation; Raphael Gukelberger, Porsche AG
4:30 p.m.	2023-01-0241	Development of 50% Thermal Efficiency S.I. Engine to Contribute Realization of Carbon Neutrality Koshiro Kimura, Hiroyuki SAKAI, Tetsuo Omura, Daishi Takahashi, Toyota Motor Corporation

Planned by Engine Combustion / Energy and Propulsion Activity

Thursday, April 20

Exhaust Emissions Control - New Developments

Session Code PFL410

Room 140 E 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 - Holmes Ahari, FCA US LLC; Sumanth Reddy Dadam, Ford Motor Company; Ron Silver, Caterpillar Inc.; Anand Srinivasan, Cummins Inc.

Chairperson - Holmes Ahari, FCA US LLC; Anand Srinivasan, Cummins Inc.

Time	Paper No.	Title
9:30 a.m.	2023-01-0354	Technology Levers for Meeting 2027 NOx and CO_2 Regulations James E. McCarthy, Jr., Eaton Corporation; Bryan Zavala, Andrew Matheaus, Southwest Research Institute

WCX SAE World Congress Experience

Technical Session Schedule

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Time	Paper No.	Title
10:00 a.m.	2023-01-0355	Design and Assessment of an Exhaust After-Treatment System Equipped with a Fuel Vincenzo Rossi, Luca Brocchi, Massimo Medda, Stefano Paltrinieri, Federico Rulli, Roberto Tonelli, Ferrari SpA
10:30 a.m.	2023-01-0351	Electrically Heated Catalyst: A Powerful Tool for Aftertreatment Optimization Emmanuel Jean, Maxime Goncalves, Forvia Faurecia Clean Mobility
11:00 a.m.	2023-01-0356	A Multi-Function, Heated Mixer for Rapid Heat-up, Low-Temperature Ammonia Demand, Deposit Prevention and to Meet Ultra-Low NOx Regulations Mansour Masoudi, Nick Poliakov, Sahm Noorfeshan, Emissol LLC
11:30 a.m.	~~2023-01-0352~~ ORAL ONLY	A Heated Mixer for Near-Zero Urea Deposit Mansour Masoudi, Emissol; Sahm Noorfeshan, Nick Poliakov, Emissol LLC; Vaibhav Kadam, Bruce Vernham, Isuzu Technical Center of America Inc; Sergio Lopez, Isuzu Motors Ltd

Planned by Mobile Emissions Committee / Energy and Propulsion Activity

Thursday, April 20

Dual-Fueled Engines

Session Code PFL260

Room 140 E Session 1:30 p.m.

Mixed mode using more than one fuel not fully mixed before combustion. Most often with auto ignition of spray injected late. Papers describing experiments and test data, simulation results focused on applications, fuel/additive effects, and RCCI (Reactivity-Controlled Compression Ignition) are invited and will be placed in appropriate sub-sessions. Papers with an emphasis on the modeling aspects of combustion are encouraged to be submitted into PFL110 or PFL120 modeling sessions.

Organizers - Vincent Costanzo; Antonio Garcia, Universitat Politecnica de Valencia; Mark Hoffman, Auburn Univ.; Luca Marchitto, STEMS-CNR; Javier Monsalve-Serrano, Universitat Politecnica de Valencia; Andrea Strzelec, University of Wisconsin-Madison

Chairperson - Mark Hoffman, Auburn Univ.

Time	Paper No.	Title
1:30 p.m.	2023-01-0281	On-Road CO_2 and NO_x Emissions for a Heavy-Duty Truck with Hydrogen-Diesel Co-Combustion Pooyan Kheirkhah, Patrick Steiche, Tyson Whyte, Hydra Energy Canada Corporation; Mang Guan, Patrick Kirchen, University of British Columbia
2:00 p.m.	2023-01-0283	Experimental study on ammonia/OME combustion in a dual-fuel engine with emphasis on highly diluted intake air conditions Thomas Untheim, Fabian Großmann, Paul Tatucu-Ertel, Marius Jochem, Technische Hochschule Nuremberg; Peter Weigand, Georgios Bikas, Technische Hochschule Nuernberg

WCX SAE World Congress Experience

Technical Session Schedule

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Time	Paper No.	Title
2:30 p.m.	2023-01-0280	Improvements of Thermal and Combustion Efficiencies by Modifying a Piston Geometry in a Diesel/Natural Gas RCCI Engine Hyunsoo Kim, Wooyeong Kim, Sanguk Lee, Choongsik Bae, Korea Advanced Inst of Science & Tech
3:00 p.m.	ORAL ONLY	Combustion and Emission Characteristics of Methane-Gasoline Dual Fuel Combustion in a Single Cylinder DISI Engine Hoseung Yi, Dongwoo Kang, Sungwook Park, Hanyang Univ.

Planned by Engine Combustion / Energy and Propulsion Activity

Thursday, April 20

Driveline Lubricants

Session Code PFL360

Room 140 F Session 9:30 a.m.

The industry continues to work on understanding the interaction of lubricating fluids with conventional transmission and electric drive unit hardware, with the goal of improving vehicle efficiency, durability, and performance. The Driveline Lubricants Session presents a variety of papers dealing with advances in driveline fluids and their relationship to current and new hardware, and how this impacts hardware performance. This session also includes papers of system model analysis and experimental testing.

Organizers - Jason Bares, BorgWarner Inc.; Elana Chapman, General Motors LLC; George S. Dodos, ELDON'S SA; Timothy Newcomb, Lubrizol Corp.; Derek Splitter, Oak Ridge National Laboratory

Chairperson - Timothy Newcomb, Lubrizol Corp; Jason Bares, BorgWarner Inc

Time	Paper No.	Title
9:30 a.m.	ORAL ONLY	100 Years of Corrosion Testing – Is It Time to Move Beyond the ASTM D130? The Wire Corrosion and Conductive Deposit Tests Gregory Hunt, Lubrizol Corp.; Lindsey Choo, Timothy Newcomb, Lubrizol Corp
10:00 a.m.	ORAL ONLY	Impact of thermal transient effects on the corrosivity of lubricants: Part 1 results of cyclic temperature profiles Gregory Hunt, Lubrizol Corp.; Lindsey Choo, Timothy Newcomb, Lubrizol Corp
10:30 a.m.	ORAL ONLY	Lube Oil Expulsion in a Front Axle Predicted Using Particle-Based Simulations William Liou, Western Michigan Univ.; Jin Xu, Sichuan University Pittsburgh Institute; Dakota Dawson, Dana Incorporated

Planned by Fuels and Lubricants / Energy and Propulsion Activity

WCX SAE World Congress Experience

Technical Session Schedule

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Thursday, April 20

Holistic Session on Fuel Consumption and Fuel Economy

Session Code PFL370

Room 140 F Session 1:30 p.m.

The focus of the session is the performance of the integrated vehicle systems (how they meet other system requirements such as drivability, criteria pollutants, safety, NVH) as well as the influence of driving styles and drive cycles. Keywords: Transmission/Driveline, Parastics (e.g., A/C, power steering, EE loads), Aerodynamics, Tires, Weight, Brakes/Hubs, Drive cycles (regulated, customer, Consumer Reports, etc.) Vehicle energy, Overall energy conversion efficiency, vehicle modeling.

Organizers - Elana Chapman, General Motors LLC; Jenny Sigelko, Daimler Trucks North America; Derek Splitter, Oak Ridge National Laboratory

Chairperson - Jenny Sigelko, Daimler Trucks North America

Moderators - Jenny Sigelko, Daimler Trucks North America

Time	Paper No.	Title
1:30 p.m.	2023-01-0347	Energy Modeling of Deceleration Strategies for Electric Vehicles William Hom, Douglas Nelson, Virginia Tech
2:00 p.m.	2023-01-0348	Unified Net Willans Line Model for Estimating the Energy Consumption of Battery Electric Vehicles Candy Yuan Li, Douglas Nelson, Virginia Tech
2:30 p.m.	2023-01-0350	Compact normalized description of vehicle traction power for simple fuel consumption modeling Patrick Phlips, Ford Motor Company; William Ruona, Ford Motor Co Ltd
3:00 p.m.	2023-01-0344	Building the Bulldog Bolt: Sensor Selection for an Autonomous Vehicle Balancing Power Requirements and Functionality Tanmay Panchal, Diane Peters, Jack Sigelko, Kettering Univ
3:00 p.m.		BREAK
3:30 p.m.	2023-01-0349	Comparison of On-Road Highway Fuel Economy and All-Electric Range to Label Values: Are the Current Label Procedures Appropriate for Battery Electric Vehicles? Gregory Pannone; Dave VanderWerp, Car and Driver
4:00 p.m.	2023-01-0345	Vehicle Powertrain Simulation Accuracy for Various Drive Cycle Frequencies and Upsampling Techniques Franz O'Meally, Jacob Holden, Madeline Gilleran, National Renewable Energy Laboratory
4:30 p.m.	2023-01-0346	Auto Stop-Start Fuel Consumption Benefits Shean Huff, Stacy Davis, Robert Boundy, Oak Ridge National Laboratory; Robert Gibson, University of Tennessee

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Planned by Fuels and Lubricants / Energy and Propulsion Activity

Thursday, April 20

Controls for Hybrids and Electric Powertrains, Part 1

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 - Vivek Kumar, Ford Motor Co.; Mufaddel Dahodwala, KPIT Technologies; Elana Chapman, General Motors LLC; Quan Zhou, Univ. of Birmingham; Yi Ding; Hongming Xu, Birmingham Univ.; Sumanth Reddy Dadam, Ford Motor Company; Saeed Siavoshani, Eaton

Chairperson - Sumanth Reddy Dadam, Vivek Kumar, Ford Motor Company

Time	Paper No.	Title
9:30 a.m.	2023-01-0545	Research on Control Strategy of Plug-in Hybrid Electric Vehicle Based on Improved Dynamic Programming Zixuan He, Wuhan University of Technology; Qinghua Yu
10:00 a.m.	2023-01-0546	“Build Your Hybrid” - A Novel Approach to Test Various Hybrid Powertrain Concepts Paul Muthyala, RWTH Aachen University; Joschka Schaub, FEV Europe GmbH; Kevin Badalian, Stefan Pischinger, RWTH Aachen University
10:30 a.m.	2023-01-0547	Development of Control System for Parallel Hybrid System with Turbo Engine Akira Takeichi, Koshiro Kosaka, Daigo NOBE, Toshiaki Suzuki, Shota Miyake, Norihiro Tsukamoto, Toyota Motor Corporation
11:00 a.m.	2023-01-0548	Mitigating Unintended Acceleration and Deceleration Hazards by Defining Drive Torque Command Tolerance Criteria for Commercial Truck Electric Motor Propulsion Control Systems Darren Keith Jones, Prakhar Srivastava, Luis Rivera Ruiz, Pavankumar Gangadhar, Randall McGrail, FEV North America Inc
11:30 a.m.	2023-01-0541	Moments of Power: Statistical Analysis of the Primary Energy Consumption of a Vehicle Thomas Steffen, Temi Jegede, James Knowles, Loughborough Univ.

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

Thursday, April 20

Controls for Hybrids and Electric Powertrains, Part 2

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)

WCX SAE World Congress Experience

Technical Session Schedule

As of March 16, 2023 19:49:59 PM

Organizers - Elana Chapman, General Motors LLC; Sumanth Reddy Dadam, Ford Motor Company; Mufaddel Dahodwala, KPIT Technologies; Yi Ding; Vivek Kumar, Ford Motor Co.; Saeed Siavoshani, Eaton; Hongming Xu, Birmingham Univ.; Quan Zhou, Univ. of Birmingham

Chairperson - Sumanth Reddy Dadam, Ford Motor Company; Vivek Kumar, Ford Motor Co.

Time	Paper No.	Title
1:30 p.m.	2023-01-0550	Nonlinear, Concave, Constrained Optimization in Six-Dimensional Space for Hybrid-Electric Powertrains Szabolcs Sovenyi, Feisel Weslati, FCA US LLC
2:00 p.m.	2023-01-0549	Architecture & Design of Common Hybrid Torque Controls within a Powertrain Domain Controller Nadirsh Patel, Hangxing Sha, Krishna Madireddy, Zachary Tuller, FCA US LLC
2:30 p.m.	ORAL ONLY	Data Driven Deep Reinforcement Learning based Control Algorithm for Fuel Efficient Engine Management Control in idling/ MIDC Drive cycle compared to production vehicles. Ramesh Krishnamurthy, Intellipredikt Technologies Pvt, Ltd.
3:00 p.m.		BREAK

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

Thursday, April 20

Advanced Battery Technologies, Part 4

Session Code PFL730

Room 141 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 - Elana Chapman, General Motors LLC; Curtis Collar, Nanotech Energy; Matilde D'Arpino, Ohio State University; Yi Ding; Santhosh Gundlapally, Gamma Technologies LLC; Xianke Lin, Ontario Tech. University; James Miller, Argonne National Laboratory; Satyam Panchal, Stellantis NV; Eugene Saltzberg; Saeed Siavoshani, Eaton; Hongming Xu, Birmingham Univ.; Di Zhu, Ford Motor Company

Chairperson - Yi Ding, TARDEC

Time	Paper No.	Title
9:30 a.m.	2023-01-0524	Battery Sizing, Parametric Analysis, and Powertrain Design for a Class 8 Heavy-Duty Battery Electric Truck Farhad Salek, Oxford Brookes University; Pobitra Halder, Deakin University; Aiden Thomas Leonard, Oxford Brookes University; Meisam Babaie, University Of Leeds; Shahaboddin Resalati, Oxford Brookes University; Ali Zare, Deakin University

WCX SAE World Congress Experience

Technical Session Schedule

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Time	Paper No.	Title
10:00 a.m.	2023-01-0516	Synthetic Grid Storage Duty Cycles for Second-Life Lithium-Ion Battery Experiments Kevin Moy, Stanford University; Simona Onori, Stanford Univ
10:30 a.m.	2023-01-0512	Progressive Meta-Model Based Design Optimization for Lithium-ion Battery Pack to Improve Cell Cycle Life Yong-Hwan Choi, Hyundai Motor, Seoul National Univ; Junho Suh, Yoonhyuk Kang, Hyunwoo Yoon, Hyundai Motor Company; Hyunhee Choi, Seoul National Univ
11:00 a.m.	2023-01-0518	Development of Powertrain System and Battery for BEV Hiroki Nagai, Naoya Kawamoto, Kotaro Horiguchi, Toyota Motor Corporation; Takehito Yoda, Toyota Motor North America, Inc; Masatoshi Hiyoshi, Masaya Yamamoto, Toyota Motor Corporation
11:30 a.m.	ORAL ONLY	Battery Integrated Modular Multilevel Converters for Automotive Powertrains: An Overview Arvind Balachandran, Lars Eriksson, Tomas Jonsson, Linköping University

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

Thursday, April 20

Advanced Battery Technologies, Part 5

Session Code PFL730

Room 141 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 - Elana Chapman, General Motors LLC; Curtis Collar, Nanotech Energy; Matilde D'Arpino, Ohio State University; Yi Ding; Santhosh Gundlapally, Gamma Technologies LLC; Xianke Lin, Ontario Tech. University; James Miller, Argonne National Laboratory; Satyam Panchal, Stellantis NV; Eugene Saltzberg; Saeed Siavoshani, Eaton; Hongming Xu, Birmingham Univ.; Di Zhu, Ford Motor Company

Chairperson - Matilde D'Arpino, Ohio State University

Time	Paper No.	Title
1:30 p.m.	2023-01-0507	A Novel Methodology for the Definition of an Optimized Immersion Cooling Fluid by Means of a Lumped Electro-Thermal Battery Pack Model Alberto Broatch, Pablo Olmeda, Xandra Margot, Luca Agizza, Universitat Politècnica de València
2:00 p.m.	2023-01-0514	CFD Simulation and Modelling of a Battery Thermal Management System: Comparison between Indirect and Immersion Cooling Massimiliana Carello, Politecnico di Torino; Massimo Bovio, UFI CELL Srl; Federico Ricci, Politecnico di Torino; Simone Dall'Acqua, UFI CELL Srl; Daniele Isidoro Strano, Alessandro Rizzello, Politecnico di Torino

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Technical Session Schedule

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Time	Paper No.	Title
2:30 p.m.	ORAL ONLY	A Novel Experimental Testing Procedure for Cylindrical Cells' Thermal Modeling Emanuele Gravante, Faissal El Idrissi, Center For Automotive Research; Matilde D'Arpino, Ohio State University; Prashanth Ramesh
3:00 p.m.	ORAL ONLY	Experimental Study of Direct Dielectric Fluids Cooling Battery System for Electric Vehicles Yasuhito Nakahara, Hiroyuki tatsumi, Kazushige Matsubara, Daisuke Takekawa, Keiichi Narita PhD, Idemitsu Kosan Co.,Ltd.
3:00 p.m.		BREAK

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

Thursday, April 20

Alternative and Advanced Fuels, Part 4

Session Code PFL330

Room 142 A 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; Elana Chapman, General Motors LLC; Elisa Toulson, Michigan State University; Cinzia Tornatore, Italian National Research Council; Derek Splitter, Oak Ridge National Laboratory; Vickey Kalaskar, Southwest Research Institute; George Karavalakis, University Of California Riverside; Andrew Ickes, Chevron

Chairperson - Elisa Toulson, Michigan State University

Time	Paper No.	Title
9:30 a.m.	2023-01-0327	Performance and Emission Characteristics of Direct Injection DME Combustion under Low NOx Emissions Simon Leblanc, Murugesa Pandian M, Xiaoye Han, Jimi Tjong, Ming Zheng, University of Windsor
10:00 a.m.	ORAL ONLY	How To Satisfy Equation Of Green-Mobility And Neutral Carbon Vehicle for All Keeping Used Thermal Engine Cars Thanks to An On Board Smart Fuel Molecular Sensor And Renewable And Synthetic BioFuel Use Alain Lunati, SP3H
10:30 a.m.	2023-01-0317	Development of a Novel Drop-in Naphthenic Spark Ignition Biofuel by Means of a Fuel Blend Calculator and a Simplified Octane Number Verification Method Tom Robeyn, Tara Larsson, Jonathan Demeersseman, Jonas Van Biesen, Sebastian Verhelst, Ghent University
11:00 a.m.	2023-01-0337	Machine Learning for Fuel Property Predictions: A Multi-Task and Transfer Learning Approach Tara Larsson, Ghent University; Florence Vermeire, KU Leuven; Sebastian Verhelst, Ghent University

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Technical Session Schedule

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Time	Paper No.	Title
11:30 a.m.	2023-01-0325	Implementation of LNG for Automotive Application as a Solution towards Sustainable Development Sauhard Singh, Sumit K Mishra, Yogesh Kumar Sharma, Sarita Seth, M Sithananthan, Pankaj Bhatnagar, Mukul Maheshwari, Indian Oil Corporation Limited; Sagar Hote, Pritesh Suple, Jaywant Mohite, N B Chougule, Tata Motors Limited

Planned by Fuels and Lubricants / Energy and Propulsion Activity

Thursday, April 20

Alternative and Advanced Fuels, Part 5

Session Code PFL330

Room 142 A 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 - Elana Chapman, General Motors LLC; Brian Gainey, Clemson University; Andrew Ickes, Chevron; Vickey Kalaskar, Southwest Research Institute; George Karavalakis, University Of California Riverside; Derek Splitter, Oak Ridge National Laboratory; Cinzia Tornatore, Italian National Research Council; Elisa Toulson, Michigan State University

Chairperson - George Karavalakis, University Of California Riverside

Time	Paper No.	Title
1:30 p.m.	ORAL ONLY	An experimental and numerical investigation on the knocking behaviour of a hydrogen-fueled internal combustion engine Federico Millo, Andrea Piano, Gianpaolo Quattrone, Politecnico di Torino; Francesco Pesce, Alessandro Gallone, Gessaroli Davide, Punch Torino SpA
2:00 p.m.	2023-01-0333	Combustion Characteristics of Iso-Octane/Hydrogen Flames under T and P Effects up to near Flammability Limits M. Zuhaib Akram, Dalian Maritime University; Muhammad Aziz, The University of Tokyo; Fanhua Ma, Tsinghua University; Yangbo Deng, Dalian Maritime University; M. Waqar Akram, University of Agriculture Faisalabad; Ali Akhtar, Dalian Maritime University
3:00 p.m.		BREAK
3:30 p.m.	2023-01-0321	Ignition Delay Time of a Toluene Reference Fuel with Substituted Phenol Additives Grace Trombley, Elisa Toulson, Michigan State University
4:00 p.m.	2023-01-0323	Effect of Spray Collapse on Mixture Preparation and Combustion Characteristics of a Spark-Ignition Heavy-Duty Diesel Optical Engine Fueled with Direct-Injected Liquefied Petroleum Gas (LPG) Rajavasanth Rajasegar, Ales Srna, Sandia National Laboratories
4:30 p.m.	2023-01-0330	DME-Propane Ignition Delay Time Measurements at Mixing Controlled Compression Ignition Engine-Relevant Conditions

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As of March 16, 2023 19:50:00 PM

Time	Paper No.	Title
		Zuhayr Pasha Mohammed, Ramees Khaleel Rahman, University Of Central Florida; Michael Pierro, University of Central Florida; Justin Urso, Subith Vasu, University Of Central Florida

Planned by Fuels and Lubricants / Energy and Propulsion Activity

Thursday, April 20

Fuel Injection and Sprays, Part 3

Session Code PFL320

Room 142 B 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 - Tarek Abdel-Salam, East Carolina University; Michele Battistoni, Universita degli Studi di Perugia; Thomas Briggs, Southwest Research Institute; Elana Chapman, General Motors LLC; Essam El-Hannouny, Argonne National Laboratory; Felix Leach, University of Oxford; Gerald Micklow, Florida Institute of Technology; Alessandro Montanaro, STEMS - CNR; Derek Splitter, Oak Ridge National Laboratory

Chairperson - Michele Battistoni, Universita degli Studi di Perugia; Felix Leach, University of Oxford

Time	Paper No.	Title
9:30 a.m.	2023-01-0308	Underexpanded Impinging Gaseous Jet Interaction with a Lubricated Cylinder Surface
		Ben Binyamin Ben David Holtzer, Leonid Tartakovsky, Technion Israel Inst. of Technology
10:00 a.m.	2023-01-0315	Prediction of Spray Vapor Tip Penetration of Diesel, Biodiesel and Synthetic Fuels Using Artificial Neural Networks with Confidence Intervals
		Bryn Richards, Nwabueze Emekwuru, Sch of Mech Eng, Coventry University, UK
10:30 a.m.	ORAL ONLY	macroscopic and microscopic spray characteristics on the spray wall impingement experiment using LPDI injector
		Young Soo Yu, Hanyang University; Sungwook Park, Hanyang Univ
11:00 a.m.	2023-01-0313	Experimental and Numerical Study of Water Injection under Gasoline Direct Injection Engine Relevant Conditions
		Jiachen Zhai, Niranjan Miganakallu Narasimhamurthy, Jeffrey Naber, Seong-Young Lee, Michigan Technological University

Planned by Fuels and Lubricants / Energy and Propulsion Activity

WCX SAE World Congress Experience

Technical Session Schedule

As of March 16, 2023 19:50:00 PM

Thursday, April 20

Transmission Systems/ Drive Unit

Session Code PFL610

Room 142 C 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, FCA US LLC; Hong Jiang, Ford Motor Company; Berthold Martin, FCA US LLC; Azadeh Narimissa, General Motors LLC

Chairperson - Pradeep Attibele, Stellantis; Hong Jiang, Ford Motor Company; Berthold Martin, FCA US LLC; Azadeh Narimissa, General Motors LLC

Time	Paper No.	Title
9:30 a.m.	2023-01-0444	A Novel Model-Based Approach for Evaluating Multi-Speed Transmission Systems for BEVs Stavros Skarlis, Theodoros Molos, e-Kinesis
10:00 a.m.	ORAL ONLY	Design of the Drivetrain of the Electric Formula Student Vehicle Andrzej Ryczek, Krystian Nowak, Pawe Maciaszczyk, Proton Dynamic
10:30 a.m.	~~2023-01-0445~~ ORAL ONLY	A 2022 Review and Perspective on Electric Motor and Transmission Matching for Electric Vehicles Darrell Robinette, Michigan Technological Univ.
11:00 a.m.	ORAL ONLY	Making the grade – Improving Efficiency, Performance and Driving Experience in the electric Powertrain John Kimes, Sigma Powertrain Inc.
11:30 a.m.	2023-01-0466	Reducing Fuel Consumption on a Heavy-Duty Nonroad Vehicle: Conventional Powertrain Modifications Bryant Goodenough, Alexander Czarnecki, Darrell Robinette, Michigan Technological Univ.; Jeremy Worm, Michigan Technological Univ. APS LABS; Phil Latendresse, John Westman, Pettibone/Traverse Lift LLC

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

Thursday, April 20

Occupant Protection for Integrated Safety and Interior Sensing

Session Code SS503

Room 250 A Session 9:30 a.m.

This session covers a wide range of aspects of integrated active and passive safety systems for enhancing safety in motor-vehicle crashes focusing on Human and driver interaction from both an integrated safety perspective adapting new interior sensing technologies

Organizers - Saeed Barbat, Ford Motor Company; Clifford Chou; Francis S. Gayzik, Wake Forest Univ. School of Medicine; Jingwen Hu, Univ. of Michigan-Ann Arbor; Lingxi Li, Indiana Univ. Purdue Univ. Indianapolis; Scott Thomas, General Motors LLC; Devon Albert, Virginia Tech

WCX SAE World Congress Experience

Technical Session Schedule

As of March 16, 2023 19:50:00 PM

Chairperson - Jingwen Hu, Univ. of Michigan-Ann Arbor

Time	Paper No.	Title
9:30 a.m.	ORAL ONLY	Development of a Real-time Health Monitoring System for Truck Driver Ho Chee Meng Benjamin, Jeong Hana, Ha Ji Hoon, Se Jin Park, SEWON Intelligence; Yoon tong-han, Yoon Hong-Cheol, White Industry Co., Ltd.; Choi HoonHee, EWONCOMFORTECH Co. Ltd
10:00 a.m.	ORAL ONLY	Validation of 60GHz In-Vehicle Radars for Child Presence and Occupant Safety
10:30 a.m.	2023-01-0651	A Study on the Improvement of Driver's Inconvenience to Ensure Driving Stability in Bad Weather Conditions Jungho Lim, Hyunsu Shin, Hyundai Motor Company; Sang Hun Jeong; Ji Hyun Yang, Kookmin University
11:00 a.m.	2023-01-0652	A Study on Estimation Tool of Occupant Injury Risk for Deriving Integrated Safety Scenarios Kwang Cheol Han, Bo Pil Seo, Hyundai Motor Company; Michiel Unger, Siemens Industry Software
11:30 a.m.	2023-01-0653	A System-Based Safety Assurance Framework for Human-Vehicle Interactions Shufeng Chen, Siddartha Khastgir, Paul Jennings, University of Warwick

Thursday, April 20

Occupant Protection: Safety Test and Simulation Methods and Applications

Session Code SS508

Room 250 A Session 1:30 p.m.

This session calls for 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; Anindya Deb, Indian Institute Of Science Bengaluru; Binhui Jiang, Hunan University; P. Miller, MGA Research Corp.; Feng Zhu, Johns Hopkins Univ.

Chairperson - Clifford Chou; Helen Kaleto, MGA Research Corp.; Feng Zhu, Johns Hopkins University

Time	Paper No.	Title
1:30 p.m.	2023-01-0007	Development of a Detailed 3D Finite Element Model for a Lithium-Ion Battery Subject to Abuse Loading Feng Zhu, Johns Hopkins University; Runzhou Zhou, Toyoda Gosei North America; David Sypeck, Embry-Riddle Aeronautical University, Inc.; Jie Deng, Sangyeon Kim, Ford Motor Company
2:00 p.m.	2023-01-0005	Multi-objective Combination Optimization of Automobile Subframe Dynamic Stiffness Tao Ouyang, Jian Wu, Qiushi Chen, Guangqiang Wu, Tongji University

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Technical Session Schedule

As of March 16, 2023 19:50:00 PM

Time	Paper No.	Title
2:30 p.m.	~~2023-01-0004~~ ORAL ONLY	Analysis on the Impact Responses of Three-Year-Old Child Occupant Using Different Human Body Computational Models Seated in the Forward and Rearward Facing CRS Yanxin Wang, Tianjin University of Science and Techno; he zhu, Geely Automobile Research Institute; Haiyan Li, Tianjin University of Science and Techno; Chong Liu, Hangjie Su, Geely Automobile Research Institute; Lijuan He, Wenle Lv, Shihai Cui, Jesse Shijie Ruan, Tianjin University of Science and Techno
3:00 p.m.		BREAK
3:30 p.m.	2023-01-0002	Development of a Neck Finite Element Model with Active Muscle Force for the THOR-50M Numerical Dummy Xiaofan Wu, Binhui Jiang, Zhonghao Bai, Guanjun Zhang, Hunan University
4:00 p.m.	2023-01-0003	Exploration of Vehicle Body Countermeasures Subjected to High Energy Loading Sanketh Ramachandra, Anindya Deb, Indian Institute of Science; Clifford Chou, Wayne State University
4:30 p.m.	2023-01-0006	Injury Assessment in Non-Standard Seating Configurations in Highly Automated Vehicles Using Digital Twin and Active Learning Ludek Hyncik, Abbas Talimian, Jan Vychytil, University of West Bohemia; Jan Kleindienst, Slim Gharbi, Pantelis Ziazopoulos, MAMA AI

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

Thursday, April 20

Human Factors in Seating Comfort

Session Code SS303

Room 250 C Session 9:30 a.m.

Designing vehicles with good ergonomics is one of the many factors needed to achieve high customer satisfaction. A basic source for comfort (or discomfort) lies in the vehicle's seats. To design for seat comfort requires knowledge of the size of the driver, the structure of the seat, the position of the seat in the vehicle and the trip duration. Papers offers in this session could include topics such as seat back angle, vehicle packaging and trip duration.

Organizers - Henry Hojnacki, Woodbridge Group

Chairperson - Henry Hojnacki, Woodbridge

Time	Paper No.	Title
9:30 a.m.	2023-01-0913	Smart Pneumatic Control System Development for Reducing Passenger Fatigue Taehoon Lee, Sangho Kim, Hyundai Motors Namyang Institute; Sunghoon Kim, Hyundai-TRANSYS; SangHoon Park, Hyundai Motors Namyang Institute; Byeongseon Son, Hyundai & Kia Corp.; Ji Hwan Kim, Hyundai Motors Corporation

WCX SAE World Congress Experience

Technical Session Schedule

As of March 16, 2023 19:50:00 PM

Time	Paper No.	Title
10:00 a.m.	ORAL ONLY	Comfort and Durability Understanding durability testing and how it affects comfort and H-Point Mark Weierstall, Woodbridge
10:30 a.m.	2023-01-0911	Next Generation Seat Ventilation System for Genesis EV Dongwoo Jeong, Seungyoung Lee, Sangho Kim, Byungyong Choi, Sangdo Park, Taeuk Kang, Hyundai Motor Company; YunHo Kim, Hosub Lim, Hyundai-TRANSYS
11:00 a.m.	2023-01-0912	Correlating Body Pressure Distribution Test to Simulation DM Alam, Woodbridge Foam Corp.
11:30 a.m.	ORAL ONLY	Mechanical Tests for Seat Comfort: Research in Robotics Ramps Up Realism and Relevance Terry O'Bannon, O'Bannon Technologies LLC

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

Thursday, April 20

Vehicle Dynamics, Electric Vehicle Drivetrain Dynamics, and Advanced Wheel Corner Concepts - Part 2

Session Code SS900

Room 251 A Session 9:30 a.m.

This session is focused on vehicle dynamics and controls using modeling and simulation, and experimental analysis of 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 - Miguel Dhaens, Tenneco Automotive Europe; Timothy Drotar, Stellantis; Gary Heydinger, SEA, Ltd.; Valentin Ivanov, Technische Universitat Ilmenau; Giampiero Mastinu, POLITECNICO DI MILANO; Barys Shyrokau, Delft Univ. of Technology; Scott Zagorski, SEA, Ltd.; Jian Jun Zhu, Cruise Automation Inc.

Chairperson - Scott Zagorski, FTI Consulting Inc.; Jian Jun Zhu, Cruise Automation Inc.

Time	Paper No.	Title
9:30 a.m.	2023-01-0666	Methodologic Assessment of Brake-by-Wire System Modelling with Regard to Accuracy, Model Complexity and Optimization Efforts Marius Heydrich, Björn Kellner, Valentin Ivanov, Technische Universitat Ilmenau
10:00 a.m.	ORAL ONLY	Field Examples of Adverse Vehicle-Driver Response to Wind Gusts on Bridges Sebastian Reymert, Ole Øiseth, Anders Ronnquist, Norwegian Univ. of Science & Technology; Lars Drugge, KTH Royal Institute of Technology

WCX SAE World Congress Experience

Technical Session Schedule

As of March 16, 2023 19:50:00 PM

Time	Paper No.	Title
10:30 a.m.	2023-01-0669	A Spline-Based Analytical Model for the Design of an Automotive Anti-Roll Bar
		Alessandro Chiari, Sara Mantovani, University Modena e Reggio Emilia; Viktor Skrickij, Vilnius Gediminas Technical University; Emilie Boulay, Tenneco Automotive Europe BVBA
11:00 a.m.	2023-01-0659	Drivers' Perceived Sensitivity to Crosswinds and to Low-Frequency Aerodynamic Lift Fluctuations
		Adam Brandt, Bengt Jacobson, Simone Sebben, Chalmers University of Technology
11:30 a.m.	2023-01-0667	The Integrated Trajectory Tracking, Yaw Stability and Roll Stability Model Predictive Control for Autonomous Vehicle in Limited Handling Condition
		Boyuan Li, Wenfei Li, Wei Hua, Zhejiang Lab; Efstathios Velenis, Cranfield University
12:00 p.m.	2023-01-0672	Advanced Modelling of Frequency Dependent Damper Using Machine Learning Approach for Accurate Prediction of Ride and Handling Performances
		Visweswara Rao Lenka, Mahindra & Mahindra, Ltd.; Baskar Anthonysamy, Mahindra Research Valley; Alok Ranjan Thanapati, Chandrakant Ramrao Deshmukh, Mahindra & Mahindra, Ltd.

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

Thursday, April 20

Automotive Lighting Technology

Session Code SS300

Room 251 A Session 1:30 p.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, OSRAM

Chairperson - Joseph Jaklic, ams-OSRAM

Time	Paper No.	Title
1:30 p.m.	2023-01-0917	Using Visual Performance Modeling to Assess the Safety Consequences of Headlight Evaluation Systems
		John D. Bullough, Icahn School of Medicine at Mount Sinai
2:00 p.m.	ORAL ONLY	Evolution of the Front Vehicle
		Antonio Pantoja, Hella Lighting Corporation
2:30 p.m.	2023-01-0915	Effects of Sequential Turn Signals under Realistic Visual Conditions

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Technical Session Schedule

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Time	Paper No.	Title
		Michael Flannagan, University of Michigan Ann Arbor; Takeshi Waragaya, Yasushi Kita, Stanley Electric Co. Ltd.
3:00 p.m.		BREAK

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

Thursday, April 20

Human Factors in Driver Vision and Lighting

Session Code SS301

Room 251 A Session 3:00 p.m.

Visual perception continues to be a critical aspect of overall driver performance. This session offers presentations highlighting new ideas for coordinating the design of warning lamps for emergency vehicles, better understanding of how drivers accomplish the visually difficult task of negotiating intersections, and prediction of the important driver vision variable of driver eye height.

Organizers - Michael Flannagan, Univ. of Michigan-Ann Arbor

Chairperson - Michael Flannagan, Univ. of Michigan-Ann Arbor

Time	Paper No.	Title
3:00 p.m.	2023-01-0837	Comparing Visual Fixations between Initially Stopped and In-motion Turn Across Path Hazards
		Brooklin Caren, Erika Ziraldo, Michele Oliver, University of Guelph
3:30 p.m.	2023-01-0838	Estimation of Seated Driver Eye Height based on Standing Height, Weight, Seatback Angle, and Seat Bottom Angle
		Todd Roescher, Bryan Randles, Judson Welcher, Aperture, LLC.
4:00 p.m.	ORAL ONLY	A Development of Hazing Reduced Silicon Wiper Blade to Enhance Durability and Marketable
		Hunjae Kim, Hyundai Motor Company
4:30 p.m.	ORAL ONLY	A New Borosilicate Glass for Automotive Glazing Applications
		Materials used for windshield applications have remained relatively unchanged since the 1960’s. The purpose of the paper is to introduce a new glass material that has been custom developed for use as a glazing material. Benefits of the material include an improvement in stone impact resistance of over 400% vs a conventional windshield construction. Additionally, the material has improved optical quality, which is important for enabling the use of various ADAS sensors. The material is also of lower density than the incumbent glass, thus enabling the aforementioned benefits, while concurrently delivering possible light-weighting.
		Thomas Cleary, Corning Inc.

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Technical Session Schedule

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

Thursday, April 20

Military Ground Vehicles - Part 4

Session Code MIL400

Room 251 B Session 9:30 a.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. Part 1 includes presentations on engine modeling, simulation, and testing.

Organizers - Matthew P. Castanier, David J. Gorsich, Vamshi Korivi, Denise M. Rizzo, Michael Tess, US Army DEVCOM GVSC

Chairperson - Vamshi Korivi, Michael Tess, US Army DEVCOM GVSC

Time	Paper No.	Title
9:30 a.m.	2023-01-0102	Developing Artificial Intelligence (AI) and Machine Learning (ML) Based Soft Sensors for In-Cylinder Predictions with a Real-Time Simulator and a Crank Angle Resolved Engine Model Robert Jane, US Army Research Laboratory; Corey James, Samantha Rose, Tae Kim, United States Military Academy
10:00 a.m.	2023-01-0103	Thermodynamic Modeling of Military Relevant Diesel Engines with 1-D Finite Element Piston Temperature Estimation James Gohn, Clemson University; Eric Gingrich, Michael Tess, Vamshi Korivi, US Army DEVCOM GVSC; Ziming Yan, MAHLE Powertrain LLC; Brian Gainey, Zoran Filipi, Benjamin Lawler, Clemson University
10:30 a.m.	ORAL ONLY	Evaluation of Modeling Approaches for Diesel Engine Piston Cooling Gallery Heat Transfer Arkady Grunin, Vamshi Korivi, CCDC Ground Vehicle Systems Center
11:00 a.m.	2023-01-0112	Data Reduction Methods to Improve Computation Time for Calibration of Piston Thermal Models Stephen Wright, Avinash Ravikumar, Laura Redmond, Benjamin Lawler, Clemson University; Matthew Castanier, Eric Gingrich, Michael Tess, US Army DEVCOM GVSC
11:30 a.m.	ORAL ONLY	A Strategy for Optimized Non-Dispersive Infrared Sensors for Derived Cetane Number Discernment of Jet Fuels Ashish Sutar, Anandvinod Dalmiya, Manaf Sheyabb, University of Illinois at Chicago; Eric Mayhew, DEVCOM Army Research Laboratory; Hadis Anahideh, Kenneth Brezinsky, Patrick T. Lynch, University of Illinois at Chicago

Planned by Integrated Design and Manufacturing Activity / Ground Vehicle Advisory Group

Thursday, April 20

Active and Automated Driving System Safety

Session Code SS400

Room 251 B Session 1:30 p.m.

This session will focus on how Advanced Driver Assistance Systems, Active Safety and Automated Driving Systems can yield significant safety benefits from the deployment of existing and proposed systems in the fleet. Topics will include the technologies used in these systems, field effectiveness assessment, safety benefits for projected systems, driver state monitoring, regulatory testing, consumer acceptance, market demand for these systems, and the performance of onboard sensors and vision systems in active and automated driving safety systems. Systems of interest include, but are not limited to, automatic emergency braking, automatic emergency steering, forward collision warning, lane departure warning, lane keeping assist, left turn assist, blind spot monitoring, and detection / avoidance of

vulnerable road users.

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

Chairperson - Luke Riexinger, Virginia Tech.; Jeffrey Wishart, Science Foundation Arizona

Time	Paper No.	Title
1:30 p.m.	2023-01-0794	Construction of Driver Models for Overtaking Behavior Using LSTM Tomohiro Baba, Shoko Oikawa, Toshiya Hirose, Shibaura Institute of Technology
2:00 p.m.	2023-01-0795	Introduction of the Small Test Robot for Individuals in Dangerous Environments (STRIDE) Platform for Use in ADAS Testing Meredith Bartholomew, Nicholas Helber, An Nguyen, Scott Zagorski, Gary Heydinger, SEA, Ltd.
2:30 p.m.	2023-01-0797	Evaluating Automated Vehicle Scenario Navigation Using the Operational Safety Assessment (OSA) Methodology Steven Como, Arizona State University; Jeffrey Wishart, Science Foundation Arizona
3:00 p.m.	ORAL ONLY	SAE On-Road Automated Driving Committee's V&V Task Force Update Jeffrey Wishart, Science Foundation Arizona

Thursday, April 20

Foundations of Automobile Electronics: Reliability, Diagnostics & Prognostics for Safety Critical Electronic Systems

Session Code AE304

Room 251 C 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; Sumanth Reddy Dadam, Ford Motor Company

Chairperson - Mark Monohon, Mark Pope, DG Technologies

Time	Paper No.	Title
9:30 a.m.	2023-01-0849	Role of Worst-Case Operating Scenario and Component Tolerance in Robust Automotive Electronic Control Module Design S.M. Nayeem Hasan, Peter Irgens, Thomas Murphy, General Motors LLC
10:00 a.m.	ORAL ONLY	Signal Flow Analysis for OBD Compliance Reporting Stephan Mauk, Concentrio AG

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Technical Session Schedule

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Time	Paper No.	Title
10:30 a.m.	2023-01-0846	Study on State-of-the-Art Preventive Maintenance Techniques for ADS Vehicle Safety Rohit Sanket, Ohio State University; Mark Monohon, DG Technologies; Athar Hanif, Qadeer Ahmed, Ohio State University
11:00 a.m.	2023-01-0847	Challenges and Opportunities of Future Vehicle Diagnostics in Software-Defined Vehicles Sandra Bickelhaupt, Michael Hahn, Nikolai Nuding, Mercedes-Benz AG; Andrey Morozov, Michael Weyrich, Universität Stuttgart
11:30 a.m.	2023-01-0848	A New Generation Automotive Tool Access Architecture for Remote In-Field Diagnosis Gasper Skvarc Bozic, Ibai Irigoyen Ceberio, Infineon Technologies AG; Matthias Ernst, Technical University of Munich; Albrecht Mayer, Infineon Technologies AG

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Thursday, April 20

Foundations of Automobile Electronics: In-Vehicle Networks

Session Code AE301

Room 251 C Session 1:30 p.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 - Sumanth Reddy Dadam, Ford Motor Company; Christopher Lupini, ETAS, INC; Mert D. Pese, Clemson University; Peter Subke, Softing Automotive; Mark Zachos, DG Technologies

Chairperson - Sumanth Reddy Dadam, Ford Motor Company; Christopher Lupini, ETAS Inc.; Mert D. Pese, Clemson University; Mark Zachos, DG Technologies

Time	Paper No.	Title
1:30 p.m.	ORAL ONLY	UDSonCAN and OBDonUDS: CAN-Based Application Layer Protocols for the Diagnostic Communication between the In-Vehicle CAN and MVCI-Based External Test Equipment Peter Subke, Softing Automotive
2:00 p.m.	ORAL ONLY	CAN XL Networking Physical Layer Options and Higher-Layer Protocols Support Holger Zeltwanger
2:30 p.m.	2023-01-0923	Research on Performance Testing and Evaluation System of Vehicle Time Sensitive Network Feng Luo, Baoyin Zhang, Zitong Wang, Zhenyu Yang, Ping Zhang, Tongji University
3:00 p.m.	ORAL ONLY	Open Discussion and Q&A Regarding Trends in Serial Data Protocols and Network Architectures Charles James Wilson, Motional Inc.

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Technical Session Schedule

As of March 16, 2023 19:50:01 PM

Time	Paper No.	Title
3:30 p.m.	2023-01-0924	Using Ethernet or a Wireless Harness and Named Data Networking in Autonomous Tractor-Trailer Communication Ahmed Elhadeedy, Jeremy Daily, Colorado State University
4:00 p.m.	2023-01-0926	Review on CAN Bus Protocol: Attacks, Difficulties, and Potential Solutions Kalyan Sai Vital Vamsi Appajosyula, Sreedhar Reddy Pacharla, Harman International India Pvt. Ltd.

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Thursday, April 20

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

Session Code AE103

Room 252 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; Xin Wang, Ford Motor Company

Chairperson - Subramaniam Ganesan, Oakland University; Xin Wang, Ford Motor Company

Time	Paper No.	Title
9:30 a.m.	2023-01-0698	Hierarchical Motion Planning and Control Algorithm of Autonomous Racing Vehicles for Overtaking Maneuvers Changhee Kim, Kyongsu Yi, Seoul National University; Jaeyong Park, Hyundai & Kia Corp.
10:00 a.m.	2023-01-0687	Data-driven Trajectory Planning of Lane Change Maneuver for Autonomous Driving Youngmin Yoon, Kyongsu Yi, Seoul National University
10:30 a.m.	2023-01-0684	Stability Monitoring Algorithm with a Combined Slip Tire Model for Maximized Cornering Speed of High-Speed Autonomous Driving Jayu Kim, Seoul National University; Jaeyong Park, Hyundai & Kia Corp.; Changhee Kim, Hyunsoo Cha, Kyongsu Yi, Seoul National University

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Thursday, April 20

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

Session Code AE106

Room 252 B 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

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Technical Session Schedule

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Organizers - Jace Allen, dSPACE Inc.; Yixin Chen, Stellantis; Amit Choudhury, Robert Bosch; Joseph D'Ambrosio, General Motors LLC; Benjamin Hager, dSPACE Inc.; Bin Li, Aptiv PLC

Chairperson - Yixin Chen, Stellantis

Time	Paper No.	Title
9:30 a.m.	2023-01-0820	Vehicle in Virtual Environment (VVE) Method of Autonomous Driving Function Evaluation and Development Sukru Yaren Gelbal, Bilin Aksun Guvenc, Levent Guvenc, Ohio State University
10:00 a.m.	2023-01-0824	Development and Test of ABS/TCS Controller with Dual-Axis Dynamometer HIL Platform Shu-Ting Liu, Chroma ATE Inc.; ChihWei Chang, Semiconductor; Yen-Hsiang Huang, Ting-He Lin, Joseph Chiu, Jian-Lin Lee, Chroma ATE Inc.
10:30 a.m.	2023-01-0830	Empirical Equations of Changes in Aerodynamic Drag Based on Direct On-Track Road Load Measurements for Multi-Vehicle Platoons Michael Duoba, Argonne National Laboratory
11:00 a.m.	ORAL ONLY	Advancing Accelerated Testing Protocols for Safe and Reliable Self-Driving Operations through Iterative Deployment in Physical and Digital Worlds Shean Huff, Oak Ridge National Laboratory; Subhadeep Chakraborty, University of Tennessee; Joseph Beck, The University of Tennessee; Eric Nafziger, Curtis Taylor, Jason Carter, Oak Ridge National Laboratory
11:30 a.m.	ORAL ONLY	Multilevel Dynamic Regenerative Braking (DRB) System Christopher R. M. Rundus, Daniel McGehee, University of Iowa

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Thursday, April 20

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

Session Code AE106

Room 252 B 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, Aptiv PLC

Chairperson - Benjamin Hager, dSPACE Inc.

Time	Paper No.	Title
1:30 p.m.	2023-01-0828	Design of a Secure Automated Driving Systems Test Data Interface Scott Zagorski, An Nguyen, Gary Heydinger, SEA Ltd.; Howard Abbey, SBD Automotive

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Technical Session Schedule

As of March 16, 2023 19:50:01 PM

Time	Paper No.	Title
2:00 p.m.	2023-01-0829	Metrics for Machine Learning Models to Facilitate SOTIF Analysis in Autonomous Vehicles Kaushik Madala, Carlos Avalos Gonzalez, UL Solutions
2:30 p.m.	2023-01-0822	An Interactive Car-Following Model (ICFM) for the Harmony-With-Traffic Evaluation of Autonomous Vehicles Haolan Meng, Junyi Chen, Tianyue Feng, Tongji University; Bin Wang, SAIC Motor Technology Center; Lu Xiong, Zhuoping Yu, Hong Chen, Tongji University
3:00 p.m.	ORAL ONLY	Built to be Safe or Built to be Compliant This talk will focus on the JRC's role in research and compliance testing for vehicle safety. It will feature the case of AEBS; EMC; and ADAS (regulation 799) and how safety standards and UNECE regulation need to evolve to ensure vehicle safety. Fabrizio Minarini
3:30 p.m.	ORAL ONLY	Closing a Critical Coverage Gap in ADAS/AD Camera Validation

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Thursday, April 20

ADAS and Autonomous Vehicle System: Safety, Fundamentals, and Driver Interface - Part 4

Session Code AE101

Room 258 Session 9:30 a.m.

This session addresses technical research related to ADAS and AVS safety, 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 - Sue Bai, Honda; Yixin Chen, Stellantis; Amit Choudhury, Robert Bosch; Joseph D'Ambrosio, General Motors LLC; Sumanth Reddy Dadam, Ford Motor Company; Bin Li, Aptiv PLC; Danyang Tian, Honda

Chairperson - Sue Bai, Honda; Samer Rajab, Locomation

Time	Paper No.	Title
9:30 a.m.	ORAL ONLY	The Importance of Humans in a Driverless World Adam Campbell, Gatik
10:00 a.m.	ORAL ONLY	The Role of the Tire/Road Contact Patch in an Understeer Event Jim Skarie, BRB Technologies, LLC
10:30 a.m.	ORAL ONLY	Steps for Safe Road Release of ADAS/AV Functions

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Technical Session Schedule

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Time	Paper No.	Title
		Abhash Das, UL Solution
11:00 a.m.	ORAL ONLY	Driver Impairment Detection and Safety Enhancement through Unified Analysis of Driver, Vehicle and Traffic Volatilities
		Riley Tavassoli, University of Tennessee; Shean Huff, Oak Ridge National Laboratory; Subhadeep Chakraborty, University of Tennessee
11:30 a.m.	2023-01-0574	An ODD-Based Scalable Assurance Framework for Automated Driving Systems
		Xizhe Zhang, Siddartha Khastgir, Paul Jennings, WMG, University of Warwick

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Thursday, April 20

Panel Discussion: Megawatt Charging System Progress and Challenges for Heavy Duty Vehicles, Aircraft and Other Large EVs

Session Code AE109

Room 258 Session 1:30 p.m.

SAE J3271 TIR has been released and after 4.5 years of industry collaboration to develop requirements for Megawatt Charging Systems vehicles and charging equip are nearly ready for deployment. Infrastructure to support charging at power levels from 350A to 3000A are a challenge to supply power to multiple vehicles at charging plazas or hubs that can add up to tens of megawatt per location. Electric aircraft and other large non-road EVs will use the same charging system optimized for those applications. The panel will discuss the evolution of standards and upcoming deployment of charging systems. Learn more about the Participants

Organizers - Theodore Bohn, Thomas Wallner, Argonne National Laboratory

Chairperson - Theodore Bohn, Thomas Wallner, Argonne National Laboratory

Moderators - Theodore Bohn, Argonne National Laboratory

Panelists - Jim Andriotis, Cavotec; Victor Atlasman, Atlis Motor Vehicles; Michael Cleveland, Progress Rail A Caterpillar Co.; Paul Stith, Black & Veatch Consulting Engrs;

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

Thursday, April 20

Electrification: Charging Architecture/Design and Electric Infrastructure - Part 3

Session Code AE600

Room 259 Session 9:30 a.m.

As the automotive industry has moved to Electrified Vehicles, the need for chargers and Charging Stations have been increasing almost exponentially. The need to manage the charging architecture and its impact to the grid has become a critical path for the electrification future. This session will answer some of those concerns. The presentations and papers will cover Charging Optimization, Design, Controls and Testing. There are presentations about Wireless Charging Design, Impact to the Grid and Standards SAE J2954/2. Heavy Duty Truck Electrification is just starting but moving at a fast pace, there are presentations about Heavy Duty Electric Truck Charging Design, Controls and Standard SAE J3271.

Organizers - Theodore Bohn, Argonne National Laboratory; Fabian Koark, Cariad; Phares Noel, Oakland Univerity; Gene Saltzberg, University of Detroit Mercy; Vincent Socci, National Instruments; Di

WCX SAE World Congress Experience

Technical Session Schedule

As of March 16, 2023 19:50:01 PM

Zhu, Ford Motor Company

Chairperson - Gene Saltzberg, University of Detroit Mercy

Time	Paper No.	Title
9:30 a.m.	2023-01-0063	Techno-Economic Assessment of Utilising Second-Life Batteries in Electric Vehicle Charging Stations Farhad Salek, Denise Morrey, Paul Henshall, Shahaboddin Resalati, Oxford Brookes University
10:00 a.m.	2023-01-0064	Optimizing Long Term Hydrogen Fueling Infrastructure Plans on Freight Corridors for Heavy Duty Fuel Cell Electric Vehicles Adam Siekmann, Vivek Sujan, Oak Ridge National Laboratory
10:30 a.m.	2023-01-0701	HIL Demonstration of Energy Management Strategy for Real World Extreme Fast Charging Stations with Local Battery Energy Storage Systems Yugandhara Yuvraj Patil, Michigan Technological University; Daniel Dobrzynski, Bryan Nystrom, Argonne National Laboratory; Zhouquan Wu, Bo Chen, Michigan Technological University
11:00 a.m.	2023-01-0707	IEC 61851 Conform Charging: Accident or Purpose? Christoph Seifert, Sophia Caroline Grund, Hans-Christian Reuss, FKFS

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Thursday, April 20

Smart Transportation and Infrastructure - Part 2

Session Code AE400

Room 259 Session 1:30 p.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, Ohio State Univ.; Ozgenur Kavas-Torris, Ford Motor Company; Jan-Mou Li, Metropolitan Washington Council of Gover; Phares Noel, Oakland Univerity; Xin Wang, Ford Motor Company; Xiangrui Zeng, Huazhong University of Science and Tech.

Time	Paper No.	Title
1:30 p.m.	2023-01-0855	Intersection Traffic Safety Evaluation Using Potential Energy Filed Method Biao Wu, Xichan Zhu, Zhixiong Ma, Xiaojun Zhou, Tongji University
2:00 p.m.	2023-01-0858	Comparison of Infrastructure- and Onboard Vehicle-Based Sensor Systems in Measuring Safety Metrics Siddharth Das, Prabin Rath, Arizona State University; Duo Lu, Rider University; Tyler Smith, Arizona State University; Jeffrey Wishart, Science Foundation Arizona; Hongbin Yu, Arizona State University

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Technical Session Schedule

As of March 16, 2023 19:50:01 PM

Time	Paper No.	Title
2:30 p.m.	2023-01-0856	Data Association between Perception and V2V Communication Sensors Mustafa Ridvan Cantas, Arpita Chand, Hao Zhang, Gopichandra Surnilla, Ford Motor Company; Levent Guvenc, Ohio State University
3:00 p.m.	2023-01-0857	Performance and Network Architecture Options of Consolidated Object Data Service for Multi-RAT Vehicular Communication András Wippelhauser, Commsignia Inc.; Arpita Chand, Somak Datta Gupta, Ford Motor Company; Andras Varadi, Commsignia Inc.

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Thursday, April 20

AI and Machine Learning - Part 1

Session Code AE500

Room 260 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 - Yixin Chen, Stellantis; Amit Choudhury, Visteon Corp.; Prakash Peranandam, General Motors LLC; Ramesh S, GM R&D Center; Xin Wang, Ford Motor Company; Alok Warey, General Motors LLC; Xiangrui Zeng, Huazhong University of Science and Tech.; Di Zhu, Ford Motor Company

Chairperson - Prakash Peranandam, General Motors LLC; Ramesh S, GM R&D Center; Alok Warey, General Motors LLC

Time	Paper No.	Title
9:30 a.m.	ORAL ONLY	Improving Automotive Safety, Cost-Efficiency and Energy-Efficiency With Embedded AI Florian Hauer, Infineon Technologies AG
10:00 a.m.	2023-01-0862	Comparison of Deep Learning Architectures for Dimensionality Reduction of 3D Flow Fields of a Racing Car Michaela Reck, Technical University of Munich; Marc Hilbert, René Hilhorst, Toyota GAZOO Racing Europe; Thomas Indinger, Technical University of Munich
10:30 a.m.	2023-01-0860	Situational Intelligence-Based Vehicle Trajectory Prediction in an Unstructured Off-Road Environment Rahul Prasanna Kumar, Yunyi Jia, Clemson University
11:00 a.m.	2023-01-0866	A Comprehensive Analysis of Methods to Write Requirements for Machine Learning Components used in Autonomous Vehicles Kaushik Madala, Jayalekshmi Krishnamoorthy, Andrea Gil Batres, Carlos Avalos Gonzalez, Melody Chang, UL Solutions
11:30 a.m.	ORAL ONLY	Machine Learning Tabulation Scheme for Fast Chemical Kinetics Computation Khashayar Ebrahimi, Lalit Patidar, Panagiotis Koutsivitis, Navin Fogla, Syed Wahiduzzaman, Gamma Technologies LLC

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As of March 16, 2023 19:50:01 PM

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Thursday, April 20

AI and Machine Learning - Part 2

Session Code AE500

Room 260 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 - Yixin Chen, Stellantis; Amit Choudhury, Robert Bosch; Prakash Peranandam, General Motors LLC; Ramesh S, GM R&D Center; Xin Wang, Ford Motor Company; Alok Warey, General Motors LLC; Xiangrui Zeng, Huazhong University of Science and Tech.; Di Zhu, Ford Motor Company

Chairperson - Prakash Peranandam, General Motors LLC; Ramesh S, GM R&D Center; Alok Warey, General Motors LLC

Time	Paper No.	Title
1:30 p.m.	2023-01-0861	The Effect of Engine Parameters on In-Cylinder Pressure Reconstruction from Vibration Signal Based on DNN Model in CNG-Diesel Dual-Fuel Engine Gyeonggon Kim, Chansoo Park, Wooyeong Kim, Korea Advanced Institute of Science & Technology; Jeeyeon Jeon, Miyeon Jeon, Korea Shipbuilding & Offshore Engineering; Choongsik Bae, Korea Advanced Institute of Science & Technology; Wooyeong Kim, Karlsruhe Institute of Technology
2:00 p.m.	ORAL ONLY	Machine Learning-Based Model for Fast Prediction of Laminar Flame Speeds in Engine Cycle Simulation Khashayar Ebrahimi, Tingting Li, Lalit Patidar, Navin Fogla, Syed Wahiduzzaman, Gamma Technologies LLC
2:30 p.m.	2023-01-0864	Deep Learning Based Automotive Requirements Analysis Sharath D H, Harman International India Pvt. Ltd.; Karthik P.C., PCKarthik; Sreekanth TG, Asadullah Ansari, Harman International India Pvt. Ltd.
3:00 p.m.		BREAK

Planned by Automobile Electronics Activity / Ground Vehicle Advisory Group

Thursday, April 20

Automotive Tribology

Session Code M214

Room 311 A/B Session 9:30 a.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, FCA US LLC; David Schall, North Carolina A&T State Univ.; Rong Zhang, GM R&D Center; Qian Zou, Oakland University

Chairperson - Rong Zhang, GM

WCX SAE World Congress Experience

Technical Session Schedule

As of March 16, 2023 19:50:01 PM

Time	Paper No.	Title
9:30 a.m.	2023-01-0870	Modeling and Study on Static Performance of the Double-Top-Foil Air Foil Journal Bearing for Air Compressors in Fuel Cell Vehicles Huan Li, Shuguang Zuo, Xudong Wu, Shanran Li, Wenping Zong, Tongji University
10:00 a.m.	2023-01-0871	Frictional and Wear Properties of Diamond-Like Carbon Films with Lubricant Additives Tomomi Honda, University of Fukui; Moritsugu Kasai, Idemitsu Kosan Co., Ltd.; Koji Miyake, Nippon ITF Inc.
10:30 a.m.	2023-01-0872	Development of Bearing with Multilayer Bi-Sb Overlay for Automotive Engines Akira Ando, Ryuji Kanaya, Yuma Haneda, Daido Metal Co., Ltd.

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Thursday, April 20

Materials Characterization and Modeling for ICE and BEV

Session Code M205

Room 311 A/B Session 1:30 p.m.

Materials are very important for vehicle design and performance. From internal combustion engines to electrified propulsion systems and fuel cell, material challenges occur in almost every design step for achieving light-weighting, functionality, and performance requirements. This session focuses on material characterization and modeling techniques already or potentially applied to automobile industry. Special emphases are advanced material characterization and modeling techniques, microstructure-properties-performance relation, residual stress, failure mechanisms, environmental effects, and material durability related issues in battery and its supporting structures.

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

Chairperson - Yi Liu, Qigui Wang, General Motors LLC

Time	Paper No.	Title
1:30 p.m.	2023-01-0930	Characterization and Modeling of Instrument Panel Textile Trim Materials for Passenger Airbag Deployment Analysis Karthigan G, Tata Consultancy Services; Vesna Savic, Sibo Hu, Gowrishankar Ravichandran, General Motors LLC; Biswajit Tripathy, Tata Consultancy Services
2:00 p.m.	ORAL ONLY	A Correlative Study Between Analytical and Experimental Results of Polyamide Thermoplastics Developed for Structural NVH Applications Vahid Mortazavian, Ascend Performance Materials
2:30 p.m.	ORAL ONLY	TrimVisible BIO - Reduced GWP Automotive Seating Foam Andrew Kee, Woodbridge Foam Corp.

WCX SAE World Congress Experience

Technical Session Schedule

As of March 16, 2023 19:50:01 PM

Time	Paper No.	Title
3:00 p.m.	ORAL ONLY	KEYNOTE: A New Micromechanics Based Full Field Numerical Framework to Simulate the Effects of Dynamic Recrystallizatin of the Formability of HCP Metals

This research presents a new full-field and mesh-free numerical framework to model microstructure evolution, dynamic recrystallization (DRX) and formability in hexagonal closedpacked (HCP) metals such as magnesium alloys at warm temperatures. A rate tangent-fast Fourier transform-based elasto-viscoplastic crystal plasticity constitutive model for HCP metals (RTCPFFT-HCP) is coupled with a probabilistic cellular automata (CA) approach to model DRX (CADRX). Furthermore, this new model is coupled with the Marciniak-Kuczynski (M-K) approach to model formability of magnesium alloys at elevated temperatures. The RTCP-FFT-HCP model computes macro stress-strain, twinning volume fraction, micromechanical fields, texture evolution and local dislocation density. Nucleation of new grains and their subsequent growth are modeled using the cellular automata approach with the probabilistic state switching rule. First, the proposed RTCP-FFT-HCP model is validated by comparing the predicted stress-strain responses and texture evolution under uniaxial tension and compression with experimental measurements for the AZ31 sheet alloy at room temperature. The coupled CA-RTCPFFT-HCP model is further validated by comparing the predicted stress-strain responses and texture evolution in uniaxial compression with experimental measurements at various temperatures for the AZ31 sheet alloy. Next, the forming limit diagrams (FLDs) with and without including the effects of DRX are simulated at three different temperatures for the AZ31 sheet alloy. The study reveals that the DRX strongly affects the deformed grain structure, grain size and texture evolution and also highlights the importance of accounting for DRX during FLD simulations at high temperatures.

Kaan Inal, University of Waterloo

WCX SAE World Congress Experience

Technical Session Schedule

As of March 16, 2023 19:50:01 PM

Time	Paper No.	Title
3:30 p.m.	ORAL ONLY	KEYNOTE: Multiphysics-Multiscale Driven Design of Battery Cells

As multiple industries are urged to address environmental and climate issues, the interest in electrification and energy storage is nowadays exponentially increasing, fostering the development of an interdisciplinary ecosystem spanning from material science to assemblies and systems engineering. Battery cell engineering constitutes a cardinal ingredient in the ongoing transformation. In such context, the trade-off between safety, costs and performance constantly challenges engineers. The digitalization of battery cells becomes therefore a way to reduce design times and allow for continuous improvements. For instance, in the analysis of the electro-chemical performance of battery cells, digitalization helps engineers to understand and control the effects of charging-discharging cycles, while limiting time-consuming experimental tests. In addition to the coupling across multiple physics, a thermal-electrochemical modelling strategy also embodies a multi-scale coupling. Based on the porous electrode theory introduced in [1-2], variables such as temperature, electric potentials in solid phase and electrolyte and ionic concentration in electrolyte are coupled and resolved at an homogenized multi-material macro-scale, along with being function of the concentration (e.g. lithium's) in solid phases, which is computed at a particle micro-scale level using a FE2 approach. As described in Allu et al. [3], multiple coupling strategies are possible. In the order of increasing accuracy and computational performance, we adopt a fully coupled (monolithic) solution scheme between for a thermo-electrochemical-stress-electrolyte fluid flow. With the present works, the Authors propose a thermal-electrochemical-mechanical multi-scale coupling procedure, implemented in the finite element analysis software Abaqus. The simulation results are compared to experimental tests for validation.

Sandeep Kulathu, Dassault Systemes

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Thursday, April 20

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

Session Code M301

Room 312 A/B Session 9:30 a.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 LLC; Santosh Kumar Sarang, Dupont Semiconductor Technologies; Ravi Thyagarajan, Texas A&M Univ

Time	Paper No.	Title
9:30 a.m.	ORAL ONLY	Exploration of Drivers' Activities and Postures in an Autonomous Driving Systems

Eunsik Kim, Seyedehfatemeh Sadeghi, Aditya Subramani Murugan, Univ. of Windsor; Minju Shin, Ewha Womans University; Chris Lee PhD, Yong Hoon

WCX SAE World Congress Experience

Technical Session Schedule

As of March 16, 2023 19:50:02 PM

Time	Paper No.	Title
		Kim PhD, Univ. of Windsor; Kyongwon Kim PhD, Ewha Womans University
10:00 a.m.	ORAL ONLY	Building a Better Circle – Closed-Loop Circularity for Automotive
		Mark Treece, Eastman Chemical Co.

Planned by Polymers and Coatings Committee / Materials Engineering Activity

Thursday, April 20

Panel Discussion: Sustainability Projects in Automotive Interiors

Session Code M301A

Room 312 A/B Session 10:30 a.m.

In past years this panel presented corporate-level OEM and supplier sustainability goals – proposing aggressive improvements around what has historically been a high reliance on fossil fuel products. This panel will present updates on recent projects to meet sustainability goals, gauging current progress, and providing insight on needs for future innovation. Learn more about the Participants

Organizers - John Berndtson, General Motors LLC; Stephen Pitrof, Inteva LLC; Ravi Thyagarajan, Texas A&M Univ; Santosh Kumar Sarang, Dupont

Moderators - Ravi Thyagarajan, Texas A&M Univ

Panelists - Daniel Bateson, Rivian Automotive; Susan Kozora, International Automotive Components; Kevin Lyons, Inteva Products LLC; Michael Rinaldi, FCA US LLC;

Thursday, April 20

Modeling and Simulation in Composites, Plastics, and Polymers

Session Code M215

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

This session focuses on state-of-art developments in physical testing and modeling of plastics and fiber reinforced polymer composite materials for the automotive industry. Special emphasis will be given to material properties and microstructure modeling during manufacturing processes and material behavior under different environmental and loading conditions. Studies and discussions on innovative theories and experimental methods, constitutive behavior, integrated computational materials engineering (ICME), and CAE correlation with testing will also be addressed. Other materials considered for this session include rubbers, adhesives, metal/plastic hybrid and materials fabricated by additive manufacturing (3D printing).

Organizers - Mingchao Guo, FCA US LLC; Y Charles Lu, Univ. of Kentucky; Zhi Yuan, Dassault Systèmes

Chairperson - Mingchao Guo, FCA US LLC

Time	Paper No.	Title
1:00 p.m.	ORAL ONLY	Predicting Temperature Dependent Strength of Over-Molded Parts
		Dustin Souza, Olivier Moulinjeune, Maxime Melchior, Hexagon

WCX SAE World Congress Experience

Technical Session Schedule

As of March 16, 2023 19:50:02 PM

Time	Paper No.	Title
1:30 p.m.	2023-01-0936	A Combined Data Science and Simulation-Based Methodology for Efficient and Economic Prediction of Thermoplastic Performance for Automotive Industry Joel Luther Thambi, Subhransu Sekhar Mohapatra, Vinod Jose Kavalakkat, Subhransu S. Mohapatra, Ullas U, Saibal Kanchan Barik, SABIC
3:00 p.m.		BREAK

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Thursday, April 20

Advances in Metalcasting and Forging

Session Code M106

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

Metalcasting and forging are a few of the oldest manufacturing processes, dating back over five millennia. However, recent advances continue to expand the horizons of metalcasting and forging: new alloys and new manufacturing techniques are leading to enhanced properties, process modeling and simulation tools are enabling better automotive component designs, the increasing use of metal-matrix composites is opening new frontiers in performance, and additive manufacturing techniques such as 3D printing of pattern materials are reducing lead times for prototype parts. This session will cover the latest developments in ferrous and non-ferrous metalcasting and forging technologies for the mobility industry.

Organizers - David Anderson; Thomas Prucha

Time	Paper No.	Title
9:30 a.m.	ORAL ONLY	Automotive Opportunities for Chassis, Brake & Powertrain Castings There will be two powertrains, ICE and EV, each using cast products. Regardless of the powertrain, there are opportunities to innovate in chassis structures, suspensions and brakes, primarily in aluminum and iron. Finally, there are new innovations in and around the foundry that will increase competitiveness of castings. Andrew Halonen
10:00 a.m.	2023-01-0878	Development of a Novel High Strength Aluminum-Cerium Based Rotor Alloy for Electric Vehicle Induction Motor Applications Anthony Lombardi, Glenn Byczynski, Nemak USA/Canada; Buddhika Guruwatta Vidanalage, Areej Fatima, Narayan Kar, University of Windsor
10:30 a.m.	ORAL ONLY	AI/ML Driven Meta Models for High Performance Ductile Iron Sand Castings Design and Manufacturing Jiten Shah, Product Development & Analysis LLC
11:00 a.m.	~~2023-01-0879~~ ORAL ONLY	Improvements of Lightweight Production Andreas Waechter, Felss Systems GmbH

WCX SAE World Congress Experience

Technical Session Schedule

As of March 16, 2023 19:50:02 PM

Planned by Metallic Materials Committee / Materials Engineering Activity

Thursday, April 20

Multi-Discipline Interaction and Special CAE Applications

Session Code M213

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

This session will address recent advances in simulation technologies at scales ranging from theoretical development, real world CAE applications, and special simulation techniques for the hybrid, EV, fuel cell and autonomous vehicles. The session focus on the use of the combination of the dynamic, static, linear and nonlinear finite element (FE), mesh free, computational fluid dynamics (CFD), and multibody dynamics (MBD) to evaluate the performance of the vehicle system. Subject coverage topics include: mesh free, geometry-based methods and their applications; Fluid & Structure Coupling; Thermal & Structural Coupling; Electromagnetic and Structural Coupling; 1-D & 3-D Multi-Domain Coupling; Preload/Stress & Manufacture Effect Consideration in Simulations.

Organizers - Peiran Ding, Farasis Energy USA; Fan Li, General Motors LLC; Zhi Yuan, Dassault Systèmes

Chairperson - Fan Li, General Motors LLC

Time	Paper No.	Title
1:30 p.m.	2023-01-0931	Thermal Reduced Order Modeling for System Analysis of EV Battery Peiran Ding, Weiran Jiang, Farasis Energy USA; Abhigyan Majumdar, UC Davis; Pranav Pawar, Arizona State University; Xiao Hu, Anil Wakale, ANSYS Inc.
2:00 p.m.	ORAL ONLY	Coupling MotionSolve (MBD) with OptiStruct (FEM), Advantages and Limitations Adrijan Ribaric, Altair Engineering Inc.
2:30 p.m.	~~2023-01-0932~~ ORAL ONLY	Prospects of Simulating Recycled Plastics
3:00 p.m.		BREAK

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Thursday, April 20

High Efficiency IC Engines Concepts, Part 2

Session Code PFL170

Room 320 Session 9:30 a.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 - Tarek Abdel-Salam, East Carolina University; Cosmin Dumitrescu, West Virginia Univ.; Aswin Ramesh, Cummins Inc.; David Roth, Roth Engine Science LLC; Yu Zhang, Aramco Research Center - Detroit

Chairperson - Yu Zhang, Cummins

WCX SAE World Congress Experience

Technical Session Schedule

As of March 16, 2023 19:50:02 PM

Time	Paper No.	Title
9:30 a.m.	2023-01-0222	Combustion Regimes in the Chrysler Multi-Air Multi-Fuel Engine, Part 2 - Diesel Micro-Pilot Combustion William Church, WVU Tech.; Steven McConnell, Marathon Petroleum Company LLC
10:00 a.m.	2023-01-0232	A Numerical Investigation of Gas Exchange Modeling and Performance Prediction of a Camless Two-Stroke Hydrogen Engine Srinibas Tripathy, Lucien Koopmans, Chalmers University of Technology; Stina Hemdal, Claes Kuylenstierna, Volvo Group Trucks Technology
10:30 a.m.	2023-01-0224	A Synergic Use of Innovative Technologies for the Next Generation of High Efficient Internal Combustion Engines for PHEVs: the PHOENICE project Toni TAHTOUH, IFP Energies nouvelles I.Carnot IFPEN TE; Federico Millo, Luciano Rolando, Giuseppe Castellano, Politecnico di Torino; Mauro Brignone, Marelli; Jason Cleeton, Johnson Matthey ECT; Nicolas Demeilliers, In Extenso Innovation Croissance; Gennaro Lucignano, Stellantis; Juan Sierra Castellanos, Garrett Motion; Alessandro Perazzo, FEV Group GmbH

Planned by General Powertrain Development / Energy and Propulsion Activity

Thursday, April 20

Particle Emissions and Control from Combustion Sources, Part 2

Session Code PFL450

Room 321 Session 9:30 a.m.

The session kicks off with a study of combustion particles from sustainable diesel like fuels. The following papers cover the combustion particle emissions from diesel engines and their control with diesel particulate filters. Finally, two papers discuss the sub 23 nanometer particles and the challenges of meeting the EU VII particle number requirements.

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

Chairperson - Kirby Baumgard, Baumgard Technologies; Andrea Strzelec, University of Wisconsin-Madison; Julian Tan, Stellantis NV

Time	Paper No.	Title
9:30 a.m.	2023-01-0392	Fresh and Aged Organic Aerosol Emissions from Renewable Diesel-Like Fuels HVO and RME in a Heavy-Duty Compression Ignition Engine Maja Novakovic, Axel Eriksson, Louise Gren, Vilhelm Malmborg, Sam Shamun, Lund University; Panu Karjalainen, Tampere University; Birgitta Svenningsson, Martin Tuner, Sebastian Verhelst, Joakim Pagels, Lund University
10:00 a.m.	2023-01-0390	Study on Soot Oxidation Characteristics of Ce and La Modified Pt-Pd CDPF Catalysts Diming Lou, Yajuan Chen, Yunhua Zhang, Tongji University; Peng Wan, Suzhou Panacat Enviromental Protection T; Piqiang Tan, Zhiyuan Hu, Liang Fang, Tong Wang, Tongji University
10:30 a.m.	ORAL ONLY	Evaluation of PM and sub-23 nm particle number emissions from a heavy-duty diesel vehicle during on-road operation Tianyi Ma, Zisimos Toumasatos, Kent Johnson, Tom Durbin, University of California, Riverside; George Karavalakis, University Of California Riverside

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Time	Paper No.	Title
11:00 a.m.	2023-01-0386	Challenges and solutions to meeting Eu VII particle number requirements during aggressive field operation Sandeep Viswanathan, Suhao He, Vishal Reddy, Ghadi Sadek, Corning Inc
11:30 a.m.	ORAL ONLY	ON ROAD PM AND PARTICLE NUMBER EMISSIONS COMPARISON BETWEEN DIESEL AND NATURAL GAS HEAVY-DUTY TRUCKS Hanwei Zhu, Zisimos Toumasatos, George Karavalakis, Kent Johnson, Tom Durbin, University Of California Riverside

Planned by Mobile Emissions Committee / Energy and Propulsion Activity

Thursday, April 20

Particle Emissions and Control from Combustion Sources, Part 3

Session Code PFL450

Room 321 Session 1:30 p.m.

This session focuses on the combustion particle emissions from ethanol and gasoline engines and how to control the particle emissions with improved gasoline particle filters. The future light duty emission standards will include measuring particles down to 10 nanometers and two papers investigate this change.

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

Chairperson - Kirby Baumgard, Baumgard Technologies; Andrea Strzelec, University of Wisconsin-Madison; Julian Tan, Stellantis NV

Time	Paper No.	Title
1:30 p.m.	2023-01-0385	Soot Formation and Ignition Characteristics of Ethanol/Gasoline Blends in a Rapid Compression Machine Joseph Gross, Musharrat Chowdhury, Adam Dempsey, Casey Allen, Marquette University
2:00 p.m.	2023-01-0394	Gasoline Particulate Filter with Membrane Technology to Achieve the Tight PN Requirement Shogo Obata, NGK Insulators, Ltd.; Yasuyuki Furuta, Tatsuya Ohashi, Takashi Aoki, NGK Insulators Ltd
2:30 p.m.	2023-01-0391	Investigation of Equivalency between Laboratory-Grade and Portable Emissions Measurement Systems in Solid Particle Number Measurement Larger than 10 nm Yoshinori Otsuki, Suguru Fukushima, Hiroshi Nakamura, HORIBA, Ltd.; Kentaro Kojima, Hiromu Sakurai, AIST
3:00 p.m.	2023-01-0387	Simulation Based Visual Study of Particulate Deposition Characteristics in Millimeter-Scale Channels of a Diesel Particulate Filter Lishuang Duan, Piqiang TAN, Ying-jie Chen, Diming Lou, Zhiyuan Hu, Tongji University

Planned by Mobile Emissions Committee / Energy and Propulsion Activity

WCX SAE World Congress Experience

Technical Session Schedule

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Thursday, April 20

Emissions Measurement and Testing, Part 3

Session Code PFL440

Room 330 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 - Michael Akard, Horiba, Ltd.; Sumanth Reddy Dadam, Ford Motor Company; Svitlana Kroll, Southwest Research Institute; Jun Peng, University of Lincoln; J. Felipe Rodriguez, International Council On Clean Transport; Andrea Strzelec, University of Wisconsin-Madison; Mert Zorlu, Cummins Inc.

Chairperson - Michael Akard, Horiba, Ltd.

Time	Paper No.	Title
9:30 a.m.	ORAL ONLY	Development, Application, and Demonstration of a Sensor-Based On-Board Sensing, Analysis, and Reporting (OSAR) for Emissions and Activity Data Collection Tom Durbin, University Of California Riverside; Kent Johnson, Univ of California-Riverside; George Karavalakis, University Of California Riverside
10:00 a.m.	2023-01-0374	Modeling of Transient Gasoline Engine Emissions using Data-Driven Modeling Techniques Ganesh Sundaram, Tobias Gehra, Jonas Ulmen, Mirjan Heubaum, Daniel Görges, Michael Guenthner, RPTU Kaiserslautern-Landau
10:30 a.m.	ORAL ONLY	A Comprehensive Evaluation of All the New State-of-the-Art 1065 Compliant PEMS Designed for Emissions at and Below 0.05 G/hp-hr NOx Tianyi Ma, George Karavalakis, University Of California Riverside
11:00 a.m.	2023-01-0379	Real-world Cold Start Emissions Evaluation for Direct-injection Gasoline Vehicle with PEMS and SEMS Jiaxin Chen, Susumu Sato, Chanpaya Eang, Tokyo Institute of Technology; Kotaro Tanaka, Ibaraki University; Takeshi Tange, NGK Spark Plug Co Ltd
11:30 a.m.	ORAL ONLY	A compact ultra-light laser-based portable emissions measurement system (PEMS) platform for vehicle emissions measurements Ritobrata Sur, Indrio Technologies Inc.

Planned by Mobile Emissions Committee / Energy and Propulsion Activity

Thursday, April 20

Panel Discussion: Decarbonization pathways and progress – Electrification, Fuel Cells… What about Hydrogen ICE and e-fuels?

Session Code PFL199

Room 330 B Session 9:30 a.m.

This panel of global experts will discuss the technical approaches that have momentum, and debate the viability of each. How do recent and anticipated regulatory changes shape the future? What about potential recession and geopolitical conflict? Learn more about the Panelists

Organizers - Scott Hotz, Southwest Research Institute; Federico Millo, Politecnico di Torino

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Moderators - Thomas Briggs, Southwest Research Institute

Panelists - Ameya Joshi, Corning Inc.; Andre Kulzer, IFS University of Stuttgart; Zissis C. Samaras, Aristotle University of Thessaloniki; Choongsik Bae, Korea Advanced Inst of Science & Tech;

Planned by General Powertrain Development / Energy and Propulsion Activity

Thursday, April 20

Powertrain Adaptation for Connectivity and Automation, Part 2

Session Code PFL150

Room 330 B Session 1:30 p.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, Ohio State University; Bharatkumar Hegde, General Motors LLC; Scott Hotz, Southwest Research Institute

Chairperson - Scott Hotz, Southwest Research Institute

Time	Paper No.	Title
1:30 p.m.	ORAL ONLY	Consumer and Fleet Perspectives on Connected and Intelligent Powertrain Technology Daniel Colquhoun, Frost & Sullivan; Sankar Rengarajan, Jayant Sarlashkar, Piyush Bhagdikar, Stanislav Gankov, Southwest Research Institute
2:00 p.m.	2023-01-0221	On-Track Demonstration of Automated Eco-Driving Control for an Electric Vehicle Jongryeol JEONG, Argonne National Laboratory; Ahammad Basha Dudekula, Elangovan Kandaswamy, Michigan Technological Univ; Dominik Karbowski, Jihun Han, Argonne National Laboratory; Jeffrey Naber, Michigan Technological Univ
2:30 p.m.	2023-01-0217	Evaluation of Longitudinal ADAS Functions for Fuel Economy Improvement of Class 8 Long Haul Trucks Sumit Paul, Vasu Goyal, Satyum Joshi, Michael Franke, Dean Tomazic, FEV North America Inc; Jonathan Zeman, Gamma Technologies LLC
3:00 p.m.	2023-01-0716	Evaluating the Impact of Connected Vehicle Technology on Heavy-Duty Vehicle Emissions Stanislav Gankov, Sandesh Rao, Bryan Zavala, Piyush Bhagdikar, Jayant Sarlashkar, Christopher Sharp, Michael Brown, Sankar Rengarajan, Southwest Research Institute
3:00 p.m.		BREAK

Planned by General Powertrain Development / Energy and Propulsion Activity

Thursday, April 20

0-D and 1-D Modeling and Numerics: Models for controls & Mechanical Systems

Session Code PFL116

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

Organizers - Jakob Andert, RWTH Aachen University; Federico Millo, Politecnico di Torino; Angelo Onorati, Politecnico di Milano; Andrea Strzelec, University of Wisconsin-Madison; Per Tunestal, Lund

WCX SAE World Congress Experience

Technical Session Schedule

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University

Time	Paper No.	Title
9:30 a.m.	2023-01-0194	Combined Physical and ANN-Based Engine Model of a Turbo-Charged DI Gasoline Engine with Variable Valve Timing Jingsi Wei, Mingjia Liu, GAC Automotive R&D Center; Michael Angerbauer, Qirui Yang, FKFS; Hanjun Xu, GAC Automotive R&D Center; Michael Grill, FKFS; André Kulzer, IFS, University of Stuttgart; Ceyuan Chen, GAC Automotive R&D Center
10:00 a.m.	2023-01-0196	Transmission Shifting Analysis and Model Validation for Medium Duty Vehicles Namdoo Kim, Ehsan Sabri Islam, Ram Vijayagopal, Michael Pamminger, Argonne National Laboratory

Planned by General Powertrain Development / Energy and Propulsion Activity

Thursday, April 20

0-D and 1-D Modeling and Numerics: Electric Powertrains

Session Code PFL117

Room 331 A/B Session 10:30 a.m.

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

Chairperson - Luciano Rolando, Politecnico di Torino

Time	Paper No.	Title
10:30 a.m.	ORAL ONLY	Development of a Virtual Test Rig for Advanced Thermal Management System for Battery Electric Vehicles Federico Millo, Luciano Rolando, Afanasie Vinogradov, Benedetta Peiretti Paradisi, Politecnico di Torino
11:00 a.m.	2023-01-0186	Effect of Fuel and Driving Conditions on Pollutant Emissions from a Diesel Vehicle – A Simulation Study Víctor Cuaical, Sara Dominguez, Ana María Valencia, Ricardo Ramírez, Maria Luisa Botero, Felipe Bustamante, Universidad de Antioquia

Planned by General Powertrain Development / Energy and Propulsion Activity

Thursday, April 20

Control System Design, Calibration, and Optimization

Session Code PFL130

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

This session focuses on powertrain control system design, calibration, and optimization.

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

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Technical Session Schedule

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Chairperson - Zhe Wang, Ford Motor Company

Time	Paper No.	Title
1:30 p.m.	2023-01-0209	Minimizing Steady-State Testing Time in an Engine Dynamometer Laboratory Steven DeCoste, Antonio Scalzi, Jun Chen, Dan DelVescovo, Oakland University
2:00 p.m.	ORAL ONLY	Using virtual system modelling tool for tuning Boost system diagnostics for Off Highway Engine Systems RANJEET ROY, Ranjeet Roy
3:00 p.m.		BREAK

Planned by General Powertrain Development / Energy and Propulsion Activity

Thursday, April 20

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

Session Code DEI100

Room 338 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.

Organizers - Tarek Abdel-Salam, East Carolina University

Chairperson - Tarek Abdel-Salam, East Carolina University; Shiqi(Shawn) Ou, Oak Ridge National Laboratory

Time	Paper No.	Title
9:30 a.m.	2023-01-0675	What Makes Passengers Uncomfortable In Vehicles Today? An Exploratory Study of Current Factors that May Influence Acceptance of Future Autonomous Vehicles Lauren K. Mims, Rakesh Gangadaraiah, Johnell Brooks, Haotian Su, Yunyi Jia, Clemson University; Julie Jacobs, Sterling Mensch, SAGE Automotive Interiors
10:00 a.m.	2023-01-0673	Opinions from Users Across the Lifespan about Fully Autonomous and Rideshare Vehicles with Associated Features Rakesh Gangadharaiah, Lauren Mims, Yunyi Jia, Johnell Brooks, Clemson University
10:30 a.m.	~~2023-01-0674~~ ORAL ONLY	A Study on the Establishment of Key Performance and Driving Character By Vehicle Segment Cheolho Hwang, Hyundai & Kia Corp.
11:00 a.m.	ORAL ONLY	Who's Gonna Develop, Fix, and Maintain All This Advanced Driving Tech?!? Justin Johnson, Tammy Meehan Russell, The PLUM Catalyst

WCX SAE World Congress Experience

Technical Session Schedule

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Time	Paper No.	Title
11:30 a.m.	~~2023-01-0676~~	Purpose-Built ADS-DV and Open-Source Innovation
	ORAL ONLY	
		Hongki Cha, ETRI

Thursday, April 20

Welding, Joining, and Fastening

Session Code M216

Room 353 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; Jwo Pan, University of Michigan

Chairperson - Catherine Amodeo, Ford Motor Company; Wei-Jen Lai, Ford Motor Co.; Pai-Chen Lin, National Chung Cheng University

Time	Paper No.	Title
9:30 a.m.	ORAL ONLY	Development of Mechanical Joining Technology for Hot Press Forming Steel-Aluminum Dissimilar Materials
		JiHyoung Park, Hyundai Steel Company
10:00 a.m.	ORAL ONLY	Influence of Dimensions of Bolted Joint on Permanent Set on Bearing Surface
		Yuya Omiya, Okayama Univ.
10:30 a.m.	ORAL ONLY	Simulations of Crack Extensions in Uncharged and Hydrogen-Charged Bend Specimens of Laser Powder Bed Fusion Processed Type 304L Stainless Steels
		Mei-Chia Lin, Shengjia Wu, Jwo Pan, University of Michigan; Paul Korinko, Timothy Krentz, Savannah River National Laboratory
11:00 a.m.	ORAL ONLY	Weldability Test for Low Slag Wire to Improve Corrosion Resistance of Automobile Chassis Part
		Sanghyeon Park, Hyundai Steel Company
11:30 a.m.	ORAL ONLY	Failure Prediction of Dissimilar Laser Welds in Lap-Shear Specimens of Aluminum and Copper Sheets
		Pai-Chen Lin, JingWei Lin, National Chung Cheng University & AIM-HI; Min-Yu Tseng, Hung-Wei Yen, National Taiwan University; Tsung-Ying Tsai, Kun-Tso Chen, Industrial Technology Research Institute
12:00 p.m.	2023-01-0941	Relationship between Material Strength and Friction Coefficients for Aluminum Alloy Bolt
		Shinji Hashimura, Kenta Horinouchi, Kazuki Kmibeppu, Shibaura Institute of Technology

WCX SAE World Congress Experience

Technical Session Schedule

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Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Thursday, April 20

Learning Lab: Day 3

Session Code LL300

Room Learning Lab Session 10:00 a.m.

Get unprecedented interaction and go one-on-one with new technology from exhibitors in the Learning Lab. You'll hear discussions on the latest innovations in mobility products with engineers and suppliers in an intimate theater venue, to ask questions and experience hands-on demonstrations. As a bonus – There will be a critical panel discussion moderated by CADIA and the Mobile History Committee will give special presentations on Thursday Morning.

Time	Paper No.	Title
10:00 a.m.	ORAL ONLY	Supporting Diversity in STEM—from Today's Classroom to Tomorrow's Workforce
		Moderators - Cheryl Thompson, CADIA Auto Diversity Inclusion & Advance
		Panelists - Andre Daughty, Daughty Enterprises LLC; Katelyn Davis, Cavnue; Victoria Thompson, Microsoft Education; Rebecca Leilani Vollmann, ABB/B&R Industrial Automation;
		Cheryl Thompson, CADIA Auto Diversity Inclusion & Advance
11:00 a.m.	ORAL ONLY	SAE Mobility History Committee - The Evolution of the Personal Luxury Vehicle
		Leonard William Kata, Chair of the SAE Mobility History Committee
11:30 a.m.	ORAL ONLY	More Than Front Wheel Drive, the 1966 Oldsmobile Toronado
		Bob Elton, SAE Mobility History Committee

Thursday, April 20

SAE EDGE Reports Knowledge Bar - Thursday, April 20

Session Code KB300

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

This Chat with Expert format is located on the exhibit floor and is designed for you to get questions answered or do some problem solving with in a casual, small group environment FORMAT: Each 40 minute activity begins with the SME presenting an opening statement on challenges or opportunities in their respective field of expertise followed by 35 minutes of dialogue with the audience. Your participation is critical so come prepared to discuss specific issues or concerns you are having.

Time	Paper No.	Title

WCX SAE World Congress Experience

Technical Session Schedule

As of March 16, 2023 19:50:03 PM

Time	Paper No.	Title
10:00 a.m.	ORAL ONLY	Opportunities and Challenges in Additive Manufacturing Now that additive manufacturing has moved from prototype to low-rate to high-rate production for increasingly critical applications in multiple industries, the next question is what next? Come prepared with your questions as this SME will cover the next opportunities for AM across the mobility industry as well as the challenges that need to be overcome to realize these opportunities. Kevin Slattery, The Barnes Global Advisors
10:45 a.m.		Networking Break
11:00 a.m.	ORAL ONLY	EV Charging Station Reliability This chat with SME is related to (2) recently published EDGE Research Reports that summarize current trends and debate, as well as future directions and needs regarding EVSE (Electric Vehicle Supply Equipment) Reliability and Availability. Several key studies have been conducted by major universities, government labs, and private entities that clearly outline the need for improvement in reliability and availability of public and private Level 2 and DCFC (Direct Current Fast Charge) stations. Lack of understanding has led to consumer anxiety and in some cases, inadvertent abuse and mishandling of EV Chargers. The SME will engage the audience in conversation around specific details from recent field data studies and focus on some of the biggest challenges the EV industry will face in this decade. We will also discuss current SAE initiatives to improve charging system reporting, and hi-light several new partnerships with charging industry partners to improve reliability. Brian J. Kozumplik, Nexteer Automotive
11:45 a.m.		Networking Break
1:00 p.m.	ORAL ONLY	Infrastructure Kelley Coyner, Innovation4Mobility
1:45 p.m.		Networking Break
2:00 p.m.	ORAL ONLY	Automotive Cybersecurity: An Introduction to ISO/SAE 21434 Paul Wooderson, David Ward, Horiba Mira, Ltd.