INTERNATIONAL POWERTRAINS, FUELS & LUBRICANTS MEETING

Event Guide

17-19 September 2018

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EMERGENCY PROCEDURES

During the event, attendees should follow the emergency guidelines. Based on the location of the incident, report emergencies to the nearest venue or SAE International representative or report to the registration desk. Should a catastrophic event occur, attendees should follow the safety and security instructions issued by the facility at the time of the event. This includes listening for instructions provided through the public address system and following posted evacuation routes if required.

OPEN EXCHANGE OF IDEAS

The purpose of this meeting is to provide an open exchange of ideas. Remarks made by participants or members of the audience cannot be quoted or attributed to the individual or their company unless the individual or company expresses permission. Any record of remarks and discussions may not be used unless the individual and their company expresses permission.

CONSENT TO USE OF IMAGES

Please note that photographs and videos of event activities and attendees, taken by or on behalf of SAE International, shall be property of SAE International. By registering for an SAE International event, you consent to the use of any photograph or video in which you appear, without notice or compensation to you.

PRACTICAL INFORMATION

EXHIBITION HOURS		
Monday, 17 September	Tuesday, 18 September	Wednesday, 19 September
10:00 – 19:30	09:30 – 18:00	09:30 – 19:00

REGISTRATION HOURS				
Sunday, 16 September	Monday, 17 September	Tuesday, 18 September	Wednesday, 19 September	Thursday, 20 September
14:00 – 20:00	07:30 – 19:30	07:30 – 17:30	08:00 – 17:00	08:00 – 11:00

NETWORKING EVENTS

The IPF&L Meeting has plenty to offer - from social events to educational sessions, plenary speakers and a bustling exhibition area. What else does it offer?

Networking opportunities - the perfect way to unwind with your colleagues and friends, meet other professionals and reflect on your time in Heidelberg.

WELCOME RECEPTION

Monday, 17 September | 18:30 – 19:30
Location: Exhibition Area, Meriansaal (Ground Floor)

The Welcome Reception provides an excellent opportunity to network, meet old friends and colleagues, as well as meet new people as the event begins.

Light appetizers and drinks will be served in comfortable exhibition facilities, making this reception a must-attend event.

GALA DINNER

Tuesday, 18 September | 19:00 – 21:30
Location: King's Hall, Heidelberg Palace

Take part in an exceptional dinner and evening at one of the city's landmarks, the Heidelberg Palace, which majestically rises over the roofs of the old town. You will be able to enjoy a selection of traditional food, regional wines and non-alcoholic beverages, whilst offering the opportunity to meet and engage with other participants.

Transfer to the Heidelberg Palace will be organized from the venue every 10 minutes as of 18:30. Access will be made based on the attendee badge.

NETWORKING RECEPTION

Wednesday, 19 September | 18:00 – 19:00
Location: Meriansaal, Foyer, Outdoors (Ground Floor)

The meeting closes with an Expert Panel Discussion followed by a celebration and reception sponsored by Aramco Research & Innovation. Take one last look around the exhibition area and network with your colleagues during this social function. All delegates are invited to attend this not to be missed event, following the fascinating panel discussions where nibbles will be provided to round off a great conference - it will be a fitting end to a wonderful week of science.

Sponsored by aramco research & innovation

All above functions are open to all conference attendees but as spaces are limited and will be managed on a first-come first-served basis, we invite you to pre-register. Accompanying guests can gain access to the Gala Dinner only by purchasing a ticket.

ORGANISING COMMITTEE

Dr. Max Magar, Co-Chair, MOT GmbH

Professor Ulrich Spicher, Co-Chair, MOT GmbH

Dr. Michael Bargende, University Stuttgart

Prof. Dr. Christian Beidl, University Darmstadt

Prof. Dr. Michael Günthner, University Kaiserslautern

Dr. Marcus Gohl, APL GmbH

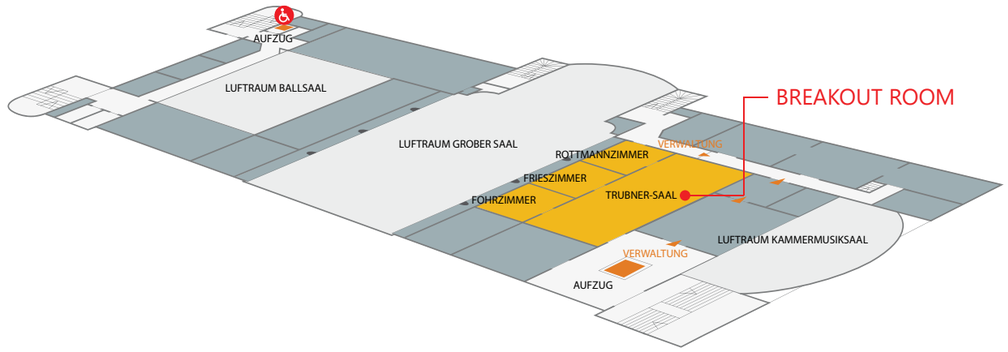
Prof. Dr. Kurt Kirsten, APL GmbH

Dr. Hans-Pete Kollmeier, Fraunhofer Gesellschaft-NAS

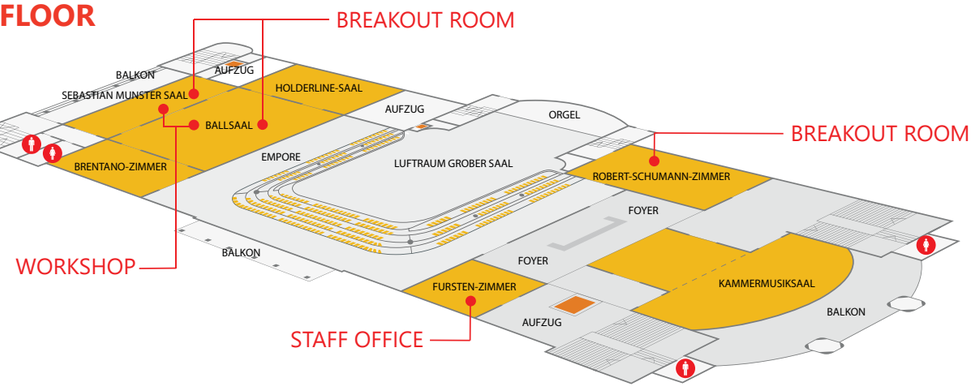
Prof. Amin Velji, KIT Karlsruhe

VENUE FLOORPLAN

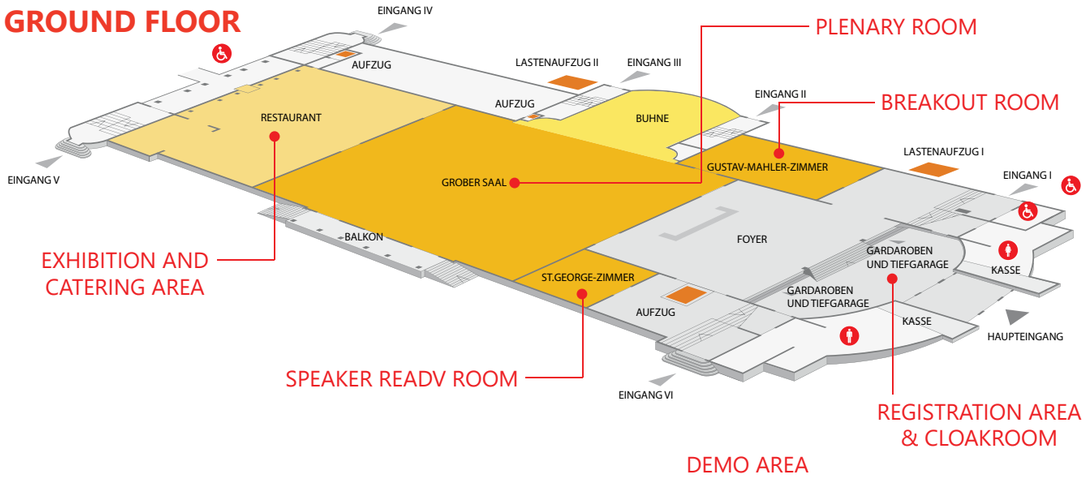
SECOND FLOOR



FIRST FLOOR



GROUND FLOOR



PROGRAMME-AT-A-GLANCE

SUNDAY, 16 SEPTEMBER		
14:00 – 20:00	**Registration**	Foyer

MONDAY, 17 SEPTEMBER		
08:30 – 10:00	**Keynote Presentation Christian Schwarz, Head of Department Predevelopment Gasoline Engines, BMW**	Grosser Saal (Ground Floor)
10:00 – 10:30	Networking Break	Meriansaal (Ground Floor)
10:30 – 12:30	Technical Sessions	
12:30 – 13:30	Networking Lunch	Meriansaal (Ground Floor)
13:30 – 15:30	Technical Sessions	
15:30 – 16:00	Networking Break	Meriansaal (Ground Floor)
16:00 – 18:30	Technical Sessions	
18:30 – 19:30	**Welcome Reception**	Meriansaal (Ground Floor)

TUESDAY, 18 SEPTEMBER		
08:30 – 09:30	**Keynote Presentation Staffen Lungren, Senior Specialist and Technology Advisor, Volvo Trucks**	Grosser Saal (Ground Floor)
09:30 – 10:00	Networking Break	Meriansaal (Ground Floor)
10:00 – 12:30	Technical Sessions	
12:30 – 13:30	Networking Lunch	Meriansaal (Ground Floor)
13:30 – 15:30	Technical Sessions	
15:30 – 16:00	Networking Break	Meriansaal (Ground Floor)
16:00 – 17:30	Technical Sessions	
19:00 – 21:00	**Gala Dinner***	Off-site location: King's Hall, Heidelberg Palace

PROGRAMME-AT-A-GLANCE

WEDNESDAY, 19 SEPTEMBER		
08:30 – 09:30	**Keynote Presentation Dr. Markus Scherer, Director Global Marketing and Product Development – Base Stocks and Metalworking Fluids, BASF SE**	Grosser Saal (Ground Floor)
09:30 – 10:00	Networking Break	Meriansaal (Ground Floor)
10:00 – 12:30	Technical Sessions	
12:30 – 13:30	Networking Lunch	Meriansaal (Ground Floor)
13:30 – 15:30	Technical Sessions	
15:30 – 16:00	Networking Break	Meriansaal (Ground Floor)
16:00 – 18:00	**Expert Panel Discussion The Future of Combustion Engines** Sponsored by aramco research & innovation	Grosser Saal (Ground Floor)
18:00 – 19:00	**Networking Reception** Sponsored by aramco research & innovation	Meriansaal, Foyer, Outdoors (Ground Floor)

THURSDAY, 20 SEPTEMBER		
08:30 – 17:30	**Workshop Gasoline Direct Injection Deposits Workshop*** Sponsored by innospec specialty chemicals	Ballsaal (First Floor)
10:00 – 11:30	**APL Automobil-Prüftechnik Landau Plant Tour***	Off-site location
13:30 – 15:30	**Daimler Wörth Plant Tour***	Off-site location

*Additional fee applies for attending this function.

KEYNOTE SPEAKERS

Dr. Christian Schwarz

Head of Department Predevelopment Gasoline Engines
BMW Group
Monday, 17 September | 08:30 – 10:00

Dr. Staffan Lundgren

Senior Technology Advisor - Energy Efficiency & Physics
Volvo Group
Tuesday, 18 September | 08:30 – 09:30

Dr. Markus Scherer

Director, Global Marketing & Product Development - Base Stocks and Metalworking Fluids
BASF SE
Wednesday, 19 September | 08:30 – 09:30

SPONSORED aramco research & innovation

EXPERT PANEL DISCUSSION
THE FUTURE OF COMBUSTION ENGINES

WEDNESDAY, SEPTEMBER 19 | 16:00 – 18:00

MODERATOR

Uwe Dieter Grebe

Executive Vice President. Global Business Development, Sales & International Operations
AVL LIST GmbH

PANELISTS

Amer A. Amer

Chief Technologist
Saudi Aramco

Rolf Brück

Managing Director
Continental Emitec GmbH

Stephen Ciatti

Principal Engineer for Advanced Engines
PACCAR Technical Center

Shuji Kimura

Research Project Manager
Nissan Motor Co., Ltd.

Kurt Kirsten

Head of Advanced Engrg and Innovation
APL Automobil-Pruftechnik Landau GmbH

GASOLINE DIRECT INJECTION DEPOSITS WORKSHOP
20 SEPTEMBER 2018

SPONSORED BY innospec fuel specialties

SESSION 1
FORMATION MECHANISMS AND DEPOSIT EFFECTS

As an introduction this first session an overview of the development of direct injection gasoline engines and the concurrent development of deposit formation issues and then focuses on some of the latest research into deposit formation mechanisms.

08:30 - 09:00	Fuel Requirements and Deposit - Related Matters for DISI Engines **Gautam Kalghatgi (ret.), Principal Professional, Saudi Aramco**
09:00 - 09:30	Impact of Injector Fouling on Combustion Performance in Gasoline Direct Injection Engines **Roger Cracknell, Technology Expert, Shell**
09:30 - 10:00	Mechanism and Model of the Formation of Carbonaceous Injector Deposits in Internal Combustion Engines **Radomir I. Slavchov, CTO, Cambridge University**
10:00 - 10:30	**COFFEE BREAK**

SESSION 2
DEPOSIT EFFECTS AND TEST METHOD DEVELOPMENT

The second session of the morning presents some recent research developments into the effects that fuel degradation and deposits can have on DIG engine performance.

10:30 - 11:00	Stochastic Preigntion and Engine Deposits: Is there a Connection **Elana Chapman, Fuels/ Biofuels Engineer, General Motors**
11:00 - 11:30	Adverse Effects of Fuel Combustion/ Degradation **Ladislav Fuka, Division Manager, SGS Czech Republik**
11:30 - 12:00	A Study of Particulate Emission Mechanism from Injector Tip Deposit of Direct-Injection Gasoline Engines **Yoshihiro Imaoka, Engineer, Nissan Motor Co Ltd**
12:00 - 13:00	**LUNCH**

*Additional fee applies for attending this session. Please revert to the Registration Desk for further information.

SPONSORED BY innospec fuel specialties

GASOLINE DIRECT INJECTION DEPOSITS WORKSHOP
20 SEPTEMBER 2018

SESSION 3
DEPOSIT EFFECTS AND TEST METHOD DEVELOPMENT

The first session of the afternoon looks at recent developments in test methods for generating DIGID and the effects that these deposits produce in engine performance.

13:00 - 13:30	Fast Method of Generating Deposits in GDI Engines and Analysis of the Impacts on Emissions **Javier Ariztegui, Manager Discipline Mobility, Repsol Petroleo S A**
13:30 - 14:00	Development of A Gasoline Direct Injection Injector Deposit Test for the Top Tier™ Detergent Gasoline Program **Dean Schoppe, Senior Project Engr, Intertek**
14:00 - 14:30	Test Method to Monitor Injector Deposit Buildup **Michael Schulz, ISP Salzbergen GmbH & Co. KG**
14:30 - 15:00	**COFFEE BREAK**

SESSION 4
ANALYSIS AND DIAGNOSTIC TECHNIQUES

The final session of the day highlights some of the sophisticated observational and analytical techniques that are being employed to understand the nature of DIGID and their formation mechanisms.

15:00 - 15:30	The Influence of Engine Test Conditions on Nozzle Tip Coking and Advanced Diagnostic Techniques for its Investigation **Gavin Dober, Senior Development Engineer, Delphi Diesel Systems**
15:30 - 16:00	Understanding Fuel Additive Performance through the Use of Modern Chromatography and Mass Spectrometry **G. John Langley, Professor, University of Southampton**
16:00 - 16:30	Impact of Injector Deposits on GDI Engine Performance and Emission **Hongming Xu, Professor, University of Birmingham**
16:30 - 17:30	**RECEPTION**

TECHNICAL TOURS

1 AUTOMOBIL-PRÜFTECHNIK LANDAU (APL) PLANT TOUR

Thursday, 20 September 2018 | 10:00 – 11:30
Fee: 40 EUR + VAT

Buses will be leaving the venue 90 minutes prior to the tour starting time. Exact timings will be provided in due course. Please note that spaces are limited and provided on a first come, first-served basis.

The fee includes:

- Return bus transfer from the venue (Kongresshaus Stadthalle Heidelberg) to the APL facility
- Guided tour of the APL facility

2 DAIMLER WÖRTH PLANT TOUR

Thursday, 20 September 2018 | 13:30 – 15:30
Fee: 50 EUR + VAT

Buses will be leaving the venue 90 minutes prior to the tour starting time. Exact timings will be provided in due course. Please note that spaces are limited and provided on a first come, first-served basis.

The fee includes:

- Return bus transfer from the venue (Kongresshaus Stadthalle Heidelberg) to the Daimler facility
- Guided tour of the Daimler facility

During your visit to the plant the following rules should be considered:
Smoking, photographing, filming and the use of consumer electronics are not permitted in the plant.
Minimum age of visitors is 16 years.

Contact the Registration Desk for further information or for joining the tours.

TECHNICAL AND BUSINESS SESSIONS

MONDAY, 17 SEPTEMBER

SESSION TITLE, DESCRIPTION, AND ROOM

TIME	Grosser Saal	Kammermusiksaal	Ballsaal	Sebastian-Munster-Saal
	Keynote - Christian Schwarz, Head of Advanced Development of Gasoline Engines, BMW (FFLK3) 08:30 - 10:00 Keynote Speakers: Christian Schwarz, BMW Group	**Combustion in Compression Ignition Engines: Part 1 Diesel Combustion Processes (FFL220)** Classical diesel engine combustion with relatively short ignition delay, including papers dealing with low CR and high EGR calibrations. 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 encouraged to be submitted into FFL110 or FFL120 modeling sessions. 10:30 - 13:00 Organizers: Stephen Busch, Sandia National Laboratories; Adam B. Dempsey, Caterpillar; Theodoros Zannis, Hellenic Naval Academy Chairpersons: Barbara Goodrich, John Deere Product Engineering Center; Felix Leach, University of Oxford	**Combustion in Gaseous Fueled Engines (FFL270)** 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 dualfuel engines will also be accepted in this session. 10:30 - 12:30 Organizers: Victor Salazar, GE Global Research Center; Riccardo Scarcelli, Ashish Shah, Argonne National Laboratory Chairpersons: Thomas Wallner, Argonne National Laboratory	**Diesel Engine Lubricants (FFL350)** The most critical performance properties of current engine lubricants need to strike a balance between improving the fuel economy of the medium/heavy duty engines and the long term protection of overall engine system hardware. Presentations in this session will discuss both challenges: parameters needed to develop dynamometer test to measure fuel economy and report on real life, comparative lubricant performance in trucks/buses fueled by CNG and diesel fuels. 10:30 - 11:30 Organizers: Jason Andersen, PACCAR Inc.; A S Ramadhas, Indian Oil Corp., Ltd. Chairpersons: Jason Andersen, PACCAR Inc.; Timothy P. Newcomb, Lubrizol Corp.
10:30		Experimental Investigation of Flame-Wall-Impingement and Near-Wall Combustion on the Piston Temperature of a Diesel Engine Using Instantaneous Surface Temperature Measurements **(2018-01-1782)** Daniel Mayer, Alexander Seelig, Torsten Kunz, Fabian Kopple, Matthias Mansbart, Robert Bosch GmbH; Michael Bargende, IVK, University of Stuttgart	Improving Combustion and Emission Characteristics in Heavy-Duty Natural-Gas Engine by Using Pistons Enhancing Turbulence **(2018-01-1685)** Fubai Li, Changpeng Liu, Heping Song, Zhi Wang, Tsinghua University	Farm Tractor Efficiency Gains through Optimized Heavy-Duty Diesel Engine Oils **(2018-01-1752)** Adam Stackpole, Alexander Michlberger, Paul Mardula, The Lubrizol Corp.; Roger Hoy, Justin Geyer, Douglas Triplett, Nebraska Tractor Test Laboratory
11:00		Bowl Geometry Effects on Turbulent Flow Structure in a Direct Injection Diesel Engine **(2018-01-1794)** Stephen Busch, Kan Zha, Sandia National Laboratories; Federico Perini, University of Wisconsin-Madison; Rolf Reitz, University of Wisconsin; Eric Kurtz, Ford Motor Company; Alok Warey, General Motors Global R & D; Richard Peterson, General Motors LLC	Effect of Single and Double-Deck Pre-Chamber Designs to the Combustion Characteristics of Premixed CH4/Air **(2018-01-1688)** Shuaishuai Sun, Yue Ma, Longxi Cui, Xiao Ma, Shi-Jin Shuai, Tsinghua University	Experimental Investigation of the Effect of Karanja Oil Biodiesel with Cerium Oxide Nano Particle Fuel Additive on Lubricating Oil Tribology and Engine Wear in a Heavy Duty 38.8L,780 HP Military CIDI Diesel Engine (**2018-01-1753**) Anand Kumar Pandey, Symbiosis Institute of Tehnology- Pune; Milankumar Nandgaonkar, College of Engineering Pune; Umang Pandey, SRM Institute of Technonolgy- Chennai; S Suresh, C V R D E, DRDO, Chennai
11:30		Study of Swirl Ratio on Mixture Preparation with a Swirl Control Valve in a Diesel Engine **(2018-01-1790)** Haiying Li, Lei Wang, Kun Wang, Weiqing Zhu, Yufeng Li, Li Jiang, China North Engine Research Institute	Study of Turbulent Entrainment Quasi-Dimensional Combustion Model for HCNG Engines with Variable Ignition Timings **(2018-01-1687)** Roopesh Kumar Mehra, Fanhua Ma, Duan Hao, Tsinghua University; Romualdas Juknelevičius, Vilnius Gediminas Technical University	
12:00		An Experimental Investigation on Spray Mixing and Combustion Characteristics for Spray C/D Nozzles in a Constant Pressure Vessel **(2018-01-1783)** Jose V. Pastor, Jose M Garcia-Oliver, Antonio Garcia, Andrés Morales López, Universitat Politecnica de Valencia	Loss Analysis of a Direct-Injection Hydrogen Combustion Engine **(2018-01-1686)** Kevin Klepatz, Hermann Rottengruber, Stephan Zeilinga, Otto-Von-Guericke University Magdeburg; Daniel Koch, Werner Prümm, Keyou	
12:30		Soot Oxidation in Periphery of Diesel Spray Flame via HR-TEM Analysis **(Oral Only)** Ryosuke Kusakari, Yoshiaki Toyama, Meiji Univ - School of Engrg; Tetsuya Aizawa, Meiji Univ		
		Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity	Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity	Planned by Fuels and Lubricants / Powertrain Fuels and Lubricants Activity

TECHNICAL AND BUSINESS SESSIONS

MONDAY, 17 SEPTEMBER

SESSION TITLE, DESCRIPTION, AND ROOM

TIME	Trubner Saal	Rob.Schumann-Zimmer	Gustav-Mahler-Zimmer
	Exhaust Emissions Control Systems (FFL420) The papers in this session covers the performance of catalyzed DPFs and investigates the pressure drop across the DPF under cold conditions. One paper also investigates gasoline particulate filters (GPFs) for meeting future emission standards. 10:30 - 12:30 Organizers: Kirby Baumgard, John Deere Power Systems; Cary Henry, Southwest Research Institute; Andrea Strzelec, Mississippi State Univ.; Athanasios Tsolakis, Univ. Of Birmigham Chairpersons: Cary Henry, Southwest Research Institute	**Hybrids, EV Powertrains, Fuel Cell and Electric (Part 1 of 2) (FFL780)** 10:30 - 12:30 Organizers: Chaitanya D. Ghodke, Convergent Science Inc.; Sergey Gladyshev, Univ. of Michigan-Dearborn; Michael Clifford Kocsis, Southwest Research Institute; James Miller, Argonne National Laboratory; Darrell Robinette, Michigan Technological Univ.; Matthew P. Thiel, Affiliated Construction Services Chairpersons: Vickey B. Kalaskar, Southwest Research Institute	**Powertrain Thermal Management: Combustion Chamber, Battery Cooling, and Engine Cooling (FFL160)** This session considers modeling (zero-D, 1D, 2D, 3D CFD) and experimental papers on: combustion chamber, systems (lubrication, cooling, fuel, EGR); components (oil pumps, coolant pump, fuel injectors, compressors, turbines, turbochargers, torque converters, gear box, fans, bearings, valves, ports, manifolds, turbine housing); heat exchangers (radiators, oil coolers); aftertreatment (SCR, DOC, DOF, exhaust gas cooling); battery cooling (HEV, EV, motor/generator) and controls (passive and active). 10:30 - 12:30 Organizers: Tarek M. Abdel-Salam, East Carolina University Chairpersons: Luigi Sequino, Istituto Motori CNR
10:30	Comparison of Accelerated Ash Loading Methods for Gasoline Particulate Filters **(2018-01-1703)** Scott Eakle, Stephen Avery, Phillip Weber, Cary Henry, Southwest Research Institute	Research and Development of a Plug-in Hybrid Hydrogen Vehicle **(Oral Only)** Changwei Jl, Beijing Univ. of Technology	Thermodynamic Analysis of an Evaporative Inlet Air Cooled Combined Cycle for Marine Application **(2018-01-1777)** Alok Kumar Mohapatra, GIFT, Bhubaneswar; Sanjay S, National Institute of Tech Jamshedpur; Tushar Choudhary, VIT Bhopal University; Anupam Kumari, NIT Jamshedpur; IRSHAD S, Shin Thermo
11:00	Studies on the Influence of Engine Conditions and Different Ash Levels on the Regeneration Behavior of Particulate Filters **(2018-01-1704)** Christian Zöllner, Dieter Brueggemann, Bayreuth Engine Research Center	Investigation of the Hybrid Operating Modes Regarding Efficiency, Emissions and Comfort for the Parallel-Series Hybrid Powertrain Concept DE-REX **(2018-01-1828)** S. Fischer, A. Viehmann, C. Beidl, S. Rinderknecht, TU Darmstadt	A Method to Evaluate the Compression Ratio in IC Engines with Porous Thermal Barrier Coatings **(2018-01-1778)** Joop Somhorst, Volvo Car Corp.; Michael Oevermann, Chalmers University of Technology; Mirko Bovo, Volvo Car Corp.; Ingemar Denbratt, Chalmers University of Technology
11:30	Emission Control System Designing to Meet China 6 **(2018-01-1706)** Qingmao Zhang, Xiangfei Ren, Xiangke Wu, Jin Li, Chu Chen, Jiangwei Wang, Geely Automobile Research Institute; Yinglei Sun, Hongyu Ji, Shengdian Chen, Johnson Matthey Chemical Ltd.	On Board Diagnostics (OBD) for Multi Topology Hybrid Electric Powertrain Architectures **(2018-01-1827)** Ragupathi Soundara Rajan, VKA, RWTH Aachen University; Michel Ferzli, FEV France S.A.S.; Felix Richert, Dirk Van Der Weem, FEV Europe GmbH	Experimental Determination of the Heat Transfer Coeffi-cient in Piston Cooling Galleries **(2018-01-1776)** Christian Binder, Vasanth E, Daniel Norling, Scania CV AB; Andreas Cronhjort, KTH Royal Institute of Technology
12:00	Effects of Soot Deposition on NOx Purification Reaction and Mass Transfer in a SCR/DPF Catalyst **(2018-01-1707)** Yoshihisa Tsukamoto, Shun Utaki, Wencong Zhang, Takao Fukuma, Jin Kusaka, Waseda University	Exhaust Energy Recovery with Variable Geometry Turbine to Reduce Fuel Consumption for Microcars **(2018-01-1825)** Fernando Ortenzi, Antonino Genovese, ENEA; Martina Carrazza, Franco Rispoli, Paolo Venturini, La Sapienza University of Rome	A Simulation Study of Optimal Integration of a Rankine Cycle Based Waste Heat Recovery System into the Cooling System of a Long-Haul Heavy Duty Truck **(2018-01-1779)** Kangyi Yang, Michael Grill, FKFS; Michael Bargende, Universitat Stuttgart
	Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity	Planned by Hybrid and Electric Powertrains Committee / Powertrain Fuels and Lubricants Activity	Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity

MONDAY, 17 SEPTEMBER

SESSION TITLE, DESCRIPTION, AND ROOM

TIME	Gustav-Mahler-Zimmer	Rob.Schumann-Zimmer	Kammermusiksaal	Trubner Saal
	0-D and 1-D Modeling and Numerics (FFL110) Separate sub-sessions cover erodimensional,one-dimensional, and uasidimensional models for simulation of SI and CI engines with respect to: engine breathing, boosting, and acoustics; SI combustion and emissions; CI combustion and emissions; fundamentals of engine thermodynamics; numerical modeling of gas dynamics; thermal management; mechanical and lubrication systems; system level models for controls; system level models for vehicle fuel economy and emissions predictions. 13:30 - 18:00 Organizers: Adrian Irimescu, Istituto Motori CNR; LU Qiu, Cummins Inc. Chairpersons: Sebastian Verhelst, Ghent University	**Alternative and Advanced Fuels (FFL330)** This session focuses on work pertaining to the production and fundamental properties of new fuels and methods for assessing their performance. 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 of inclusion of more than 7% biodiesel; the substitution of diesel fuel and gasoline with components other than biodiesel and ethanol respectively. 13:30 - 17:30 Organizers: Carlo Beatrice, Istituto Motori CNR; Felix Leach, University of Oxford; Simona Silvia Merola, Istituto Motori CNR; Theodoros Zannis, Hellenic Naval Academy Chairpersons: Elana Chapman, General Motors; Felix Leach, University of Oxford	**Combustion in Compression Ignition Engines: Part 2 Heat Release Modulation and Efficiency (FFL220)** Classical diesel engine combustion with relatively short ignition delay, including papers dealing with low CR and high EGR calibrations. 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 encouraged to be submitted into FFL110 or FFL120 modeling sessions. 13:30 - 16:30 Organizers: Stephen Busch, Sandia National Laboratories; Adam B. Dempsey, Caterpillar; Theodoros Zannis, Hellenic Naval Academy Chairpersons: Stephen Busch, Sandia National Laboratories	**Exhaust Emissions Control: New Developments (FFL410)** Papers are invited on technology developments and the integration of these technologies into new emission control systems. Topics include the integration of various diesel particulate matter (PM) and diesel Nitrogen Oxide (NOx) reduction technologies plus analogous technologies for the growing population of direct injection gasoline engines. Novel developments in DEF injection system, sensors and control systems will also be considered. 13:30 - 16:30 Organizers: Thorsten Boger, Corning GmbH; Anna Fathali, Volvo Car Group; Ashok Kumar, Cummins Inc.; Anand Srinivas, Sastra Deemed University; Andrea Strzelec, Mississippi State Univ. Chairpersons: Cary Henry, Southwest Research Institute; Hermann Sebastian Rottengruber, Otto- Von-Guericke University Magdeburg
13:30	Holistic Evaluation of CO2 Saving Potentials for New Degrees of Freedom in SI Engine Process Control Based on Physical Simulations **(2018-01-1654)** Tim Wandschneider, Katharina Wiege, Wolfram Gottschalk, IAV GmbH	Methodical Selection of Sustainable Fuels for High Performance Racing Engines **(2018-01-1749)** Lea Schwarz, Universität Stuttgart; Michael Bargende, Universitat Stuttgart; Stefan Dreyer, Ulrich Baretzky, Wolfgang Kotauschek, Sebastian Wohlgemuth, Florian Bach, Audi AG	Investigation into the Optimized Heat Release Rate and Corresponding Variation of In-Cylinder Specific Heat Ratio for the Improvement in Thermal Efficiency by Utilizing Two-Zone Combustion Model Analysis **(2018-01-1796)** Kenji Enya, Hiroki Watanabe, Noboru Uchida, New Ace Inst. Co., Ltd.	Severe Soot Oxidations in Gasoline Particulate Filter Applications **(2018-01-1699)** Thorsten Boger, Dominik Rose, Per Nicolin, Bertrand Coulet, Corning GmbH; Anastasiia Bachurina, Corning
14:00	Investigation of Flame Propagation Description in Quasi-Dimensional Spark Ignition Engine Modeling **(2018-01-1655)** Simon Malcher, Michael Bargende, Universitat Stuttgart; Michael Grill, FKFS; Ulrich Baretzky, Hartmut Diel, Sebastian Wohlgemuth, Gordon Röttger, Audi AG	Effects of Bio-Alcohol Fuel Blends on the Aging of Engine Lubricating Oil **(2018-01-1746)** Sascha Prehn, Christine Vogel, Bert Buchholz, University of Rostock	Improvement of Thermal Efficiency in a Diesel Engine with High-Pressure Split Main Injection **(2018-01-1791)** Naoto Horibe, Zhichao Bao, Tomoki Taguchi, Kenta Egoshi, Hiroshi Kawanabe, Takuji Ishiyama, Kyoto University	Holistic Development of Future Low NOx Emission Concepts for Heavy-Duty Applications **(2018-01-1700)** Hendrik Rauch, Reza Rezaei, Martin Weber, David Kovacs, Vadim Strots, Christoph Bertram, IAV GmbH
14:30	Statistical Study of Ring Geometry Effect on Piston Ring/Liner Tribology Using Classical Design of Experiment **(2018-01-1658)** Cristiana Delprete, Abbas Razavykia, DIMEAS, Politecnico di Torino, Italy	New GKI - Gasoline Knock Index for Rating of Fuels Knock Resistance on an Upgraded CFR Test Engine **(2018-01-1743)** Johann Hauber, Karl Huber, Technische Hochschule Ingolstadt; Robert Nell, ROFA - Laboratory and Process Analyzers	Optical Diagnostics of Inversed-Delta Rate Shaping Diesel Spray Flame towards Reduction of Late Combustion **(2018-01-1793)** Mohd Fareez Edzuan Bin Abdullah, Yoshiaki Toyama, Kazuhiro Takahara, Soshu Saruwatari, Shinobu Akiyama, Taizo Shimada, Tetsuya Aizawa, Meiji University	Deterioration Characteristic of Catalyzed DPF Applied on Diesel Truck Durable Ageing **(2018-01-1701)** Hua Zhou, Jilin University & CATARC; Hongwei Zhao, Jilin University; Zenghui Yin, Qian Feng, Maoxiang Zhou, Jingyuan Li, Kongjian Qin, Mengliang Li, CATARC
15:00	An Integrated Methodology for 0D Map-Based Powertrain Modelling Applied to a 48 V Mild-Hybrid Diesel Passenger Car **(2018-01-1659)** Giuseppe DiPierro, Federico Millo, Politecnico di Torino; Mauro Scassa, Alessandro Perazzo, FEV Italia	Characterization of Hydroprocessed Used Cooking Oils as High Cetane Number Blending Component for Automotive Diesel **(2018-01-1745)** Dimitrios Karonis, Iraklis Zahos Siagos, National Technical University of Athens; Stella Bezergianni, Centre for Research & Technology Hellas	Analyzing Factors Affecting Gross Indicated Efficiency When Inlet Temperature Is Changed **(2018-01-1780)** Nhut Lam, Per Tunestal, Lund University; Arne Andersson, Volvo Global Truck Tech Powertrain Eng.	The Use of Ozone in Low Temperature Methane Control for Natural Gas Applications **(2018-01-1702)** Matthew Keenan, Ricardo (UK); Jacques Nicole, Damodara Poojary, Ricardo Inc.
15:30	BREAK	BREAK	BREAK	BREAK
16:00	Predicting the Influences of Intake Port Geometry on the Tumble Generation and Turbulence Characteristics by Zero-Dimensional Spark Ignition Engine Model **(2018-01-1660)** Yirop Kim, Myoungsoo Kim, Joohan Kim, Han Ho Song, Seoul National University; Yeongseop Park, Donghee Han, Hyundai Motor Group	Diesel Fuel Improvers and Their Effect on Microbial Stability of Diesel/Biodiesel Blends **(2018-01-1751)** Chrysovalanti Tsesmeli, George S. Dodos, Fanourios Zannikos, National Technical University of Athens	Investigation of Late Stage Conventional Diesel Combustion - Effect of Additives **(2018-01-1787)** P.C. Bakker, Robbert Willems, Nico Dam, Bart Somers, Eindhoven University of Technology; Caroline Wakefield, Mark Brewer, Roger Cracknell, Shell Global Solutions (UK)	Advanced high temperature stable coated gasoline particulate filters for close-coupled applications **(Oral Only)** Jan Schoenhaber, Umicore AG & Co. KG; Naina Deibel, Joerg Michael Richter, Susanne Kunert, Carolin Braun, Umicore AG & Co KG
16:30	A Heat Transfer Model for Low Temperature Combustion Engines **(2018-01-1662)** Stijn Broekaert, Michel De Paepe, Sebastian Verhelst, Ghent University	An Optical Study on the Combustion of Gasoline/PODEn Blends in a Constant Volume Vessel **(2018-01-1748)** Yue Ma, Longxi Cui, Xiao Ma, Zhi Wang, Shi-Jin Shuai, Tsinghua University		
17:00	Simulation of Intake Manifold Water Injection in a Heavy Duty Natural Gas Engine for Performance and Emissions Enhancement **(2018-01-1653)** Zeqi Kang, Zhe Kang, Lang Jiang, Jun Deng, Zhijun Wu, Liguang Li, Tongji University; Heping Liang, Mingyu Shu, Y&C Engine Co., LTD.	Optimization of process of biodiesel produced via Acid catalysts using Sulfuric Acid, Hydrocloric acid and Nitric acid. **(Oral Only)** Shyamsing Vijaysing Thakur, D Y Patil COE Pune		
17:30	Numerical Investigation of Syngas Fueled HCCI Engine Using Stochastic Reactor Model with Detailed Kinetic Mechanism **(2018-01-1661)** Rakesh Kumar Maurya, Mohit Raj Saxena, Rahul Yadav, Akshay Rathore, Indian Institute of Technology Ropar			
	Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity The papers in this session are available in SAE Technical Paper Collection, SUB-TP-00008, and also individually. To purchase visit collections.sae.org	Planned by Fuels and Lubricants / Powertrain Fuels and Lubricants Activity	Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity	Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity

MONDAY, 17 SEPTEMBER

SESSION TITLE, DESCRIPTION, AND ROOM

TIME	Sebastian-Munster-Saal	Ballsaal
	Gasoline Engine Lubricants (FFL340) The main performance properties of engine oils include preventing wear and improving fuel efficiency. However, engine lubricants must also prevent corrosion, seal degradation and not degrade over time. Techniques to study and lubricant technologies to control these often overlooked performance properties of engine oils are constantly being improved. This session will discuss the latest advances in these areas. 13:30 - 18:00 Organizers: Richard T. Butcher, BP Castrol; Karl Dearn, Univ. of Birmingham Chairpersons: Richard T. Butcher, BP Castrol; Karl Dearn, Univ. of Birmingham	**Homogeneous Charge Compression Ignition, HCCI (FFL230)** 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 encouraged to be submitted into FFL110 or FFL120 modeling sessions 13:30 - 17:30 Organizers: Benjamin Lawler, Sotirios Mamalis, Stony Brook Univ.; Ezio Mancaruso, Istituto Motori CNR Chairpersons: Ezio Mancaruso, Istituto Motori CNR
13:30	Development of a Standardized Test to Evaluate the Effect of Gasoline Engine Oil on the Occurrence of Low Speed Pre-Ignition - The Sequence IX Test **(2018-01-1808)** Felt Mounce, Southwest Research Institute	Effects of Low Temperature Reforming (LTR) Products of Low Octane Number Fuels on HCCI Combustion **(2018-01-1682)** Chao Geng, Hai Feng Liu, Xinghui Fang, Zhi Yang, Yanqing Cui, Yu Wang, Lei Feng, Mingfa Yao, Tianjin University
14:00	Engine Accelerated Aging Method Developed to Study the Effect of Lubricant Formulations on Catalyzed Gasoline Particulate Filter Durability **(2018-01-1804)** Huifang Shao, Guillaume Carpentier, Danhua Yin, Yinhui Wang, Joesph Remias, Joseph Roos, Afton Chemical Corp.; Wenzheng Xia, Yi Zheng, Xinbo Yuan, Dongxia Yang, Xiaokun He, Kunming SPMC Co., Ltd.; Zenghui Yin, CATARC	Crank-Angle Resolved Exergy Analysis of Ethanol Fueled HCCI Engine Using Newly Reduced Ethanol Oxidation Mechanism **(2018-01-1683)** Rakesh Kumar Maurya, Parth Jaggi, Mohit Raj Saxena, Indian Institute of Technology-Ropar
14:30	Study of Interaction of N-Methyl Aniline Octane Booster on Lubricating Oil **(2018-01-1809)** Herve Marie, Esso SAF; Hans Peter Deeg, Harald Philipp, Porsche AG; Nicholas Marukos, Chengrong Wang, ExxonMobil Research & Engineering Co.	A Computational Study of Lean Limit Extension of Alcohol HCCI Engines **(2018-01-1679)** Qiyan Zhou, Shanghai Jiao Tong University; Mohammed Jaasim Mubarak Ali, Balaji Mohan, King Abdullah University of Science & Tech.; Xing-Cai Lu, Shanghai Jiao Tong University; Hong Im, King Abdullah University of Science & Tech.
15:00	Development of an On-Line System for Oil Void Fraction Measurements **(2018-01-1803)** Shinobu Makita, Yuji Ikeda, Imagineering Inc.	Numerical and Experimental Investigation of Ethyl Alcohol as Oxygenator on the Combustion, Performance, and Emission Characteristics of Diesel/Cotton Seed Oil Blends in Homogenous Charge Compression Ignition Engine **(2018-01-1680)** Medhat Elkelawy, Hagar Bastawissi, Tanta University; S. Chandra Sekar, K. Karuppasamy, Anna University; N. Vedaraman, CSIR-CLRI; Karuppiah Sathiyamoorthy, SRM IST; Ravishankar Sathyamurthy, Tanta University
15:30	BREAK	BREAK
16:00	High-Accuracy Viscosity-Temperature Model for Engine Simulation **(2018-01-1805)** John C. Bucknall, Castrol Ltd.	Combustion Behavior of n-Heptane, Isooctane, Toluene and Blends under HCCI Conditions in the Pressure-Temperature Diagram **(2018-01-1684)** Jean-Baptiste Masurier, Omar Altoaimi, Abdulrahman Mohammed, Muhammad Waqas, Bengt Johansson, King Abdullah University of Science & Tech.
16:30	Simulated Bearing Durability and Friction Reduction with Ultra-Low Viscosity Oils **(2018-01-1802)** Konstantinos Kalogiannis, MAHLE Engine Systems (UK) Ltd.; Priyanka Desai, Shell Global Solutions (US) Inc.; Omar Mian, MAHLE Engine Systems (UK) Ltd.; Robert Mainwaring, Shell Global Solutions (UK) Inc.	Blending Octane Number of 1-Butanol and Iso-Octane with Low Octane Fuels in HCCI Combustion Mode **(2018-01-1681)** Muhammad Umer Waqas, Abdulrahman Mohammed, Jean-Baptiste Masurier, Bengt Johansson, King Abdullah University of Science & Tech.
17:00	Prediction of Lubricant Performance in an EHL Valvetrain Simulation Using an Equation of State and Detailed Rheology Characterization Approach **(2018-01-1806)** Adnan Mahmood, BP Technology Centre; Oleg Nerushev, School of Chemistry, University of Edinburgh	Investigation of the Injection Strategy for PCCI Combustion Control Using the Ultrahigh Pressure Fuel Injection **(Oral Only)** Susumu Sato, Hiroki Nakazawa, Pop-Paul Ewphun, Hidenori Kosaka, Tokyo Institute of Technology
17:30	Auto-ignition Characteristics of Lubricant Droplets under Hot Co-Flow Atmosphere **(2018-01-1807)** Kaifeng Pan, Jun Deng, Yongquan Chen, Erbao Zhang, Wei Xie, Qiushi Qin, Zongju Qu, Liguang Li, Tongji University	
	Planned by Fuels and Lubricants / Powertrain Fuels and Lubricants Activity	Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity

TUESDAY, 18 SEPTEMBER

SESSION TITLE, DESCRIPTION, AND ROOM

TIME	Grosser Saal	Ballsaal	Kammermusiksaal	Sebastian-Munster-Saal
	Keynote: Staffan Lundgren, Volvo (FFLK2) 08:30 - 09:30 Keynote Speakers: Staffan H. Lundgren, Volvo Group	**Combustion Control and Optimization (FFL280)** 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. 10:00 - 12:00 Organizers: Adrian Irimescu, Istituto Motori CNR; Michael Clifford Kocsis, Southwest Research Institute Chairpersons: Michael Clifford Kocsis, Southwest Research Institute; Jose V. Pastor, Universitat Politecnica de Valencia	**Combustion in Compression Ignition Engines: Part 3 Oxygen and Additive Effects (FFL220)** Classical diesel engine combustion with relatively short ignition delay, including papers dealing with low CR and high EGR calibrations. 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 encouraged to be submitted into FFL110 or FFL120 modeling sessions. 10:00 - 13:00 Organizers: Stephen Busch, Sandia National Laboratories; Adam B. Dempsey, Caterpillar; Theodoros Zannis, Hellenic Naval Academy Chairpersons: Stephen Busch, Sandia National Laboratories; Theodoros Zannis, Hellenic Naval Academy	**Driveline Lubricants (FFL360)** In the industry there is continuing work on understanding the interaction of lubricating fluids with driveline hardware and on improving the fluids used in these applications. In this session are presented a variety of papers dealing with different applications where the interaction of driveline fluids with equipment is important. 10:00 - 12:00 Organizers: Jason Bares, BorgWarner Automotive; Timothy P. Newcomb, Lubrizol Corp.; Joe Remias, Afton Chemical Corp. Chairpersons: Jason Bares, BorgWarner Automotive; Timothy P. Newcomb, Lubrizol Corp.
10:00		A Physical-Based Approach for Modeling the Influence of Different Operating Parameters on the Dependency of External EGR Rate and Indicated Efficiency **(2018-01-1736)** Daniel Langmandel, Hannes Orlick, Daniel Haas, BMW AG; Hermann Rottengruber, Otto-Von-Guericke University Magdeburg; Franziska Riegger, TU Berlin	Natural Flame Luminosity and Emission Spectra of Diesel Spray Flame under Oxygen-Enriched Condition in an Optical Constant Volume Vessel **(2018-01-1781)** Yu Wang, Lei Feng, Chao Geng, Beiling Chen, Haifeng Liu, Mingfa Yao, Tianjin University	Establishing Long-Term Corrosion Protection in Modern Transmissions **(Oral Only)** Jason Bares, BorgWarner Inc.; Gregory Hunt, Lubrizol Limited; Christopher Prengaman, Lubrizol Corporation; Stefan Nicholson, Lubrizol Limited; Choong Fong Tang, BorgWarner Inc.; Josey Wicks, BorgWarner Inc
10:30		Evaluating Emissions in a Modern Compression Ignition Engine Using Multi-Dimensional PDF-Based Stochastic Simulations and Statistical Surrogate Generation **(2018-01-1739)** Jiawei Lai, Owen Parry, Sebastian Mosbach, Amit Bhave, CMCL Innovations; Viv Page, Caterpillar UK	Numerical Investigation on Effects of Oxygen-Enriched Air and Intake Air Humidification on Combustion and Emission Characteristics of Marine Diesel Engine **(2018-01-1788)** Changpu Zhao, Ke Wang, Sirui Huang, Tianjin University	Establishing Lubricant Electrical Conductivity Limits **(Oral Only)** Gregory Hunt, Lubrizol Corporation (The); Chris McFadden, Kieron Donnelly, Timothy P. Newcomb, Christopher Saxton, Lubrizol Corp.
11:00		Comparison of Primary Sensitive Reactions on Fuel Reactivity between Detailed and Skeletal Mechanisms of Gasoline Surrogate **(2018-01-1737)** Xiangzan Meng, Yi Meng, Hitachi (China) R&D Corporation	Performance and Exhaust Emissions Analysis of a Diesel Engine Using Oxygen-Enriched Air **(2018-01-1785)** Flavio Manenti, Politecnico di Milano; Massimo Milani, Luca Montorsi, Fabrizio Paltrinieri, Universita di Modena e Reggio Emilia; Carlo Pirola, Università di Milano; Carlo Alberto Rinaldini, Universita di Modena e Reggio Emilia	Farm Tractor Efficiency Gains through Next Generation Transmission Hydraulic Fluid Design **(Oral Only)** Michael Huston, Mark Dewey, Blayne McKenzie, Wayne Moore, Farrukh Qureshi, Elizabeth Schifer, Adam Stackpole, Robert Thelwall, The Lubrizol Corporation
11:30		Cognitive Model of the Internal Combustion Engine **(2018-01-1738)** Vladimir Vychuzhanin, Education & Technology Solutions Inc.; Nickolay Rudnichenko, Denys Shybaiev, Odessa Naitonal Maritime University; Igor Gritsuk, Kharkov National Auto and Highway University; Victor Boyko, Natalia Shybaieva, Andrii Golovan, Odessa Naitonal Maritime University; Victor Zaharchuk, Lutsk National Technical University; Ernest Rabinovich, Kharkov National Auto and Highway University; Volodymyr Savchuk, Kherson State Maritime Academy; Evgeny Zenkin E.Y., Kharkov National Auto and Highway University	Numerical Investigation on Effects of Combustion Chamber Structure and Oxygen Enriched Air on Combustion and Emission Characteristics of Marine Diesel Engine **(2018-01-1786)** Changpu Zhao, Sirui Huang, Ke Wang, Tianjin University	Super Low Viscosity ATF; AW-2 **(2018-01-1756)** Kohei Masuda, Hajime Nakao, Hitoshi Komatsubara, Osamu Kurosawa, JXTG Nippon Oil & Energy Corp.; Katsuhito Yamada, Kazunori Ishikawa, Atsushi Mori, Aisin AW Co.,Ltd.
12:00		Emission Reduction during Cold Start by Combustion Controlled Increase of In-Cylinder Temperatures **(2018-01-1740)** Fabian Titus, MOT GmbH; Peter Berlet, IAVF Antriebstechnik GmbH; Florian Sobek, Justus Wessling, MOT GmbH	Effect of Butanol Addition on Performance, Combustion Stability and Nano-Particle Emissions of a Conventional Diesel Engine **(2018-01-1795)** Mohit Raj Saxena, Rakesh Kumar Maurya, Indian Institute of Technology Ropar	
12:30			A Modeling Study on the Influence of Aromatic Fluorescence Tracers on Compression Ignition Engine Operation **(2018-01-1784)** Robert A. Schiessl, Jörg Sommerer, ITT/KIT	
		Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity	Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity	Planned by Fuels and Lubricants / Powertrain Fuels and Lubricants Activity 10

TUESDAY, 18 SEPTEMBER

SESSION TITLE, DESCRIPTION, AND ROOM

TIME	Trubner Saal	Rob.Schumann-Zimmer	Gustav-Mahler-Zimmer
	Emissions Control Modeling (FFL430) Papers cover exhaust aftertreatment system models, as well as their validation and application. Technologies encompassed include DOC, HC Trap, DPF, GPF, LNT, TWC, SCR, SCRF, ammonia oxidation catalysts, hybrid or combined catalysts, urea-water solution spray dynamics, and mixture non-uniformity. Modeling aspects range from fundamental, 3D models of individual components to system level simulation, optimization, variation, degradation, and control. 10:00 - 12:30 Organizers: Jian Gong, Thomas McKinley, Cummins Inc.; Andrea Strzelec, Mississippi State Univ. Chairpersons: Mert Zorlu, Cummins Inc.	**Hybrids, EV Powertrains, Fuel Cell and Electric (Part 2 of 2) (FFL780)** 10:00 - 12:00 Organizers: Chaitanya D. Ghodke, Convergent Science Inc.; Sergey Gladyshev, Univ. of Michigan-Dearborn; Michael Clifford Kocsis, Southwest Research Institute; James Miller, Argonne National Laboratory; Darrell Robinette, Michigan Technological Univ.; Matthew P. Thiel, Affiliated Construction Services Chairpersons: Vickey B. Kalaskar, Southwest Research Institute	**Multi-Dimensional Engine Modeling: Part 1 (FFL120)** The session covers advances in the development and application of models and tools involved in multi-dimensional engine modeling: 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. 10:00 - 12:30 Organizers: Stefano Fontanesi, Universita di Modena e Reggio Emilia; Chaitanya D. Ghodke, Convergent Science Inc.; Max Magar, Mot GmbH Chairpersons: Morten Kronstedt, APL Automobil-Pruftechnik Landau GmbH; Cecile Pera,Convergent Science Inc.
10:00	Application of Genetic Algorithm for the Calibration of the Kinetic Scheme of a Diesel Oxidation Catalyst Model **(2018-01-1762)** Federico Millo, Mahsa Rafigh, Francesco Sapio, Politecnico di Torino; Eduardo J. Barrientos, Paolo Ferreri, GM Global Propulsion Systems	Effects of Clamping Force on the Operating Behavior of PEM Fuel Cell **(2018-01-1718)** Rouxian Chen, Yanzhou Qin, Qing Du, Jun Peng, Tianjin University	Quantitative Optical Analysis and Modelling of Short Circuits and Blow-Outs of Spark Channels under High-Velocity Flow Conditions **(2018-01-1728)** Shogo Sayama, Masao Kinoshita, Yoshiyuki Mandokoro, Ryo Masuda, Takayuki Fuyuto, Toyota Central R&D Labs., Inc.
10:30	Kinetic Measurements of HNCO Hydrolysis over SCR Catalyst **(2018-01-1764)** Masahiro Matsuoka, Ibaraki University; Takaaki Kitamura, Japan Automobile Research Institute; Akira Obuchi, AIST; Jun Tsuchida, Kotaro Tanaka, Mitsuru Konno, Ibaraki University	AVL Fuel Cell Engineering Solutions **(Oral Only)** Farzaneh Moradi, Juergen Rechberger, AVL LIST GmbH	Application of Models of Short Circuits and Blow-Outs of Spark Channels under High-Velocity Flow Conditions to Spark Ignition Simulation **(2018-01-1727)** Ryo Masuda, Shogo Sayama, Takayuki Fuyuto, Makoto Nagaoka, Toyota Central R&D Labs., Inc.; Akimitsu Sugiura, DENSO Corp.; Yasushi Noguchi, Toyota Motor Corp.
11:00	Development of Model Predictive Control Strategy of SCR System for Heavy-Duty Diesel Engines with a One-State Control- Oriented SCR Model **(2018-01-1763)** Guoyang Wang, Shandong University; Hafiz Liaqat Ali, Jun Zhang, Jinzhu Qi, Yang Liu, Shiyu Liu, Kaiyuan Cai, Shi-Jin Shuai, Tsinghua University; Zhiming Wang, Shandong University	Structural Integrity of In-Wheel Motors **(2018-01-1829)** Matic Frajnkovic, Senad Omerovic, Uros Rozic, Jurij Kern, Raphael Connes, Kristof Rener, Matej Biek, Elaphe Propulsion Technologies, Ltd.	Modeling the Pilot Injection and the Ignition Process of a Dual Fuel Injector with Experimental Data from a Combustion Chamber Using Detailed Reaction Kinetics **(2018-01-1724)** Jens Frühhaber, Technische Universität Wien; Andreas Peter, University of Erlangen- Nuremberg; Sebastian Schuh, Thomas Lauer, Technische Universität Wien; Michael Wensing, University of Erlangen-Nuremberg; Franz Winter, Technische Universität Wien; Peter Priesching, Klaus Pachler, AVL
11:30	0D Modeling of Real-Driving NOx Emissions for a Diesel Passenger Vehicle **(2018-01-1761)** Sangmyeong Kim, Tatsuya Kuboyama, Yasuo Moriyoshi, Chiba University; Hisakazu Suzuki, National Traffic Safety & Enviro Lab.	Line Voltage Control of Induction Motor for Increase Its Efficiency in Stable Area **(2018-01-1830)** Sergey Gladyshev, University of Michigan- Dearborn; Nikolai Gladychev, University College Dublin; Valentina Goun, Alexey Bakin, South Ural State University	Effect of Water Injection and Spatial Distribution on Combustion, Emission and Performance of GDI Engine-A CFD Analysis **(2018-01-1725)** Ankit Ashokrao Raut, J M Mallikarjuna, Indian Institute of Technology- Madras
12:00	Numerical Analysis on the Potential of Reducing DPF Size Using Low Ash Lubricant Oil **(2018-01-1760)** Jun Zhang, Tsinghua University; Jinzhu Qi, Yantai University; Shi-Jin Shuai, Lei Wang, Shiyu Liu, Guoyang Wang, Tsinghua University; Fan Liu, Shell Commercial Fuels and Lubricants; Jason Brown, Shell Global Solutions (US) Inc.		Simulation of the Effect of Intake Pressure and Split Injection on Lean Combustion Characteristics of a Poppet-Valve Two- Stroke Direct Injection Gasoline Engine at High Loads **(2018-01-1723)** Xiao Li, Bang-Quan He, Tianjin University; Hua Zhao, Brunel University; Yan Zhang, Yufeng Li, Honglin Bai, China North Engine Research Institute
	Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity	Planned by Hybrid and Electric Powertrains Committee / Powertrain Fuels and Lubricants Activity	Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity

TUESDAY, 18 SEPTEMBER

SESSION TITLE, DESCRIPTION, AND ROOM

TIME	Kammermusiksaal	Ballsaal	Trubner Saal	Sebastian-Munster-Saal
	Abnormal Combustion: Knock (FFL212) This session focuses the abnormal SI combustion process commonly referred to as knock or spark knock. 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. 13:30 - 17:00 Organizers: Vincent S. Costanzo, Aramco Research Center; Alessandro D'Adamo, Universita di Modena e Reggio Emilia; Brian C. Kaul, Oak Ridge National Laboratory; Max Magar, Mot GmbH; Luca Marchitto, Simona Silvia Merola, Istituto Motori CNR; James W G Turner, University Of Bath Chairpersons: Richard S. Davis, General Motors; Max Magar, Mot GmbH	**Dual Fuel Combustion (FFL260)** 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 FFL110 or FFL120 modeling sessions. 13:30 - 17:00 Organizers: Antonio Garcia, Universitat Politecnica de Valencia; Andrew Ickes, Chevron; Benjamin Lawler, Stony Brook Univ.; Soheil Zeraati Rezaei, Univ. of Birmingham Chairpersons: Antonio Garcia, Universitat Politecnica de Valencia; Soheil Zeraati Rezaei, Univ. of Birmingham	**Emissions Measurement and Testing: Part 1 (FFL440)** 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. 13:30 - 16:30 Organizers: Krishna Kamasamudram, Cummins Inc.; Andrea Strzelec, Mississippi State Univ. Chairpersons: E. Robert Fanick, Imad A. Khalek, Southwest Research Institute; Mert Zorlu, Cummins Inc.	**Fuel & Additive Effects on Engine Systems (FFL310)** 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. Papers focusing primarily on engine combustion but with fuel and additive content may belong in a FFL200 session. 13:30 - 15:00 Organizers: Barbara Goodrich, John Deere Product Engineering Center; Andrew Ickes, Chevron; Antonino La Rocca, University of Nottingham Chairpersons: Barbara Goodrich, John Deere Product Engineering Center; Michael Clifford Kocsis, Southwest Research Institute
13:30	Distribution of Knock Frequencies in Modern Engines Compared to Historical Data **(2018-01-1666)** Vikram Mittal, US Military Academy	Dual Fuel Injection (DI + PFI) for Knock and EGR Dilution Limit Extension in a Boosted SI Engine **(2018-01-1735)** Taehoon Han, George Lavoie, Margaret Wooldridge, André Boehman, University of Michigan	Real-world emissions performance of commercial vehicles, NRMM and passenger cars following independent tests. Are ICE's becoming clean enough, quick enough considering both CO2 and NOx?	Critical Analysis of PM Index and Other Fuel Indices: Impact of Gasoline Fuel Volatility and Chemical Composition **(2018-01-1741)** Arij Ben Amara, Toni Tahtouh, Elisabeth Ubrich, Laurie Starck, IFP Energies Nouvelles, Institut Carnot IFPEN TE; Hidenori Moriya, Yutaka Ilda, Nagata KOJI, Toyota Motor Corp.
14:00	The Fuel Economy Improvement through the Knock Margin Expansion in a Turbocharged Gasoline Direct Injection Engine **(2018-01-1671)** Ji Yong Shin, Chansoo Park, Jinyoung Jung, Choongsik Bae, Korea Advanced Inst. of Science & Tech.	POMDME as an Alternative Pilot Fuel for Dual-Fuel Engines: Optical Study in a RCEM and Application in an Automotive Size Dual-Fuel Diesel Engine **(2018-01-1734)** Ale Srna, Paul Scherrer Institute; Christophe Barro, ETH Zurich; Kai Herrmann, FHNW University of Applied Sciences; Fabio Möri, Richard Hutter, Konstantinos Boulouchos, ETH Zurich	Effects of Environmental Parameters on Real-World NOx Emissions and Fuel Consumption for Heavy-Duty Diesel Trucks Using an OBD Approach **(2018-01-1817)** Hua Zhou, Jilin University & CATARC; Hongwei Zhao, Jilin University; Qian Feng, Zenghui Yin, Jingyuan Li, Kongjian Qin, Mengliang Li, Lijuan Cao, CATARC	Understanding the Adverse Effects of Inlet Valve Deposits on SI Engine Operation, through a Novel Technique to Create Surrogate Deposits **(2018-01-1742)** Andreas F. G. Glawar, Shell Global Solutions (US) Inc.; Pauline R. Ziman, Shell Global Solutions (UK); Kaihua Wu, Shell (Shanghai) Technology Ltd.; Vinod Natarajan, Shell Global Solutions (US) Inc.; Eike J. Wolgast, Carolin Dankers, Shell Global Solutions (Deutschland) GmbH; Adrian P. Groves, Shell Global Solutions (UK)
14:30	Combustion Characteristics of PRF and TSF Ethanol Blends with RON 98 in an Instrumented CFR Engine **(2018-01-1672)** Alexander Hoth, Christopher P. Kolodziej, Toby Rockstroh, Thomas Wallner, Argonne National Laboratory	Evaluating the Efficiency of a Conventional Diesel Oxidation Catalyst for Dual-Fuel RCCI Diesel-Gasoline Combustion **(2018-01-1729)** Jesus Benajes, Antonio Garcia, Javier Monsalve-Serrano, Rafael Sari, Universitat Politecnica de Valencia	Real Driving NOx Emissions from Euro VI Diesel Buses **(2018-01-1815)** Petri Söderena, Nils-Olof Nylund, Rasmus Pettinen, VTT Technical Research Center of Finland; Reijo Mäkinen, Helsinki Region Transport	Deleterious materials in marine fuels: A study on the occurrence and the effects on marine engines **(Oral Only)** Sophia Themelarou, Lloyd's Register of Shipping
15:00	Effects of EGR Constituents and Fuel Composition on DISI Engine Knock: An Experimental and Modeling Study **(2018-01-1677)** David Vuilleumier, Namho Kim, Magnus Sjöberg, Sandia National Laboratories; Nozomi Yokoo, Terutoshi Tomoda, Koichi Nakata, Toyota Motor Corp.	Effects of Hot and Cooled EGR for HC Reduction in a Dual-Fuel Premixed Charge Compression Ignition Engine **(2018-01-1730)** Eui joon Shim, Hyunwook Park, Choongsik Bae, Korea Advanced Inst. of Science & Tech.	Feasibility of Virtual Environments to Develop Future Driving Cycles **(2018-01-1816)** Peter Kay, University of the West of England	
15:30	BREAK	BREAK	BREAK	BREAK
16:00	Effectiveness of Fuel Enrichment on Knock Suppression in a Gasoline Spark-Ignited Engine **(2018-01-1665)** Eshan Singh, Robert Dibble, King Abdullah University of Science & Tech.	Cylinder Selective Combustion, the New Diesel Dual Fuel Combustion Control Concept for Low Load Operating Condition **(2018-01-1733)** Krisada Wannatong, Thananchai Tepimonrat, Sompach Kongviwattanakul, PTT Public Company Limited	Impact of Demanding Low Temperature Urban Operation on the Real Driving Emissions Performance of Three European Diesel Passenger Cars **(2018-01-1819)** Rod Williams, Shell Global Solutions (UK); Jon Andersson, Ricardo Consulting Engineers Ltd. (UK); Heather Hamje, Concawe, Belgium; Pauline Ziman, Shell Global Solutions (UK); Kenneth Kar, ExxonMobil Research and Engineering (USA); Corrado Fittavolini, Leonardo Pellegrini, Eni SpA, Italy; Garry Gunther, Phillips 66, USA; Fermin Oliva, Repsol, Spain; Paul Van de Heijning, Kuwait Petroleum Res. & Tech. (Netherlands)	
16:30	Experimental and Numerical Investigation of the AFIDA Constant Volume Combustion Chamber for Characterizing Gasoline Range Fuel Ignition Kinetics **(Oral Only)** Jon Luecke, Mohammad Rahimi, Bradley Thomas Zigler, National Renewable Energy Laboratory	Effect of Diesel Injection Timing on Peak Pressure Rise Rate and Combustion Stability in RCCI Engine **(2018-01-1731)** Mohit Raj Saxena, Rakesh Kumar Maurya, Indian Institute of Technology Ropar		
	Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity	Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity The papers in this session are available in SAE Technical Paper Collection, SUB-TP-00009, and also individually. To purchase visit collections.sae.org	Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity	Planned by Fuels and Lubricants / Powertrain Fuels and Lubricants Activity

TUESDAY, 18 SEPTEMBER

SESSION TITLE, DESCRIPTION, AND ROOM

TIME	Gustav-Mahler-Zimmer	Rob.Schumann-Zimmer	Rob.Schumann-Zimmer	Sebastian-Munster-Saal
	Multi-Dimensional Engine Modeling: Part 2 (FFL120) The session covers advances in the development and application of models and tools involved in multi-dimensional engine modeling: 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. 13:30 - 16:30 Organizers: Stefano Fontanesi, Universita di Modena e Reggio Emilia; Chaitanya D. Ghodke, Convergent Science Inc.; Max Magar, Mot GmbH Chairpersons: Morten Kronstedt, APL Automobil-Pruftechnik Landau GmbH; Cecile Pera, Convergent Science Inc.	**Particle Emissions from Combustion Sources (FFL450)** Papers are invited for this session on particle emissions from combustion engines, including measurement and testing methods, and the effects of changes in fuel composition. Papers are also invited on the topics of the environmental and health effects of elemental carbon and organic carbon that constitutes solid cored particles plus the environmental and health effects of secondary organic aerosol emissions. This includes particulate emissions from both gasoline and diesel engines. 13:30 - 15:30 Organizers: Jose M. Herreros, Univ. of Birmingham; Imad A. Khalek, Southwest Research Institute; Antonino La Rocca, University of Nottingham; Andrea Strzelec, Mississippi State Univ. Chairpersons: Elana Chapman, General Motors; Jose M. Herreros, Univ. of Birmingham; Imad A. Khalek, Southwest Research Institute	**Gaseous Engine Emissions (FFL460)** Papers to address well-to-wheels CO2 production for alternative technologies, fuel economy and all greenhouse gas emission research with their primary focus on engine, emissions, fuels, control or related components or sub-components. This includes hydrocarbon species and specific NOx species production over aftertreatment devices. 16:00 - 17:00 Organizers: Kirby Baumgard, John Deere Power Systems; Ulrich Spicher; Andrea Strzelec, Mississippi State Univ.; Amin Velji, Karlsruhe Institute Of Technology Chairpersons: Elana Chapman, General Motors; Jose M. Herreros, Univ. of Birmingham; Imad A. Khalek, Southwest Research Institute	**Holistic Session on Fuel Consumption and Fuel Economy (FFL370)** The focus of this session is the performance of integrated vehicle systems and the influence of driving styles and drive cycles on fuel consumption/economy. This will include how integration of vehicle components such as the powertrain, parasitics, accessories, mass elements, aerodynamics, tires, brakes, and hubs affect the overall vehicle energy and energy conversion efficiency. 16:00 - 17:00 Organizers: Michael Clifford Kocsis, Southwest Research Institute; Benjamin Lawler, Stony Brook Univ. Chairpersons: Barbara Goodrich, John Deere Product Engineering Center; Michael Clifford Kocsis, Southwest Research Institute
13:30	Detonation Peninsula for TRF-Air Mixtures: Assessment for the Analysis of Auto-Ignition Events in Spark-Ignition Engines **(2018-01-1721)** Ahmed Guerouani, Anthony Robert, Jean-Marc Zaccardi, IFP Energies Nouvelles	Effect of Lubricant Oil on Particle Emissions from a Gasoline Direct Injection Light-Duty Vehicle **(2018-01-1708)** Vinay Premnath, Imad Khalek, Peter Morgan, Southwest Research Institute; Alexander Michlberger, Mike Sutton, Paul Vincent, The Lubrizol Corp.		
14:00	Probabilistic Approach to Predict Abnormal Combustion in Spark Ignition Engines **(2018-01-1722)** Mohammed Jaasim Mubarak Ali, Minh Bau Luong, Aliou Sow, Francisco Hernandez Perez, Hong Im, King Abdullah University of Science & Tech.	A Review of the Requirements for Injection Systems and the Effects of Fuel Quality on Particulate Emissions from GDI Engines **(2018-01-1710)** Felix Leach, University of Oxford; Tobias Knorsch, Christoph Laidig, Wolfram Wiese, Robert Bosch GmbH		
14:30	Comparing Large Eddy Simulation of a Reacting Fuel Spray with Measured Quantitative Flame Parameters **(2018-01-1720)** Tamara Ottenwaelder, Stefan Pischinger, RWTH Aachen University	Particle Emissions from Gasoline Engines During Engine Start-Up (Cranking) **(Oral Only)** Imad A. Khalek, Southwest Research Institute		
15:00	Heat Loss Analysis for Various Piston Geometries in a Heavy-Duty Methanol PPC Engine **(2018-01-1726)** Mateusz Pucilowski, Mehdi Jangi, Sam Shamun, Martin Tuner, Xue-Song Bai, Lund University	Effect of Fuel Injection Strategy on Nano-Particle Emissions from RCCI Engine **(2018-01-1709)** Mohit Raj Saxena, Rakesh Kumar Maurya, Indian Institute of Technology Ropar		
15:30	BREAK	BREAK	BREAK	BREAK
16:00	High Pressure Fuel Injection Spray Formation: The Effect of Nozzle Geometry and Flow Vortex Dynamics **(Oral Only)** Junmei Shi, DELPHI Automotive Systems Luxembourg SA		Novel Rankine Cycle for Hybrid Vehicles **(2018-01-1711)** Ivica Kraljevic, Theo Gottwald, Fraunhofer ICT; Ulrich Spicher, KIT retired	Evaluation of Engine Programming to Reduce Fuel Consumption **(2018-01-1757)** Marius-Dorin Surcel, Adime Kofi Bonsi, FPInnovations
16:30			Potential of advanced combustion for fuel consumption and emission reduction in the light-duty fleet **(Oral Only)** Paul C. Miles, Sandia National Laboratories	The Choice of a Rational Type of Fuel for Technological Vehicles **(2018-01-1759)** Victor Zaharchuk, Lutsk National Technical University; Igor V. Gritsuk, Kharkov National Auto and Highway University; Oleg Zaharchuk, Lutsk National Technical University; Andrii Golovan, Odessa Naitonal Maritime University; Sergey Korobka, Lviv National Agrarian University; Larisa Pylypiuk, Lutsk National Technical University; Nickolay Rudnichenko, Odessa Naitonal Maritime University
	Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity	Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity	Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity	Planned by Fuels and Lubricants / Powertrain Fuels and Lubricants Activity

WEDNESDAY, 19 SEPTEMBER

SESSION TITLE, DESCRIPTION, AND ROOM

TIME	Grosser Saal	Kammermusiksaal	Gustav-Mahler-Zimmer	Trubner Saal
	Keynote: Markus Scherer, BASF (FFLK1) 08:30 - 09:30 Keynote Speakers: Markus Scherer, BASF SE	**Abnormal Combustion: Preignition / SPI / LSPI (FFL211)** This session focuses on abnormal SI combustion processes with a focus on preignition, including low-speed, stochastic preignition. 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. 10:00 - 12:30 Organizers: Vincent S. Costanzo, Aramco Research Center; Alessandro D'Adamo, Universita di Modena e Reggio Emilia; Brian C. Kaul, Oak Ridge National Laboratory; Max Magar, Mot GmbH; Luca Marchitto, Simona Silvia Merola, Istituto Motori CNR; James W G Turner, University Of Bath Chairpersons: Richard S. Davis, General Motors; Max Magar, Mot GmbH	**Diagnostic Development (FFL150)** This session focuses on engine combustion and flow diagnostic development and demonstration. Examples of diagnostics of interest include, but are not limited to: LIF, PLIF, absorption/emission spectroscopy, ion probes, pressure sensors, and extractive and exhaust gas composition sensors. 10:00 - 12:30 Organizers: Dennis Craggs, FCA US LLC; Matthew P. Thiel, Affiliated Construction Services Chairpersons: Christian V. Beidl, VKM TU Darmstadt	**Emissions Measurement and Testing: Part 2 (FFL440)** 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. 10:00 - 11:30 Organizers: Krishna Kamasamudram, Cummins Inc.; Andrea Strzelec, Mississippi State Univ. Chairpersons: E. Robert Fanick, Imad A. Khalek, Southwest Research Institute; Mert Zorlu, Cummins Inc.
10:00		On-Road Monitoring of Low Speed Pre-Ignition **(2018-01-1676)** Alexander Michlberger, Mike Sutton, The Lubrizol Corp.; Michael Kocsis, Garrett Anderson, Adam Van Horn, Southwest Research Institute	Evaluation of the Powertrain Condition Based on the Car Acceleration and Coasting Data **(2018-01-1771)** Ernest Rabinovich, Igor V. Gritsuk, Vladimir Zuiev, Evgeny Zenkin E.Y., Kharkiv National Auto and Highway University; Andrii Golovan, Odessa National Maritime University; Yuriy Zybtsev, Vladimir Volkov, Kharkiv National Auto and Highway University; Juraj Gerlici, Kateryna Kravchenko, University of Zilina; Olena Volska, Donbass State Engineering Academy; Nickolay Rudnichenko, Odessa National Maritime University	Investigation of Oil Sources in the Combustion Chamber of Direct Injection Gasoline Engines **(2018-01-1811)** Marcus Gohl, APL Automobil-Pruftechnik Landau GmbH; Gerhard Matz, Ann-Christin Preuss, Inst. of Analytical Measurement Hamburg; Stefan Pischinger, Marco Günther, Thomas Ebert, VKA RWTH Aachen University
10:30		Effect of Mixture Formation and Injection Strategies on Stochastic Pre-Ignition **(2018-01-1678)** Eshan Singh, Mohammed Jaasim Mubarak Ali, Adrian Ichim, King Abdullah University of Science & Tech.; Kai Morganti, Saudi Aramco; Robert Dibble, King Abdullah University of Science & Tech.	Software Reliability Growth Modeling: Comparison between Non-Linear-Regression Estimation and Maximum-Likelihood-Estimator Procedures **(2018-01-1772)** Shreya Krishna, Cucek-Cochin University of Science and Tech.; N. K. Goyal, Indian Institute of Technology- Kharagpur; Shikhar Dhar, University of Illinois at Urbana-Champaign	Polycyclic Aromatic Hydrocarbons in Diesel Engine Exhaust Both with and without Aftertreatment **(2018-01-1812)** E. Robert Fanick, Svitlana Kroll, Southwest Research Institute
11:00		Combined Fuel and Lubricant Effects on Low Speed Pre-Ignition **(2018-01-1669)** Michael Clifford Kocsis, Thomas Briggs, Garrett Anderson, Southwest Research Institute	The Complex Application of Monitoring and Express Diagnosing for Searching Failures on Common Rail System Units **(2018-01-1773)** Igor V. Gritsuk, Evgeny Zenkin E.Y., Kharkov National Auto and Highway University; Nickolay Bulgakov, Kherson State Maritime Academy; Andrii Golovan, Odessa National Maritime University; Ivan Kuric, University of Zilina; Vasyl Mateichyk, National Transport University; Milan Saga, University of Zilina; Vladimir Vychuzhanin, Education & Technology Solutions Inc.; Roman Symonenko, State Road Transport Research Institute; Ernest Rabinovich, Viacheslav Pavlenko, Kharkov National Auto and Highway University; Dmytro Pohorletskyi, Kherson State Maritime Academy	The Effect of Cerium Oxide Nano Particles Fuel Additive on Performance and Emission of Karanja Biodiesel Fueled Compression Ignition Military 585kW Heavy Duty Diesel Engine **(2018-01-1818)** Anand Kumar Pandey, Symbiosis Institute of Technology; Milankumar Nandgaonkar, College of Engineering Pune; Umang Pandey, SRM Institute of Technology-Chennai; S Suresh, CVRDE, DRDO, Chennai; Anil Varghese, Army Base Workshop- Pune
11:30		Impact of Engine Age and Engine Hardware on Low-Speed Pre-Ignition **(2018-01-1663)** Vickey B. Kalaskar, Andre Swarts, Terrence Alger, Southwest Research Institute	Improving the Process of Vehicle Units Diagnosis by Applying Harmonic Analysis to the Processing of Discrete Signals **(2018-01-1774)** Andrii Golovan, Sergey Rudenko, Odessa National Maritime University; Igor Gritsuk, Kharkov National Auto and Highway University; Anatoliy Shakhov, Odessa National Maritime University; Vladimir Vychuzhanin, Education & Technology Solutions Inc.; Vasyl Mateichyk, Rzeszow University of Technology; Olga Kononova, Odessa National Maritime University; Ivan Kuric, Milan Saga, University of Zilina; Evgeny Zenkin E.Y., Kharkov National Auto and Highway University	
12:00		The Effect of Pressure, Temperature and Additives on Droplet Ignition of Lubricant Oil and Its Surrogate **(2018-01-1673)** Sumit Maharjan, King Abdullah University of Science & Tech.; Yasser Qahtani, Saudi Aramco, Research and Development; William Roberts, Ayman Elbaz, King Abdullah University of Science & Tech.	Design Features of Optically Accessible Engines for Flow and Combustion Studies - A Review **(2018-01-1775)** Mayank Mittal, Indian Institute of Technology- Madras; Pramod Mehta, Indian Institute of Technology Palakkad	
		Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity	Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity	Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity

WEDNESDAY, 19 SEPTEMBER

SESSION TITLE, DESCRIPTION, AND ROOM

TIME	Sebastian-Munster-Saal	Rob.Schumann-Zimmer	Ballsaal	Rob.Schumann-Zimmer
	Fuel Injection and Sprays: Part 1 (FFL320) 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 both gasoline and diesel fuel sprays and fuel injection equipment are encouraged. 10:00 - 12:00 Organizers: Gerald Micklow, Florida Institute of Technology; Tarek M. Abdel-Salam, East Carolina University; Alessandro Montanaro, Istituto Motori CNR; Chaitanya D. Ghodke, Convergent Science Inc.; LU Qiu, Cummins Inc. Chairpersons: Tarek M. Abdel-Salam, East Carolina University; Luigi Allocca, Istituto Motori CNR	**New CI and SI Engines and Components (FFL510)** 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. 10:00 - 11:00 Organizers: Cinzia Tornatore, Istituto Motori CNR Chairpersons: Michael Bargende, Universitat Stuttgart	**Partially Premixed Combustion, PPC (FFL250)** Mixed mode with auto ignition but inhomogeneous charge. Injection-controlled but with EOI before SOC. Papers describing experiments and test data, simulation results focused on applications, fuel/additive effects, combustion control, and PPC injection strategies 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 FFL110 or FFL120 modeling sessions. 10:00 - 12:00 Organizers: Antonio Garcia, Universitat Politecnica de Valencia; Bengt Johansson, King Abdullah Univ. of Science & Tech.; Amin Velji; Yu Zhang, Aramco Research Center Chairpersons: Antonio Garcia, Universitat Politecnica de Valencia; Bengt Johansson, King Abdullah Univ. of Science & Tech.	**Engine Boosting Systems (FFL520)** This session will cover conceptual, modeling and experimental studies relating to advanced turbochargers/superchargers and advanced boosting systems to achieve increased power density, better fuel economy, and reduced emissions. 11:30 - 12:00 Organizers: Wei Chen, BorgWarner Inc.; Liangjun Hu, Ford Motor Company; LU Qiu, Cummins Inc. Chairpersons: Michael Bargende, Universitat Stuttgart
10:00	Outwardly Opening Hollow-Cone Diesel Spray Characterization under Different Ambient Conditions **(2018-01-1694)** Alessandro Montanaro, Luigi Allocca, Carlo Beatrice, Istituto Motori CNR; Roberto Ianniello, Università di Cassino	Investigation of a Cylinder Activation Concept for a Turbocharged Direct-Injection Gasoline Engine **(2018-01-1713)** Anton Schurr, Michael Guenthner, Rudolf Flierl, David Woike, Florian Mueller, University of Kaiserslautern (TUK)	Compression Ignition of Low Octane Gasoline under Partially Premixed Combustion Mode **(2018-01-1797)** Yanzhao An, Mohammed Jaasim Mubarak Ali, R Vallinayagam, Abdullah AlRamadan, King Abdullah University of Science & Tech.; Jaeheon Sim, Junseok Chang, Saudi Aramco; Hong Im, Bengt Johansson, King Abdullah University of Science & Tech.	
10:30	Assessment of the New Features of a Prototype High-Pressure Hollow Cone Spray Diesel Injector by Means of Engine Performance Characterization and Spray Visualization **(2018-01-1697)** Luigi Sequino, Giacomo Belgiorno, Gabriele Di Blasio, Ezio Mancaruso, Carlo Beatrice, Bianca Maria Vaglieco, Istituto Motori CNR	Achates Power Opposed Piston Engine: Enabling the future of high efficiency and low emissions with gasoline compression ignition **(Oral Only)** Ashwin Salvi, Gerhard Regner, Reed Hanson, Fabien Redon, Achates Power Inc.	Effects of Different Injection Strategies and EGR on Partially Premixed Combustion **(2018-01-1798)** Jinlin Han, Shuli Wang, Bart Somers, Eindhoven University of Technology	
11:00	Heavy-Duty Diesel Engine Spray Combustion Processes: Experiments and Numerical Simulations **(2018-01-1689)** Noud Maes, Nico Dam, Bart Somers, Eindhoven University of Technology; Tommaso Lucchini, Gianluca D'Errico, Politecnico di Milano; Gilles Hardy, FPT Motorenforschung AG		Effect of Temperature-Pressure Time History on Auto-Ignition Delay of Air-Fuel Mixture **(2018-01-1799)** Katsuya Matsuura, Honda R&D; Norimasa Iida, Keio University	
11:30	Effects of Injection Rate Profiles on Auto-Ignition in Ignition Quality Tester **(2018-01-1695)** Yueqi Luo, Shanghai Jiao Tong University; Mohammed Jaasim Mubarak Ali, King Abdullah University of Science & Tech.; Zhen Huang, Shanghai Jiao Tong University; Hong Im, King Abdullah University of Science & Tech.		Effect of Piston Geometry on Stratification Formation in the Transition from HCCI to PPC **(2018-01-1800)** Changle Li, Lund University; Leilei Xu, Lund University, Shanghai Jiao Tong University; Xue-Song Bai, Per Tunestal, Martin Tuner, Lund University	Effective Suppression of Surge Instabilities in Turbocharger Compression Systems through a Close-Coupled Compressor Inlet Restriction **(2018-01-1714)** Rick Dehner, Ahmet Selamet, Ohio State University; Keith Miazgowicz, Ford Motor Company
	Planned by Fuels and Lubricants / Powertrain Fuels and Lubricants Activity The papers in this session are available in SAE Technical Paper Collection, SUB-TP-00009, and also individually. To purchase visit collections.sae.org	Planned by New Engines, Components, Actuators and Sensors / Powertrain Fuels and Lubricants Activity	Planned by Engine Combustion / Powertrain Fuels and Lubricants Activi	Planned by New Engines, Components, Actuators and Sensors / Powertrain Fuels and Lubricants Activity

WEDNESDAY, 19 SEPTEMBER

SESSION TITLE, DESCRIPTION, AND ROOM

TIME	Gustav-Mahler-Zimmer	Trubner Saal	Sebastian-Munster-Saal	Kammermusiksaal
	Control System Design and Calibration (FFL130) Session covers control, calibration, and system-level optimization related to achieving stringent market fuel economy, emissions, performance, reliability, and quality demands. Topics include the control, calibration, and diagnostics of the engine, drivetrain, and supporting electromechanical subsystems related to energy management in conventional and hybrid operation, considering the simultaneous optimization of hardware design parameters and control software calibration parameters. 13:30 - 14:30 Organizers: John Shutty, BorgWarner Automotive; Guoming G. Zhu, Michigan State University Chairpersons: Guoming G. Zhu, Michigan State University	**Emissions Measurement and Testing: Part 3 (FFL440)** 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. 13:30 - 16:30 Organizers: Krishna Kamasamudram, Cummins Inc.; Andrea Strzelec, Mississippi State Univ. Chairpersons: E. Robert Fanick, Imad A. Khalek, Southwest Research Institute; Mert Zorlu, Cummins Inc.	**Fuel Injection and Sprays: Part 2 (FFL320)** 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 both gasoline and diesel fuel sprays and fuel injection equipment are encouraged. 13:30 - 15:30 Organizers: Gerald Micklow, Florida Institute of Technology; Tarek M. Abdel-Salam, East Carolina University; Alessandro Montanaro, Istituto Motori CNR; Chaitanya D. Ghodke, Convergent Science Inc.; LU Qiu, Cummins Inc. Chairpersons: Tarek M. Abdel-Salam, East Carolina University; Alessandro Montanaro, Istituto Motori CNR	**General SI Combustion (FFL210)** This session focuses on general studies of SI combustion and related processes including studies of mixture formation, engine efficiency, 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. 13:30 - 16:00 Organizers: Vincent S. Costanzo, Aramco Research Center; Alessandro D'Adamo, Universita di Modena e Reggio Emilia; Brian C. Kaul, Oak Ridge National Laboratory; Max Magar, Mot GmbH; Luca Marchitto, Simona Silvia Merola, Istituto Motori CNR; James W G Turner, University Of Bath Chairpersons: Richard S. Davis, General Motors; Max Magar, Mot GmbH
13:30	Supervisory Controller for a Light Duty Diesel Engine with an LNT-SCR After-Treatment System **(2018-01-1767)** Dhinesh Velmurugan, Volvo Car Corp.; Tomas McKelvey, Chalmers University of Technology; Daniel Lundberg, Volvo Car Corp.	Emission Performance of LPG Vehicles by Remote Sensing Technique in Hong Kong **(2018-01-1820)** Bruce D Organ, VTC Jockey Club Emissions Centre; Yuhan Huang, John Zhou, Guang Hong, University of Technology Sydney; Yat-Shing Yam, Hong Kong Environmental Protection Dept.; Edward Chan, VTC Jockey Club Emissions Centre	OH Radical and Soot Concentration Structures in Diesel Sprays under Low Sooting and Non-Sooting Conditions **(2018-01-1690)** Chengjun Du, Mats Andersson, Chalmers University of Technology	Fuel Stratification Using Twin-Tumble Intake Flows to Extend Lean Limit in Super-Lean Gasoline Combustion **(2018-01-1664)** Yasuo Moriyoshi, Tatsuya Kuboyama, Makoto Kaneko, Toshio Yamada, Hironao Sato, Chiba University
14:00	Effects of the Differences in Driving Behavior on Fuel Economy and Emission Characteristics during Vehicle Simulator Execution **(2018-01-1768)** Nobunori Okui, National Traffic Safety & Enviro Lab.	Development of a Burner Based Test System to Evaluate the Performance of Light Duty and High Displacement Aftertreatment Systems **(Oral Only)** Bryan Zavala, Southwest Research Institute	Split Injection Spray Development, Mixture Formation, and Combustion Processes in a Diesel Engine Piston Cavity: Rig Test and Real Engine Results **(2018-01-1698)** Tomoya Shiwaku, Shintaro Yasaki, Keiya Nishida, Youichi Ogata, University of Hiroshima; Mamoru Suzuki, Tsutomu Umehara, Toyota Industries Corp.	Homogeneous Lean Combustion in a 2lt Gasoline Direct Injected Engine with an Enhanced Turbo Charging System **(2018-01-1670)** Kristoffer Clasen, Lucien Koopmans, Chalmers University of Technology; Daniel Dahl, Volvo Car Corp.
14:30		Variation in System Performance while Sorting DEF Heating Hardware Options **(2018-01-1813)** Ezio Vermiglio, PACCAR Technical Center; Kyle Gilliam, Peterbilt Motors Co.; Anthony Chin, PACCAR Technical Center; Treaver Leonard, Peterbilt Motors Co.; Darren Erickson, PACCAR Inc.	Characterizing Spray Propagation of GDI Injectors under Crossflow Conditions **(2018-01-1696)** Richard Welss, Sebastian Bornschlegel, Michael Wensing, University of Erlangen-Nuremberg	Laminar Burning Velocity of Market Type Gasoline Surrogates as a Performance Indicator in Internal Combustion Engines **(2018-01-1667)** Raik Hesse, Joachim Beeckmann, Kevin Wantz, Heinz Pitsch, RWTH Aachen University
15:00		NH3 Sensor Measurements in Different Engine Applications **(2018-01-1814)** Timo Murtonen, Hannu Vesala, Paivi Koponen, Rasmus Pettinen, Tuula Kajolinna, Olli Antson, VTT Technical Research Centre of Finland	Strategies to Define Surrogate Fuels for the Description of the Multicomponent Evaporation Behavior of Hydrocarbon Fuels **(2018-01-1692)** Andrea Pati, Sandro Gierth, Philip Haspel, Christian Hasse, TU Darmstadt; Jerome Munier, Porsche AG	Assessing the Effect of Compression Ratio on the Performance, Combustion and Emission Characteristics of a Spark-Ignition Engine, and Optimum Spark Advance at Different Operating Conditions **(2018-01-1668)** Sachin Kumar Gupta, Mayank Mittal, Indian Institute of Technology- Madras
15:30	BREAK	BREAK	BREAK	BREAK
				Optimization of the Lubrication Distribution in Multi Plate Wet-Clutches for HVT Transmissions: An Experimental - Numerical Approach **(2018-01-1822)** Stefano Terzi, Universita di Modena e Reggio Emilia; Bernhard Manhartsgruber; Massimo Milani, Luca Montorsi, Universita di Modena e Reggio Emilia
	Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity	Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity	Planned by Fuels and Lubricants / Powertrain Fuels and Lubricants Activity	Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity

WEDNESDAY, 19 SEPTEMBER

SESSION TITLE, DESCRIPTION, AND ROOM

TIME	Rob.Schumann-Zimmer	Gustav-Mahler-Zimmer	Grosser Saal
	New Engine Components, Actuators and Sensors (FFL590) 13:30 - 15:30 Organizers: Wei Chen, BorgWarner Inc.; Adrian Irimescu, Istituto Motori CNR; Timothy Kunz, Delphi Corp.; Simona Silvia Merola, Istituto Motori CNR; Darrell Robinette, Michigan Technological Univ.; Guoming G. Zhu, Michigan State University Chairpersons: Steven Przesmitzki, Aramco Research Center	**Fluid Flow Measurement and Analysis (FFL140)** The focus of this session is the measurement and analysis of in-cylinder and port flows in research and production engines. Topics may including PIV, PTV, LDV, and fluorescent tracer measurements of velocity and turbulence characteristics and modeling analysis of engine flows. 14:30 - 15:30 Organizers: Max Magar, Mot GmbH; Luca Marchitto, Istituto Motori CNR Chairpersons: Guoming G. Zhu, Michigan State University	**Expert Panel Discussion: The Future of Combustion Engines (FFLK4)** Lately, the reputation of combustion engines has seen a decline, particularly in Europe. The reasons behind this trend are diverse. First of all, there is a paradigm shift concerning the demands for individual mobility. Politicians as well as tech companies are promoting the vision of autonomous and connected battery-electric vehicles, an allegedly cleaner mobility vision particularly appealing to millennials. In addition, ecological awareness has risen significantly in recent years. The public discussion primarily highlights the environmental issues related to the combustion of fossil fuels. The majority of governments have recently entered a commitment to inhibit the ongoing climate change that exacerbates the requirements for combustion engine even further. Moreover, the recent disclosures on irregularities regarding exhaust emissions of certain Diesel cars reflect poorly on combustion engines in general. As a consequence many politicians and environmentalists claim that combustion engines have to be banned sooner rather than later.Against this background, we believe that a discussion amongst experts in the various fields of combustion engine R&D and its periphery is warranted to assess the future sustainability of combustion engines. Furthermore, the panel discussion aims to provide strategies that enable combustion engines to qualify as propulsion systems for the future. Major focal areas should be strategies for exhaust emission control, sustainable alternative fuels, novel propulsion concepts and general requirements that have to be met in the future. 16:00 - 18:00 Moderators: Uwe Dieter Grebe, AVL LIST GmbH Panelists: Amer A. Amer, Saudi Aramco Rolf Brueck, Continental Emitec GmbH Stephen Ciatti, PACCAR Technical Center Shuji Kimura, Nissan Motor Co., Ltd. Kurt Kirsten, APL Automobil-Pruftechnik Landau GmbH
13:30	Design Parameters for Small Engines Based on Market Research **(2018-01-1717)** Vikram Mittal, US Military Academy		
14:00	Vibration Response Properties in Frame Hanging Catalyst Muffler **(Oral Only)** Gyoko Oh, Tokyo Roki Co., Ltd.; Masayoshi Shimada, Hino Motors, Ltd.		
14:30	Effect of Thermocouple Size on the Measurement of Exhaust Gas Temperature in Internal Combustion Engines **(2018-01-1765)** Nick Papaioannou, Felix Leach, Martin Davy, University of Oxford	Combined CFD - PIV Methodology for the Characterization of Air Flow in a Diesel Engine **(2018-01-1769)** Antonio Gil, Jose V. Pastor, Antonio Garcia, Leonardo Pachano, Universitat Politecnica de Valencia	
15:00	Design and Development of a Roller Follower Hydraulic Lash Adjustor to Eliminate Lash Adjustment and Reduce Noise in a Serial Production Diesel Engine **(2018-01-1766)** Leighton Roberts, James McCarthy, Jr., Eaton	POD-Based Analysis of In-Cylinder Flow Data from Molecular Tagging Velocimetry in a Spark-Ignition Engine **(2018-01-1770)** Ali Ahammed Jasim, Mayank Mittal, Indian Institute of Technology- Madras; Harold Schock, Michigan State University	
15:30	BREAK	BREAK	BREAK
	Planned by New Engines, Components, Actuators and Sensors / Powertrain Fuels and Lubricants Activity	Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity	

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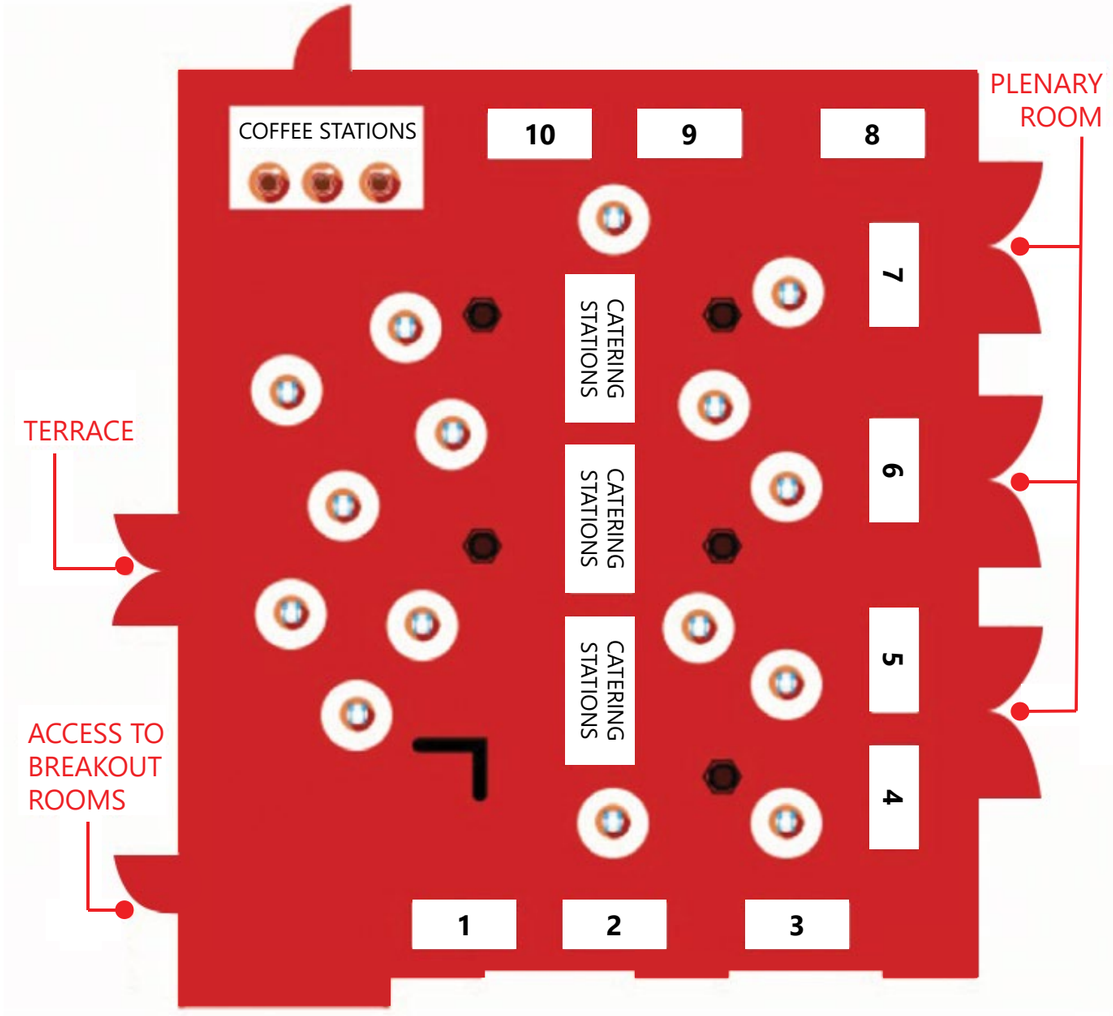

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2018

Intelligent and Connected Vehicles
August 14-15
Kunshan City, Jiangsu, China

Connect2Car™ Executive Leadership Forum
September 5-6
San Jose, CA

SAE New Energy Vehicle Forum
September 11-12
Shanghai, China

COMVEC™
September 11-13
Rosemont, IL

On-Board Diagnostics
September 11-13
Indianapolis, IN

North American International Powertrain Conference
September 12-14
Chicago, IL

Noise and Vibration Forum
September 13
Shanghai, China

International Powertrains, Fuels & Lubricants Meeting
September 17-19
Heidelberg, Germany

From ADAS to Automated Driving October 9-11
Detroit, MI

Transmission and Driveline Technologies
October 9-10
Plymouth, MI

Co-Optimization of Fuels and Engines
October 9-10
Plymouth, MI

Thermal Management Systems Symposium
October 9-11
San Diego, CA

Brake Colloquium & Exhibition
October 14-17
Palm Desert, CA

Heavy Duty Diesel Emissions Control
October 16-17
Gothenburg, Sweden

SAE/JSAE Small Engine Technology Conference
November 6-8
Dusseldorf, Germany

Aerospace Systems + Technology Conference
November 6-8
London, UK

Defense Maintenance and Logistics Exhibition
December 17-19
Tampa, FL

DoD Maintenance Symposium
December 17-20
Tampa, FL

2019

Connect2Car™ at CES
January 8
Las Vegas, NV

International Powertrains, Fuels & Lubricants Meeting
January 22-24
San Antonio, TX

Hybrid and Electric Vehicle Technologies
February 19-21
Anaheim, CA

On-Board Diagnostics
March 12-14
Stuttgart, Germany

SAE AeroTech Americas
March 26-28
Charleston, SC

Government/Industry Meeting
April 3-5
Washington, DC

High Efficiency IC Engine
April 7-8
Detroit, MI

WCX™: SAE World Congress Experience
April 9-11
Detroit, MI

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April 9-11
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Noise and Vibration Conference & Exhibition
June 10-13
Grand Rapids, MI

International Conference on Icing of Aircraft, Engines, and Structures
June 17-21, 2019
Minneapolis, MN

JSAE/SAE International Powertrains, Fuels & Lubricants Meeting
August 25-29
Kyoto, Japan

COMVEC™
September 10-12
Indianapolis, IN

On-Board Diagnostics
September 17-19
Garden Grove, CA

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September 18-20
Chicago, IL

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September 22-25
Orlando, FL

SAE AeroTech Europe
September 24-26
Bordeaux, France

Thermal Management Systems Symposium
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