Tuesday, April 8

Thermal Systems for Hybrid and Electric Vehicles

Session Code: HX105
Room 110 A/B Session Time: 9:30 a.m.

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

Organizers - Ales Alajbegovic, Exa Corp.; Ramesh Kumar Goyal, General Motors Co. (Retired); John Rugh, National Renewable Energy Laboratory

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<thead>
<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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<tr>
<td>9:30 a.m.</td>
<td>2014-01-0708</td>
<td>Evaporator-Condenser Improvement and Impact on Heat Pump System Performances for EVs</td>
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<td>Jugurtha Benouali, Valeo Climate Control Inc.; Christophe Petitjean, Isabelle Citti, Regis Beauvis, Laurent Delaforge, Valeo Thermal Systems</td>
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<tr>
<td>9:50 a.m.</td>
<td>2014-01-0712</td>
<td>Combined Condensing Air-Conditioning System</td>
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<td>Jae Yeon Kim, Hyundai Motor Co.; Yong Nam Ahn, Halla Visteon Climate; Shim Rok, Su Whan Kim, Wan Je Cho, Hyundai-Motors; Jy Choi, Hyun Keun Shin, Sang Ok Lee, Halla Visteon Climate</td>
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<tr>
<td>10:10 a.m.</td>
<td>2014-01-0711</td>
<td>Plug-in Hybrid Cooling System Requirements</td>
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<td>Michael Bassett, Jonathon Hall, Marco Warth, MAHLE Powertrain, Ltd.; Andreas Eilemann, Christian Merkle, MAHLE Behr GmbH &amp; Co. KG</td>
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<tr>
<td>10:30 a.m.</td>
<td>2014-01-0707</td>
<td>Thermal Management Modeling for Avoidance of Thermal Runaway Conditions in Lithium-Ion Batteries</td>
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<td>Nicolas F. Ponchaut, Francesco Colella, Ryan Spray, Quinn Horn, Exponent Inc.</td>
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<tr>
<td>11:10 a.m.</td>
<td>2014-01-0713</td>
<td>Investigation of Climate Control Power Consumption in DTE Estimation for Electric Vehicles</td>
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<td>Guangning(Gary) Gao, Ford Motor Co.</td>
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2014-01-0709 Robust Thermal Design of a DC-DC Converter in an Electric Vehicle (Written Only -- No Oral Presentation)
Kesav Kumar Sridharan, Ravish Masti, Ravi Kumar, Jiancheng Xin, Wendong Wang, Henry Kong, Delphi Automotive

The papers in this session are available in SAE Technical Paper Collection, COLL-GTL-00001, and also individually. purchase visit collections.sae.org

Planned by Thermal Management Activity / EMB Land and Sea Group

Tuesday, April 8

Energy Efficiency of Thermal Systems

Session Code: HX103
Room 110 A/B Session Time: 1:00 p.m.

Proper thermal management can significantly contribute to overall system energy efficiency. This session highlights the latest developments in thermal management energy efficiency.

Organizers - Ronald Semel, General Motors Co.; Gursaran D. Mathur, CalsonicKansei North America Inc.; Jeffrey Bozeman, General Motors Co.

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<th>Time</th>
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</table>
1:00 p.m. 2014-01-0672  Reducing Energy Losses from Automotive Engine Lubricants by Thermal Isolation of the Engine Mass
Andrew P. Roberts, Richard Brooks, Philip Shipway, University of Nottingham; Robert Gilchrist, Jaguar Land Rover Ltd.; Ian Pegg, Ford Motor Co., Ltd.

1:20 p.m. 2014-01-0674  Fuel Economy Improvement During Cold Start Using Recycled Exhaust Heat and Electrical Energy for Engine Oil and ATF Warm-Up
Byungchan Lee, Dohoy Jung, University of Michigan; John Myers, Jae-Hoon Kang, Hyundai-Kia America Technical Center Inc.; Young-Ho Jung, Kwang-Yeon Kim, Hyundai-Kia Motors

1:40 p.m. 2014-01-0673  Combining a Diesel Particulate Filter and Heat Exchanger for Waste Heat Recovery and Particulate Matter Reduction
Charles Sprouse III, Benedictine College; University of Kansas; Christopher Depcik, University of Kansas

2:00 p.m. 2014-01-0675  Oil-Free Axial Piston Expander for Waste Heat Recovery
Rémi Daccord, Antoine Darmedru, Julien Melis, Exoes

2:20 p.m. 2014-01-0676  Energy Balance During the Warm-Up of a Diesel Engine
Carlos A. Romero, Universidad Tecnologica de Pereira; Antonio Torregrosa, Pablo Olmeda, Jaime Martin, CMT Universitat Politècnica de València

2:40 p.m. 2014-01-0680  Impact of Paint Color on Rest Period Climate Control Loads in Long-Haul Trucks
Jason Aaron Lustbader, Cory Kreutzer, Matthew A. Jeffers, National Renewable Energy Laboratory; Steven Adelman, Skip Yeakel, Volvo Group Trucks Technology; Philip Brontz, Kurt Olson, James Ohlinger, PPG Industries Inc.

3:00 p.m. 2014-01-0677  Additional Power Generation from the Exhaust Gas of a Diesel Engine Using Ammonia as the Working Fluid
Saiful Bari, Shekh Rubaiyat, University of South Australia

3:20 p.m. 2014-01-0678  A Study of the Rankine Cycle Generating System for Heavy Duty HV Trucks
Takatoshi Furukawa, Masaaki Nakamura, Koichi Machida, Kiyohiro Shimokawa, Hino Motors, Ltd.

3:40 p.m. 2014-01-0679  Study of Cooling Drag Reduction Method by Controlling Cooling Flow

4:00 p.m. 2014-01-0671  Efficiency Analysis of the Rankine Cycle System Used for Engine Exhaust Energy Recovery under Driving Cycle
Can Yang, Hui Xie, Shengkai Zhou, Tianjin Univ.

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00435 and SUB-TP-00010, and individually. To purchase visit collections.sae.org

Planned by Thermal Management Activity / EMB Land and Sea Group

Tuesday, April 8

Load Simulation and Vehicle Performance (Part 1 of 5): Nonlinear Components/Systems
Session Code: M107
Room 111 A  Session Time: 9:30 a.m.
Focusing on new theory, formulation and modeling of amplitude-, frequency- and temperature-dependent nonlinear components/systems such as rubber and hydraulic mounts or bushings, shock absorbers, and any joint friction/damping; dynamic characterization through lab and field testing; Linearization methodology; Model validation, application, and sensitivity analysis in vehicle system/subsystem simulations; Nonlinear system identification, modeling, and application in testing accuracy improvement, etc.

Organizers - Guangqiang Wu, Tongji University; Peijun Xu, Ebco Inc.; Fulun Yang, Tenneco Inc.

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<tr>
<th>Time</th>
<th>Paper No.</th>
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<tr>
<td>9:30 a.m.</td>
<td>ORAL ONLY</td>
<td>Technical Keynote: Nonlinear Dynamics Resolution for Vehicle NVH Matter</td>
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<td>Guangqiang Wu, Tongji Univ.</td>
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<td>10:10 a.m.</td>
<td>2014-01-0851</td>
<td>Estimation of Nonlinear Viscoelastic Parameters from Estimated Linear Models of Behavior around Multiple Settling Points of a Foam-Mass System</td>
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<td>Yousof Azizi, Purdue Univ.; Vaidyanadan Sundaram, Cummins Emission Solutions; Patricia Davies, Anil Bajaj, Purdue Univ.</td>
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<tr>
<td>10:30 a.m.</td>
<td>2014-01-0880</td>
<td>Non-Linear Modeling of Bushings and Cab Mounts for Calculation of Durability Loads</td>
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<td>Christian Scheiblegger, Munich University of Applied Sciences; Nantu Roy, Orlando Silva Perez, Chrysler Group LLC; Andrew Hills, University of Bath; Peter Pfeffer, Munich University of Applied Sciences; Jos Darling, University of Bath</td>
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<tr>
<td>10:50 a.m.</td>
<td>2014-01-0852</td>
<td>Rubber Isolator Dynamic Characteristics Testing and Modeling</td>
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<td>Peijun Xu, Ebco Inc.</td>
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<td>11:10 a.m.</td>
<td>2014-01-0869</td>
<td>Combination of Test with Simulation Analysis of Brake Groan Phenomenon</td>
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<td>Guangqiang Wu, Shuyi Jin, Tongji University</td>
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<tr>
<td>11:40 a.m.</td>
<td>2014-01-0846</td>
<td>Modeling Air-Spring Suspension System of the Truck Driver Seat (Written Only -- No Oral Presentation)</td>
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<td>Ankang Jin, Weiguo Zhang, Shihu Wang, Huazhong University of Science and Tech.; Yu Yang, C&amp;C Trucks Co., Ltd.; Yunqing Zhang, Huazhong University of Science and Tech.</td>
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The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00377, and also individually. To purchase visit collections.sae.org

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Tuesday, April 8

Load Simulation and Vehicle Performance (Part 2 of 5): Ride Comfort

Session Code: M107

Room 111 A

Session Time: 1:00 p.m.

Focusing on studies of driver behavior modeling, driving simulator techniques, vehicle ride comfort evaluation and enhancement, test/simulation correlation analysis, vehicle elastomeric component modeling (i.e. bushings, rubber mounts, springs, dampers, seat cushions), passive, semi-active and active suspension systems, suspension seat analysis and modeling techniques, the effect and control of booming, shaking, impact harshness, brake judder and any other phenomena affecting ride comfort of driver, passengers, goods, etc.

Organizers - Jennifer Johrendt, Univ. of Windsor; Peijun Xu, Ebco Inc.; James Yang, Texas Tech. Univ.

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<th>Time</th>
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<tr>
<td>1:00 p.m.</td>
<td>2014-01-0877</td>
<td>Optimal Seat Dynamic Parameters Determination for Minimizing Virtual Driver's Fatigue</td>
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<td>Prasad Kumbhar, Cummins Filtration, Inc; Ning Li, Texas Tech University; Peijun Xu, Ebco Inc.; James Yang, Texas Tech University</td>
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</table>
With the higher federal fuel economy standards announced recently, Mg is becoming increasingly more attractive as structural material for automobiles. In recent years, the interest in magnesium research for automotive applications has expanded beyond cast alloys to include wrought alloys. The focus is not only on improving alloy properties, but also on reducing process costs. The technical papers to be presented at the 2013 Magnesium Technologies sessions reflect this broadening perspective.

Fadi Abu-Farha, Clemson Univ.; Alan Luo, Ohio State University

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<th>Time</th>
<th>Paper No.</th>
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<tr>
<td>9:30 a.m.</td>
<td>2014-01-1013</td>
<td>A Lode Angle Dependent von Mises Yield and Hardening Model for Deformation Simulation of Cast Magnesium Alloy</td>
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<td>Guowu Shen, Su Xu, Jie Liang, John Sollen, CanmetMATERIALS</td>
</tr>
<tr>
<td>9:50 a.m.</td>
<td>2014-01-1015</td>
<td>Effect of Stress Triaxiality on the Constitutive Response of Super Vacuum Die Cast AM60B Magnesium Alloy</td>
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<td>Dan Kraehling, David Anderson, Michael Worswick, University of Waterloo; Tim Skszek, Magna Intl Inc.</td>
</tr>
<tr>
<td>10:10 a.m.</td>
<td>2014-01-1014</td>
<td>Impact of Texture on r-value and its Measurement in Magnesium Alloy Sheets</td>
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<td>Jidong Kang, CanmetMATERIALS; Raja Mishra, General Motors Co.</td>
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</table>
Tuesday, April 8

Fatigue Research and Applications

Session Code: M200

This session covers recent fatigue research, analysis, analytical tools development, and novel applications of fatigue technology in the ground vehicle industry.

Organizers - John J. Bonnen, Carlos Carvalho Engler-Pinto, Ford Motor Co.; Jackie D. Rehkopf, Plasan Carbon Composites

Chairpersons - John Bonnen, Ford Motor Co

Time Paper No. Title

10:30 a.m. 2014-01-0973 ORAL ONLY Mechanical Properties and Microstructural Evolution in Mg AZ31B Friction Stir Back Extruded Tubes
Justin Milner, Fadi Abu-Farha, Clemson University

Planned by Metallic Materials Committee / Materials Engineering Activity

10:30 a.m. ORAL ONLY Fatigue Behavior of Aluminum Alloys under Multiaxial Loading
Qigu Wang, General Motors Co.; Guoqiu He, Tongji University; Yucong Wang, General Motors Co.

1:00 p.m. 2014-01-0976 Fatigue Behavior of Stainless Steel Sheet Specimens at Extremely High Temperatures
Katherine Avery, Jwo Pan, Univ. of Michigan; Carlos Carvalho Engler-Pinto, Ford Motor Co.; Zhigang Wei, Tenneco Automotive Co., Ltd.; Fulun Yang, Shengbin Lin, Tenneco Inc.; Limin Luo, Tenneco Automotive; Dmitri Konson, Tenneco Inc.

1:20 p.m. 2014-01-0977 Effect of Environment on the Very High Cycle Fatigue Behavior of a Cast Aluminum Alloy
Wenkai Li, Nanjing Univ. of Aero. & Astro., China

1:40 p.m. 2014-01-0975 Fatigue Analysis of Weld Seams Considering Geometrical Manufacturing Deviations
Helmut Dannbauer, Magna Engineering Center Steyr

2:00 p.m. 2014-01-0974 Study of Impact of Shot Size Ratio in the Process of Shot Peening on Fatigue Life of Suspension Coil Spring
Deepak Tiwari, Anand Bhope, Maruti Suzuki India, Ltd.; Akshay Hegde, Stumpf Schuele Somappa Springs Pvt Ltd.

2:20 p.m. 2014-01-0978 A Study on a Visualization of Fatigue Behavior near the Glass Transition Region
Hideto Komurasaki, Kenichi Uchida, NOK Corp.

2:20 p.m. 2014-01-0973 Fatigue Analysis of Weld Seams Considering Geometrical Manufacturing Deviations
Helmut Dannbauer, Magna Engineering Center Steyr

2:40 p.m. 2014-01-0973 Study of Impact of Shot Size Ratio in the Process of Shot Peening on Fatigue Life of Suspension Coil Spring
Deepak Tiwari, Anand Bhope, Maruti Suzuki India, Ltd.; Akshay Hegde, Stumpf Schuele Somappa Springs Pvt Ltd.

3:00 p.m. 2014-01-0979 Improvement on Mechanical and Corrosion Properties of Heavy Duty Compacted Graphite Iron Cylinder Heads by Gas Nitriding
Emin Kondakci, Rifat Yilmaz, Nuri Solak, Istanbul Technical Univ.

3:20 p.m. 2014-01-0978 A Study on a Visualization of Fatigue Behavior near the Glass Transition Region
Hideto Komurasaki, Kenichi Uchida, NOK Corp.
Expert Panel Discussion: Lessons Learned Executing Global Interiors

Session Code: M306
Room 112 A
Session Time: 9:30 a.m.

There has been effort to communizing platforms globally for cost reduction. This effort has included OEM engineering global lead locations, globally homologated designs, manufacturing technology standardization and material infrastructure communization. As this effort has been rolled out, there have been lessons learned regarding the cost/benefit tradeoffs of global communization. The panelists will share their views of these lessons learned, and provide insights in future directions.

Organizers - Robert Egbers, Comusa; Lisa Fallon, General Motors Co.; Stephen M. Pitrof, Inteva LLC; Ravi Thyagarajan, US Army TARDEC

Panelists - Sreenivas Kuchibhatla, Ford Motor Co.; Gagan Mann, Chrysler Corp.; Timothy Brademeyer, Johnson Controls Automotive Sys Group;

Tuesday, April 8

Advances in Instrument Panels, Seats, and Interiors

Session Code: M300
Room 112 A
Session Time: 1:00 p.m.

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

Organizers - Robert Egbers, Comusa; Lisa Fallon, General Motors Co.; Stephen M. Pitrof, Inteva LLC; Ravi Thyagarajan, US Army TARDEC

Time Paper No. Title

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00419, and also individually. To purchase visit collections.sae.org

Planned by Metallic Materials Committee / Materials Engineering Activity
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<tr>
<td>1:00 p.m.</td>
<td>2014-01-1027</td>
<td>Development of Thermoplastic Polyurethane (TPU) Material</td>
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<td>Daisuke Taniguchi, Wataru Tokuhara, Yuichi Miyake, Material Development Division</td>
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<tr>
<td>1:40 p.m.</td>
<td>2014-01-1029</td>
<td>Prediction of Part Warpage of Injection Molded Parts that are Joined using Vibration and Infrared Welding - A Simulation-Based Approach</td>
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<td>2:00 p.m.</td>
<td>2014-01-1033</td>
<td>Polyurethane-Free Lightweight Automotive Seat</td>
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<td>Seishiro Murata, JSP; Hiroyuki Ito, Toyo Seat; Steven Sopher, JSP</td>
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<td>2:20 p.m.</td>
<td>2014-01-1032</td>
<td>CAE Applications and Techniques used in Calculating the Snaps Insertions and Retentions Efforts in Automotive Trims</td>
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<td>Mohammed K Billal, B V Moorthy, Chrysler India Automotive Pvt, Ltd.; Dan Aquilina, Steven Schenten, Chrysler LLC</td>
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<tr>
<td>3:00 p.m.</td>
<td>2014-01-1024</td>
<td>Thermophysical Properties Measurement of Interior Car Materials vs. Temperature and Mechanical Compression</td>
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<td>Michael Kolich, Ford Motor Co.; Daniel Dooge, Mark Doroudian, ESI North America; Efim Litovsky, Richard Ng, Jacob Kleiman, Integrity Testing Labs</td>
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<td>3:20 p.m.</td>
<td>2014-01-1028</td>
<td>Investigation of Finite Element Material Models for Instrument Panel Head Impact Simulation</td>
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<td>Venkat Pisipati, Srikanth Krishnaraj, Edgar Quintero Campos, Inteva Products LLC</td>
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<tr>
<td>3:40 p.m.</td>
<td>2014-01-1026</td>
<td>Biobased Fillers for Polypropylene for Interior Application</td>
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<td>Ayse Ademuwagun, Hyundai-Kia America Technical Center Inc.; Joel Myers, Hyundai America Technical Center</td>
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<td></td>
<td>2014-01-1023</td>
<td>Five Bonding Techniques of Side Door Trim Insert Skin Decoration (Written Only -- No Oral Presentation)</td>
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<td>Dinesh Pahuja, Arpit Kapila, Sanjay Haldar, Sandeep Raina, Maruti Suzuki Automobiles India Ltd.</td>
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Planned by Polymers and Coatings Committee / Materials Engineering Activity

**Tuesday, April 8**

**Body Engineering and Design**

**Session Code:** B100

**Room 112 B**

**Session Time:** 1:00 p.m.

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

**Organizers:** Mallikarjuna Bennur, General Motors Co.; Raghu Echempati, Kettering Univ.; Ramakrishna Koganti, Ramk Inc.; Vesna Savic, General Motors Co.

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<th>Time</th>
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<tr>
<td>1:00 p.m.</td>
<td>2014-01-0348</td>
<td>Vehicle Spaciousness and Packaging Efficiency</td>
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<td>Rajiv Mehta, Mark Hadley, General Motors Co.</td>
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</table>
Adoption of structural plastic composites for vehicle Lightweighting is complex on many levels. The 2014 session highlights OEM perspectives, technology pathways gaps and gap analysis, consortium/government projects, enabling technologies and new business models. The session concludes with a panel discussion on pathways to enable the automotive industry to meet required cost, weight, assembly needs with a focus on collaboration and partnerships as a critical element.

1:20 p.m.  2014-01-0367  Automotive Design Quantification: Parameters Defining Exterior Proportions According to Car Segment
Martin Luccarelli, Free University of Bozen-Bolzano; Markus Lienkamp, Technical University of Munich; Dominik Matt, Pasquale Russo Spena, Free University of Bozen-Bolzano

1:40 p.m.  2014-01-0368  The Potential of Using Heat-Treated Spring Steel in Functional Body Parts for Weight Reduction
James Nelsen, Hyundai-Kia America Technical Center Inc.

2:00 p.m.  2014-01-0369  Two-Step Hood Opening System Development for Easier Hood Opening Operation
Sangil Kim, Seungwoo Seo, ChungHwa Jung, SeungHyun Baek, ChangGi Ha, Hyundai Motor Co.; KiRyun Ahn, MunBae Tak, Pyeonghwa Automotive Co.

2:20 p.m.  2014-01-0370  Structural Evaluation of Ashcan and Performance Enhancement by Spring Optimization
Pankaj G. Bhirud, Shreyas Shingavi, Ajay Virmalwar, Tata Technologies Ltd.

2:40 p.m.  2014-01-0371  Bus Body Modularity - Design and Manufacturing
Vignesh T Shekar, Sreedhar Reddy, Mukul Mitra, Anil Cherukuri, Ashok Leyland, Ltd.

2014-01-0372  Increase in Vehicle Front, Rear and Side Stiffness Coefficients in the Past Twenty Years Necessitates New Representative Database (Written Only -- No Oral Presentation)
Ellen L. Lee, Patrick J. Lee, Mark S. Erickson, Wilson C. Hayes, Hayes & Associates

2014-01-0373  Supporting Hinge Arrangement for Heavy Weight Side Opening Tailgate (Written Only -- No Oral Presentation)
Rahul Shashikant Patil, Tata Motors Ltd. / Tata Technologies Ltd.

2014-01-0374  Computational Analysis and Optimization of Torsional Stiffness of a Formula-SAE Chassis (Written Only -- No Oral Presentation)
Atishay Jain, Mahindra 2 Wheelers, Ltd.

Planned by Body Engineering Committee / Automobile Body Activity

Tuesday, April 8

Structural Plastic Composite Components & Pathway to Adoption & Role of Collaboration/Consortium (Part 1 of 2)

Session Code:  M304
Room 112 C/D  Session Time:  9:30 a.m.

Adoption of structural plastic composites for vehicle Lightweighting is complex on many levels. The 2014 session highlights OEM perspectives, technology pathways gaps and gap analysis, consortium/government projects, enabling technologies and new business models. The session concludes with a panel discussion on pathways to enable the automotive industry to meet required cost, weight, assembly needs with a focus on collaboration and partnerships as a critical element.

Organizers - Marianne S. Morgan, BASF
Chairpersons - Mark Minnichelli, BASF Corp.

Time  Paper No.  Title

9:30 a.m.  ORAL ONLY  Opening Remarks and Introductions
Marianne S. Morgan, BASF; Mark Minnichelli, BASF Corp.
Tuesday, April 8

Structural Plastic Composite Components – Pathway to Adoption – Role of Collaboration/Consortium (Part 2 of 2)

Session Code: M304
Room 112 C/D

Adoption of structural plastic composites for vehicle Lightweighting is complex on many levels. The 2014 session highlights OEM perspectives, technology pathways gaps and gap analysis, consortium /government projects, enabling technologies and new business models. The session concludes with a panel discussion on pathways to enable the automotive industry to meet required cost, weight, assembly needs with a focus on collaboration and partnerships as a critical element.

Organizers - Marianne S. Morgan, BASF
Chairpersons - Mark Minnichelli, BASF Corp.

Time | Paper No. | Title
--- | --- | ---
1:00 p.m. | ORAL ONLY | Technology Roadmaps to the Plastic Composite Intensive Vehicle – American Chemistry Council
Matthew D. Marks, SABIC’s Innovative Plastics BU

1:40 p.m. | ORAL ONLY | Government Funded National Composites Manufacturing Opportunities - Michigan Initiative
Raymond Boeman, Oak Ridge National Laboratory

2:00 p.m. | ORAL ONLY | Reclaiming and Repurposing Carbon Fiber
James Stike, Materials Innovation Technologies LLC

2:20 p.m. | ORAL ONLY | Networking Break

2:40 p.m. | ORAL ONLY | Composite-Intensive Vehicles: Addressing Assembly Constraints
Susan Okray, Munro & Associates

3:00 p.m. | ORAL ONLY | Engineering Software for Designing Cost Effective Mixed Material Vehicles
Marc H. Attar, Siemens PLM Software

3:20 p.m. | ORAL ONLY | Licensing Technology vs. Collaborative Research
Phillip Smith, ITECS - Innovative

Planned by Polymers and Coatings Committee / Materials Engineering Activity
End of Life Management: Reuse / Recycle / Remanufacture

Session Code: SDP119
Room 113 A/B

This session reviews vehicle end-of-life issues including, parts reuse, parts remanufacturing for reuse, parts/materials recycling, and the technologies and processes associated with these activities.

Organizers - Susan Sawyer-Beaulieu, Univ. of Windsor; Jacob Hohn, Rsr Technologies; Richard T. Paul, Environmental Consultant

Chairpersons - Susan Sawyer-Beaulieu, Univ of Windsor

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<tr>
<td>9:30 a.m.</td>
<td>2014-01-1973</td>
<td>Development of High Efficiency and Compact Bumper Recycling Equipment</td>
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<td>Atsushi Mizutani, Nissan</td>
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Panel Discussion with the Presenters

Moderators - Elias Shakour, CAR Group
Panelists - Marc H. Attar, Siemens PLM Software; Raymond Boeman, Oak Ridge National Laboratory; Matthew D. Marks, SABIC Innovative Plastics; Susan Okray, Munro & Associates; Phillip Smith, ITECS - Innovative; James Stike, Materials Innovation Technologies LLC;

Tuesday, April 8

Panel Discussion: Certified Recycled Polymers - Ready for PRIME Time? A Business/Engineering and Material Science Discussion

Session Code: SDP199
Room 113 A/B

Organizers - Michael D. Powers, Vice President Sales and Business Development, Wellman Engineering Resins
Moderators - John J. Bradburn, General Motors Co.
Panelists - Deen Chundury, Vice President of Research & Development, Wellman Engineering Resins; Mark Lapain, Materials Technical Manger, Magna International; David Lipka, Senior Project Engineering, Materials Engineering, Nissan Technical Center NA; David A. Nash, Director of Engineering, Dana Holding Corp.;

Tuesday, April 8

SAE/MIT Innovation Competition

Session Code: IDM800
Room 113 A/B

Session Time: 1:00 p.m.
The goal of the competition is to provide ideas for the vehicle industry when it faces tremendous challenges by innovative start ups. Sponsored by General Motors and by EmiSense, the following a series of presentations from past start up competitors, each company will present their technology and a compelling reason for development. Judging will follow and cash and in kind prizes to be awarded. This will be preceeded by several success stories from previous competitors.

Organizers - David Stout, David B Stout Associates LLC

<table>
<thead>
<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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<tbody>
<tr>
<td>1:15 p.m.</td>
<td>ORAL ONLY</td>
<td>Opening Remarks</td>
</tr>
<tr>
<td></td>
<td></td>
<td>David Stout, David B Stout Associates LLC; Dennis Nash, MIT Enterprise Forum Great Lakes Region</td>
</tr>
<tr>
<td>1:25 p.m.</td>
<td>ORAL ONLY</td>
<td>Keynote Speaker</td>
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<td>Jean Redfield, NextEnergy</td>
</tr>
<tr>
<td>1:45 p.m.</td>
<td>ORAL ONLY</td>
<td>Adaptive Tunable Antennas - A Review of 2013 Competition Winner</td>
</tr>
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<td>Randy Dence, Monarch Antenna</td>
</tr>
<tr>
<td>2:05 p.m.</td>
<td>ORAL ONLY</td>
<td>Judges Introduction and Explanation of Competition Rules</td>
</tr>
<tr>
<td></td>
<td></td>
<td>David Stout, David B Stout Associates LLC</td>
</tr>
<tr>
<td>2:15 p.m.</td>
<td>ORAL ONLY</td>
<td>Visual Inspection System to Detect Damaged Tools, Incorporating Predictive Tool Ware</td>
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<td>Gerald Budd, Phoenix Imaging</td>
</tr>
<tr>
<td>2:35 p.m.</td>
<td>ORAL ONLY</td>
<td>Steel Clad, Aluminum Brakes for Cost Effective Improved Performance</td>
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<td>Nannon Huang, LiteBrake Tech. LLC</td>
</tr>
<tr>
<td>2:55 p.m.</td>
<td>ORAL ONLY</td>
<td>Advanced, Rugged-Low-Fire Ceramics with No Cure Shrinkage</td>
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<td>David Hatfield, Covaron</td>
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<tr>
<td>3:15 p.m.</td>
<td>ORAL ONLY</td>
<td>Smart Phone Application to Rapidly find Inexpensive Urban Parking</td>
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<td>Gerhard Boiciuc, NavPark</td>
</tr>
<tr>
<td>3:35 p.m.</td>
<td>ORAL ONLY</td>
<td>Wireless Telemetry System for Connected Vehicle Applications</td>
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<td>Martin Nathanson, Paxgrid</td>
</tr>
<tr>
<td>4:00 p.m.</td>
<td>ORAL ONLY</td>
<td>Judges Feedback and Award Presentation</td>
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<tr>
<td></td>
<td></td>
<td>David Stout, David B Stout Associates LLC; Dennis Nash, MIT Enterprise Forum Great Lakes Region</td>
</tr>
</tbody>
</table>

Coated Materials

Organizers - SungChul Cha, Hyundai Motor Co.; Ton Hurkmans, Ionbond LLC

Chairpersons - SungChul Cha, Hyundai Motor Co; Ton Hurkmans, Ionbond LLC

<table>
<thead>
<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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<tbody>
<tr>
<td>9:30 a.m.</td>
<td>ORAL ONLY</td>
<td>Consideration and Development of Coatings for Aluminum Die Casting Dies and High Temperature Application</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SungChul Cha, Hyundai Motor Co.</td>
</tr>
</tbody>
</table>
Tuesday, April 8

Advances in Alternative Energy Sources for Sustainable Development in the Transportation Sector

Session Code: SDP110
Room 113 C  Session Time: 1:00 p.m.

This session explores advances in the creation of sustainable energy sources and their usage in the transportation sector. Topics can include research and in-production technology used to produce renewable energy sources and materials. A discussion on lifecycle analysis of the energy sources is also highly recommended. The SDPC encourages usage of papers, presentations, and panels in this session to display leading edge technologies and practical tools for engineers.


<table>
<thead>
<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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<tbody>
<tr>
<td>1:00 p.m.</td>
<td>2014-01-1948</td>
<td>Determination of Carbon Footprint using LCA Method for Straight Used Cooking Oil as a Fuel in HGVs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hu Li, University of Leeds; Jim Ebner, Biomotive Fuels Ltd; Peipei Ren, Laura Campbell, Buland Dizayi, Seyed Hadavi, University of Leeds</td>
</tr>
<tr>
<td>1:20 p.m.</td>
<td>2014-01-1946</td>
<td>Thermodynamic Analysis of an Electricity-Cooling WHR Cogeneration System Aboard Ships using Siloxanes as Working Fluids</td>
</tr>
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<td></td>
<td>Youcai Liang, Gequn Shu, Hua Tian, Haiqiao Wei, Xingyu Liang, Mingru Zhao, State Key Lab of Engines</td>
</tr>
<tr>
<td>1:40 p.m.</td>
<td>2014-01-1949</td>
<td>Simulation and Analysis of an ORC-Desalination Combined System Driven by the Waste Heat of Charge Air at Variable Operation Conditions</td>
</tr>
<tr>
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<td></td>
<td>Xuan Wang, Ge-Qun Shu, Hua Tian, Youcai Liang, Xiangxiang Wang, State Key Lab of Engines</td>
</tr>
<tr>
<td>2:00 p.m.</td>
<td>2014-01-1932</td>
<td>Development of a Spring-Based Automotive Starter</td>
</tr>
<tr>
<td></td>
<td></td>
<td>David H. Myszka, Jonathan Lauden, Patrick Joyce, Andrew Murray, University of Dayton; Christoph Gillum, Stress Engineering Services Inc.</td>
</tr>
</tbody>
</table>
Panel Discussion: Quantifying and Communicating the Business Value of Augmented and Virtual Reality

Session Code: IDM600
Room 114 A  Session Time: 9:30 a.m.

The dialog with stakeholders in order to obtain their support adoption and expansion of AR applications and processes requires metrics and several parallel communication strategies. Panelist will share how they have sought to measure the potential value of Augmented Reality for both internal and external customers, how and when they translate pilot results into impacts for the business, and the multidisciplinary approaches used to engage with business groups.

Organizers - Elizabeth Baron, Ford Motor Co
Chairpersons - Elizabeth Baron, Ford Motor Co
Moderators - Elizabeth Baron, Ford Motor Co
Tuesday, April 8

CAE Durability Analysis and Applications (Part 1 of 3)

Session Code: M109
Room 114 A

Session Time: 1:00 p.m.

This technical session focuses on state-of-the-art fatigue theory and advanced development in fatigue analysis methodology and research. Studies and discussions on innovative and improved fatigue theory/methods in material constitutive modeling, damage rules/fatigue damage calculation, and fatigue life predictions will be addressed.

Organizers - Mingchao Guo, Chrysler Group LLC; Guofei Chen, United States Steel Corp.; Abolhassan Khosrovaneh, GM; Ali Fatemi, Univ. of Toledo; Zhigang Wei, Tenneco Automotive Co., Ltd.; Guangtian Gavin Song, AM General LLC; Mark A. Pompetzki, HBM-nCode; Yung-Li Lee, Chrysler Group LLC

Chairpersons - Ali Fatemi; Mark A. Pompetzki, HBM-nCode

Time | Paper No. | Title |
--- | --- | --- |
1:00 p.m. | ORAL ONLY | Technical Keynote: Some Guidelines and Simple Techniques for Fatigue Analysis and Design | Ali Fatemi, Univ. of Toledo |
1:40 p.m. | 2014-01-0901 | Tensile and Fatigue Behaviors of Two Thermoplastics Including Strain Rate, Temperature, and Mean Stress Effects | Ali Fatemi, Steve Mellot, Univ. of Toledo; Abolhassan Khosrovaneh, Charles Buehler, General Motors Co. |
2:00 p.m. | 2014-01-0915 | TMF Life Prediction of High Temperature Components Made of Cast Iron HiSiMo: Part I: Uniaxial Tests and Fatigue Life Model | Philipp von Hartrott, Fraunhofer IWM; Thomas Seifert, Offenburg University of Applied Sciences; Steven Dropps, John Deere Power Systems |
2:20 p.m. | 2014-01-0905 | TMF Life Prediction of High Temperature Components Made of Cast Iron HiSiMo: Part II: Multiaxial Implementation and Component Assessment | Thomas Seifert, Offenburg University of Applied Sciences; Radwan Hazime, ADACS Inc.; Steven Dropps, John Deere Power Systems |
2:40 p.m. | ORAL ONLY | Comparison of Different Material Models for Fatigue Assessment of High Temperature Engine Components | Helmut Dannbauer, Magna Engineering Center Steyr |
3:00 p.m. | 2014-01-0924 | ¿Projection-by-Projection¿ Approach: A Spectral Method for Multiaxial Random Fatigue | Alessandro Cristofori, University of Ferrara; Denis Benasiutti, University of Udine |
3:20 p.m. | 2014-01-0923 | Random Vibration Fatigue - A Study Comparing Time Domain and Frequency Domain Approaches for Automotive Applications | Giovanni Morais Teixeira, Fatigue R&D Principal Engineer |

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00392, and also individually. To purchase visit collections.sae.org

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity
Occupant Protection: Occupant Restraints (Air Bags, Seat Belts, Knee Bolsters, Child Seats, etc.)

Session Code: B403
Room 114 B  Session Time: 9:30 a.m.

The Occupant Restraints Session invites papers that document new research on the restraint topics of airbags, seat belts, inflatable bolsters/seat belts, knee bolsters, Child Restraint Systems (CRS) and other related areas. These papers could include several of the following: technology description, occupant performance considerations, field data studies, development/validation methodology / results, CAE/Finite Element methods/results, packaging, and implementation / performance challenges.

Organizers - Aditya Belwadi, Children's Hospital of Philadelphia; Lisa Fallon, General Motors Co.; Jason R. Kerrigan, Univ. of Virginia; J. Kirk Russell, Performance Events Promotion LLC; Scott D. Thomas, General Motors Co.; Chris A. Van Ee, Design Research Engineering

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<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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<tbody>
<tr>
<td>9:30 a.m.</td>
<td>2014-01-0508</td>
<td>Design, Development and Testing of an Improved Stock Car Driver's Window Net Mounting System</td>
</tr>
<tr>
<td>9:50 a.m.</td>
<td>2014-01-0507</td>
<td>Expansion of Motorized Seatbelt Control that Adjusts to Vehicle Behavior and the Effect of that Expansion</td>
</tr>
<tr>
<td>10:10 a.m.</td>
<td>2014-01-0509</td>
<td>Equivalency or Compromise? A Comparative Study of the Use of Nylon 6,6 and Polyester Fiber in Automotive Airbag Cushions</td>
</tr>
<tr>
<td>10:30 a.m.</td>
<td>2014-01-0511</td>
<td>Prevention of Cushion Failure of Side Curtain Airbag By CAE</td>
</tr>
</tbody>
</table>

The papers in this session are available in SAE Technical Paper Collection, SUB-TP-00007, and also individually. To purchase visit collections.sae.org

Planned by Occupant Protection Committee / Automobile Body Activity; Motorsports Engineering Committee / Motors Engineering Activity

Tuesday, April 8

Occupant Protection: Biomechanics

Session Code: B401
Room 114 B  Session Time: 1:00 p.m.

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

Organizers - Elizabeth Mary Fievisohn, Virginia Tech.; Jacob L. Fisher, Exponent Inc.; Warren N. Hardy, Virginia Tech.; Jason R. Kerrigan, Univ. of Virginia

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<th>Time</th>
<th>Paper No.</th>
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<tbody>
<tr>
<td>1:00 p.m.</td>
<td>2014-01-0491</td>
<td>Evaluation of Ejection Risk and Injury Distribution Using Data from the Large Truck Crash Causation Study (LTCCS)</td>
</tr>
</tbody>
</table>

Michael E. Zabala, Exponent Inc.; Nicholas Yang, Stacy Imler, Exponent Failure Analysis; Ke Zhao, Rose Ray, Exponent Inc.
The papers in this session are available in SAE Technical Paper Collection, SUB-TP-00006 and SUB-TP-00007, and also individually. To purchase visit collections.sae.org

Planned by Occupant Protection Committee / Automobile Body Activity

Tuesday, April 8

Materials and Residual Stress Test Development

Session Code: M106

Room 115 A

Key words: residual stress, retained austenite, x-ray diffraction, neutron diffraction, induction hardening, carburizing, shot peening, quench and template, residual stress simulation, residual stress test

Organizers - Gerald A. Shulke, Xichen Sun, Chrysler Group LLC; Xin Zhang, Ftech R&D North America

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<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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<tbody>
<tr>
<td>9:30 a.m.</td>
<td>ORAL ONLY</td>
<td>Realistic Modelling of Shot Peening Using a Novel Periodic Cell Model</td>
</tr>
</tbody>
</table>

Gerald A. Shulke, Xichen Sun, Chrysler Group LLC; Xin Zhang, Ftech R&D North America

William R. Busson, Michael Prange, Exponent Inc.

Toshiyuki Yanaoka, Yasuhiro Dokko, Honda R&D Co., Ltd.

Bethany L. Suderman, Irving S. Scher, Guidance Engineering; Randal P. Ching, University of Washington

Lisa P. Gwin, Herbert Guzman, Enrique Bonugli, William Scott, Mark Freund, Biodynamic Research Corp.


Zhuo Chen, Fan Yang, Shaker Meguid, University of Toronto

Abhinav Karanam, Vishank Kumar, Lukas Bichler, University of British Columbia
Tuesday, April 8

Steering and Suspension Technology Symposium

Session Code: AC300

Room 115 A

The purpose of this session is to provide a forum for presentations on steering and suspension related topics as it applies to ground vehicles. Papers for this session should address new approaches as well as advances in application of steering, suspension related technologies.

Organizers - Robert Ackley, Ford Motor Co.; Prashant Patel, Chrysler Group LLC

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<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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<tbody>
<tr>
<td>1:00 p.m.</td>
<td>2014-01-0065</td>
<td>Independent Control of Steering Force and Wheel Angles to Improve Straight Line Stability</td>
</tr>
<tr>
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<td>Hiroki Taniguchi, Takeshi Kimura, Yuya Takeda, Taku Suzuki, Akihiro Kaneko, Tomohiro Jinbo, Nissan Motor Co., Ltd.</td>
</tr>
<tr>
<td>1:20 p.m.</td>
<td>2014-01-0063</td>
<td>Independent Left and Right Rear Toe Control System</td>
</tr>
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<td>Yutaka Horiuchi, Takashi Yanagi, Honda</td>
</tr>
<tr>
<td>1:40 p.m.</td>
<td>2014-01-0058</td>
<td>Consideration about Meshing of Worm Gear Based on MUB (Meshing Under Base-Circle) Theory for EPS</td>
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<td>Yosuke Tanaka, Yasuo Shimizu, Honda R&amp;D Co., Ltd.</td>
</tr>
<tr>
<td>2:00 p.m.</td>
<td>2014-01-0046</td>
<td>Durability Design Method of New Stopper Bush Using New Theory (Friction and Spring) for Electric Power Steering</td>
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<td>Takehito Shiraiishi, Yasuo Shimizu, Honda R&amp;D Co., Ltd.</td>
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<tr>
<td>2:20 p.m.</td>
<td>2014-01-0048</td>
<td>Experimental Study on the Effect of Coil Spring Reaction Force Vector on McPherson Strut Suspension Characteristics</td>
</tr>
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<td>Shinichi Nishizawa, NHK International Corp.; Takahiro Nakamura, Kazuo Furukawa, Senri Moriyama, Ryuichi Sato, NHK Spring Co., Ltd.</td>
</tr>
<tr>
<td>2:40 p.m.</td>
<td>2014-01-0057</td>
<td>Preview Ride Comfort Control for Electric Active Suspension (eActive3)</td>
</tr>
<tr>
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<td>Akihito Yamamoto, Aisin Seiki Co., Ltd.; Haruhiko Sugai, Toyota Motor Corp.; Ryo Kanda, Toyota Technical Development Corp.; Shuuichi Buma, Kinki University Technical College</td>
</tr>
<tr>
<td>3:00 p.m.</td>
<td>ORAL ONLY</td>
<td>The ¿LEICHT Concept¿: Lightweight, Energy-efficient, Integrated Chassis with Hub-motor Technology for Future EV From the Concept to the Prototype</td>
</tr>
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<td>Andreas Höfer, Horst Friedrich, Marc Hampel, Institute of Vehicle Concepts, DLR e.V.</td>
</tr>
</tbody>
</table>
Sheet / Hydro / Gas Forming Technology and Modeling (Part 1 of 3)

Session Code: M201
Room 115 B
Session Time: 9:30 a.m.

Failure modes, phase change materials, hydro-forming, hot stamping, warm forming and super plastic forming issues and applications in sheet metal forming are interests in this session. Papers for the Sheet/ Hydro/ Gas Forming Technology and Modeling Session advance the knowledge in the state of the art in all types of sheet metal forming. Topics include using simulated, analytical, numerical and experimental tools and sheet metals for the various forming technologies.


Time | Paper No. | Title |
--- | --- | --- |
9:30 a.m. | ORAL ONLY | Thermal Forming Limit Behavior of 6xxx Series Aluminum Alloys at Warm Forming Temperatures
Liang Ying, Jindong Lu, Ying Chang, Kunmin Zhao, Minghua Dai, Ping Hu, Dalian University of Technology

9:50 a.m. | ORAL ONLY | An Experimental and Modeling Investigation of Room-Temperature Formability of AA7075 Aluminum
Aashish Rohatgi, Richard Davies, Elizabeth Stephens, Pacific Northwest National Laboratory

10:10 a.m. | 2014-01-0981 | Hot Stamping of a B-Pillar Outer from High Strength Aluminum Sheet AA7075
Nia R. Harrison, S. George Luckey, Ford Motor Co.

10:30 a.m. | 2014-01-0984 | Experimental Evaluation of the Quench Rate of AA7075
Aledoni Keci, University of Michigan; Nia R. Harrison, S. George Luckey, Ford Motor Co.

10:50 a.m. | 2014-01-0983 | On Modeling the Hot Stamping of High Strength Aluminum Sheet
Andrey Ilinich, S. George Luckey, Ford Motor Co.
Tuesday, April 8

Sheet / Hydro / Gas Forming Technology and Modeling (Part 2 of 3)

Session Code: M201

Failure modes, phase change materials, hydro-forming, hot stamping, warm forming and super plastic forming issues and applications in sheet metal forming are interests in this session. Papers for the Sheet/ Hydro/ Gas Forming Technology and Modeling Session advance the knowledge in the state of the art in all types of sheet metal forming. Topics include using simulated, analytical, numerical and experimental tools and sheet metals for the various forming technologies.


Time Paper No. Title

1:00 p.m. ORAL ONLY 2014-01-0987 Phase Distributions and Mechanical Properties of Hot Stamped Automotive Part
Kunmin Zhao, Ying Chang, Jindong Lu, Liang Ying, Dalian University of Technology

1:20 p.m. ORAL ONLY 2014-01-0985 Forming Limit Diagram Determination with Digital Image Correlation
Danielle Zeng, Ford Research and Innovation Center; Z. Xia, Ford Motor Co.; Yuan Gan, ETA Inc (Engineering Tech Assoc); Feng Ren, Ford Motor Co.; Laurent Chappuis, Ford Motor Co

1:40 p.m. ORAL ONLY 2014-01-0982 Determination of Forming Limit and Fracture Limit Curves Using Digital Image Correlation
Gang Huang, Sriram Sadagopan, ArcelorMittal USA; Hubert Schreier, Correlated Solutions Inc.

2:00 p.m. ORAL ONLY 2014-01-0985 Robustness Analysis in Stamping - Product Design and Material Property Variation
Tony Yu Chang, Yuwei Wang, Severstal North America Inc.; Liang Huang, Yinong Shen, Ford Motor Co.; Evangelos Liasi, Ford Product Development

2:20 p.m. ORAL ONLY 2014-01-0982 Evaluation of Metal Gainers for Advanced High Strength Steel Flanging
Xiaoming Chen, US Steel; Ching-Kuo Hsiung, Ken Schmid, General Motors Co.; Changqing Du, Dajun Zhou, Chrysler Group LLC; Chris Roman, General Motors Co.

3:00 p.m. ORAL ONLY Springback Predictions for Pure Bending of DP590 Steel Using Nonlinear Kinematic Hardening Calibrated from Tension-Compression Experiments
Yannis Korkolis, Nengxiu Deng, Univ. of New Hampshire
### Tuesday, April 8

**Reliability and Robust Design in Automotive Engineering: Reliability-Based Design Optimization and Robustness**

**Session Code:** IDM102  
**Room 116 A**  
**Session Time:** 1:00 p.m.

This session will address theoretical developments and automotive applications in RBDO and Robust Design. Topics include: computational algorithms for efficient estimation of reliability, Monte Carlo simulation, Bayesian reliability, Dempster-Shafer Evidence Theory, and Multi-Disciplinary Optimization, among others.

**Organizers:** David A. Lamb, US Army TARDEC; Paul Lubinski, Thermo King Corp.; Zissimos Mourelatos, Oakland University; Efstratios Nikolaidis, University Of Toledo; Vijitashwa Pandey, Oakland University

**Chairpersons:** Zissimos Mourelatos, Oakland University

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<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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<tbody>
<tr>
<td>1:00 p.m.</td>
<td>2014-01-0718</td>
<td>Reliability of Multi-Sensor Fusion for Next Generation Cars and Trucks</td>
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<td>Venkatesh Agaram, PTC Inc.</td>
</tr>
<tr>
<td>1:20 p.m.</td>
<td>ORAL ONLY</td>
<td>Estimation of Probability of First Excursion by Separable Monte Carlo Simulation</td>
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<td>Mahdi Norouzi, Frostburg State Univ.; Efstratios Nikolaidis, University Of Toledo</td>
</tr>
<tr>
<td>1:40 p.m.</td>
<td>2014-01-0715</td>
<td>Reliability Analysis of Composite Inflatable Space Structures Considering Fracture Failure</td>
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<td>Jin Woo Lee, Efstratios Nikolaidis, University of Toledo</td>
</tr>
<tr>
<td>2:00 p.m.</td>
<td>2014-01-0716</td>
<td>Flexible Design and Operation of a Smart Charging Microgrid</td>
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<tr>
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<td>Vijitashwa Pandey, Oakland Univ.; Annette Skowronska, US Army TARDEC; Zissimos Mourelatos,</td>
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<td>Oakland Univ.; David Gorsich, US Army RDECOM; Matthew Castanier, US Army TARDEC</td>
</tr>
<tr>
<td>2:20 p.m.</td>
<td>2014-01-0719</td>
<td>Enhancing Decision Topology Assessment in Engineering Design</td>
</tr>
<tr>
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<td></td>
<td>Vijitashwa Pandey, Zissimos Mourelatos, Oakland Univ.; Matthew Castanier, US Army TARDEC</td>
</tr>
<tr>
<td>2:40 p.m.</td>
<td>2014-01-0714</td>
<td>Tactical Criteria for Software Code Quality Goals</td>
</tr>
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<td>Sanghun Cho, Taewan Gu, Eunyoung Yoo, Youngkyu Jeong, Baegsu Joo, Hyundai Autron</td>
</tr>
</tbody>
</table>

*The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00403, and also individually. To purchase visit collections.sae.org*

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

**Organizers**
Jennifer M. Badgley, Lear Corp.; Bonita J. Thomas, Chrysler Corporation LLC; Marilyn Vala, Chrysler Corp.

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<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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<tbody>
<tr>
<td>9:30 a.m.</td>
<td>2014-01-0456</td>
<td>Analysis of Body Pressure Ratio for Evaluation of Automotive Seating Comfort</td>
</tr>
<tr>
<td>9:50 a.m.</td>
<td>ORAL ONLY</td>
<td>Package and Ergonomic Considerations for North American High Body Mass Index Population</td>
</tr>
<tr>
<td>10:10 a.m.</td>
<td>2014-01-0462</td>
<td>Vibration Effect Investigation in Baby Car Seats and Automobile Seats</td>
</tr>
</tbody>
</table>

Planned by Integrated Design and Manufacturing Activity / EMB Land and Sea Group; Quality, Reliability and Robust Committee / Integrated Design and Manufacturing Activity

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**Human Factors in Seating Comfort**

**Session Code:** B303  
**Session Time:** 9:30 a.m.

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

**Organizers**
Jennifer M. Badgley, Lear Corp.; Bonita J. Thomas, Chrysler Corporation LLC; Marilyn Vala, Chrysler Corp.

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<tr>
<th>Time</th>
<th>Paper No.</th>
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<tbody>
<tr>
<td>9:30 a.m.</td>
<td>2014-01-0456</td>
<td>Analysis of Body Pressure Ratio for Evaluation of Automotive Seating Comfort</td>
</tr>
<tr>
<td>9:50 a.m.</td>
<td>ORAL ONLY</td>
<td>Package and Ergonomic Considerations for North American High Body Mass Index Population</td>
</tr>
<tr>
<td>10:10 a.m.</td>
<td>2014-01-0462</td>
<td>Vibration Effect Investigation in Baby Car Seats and Automobile Seats</td>
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</tbody>
</table>

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Mobility Issues for an Aging Population

Session Code: B304
Room 116 B

Aging mobility is important to the automotive industry for the following reasons:
- 37% of the population is over age 50
- 52% of vehicles sold in 2012 were to > 55 years of age consumers.
- A 65 year old is 4x more likely to buy a new car than a 25 year old.

This group will have unique issues associated with it that will need to be addressed by the automotive industry as they design vehicles for this ever growing population. Hear presentation that will address these critical issues.

Organizers - Marilyn Vala, Chrysler Corp.

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<thead>
<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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<tbody>
<tr>
<td>1:00 p.m.</td>
<td>ORAL ONLY</td>
<td>Welcome and Opening Remarks</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Marilyn Vala, Chrysler Corp.</td>
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<tr>
<td>1:20 p.m.</td>
<td>ORAL ONLY</td>
<td>Technical Keynote</td>
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<td>Jake Nelson, AAA</td>
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<tr>
<td>1:40 p.m.</td>
<td>ORAL ONLY</td>
<td>Package and Ergonomic Considerations for North American Population</td>
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<td>Over 65</td>
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<td>Claudia P. Escobar, Hyundai-Kia America Technical Center Inc.</td>
</tr>
<tr>
<td>2:00 p.m.</td>
<td>ORAL ONLY</td>
<td>HMI Considerations for Aging Drivers</td>
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<td>Thomas Seder, General Motors Co.</td>
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<tr>
<td>2:20 p.m.</td>
<td>ORAL ONLY</td>
<td>Mobility Issues for Aging Population - Advanced Interfaces for Elderly Drivers</td>
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<td>Susan Drescher, Continental Automotive Systems</td>
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</tbody>
</table>
Tuesday, April 8

Advanced Vehicle Technology Competitions (Part 1 of 2)

Session Code: PFL760
Room 140 A

The EcoCAR 2: Plugging in to the Future student vehicle competition, sponsored by General Motors and the U.S. Department of Energy, tasks university teams with designing, implementing and refining advanced powertrains into a conventional midsize sedan. This session presents yearly results from teams in the competition, highlighting the entire EcoCAR vehicle development process.

Organizers - Steven Boyd, US Dept. of Energy; Patrick M. Walsh, Brian Benoy, Robert Jesse Alley, Argonne National Laboratory
Chairpersons - Patrick Walsh, Argonne National Laboratory

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<tr>
<th>Time</th>
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<tr>
<td>9:30 a.m.</td>
<td>ORAL ONLY</td>
<td>Introductions</td>
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<td>Patrick M. Walsh, Argonne National Laboratory</td>
</tr>
<tr>
<td>9:50 a.m.</td>
<td>2014-01-1917</td>
<td>Powertrain Integration and Controls Development Process for a Parallel Through the Road Plug-in Hybrid Electric Vehicle</td>
</tr>
<tr>
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<td>Trevor Crain, Joshua Wilke, Brendan Boyer, Trevor Fayer, Brian Fabien, Per Reinhall, University of Washington</td>
</tr>
<tr>
<td>10:10 a.m.</td>
<td>ORAL ONLY</td>
<td>Hybrid Transaxle for a Torque-Coupled Parallel PHEV</td>
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<td>Matthew Doude, G.Marshall Molen, Mississippi State University; Joshua Hoop, AVL Powertrain Engineering</td>
</tr>
<tr>
<td>10:30 a.m.</td>
<td>2014-01-1915</td>
<td>Powertrain Design to Meet Performance and Energy Consumption Goals for EcoCAR 3</td>
</tr>
<tr>
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<td>David Ord, Eli White, P. Christopher Manning, Abhijit Khare, Lucas Shoults, Douglas Nelson, Virginia Tech</td>
</tr>
<tr>
<td></td>
<td>2014-01-1914</td>
<td>Developing Modeling and Simulation Tools in Class to Prepare Engineering Students for the Automotive Industry (Written Only -- No Oral Presentation)</td>
</tr>
<tr>
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<td>Idan Kovent, Jerry Ku, Wayne State University</td>
</tr>
<tr>
<td>2014-01-1916</td>
<td>Plug-In Hybrid Electric Vehicle Architecture Comparison for Strong Hybridization of A Mid-Size Sedan as Part of &lt;italic&gt;EcoCAR2: Plugging Into the Future&lt;/italic&gt; (Written Only -- No Oral Presentation)</td>
<td></td>
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<td>Brian Harries, Townsend Hyatt, Kenneth Leslie, Brandon Smith, Marc Compere, Embry Riddle Aeronautical University</td>
</tr>
</tbody>
</table>
Tuesday, April 8

Advanced Vehicle Technology Competitions (Part 2 of 2)

Session Code: PFL760

Room 140 A

Session Time: 1:00 p.m.

The EcoCAR 2: Plugging in to the Future student vehicle competition, sponsored by General Motors and the U.S. Department of Energy, tasks university teams with designing, implementing and refining advanced powertrains into a conventional midsize sedan. This session presents yearly results from teams in the competition, highlighting the entire EcoCAR vehicle development process.

Organizers - Steven Boyd, US Dept. of Energy; Patrick M. Walsh, Brian Benoy, Robert Jesse Alley, Argonne National Laboratory

Chairpersons - Patrick Walsh, Argonne National Laboratory

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<tr>
<th>Time</th>
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<tr>
<td>1:00 p.m.</td>
<td>2014-01-1925</td>
<td>Detailed Analysis of a Fuel Cell Plug-in Hybrid Vehicle Demonstration</td>
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<td>Shawn Salisbury, Thomas Bradley, Jake Bucher, Benjamin Geller, Colorado State Univ.</td>
</tr>
<tr>
<td>1:20 p.m.</td>
<td>2014-01-1927</td>
<td>Efficient Thermal Modeling and Integrated Control Strategy of Powertrain for a Parallel Hybrid EcoCAR2 Competition Vehicle</td>
</tr>
<tr>
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<td>Mengjia Cao, Idan Kovent, Jerry Ku, Wayne State University</td>
</tr>
<tr>
<td>1:40 p.m.</td>
<td>2014-01-1919</td>
<td>Novel Battery Cold Plate Design for Increased Passive Cooling</td>
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<td>Domenic Leo Barsotti, Sandra Boetcher, Embry-Riddle Aeronautical University</td>
</tr>
<tr>
<td>2:00 p.m.</td>
<td>2014-01-1922</td>
<td>ESS Design Process Overview and Key Outcomes of Year Two of EcoCAR 2: Plugging in to the Future</td>
</tr>
<tr>
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<td>Robert Jesse Alley, Patrick Walsh, Nicola Lambiase, Brian Benoy, Kristen De La Rosa, Argonne National Laboratory; Douglas Nelson, Virginia Tech; Shawn Midlam-Mohler, The Ohio State Univ; Jerry Ku, Wayne State University; Brian Fabien, University of Washington</td>
</tr>
<tr>
<td>2:20 p.m.</td>
<td>2014-01-1923</td>
<td>Structuring a Hybrid Vehicle Supervisory Control System Simulink Model for Simpler Version Control with Multiple Software Developers</td>
</tr>
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<td>Trevor Crain; Trevor Fayer; Brian Fabien, Per Reinhall, University of Washington</td>
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The papers in this session are available in SAE Technical Paper Collection, COLL-GTL-00001 and COLL-TP-00400, also individually. To purchase visit collections.sae.org

Planned by Hybrid and Electric Powertrains Committee / Powertrain Fuels and Lubricants Activity
Tuesday, April 8

Multi-Dimensional Engine Modeling (Part 1 of 4)

Session Code: PFL120

Room 140 B  Session Time: 9:30 a.m.

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

Organizers - Hardo Barths, General Motors; Sarah Diakhaby, Computational Dynamics, Ltd.; Allen David Gosman, CD-adapco; David Gosman, CD-adapco UK; Carl Hergart, Caterpillar Inc.

Time  Paper No.  Title

9:30 a.m.  2014-01-1117  Global Sensitivity Analysis of a Diesel Engine Simulation with Multi-Target Functions
Yuanjiang Pei, Argonne National Lab.; Ruiqin Shan, Univ. of Connecticut; Sibendra Som, Argonne National Lab.; Tianfeng Lu, Univ. of Connecticut; Douglas Longman, Michael J. Davis, Argonne National Lab.

9:50 a.m.  2014-01-1124  Modeling the Effects of High EGR Rates in Conjunction with Optimum Multiple Injection Techniques in a Heavy Duty DI Diesel Engine
Raouf Mobasher, Boroujerd Univ.; Seyed Alireza Khabbaz, Tabriz Univ.

10:10 a.m.  2014-01-1127  Mixing in Wall-Jets in a Heavy-Duty Diesel Engine: A LES Study
Rickard Solsjo, Mehdi Jangi, Clément Chartier, Oivind Andersson, Xue-Song Bai, Lund Univ.

10:30 a.m.  2014-01-1134  Numerical Study of the Influence of EGR on In-Cylinder Soot Characteristics in a Heavy-Duty Diesel Engine using CMC
Daniele Farrace, Michele Bolla, Swiss Federal Institute of Technology; Yuri M. Wright, ETH Zurich/Combustion-FlowSolutions GmbH; Konstantinos Boulouchos, Swiss Federal Institute of Technology

10:50 a.m.  2014-01-1141  Effect of Piston Bowl Shape and Swirl Ratio on Engine Heat Transfer in a Light-Duty Diesel Engine
Helgi Fridriksson, Martin Tuner, Oivind Andersson, Bengt Sundén, Lund Univ.; Hakan Persson, Mattias Ljungqvist, Volvo Car Corp.

11:10 a.m.  2014-01-1126  A Numerical Study on Stratified Turbulent Combustion in a Direct-Injection Spark-Ignition Gasoline Engine Using an Open-Source Code
Chen Huang, Ehsan Yasari, Andrei Lipatnikov, Chalmers Univ. of Technology

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00381 and SUB-TP-00009, and individually. To purchase visit collections.sae.org

Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity
Multi-Dimensional Engine Modeling (Part 2 of 4)

Session Code: PFL120

Room 140 B  Session Time: 1:00 p.m.

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

Organizers - Hardo Barths, General Motors; Sarah Diakhaby, Computational Dynamics, Ltd.; Allen David Gosman, CD-adapco; David Gosman, CD-adapco UK; Carl Hergart, Caterpillar Inc.

Time  Paper No.  Title
1:00 p.m.  2014-01-1145  Numerical Analysis of Pollutant Formation in Direct-Injection Spark-Ignition Engines by Incorporating the $G$-Equation with a Flamelet Library
Joohan Kim, Gyujin Kim, Seoul National Univ.; Hoon Lee, Advanced Institutes of Convergence Tech; Kyoungdoug Min, Seoul National Univ.

1:20 p.m.  2014-01-1151  Integrated In-Cylinder/CHT Analysis for the Prediction of Abnormal Combustion Occurrence in Gasoline Engines
Stefano Fontanesi, Giuseppe Cicaelese, Giuseppe Cantore, Alessandro D'Adamo, Università degli studi di Modena e Reggio Emilia

1:40 p.m.  2014-01-1135  Simulation and Analysis of In-Cylinder Soot Formation in a Gasoline Direct-Injection Engine Using a Detailed Reaction Mechanism
Chitralkumar V. Naik, Long Liang, Karthik Puduppakkam, Ellen Meeks, Reaction Design Inc.

2:00 p.m.  2014-01-1142  Estimation of Particulate Matter in Direct Injection Gasoline Engines by Non-Combustion CFD
Yoshihiro Sukegawa, Kengo Kumano, Kenichiro Ogata, Hitachi, Ltd.

2:20 p.m.  2014-01-1136  Charge Motion and Mixture Formation Analysis of a DISI Engine Based on an Adaptive Parallel Mesh Approach
Karl Georg Stapf, Ingenieurbuero TWB; Sandeep Menon, David Schmidt, University of Massachusetts; Michael Rieß, Marc Sens, IAV GmbH

2:40 p.m.  2014-01-1147  A LES Study on the Evolution of Turbulent Structures in Moving Engine Geometries by an Open-Source CFD Code
Andrea Montorfano, Federico Piscaglia, Angelo Onorati, Politecnico di Milano

3:00 p.m.  2014-01-1118  RANS and LES Study of Lift-Off Physics in Reacting Diesel Jets
Muhsin M. Ameen, Purdue University; John Abraham, Purdue University, University of Adelaide

3:20 p.m.  2014-01-1149  Numerical methods of improving computation efficiency on diesel spray and combustion using large eddy simulation in KIVA3V code
Lei Zhou, Tsinghua Univ.; Kai Hong Luo, University College London; Shi-jin Shuai, Tsinghua Univ.; Ming Jia, Dalian University of Technology

3:40 p.m.  2014-01-1125  Primary Atomization of a GDi Multi-Hole Plume Using VOF-LES Method
Bizhan Befrui, Mario D’Onofrio, Delphi Automotive

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00381 and SUB-TP-00008, individually. To purchase visit collections.sae.org

Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity
Tuesday, April 8

Physical Plant Models for Controls
Session Code: PFL116
Room 140 C
Session Time: 9:30 a.m.

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

Organizers - Norbert Meyer, dSPACE GmbH; Federico Millo, Politecnico di Torino; Christof Schernus, FEV GmbH; Per Tunestal, Lund University

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<th>Time</th>
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<tr>
<td>9:30 a.m.</td>
<td>ORAL ONLY</td>
<td>Session Insert: Challenges in Real Time In-Cylinder Simulation for HIL Applications - Parameterization and Discretization</td>
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<td></td>
<td>Norbert Meyer, dSPACE GmbH</td>
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<tr>
<td>9:50 a.m.</td>
<td>2014-01-1096</td>
<td>Fluid-Dynamic Modeling and Advanced Control Strategies for a Gaseous-Fuel Injection System</td>
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<td>Daniela Anna Misul, Mirko Baratta, Hamed Kheshtinejad, Politecnico di Torino</td>
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<td>10:10 a.m.</td>
<td>2014-01-1097</td>
<td>Development of Engine Model Using Modulization Method for EMS Verification through MIL and HIL</td>
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<td>Bo-Chuan Chen, Yuh-Yih Wu, Hsien-Chi Tsai, National Taipei University of Technology; Bo-Liang Chen, Industrial Technology Research Institute</td>
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<tr>
<td>10:30 a.m.</td>
<td>2014-01-1095</td>
<td>Crank-Angle Resolved Modeling of Fuel Injection and Mixing Controlled Combustion for Real-Time Application In Steady-State and Transient Operation</td>
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<td>Christoph Poetsch, AVL LIST GmbH</td>
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<tr>
<td>10:50 a.m.</td>
<td>2014-01-1092</td>
<td>Transient Build-up and Effectiveness of Diesel Exhaust Gas Recirculation</td>
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<td>Usman Asad, University of Windsor; Jimi Tjong, Ford Motor Co.</td>
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<tr>
<td>11:10 a.m.</td>
<td>2014-01-1094</td>
<td>Dual Fuel Engine Simulation - A Thermodynamic Consistent HiL Compatible Model</td>
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<td>Johann C. Wurzenberger, AVL LIST GmbH; Tomaz Katrasnik, Univ. of Ljubljana</td>
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<tr>
<td>11:10 a.m.</td>
<td>2014-01-1093</td>
<td>Control-Oriented Modeling of Turbocharged Diesel Engines Transient Combustion Using Neural Networks (Written Only -- No Oral Presentation)</td>
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<td>Taotao Wu, Changlu Zhao, Kai Han, Bolan Liu, Zhenxia Zhu, Yangyang Liu, Xiaokang Ma, Guoliang Luo, Beijing Institute of Technology</td>
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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 General Powertrain Development / Powertrain Fuels and Lubricants Activity

Tuesday, April 8

Embedded Estimator Design & Calibration
Session Code: PFL131
Room 140 C
Session Time: 1:00 p.m.

Organizers - Feilong Liu, Delphi Corp.; Peter J. Maloney, MathWorks Inc.

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Wednesday, April 9
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<th>Title</th>
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<tr>
<td>2:40 p.m.</td>
<td>2014-01-1173</td>
<td>Particle Image Velocimetry Measurements of Swirl and Scavenging in a Large Marine Two-Stroke Diesel Engine</td>
</tr>
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<td>Johan Hult, Simon Matlok, Stefan Mayer, MAN Diesel &amp; Turbo</td>
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<tr>
<td>3:00 p.m.</td>
<td>2014-01-1174</td>
<td>Analyzing In-cylinder Flow Evolution and Variations in a Spark-Ignition Direct-Injection Engine Using Phase-Invariant Proper Orthogonal Decomposition Technique</td>
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<td>Hao Chen, Min Xu, Shanghai Jiao Tong Univ.; David L.S. Hung, Univ. of Michigan - SJTU Joint Institute</td>
</tr>
</tbody>
</table>
### Engine Boosting Systems

**Session Code:** PFL520  
**Room 140 D**  
**Session Time:** 1:00 p.m.

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.

**Organizers** - Marcello Canova, Ohio State University; Eric Krivitzky, Concepts NREC; William Smith, Honeywell Intl. (Turbo Technologies); Arjun D. Tuteja

**Chairpersons** - Eric Krivitzky, Concepts NREC

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<tr>
<td>1:00 p.m.</td>
<td>2014-01-1650</td>
<td>A Comprehensive Powertrain Model to Evaluate the Benefits of Electric Turbo Compound (ETC) in Reducing CO2 Emissions from Small Diesel Passenger Cars</td>
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<td>Ivan Arsie, Andrea Cricchio, Cesare Pianese, Universita di Salerno; Matteo De Cesare, Walter Nesci, Magneti Marelli Powertrain SPA</td>
</tr>
<tr>
<td>1:20 p.m.</td>
<td>2014-01-1646</td>
<td>Responsiveness of a 30 Bar BMEP 3-Cylinder Engine: Opportunities and Limits of Turbocharged Downsizing</td>
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<td>Sebastian Martin, Christian Beidl, Technische Universitãt Darmstadt; Rolf Mueller, Mahle International GmbH</td>
</tr>
<tr>
<td>1:40 p.m.</td>
<td>2014-01-1647</td>
<td>The Radial Turbine for Small Turbocharger Applications: Evolution and Analytical Methods for Twin-Entry Turbine Turbochargers</td>
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<td>Norbert A. Schorn</td>
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<td>2:20 p.m.</td>
<td>2014-01-1656</td>
<td>1-D Simulation Study of Divided Exhaust Period for a Highly Downsized Turbocharged SI Engine - Scavenge Valve Optimization</td>
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<td>Bo Hu, Sam Akehurst, Chris Brace, Colin Copeland, University of Bath; James Turner, Jaguar Land Rover</td>
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<td>2:40 p.m.</td>
<td>2014-01-1648</td>
<td>Investigation on the Effects of Nozzle Openings for a Radial Turbine with Variable Nozzle</td>
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<td>Yinhong Liu, Dazhong Lao, Yixiong Liu, Ce Yang, Mingxu Qi, Beijing Institute of Technology</td>
</tr>
<tr>
<td>3:00 p.m.</td>
<td>2014-01-1655</td>
<td>Numerical Flow Analysis of a Centrifugal Compressor with Ported and without Ported Shroud</td>
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<td>Bernhard Semlitsch, JyothishKumar V, Mihai Mihaescu, Laszlo Fuchs, KTH Royal Institute of Technology; Ephraim Gutmark, Matthieu Gancedo, University of Cincinnati</td>
</tr>
</tbody>
</table>
3:20 p.m. 2014-01-1645 Non-Intrusive Methodology for Estimation of Speed Fluctuations in Automotive Turbochargers under Unsteady Flow Conditions
Fabrizio Ponti, Vittorio Ravaglioli, Enrico Corti, Davide Moro, University of Bologna; Matteo De Cesare, Magneti Marelli Powertrain SPA

3:40 p.m. 2014-01-1651 Quantification and Sensitivity Analysis of Uncertainties in Turbocharger Compressor Gas Stand Measurements Using Monte Carlo Simulation
Sathvick Shiva Kumar, HAN University of Applied Sciences; Bert van Leeuwen, Mitsubishi Turbocharger & Engine Europe; Aaron Costall, Imperial College London

9:30 a.m. 2014-01-1644 One Better Model of Vehicle Turbocharged Diesel Engine than VNT Turbo (Written Only -- No Oral Presentation)
Guohua Xie, Shanghai Diesel Engine Co., Ltd.; Lei Shi, Xiaoyu Xie, Shanghai Jiao Tong University

10:10 a.m. 2014-01-1652 Turbocharging of a Two-cylinder Lean-Burn Natural Gas Engine with Uneven Firing Order (Written Only -- No Oral Presentation)
Sebastian Wohlgemuth, Lisann Meiland, Georg Wachtmeister, TU Muenchen; Peter Fledersbacher, SA Charging Solutions AG

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Planned by New Engines, Components, Actuators and Sensors / Powertrain Fuels and Lubricants Activity

Tuesday, April 8

Engine Block Structures, Oil & Water Pumps, Intake, and Exhaust Systems

Session Code: PFL580
Room 140 E
Session Time: 9:30 a.m.

This session describes design, performance, and operating characteristic of components and subsystems with lubrication and cooling systems, intake and exhaust systems, and engine block structures and features.

Organizers - Dwight Doig, Cummins Inc.

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<td>9:30 a.m.</td>
<td>2014-01-1709</td>
<td>Inversion-Based Intake Manifold Pressure Control System for Modern Diesel Engines</td>
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<td>Johannes Reß, Christian Bohn, Clausthal University of Technology; Frank Märzke, Ralf Meinecke, Michael Schollmeyer, Robert Frase, IAV Automotive Engineering</td>
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<tr>
<td>10:10 a.m.</td>
<td>2014-01-1712</td>
<td>A Tridimensional CFD Analysis of the Oil Pump of an High Performance Engine</td>
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<td>Emma Frosina, Universita di Napoli; Adolfo Senatore, Dario Buono, University of Naples Federico II; Micaela Olivetti, OMIQ s.r.l.</td>
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</tbody>
</table>

2014-01-1705 Practical Considerations in the Airflow Optimization of a Single Cylinder Diesel Engine (Written Only -- No Oral Presentation)
Siva Krishna Reddy Dwarsahala, Padmavathi Ramadandi, Rehan Shaik, Radhakrishnan Shankar, Mahindra & Mahindra Ltd.

2014-01-1707 Design and Development of a Novel Charge Boosting System for a Single Cylinder SI Engine (Written Only -- No Oral Presentation)
Saravanan D, Anish Gokhale, Karthikeyan N, Mahindra 2 Wheelers Ltd.
Tuesday, April 8

New CI & SI Engines and Components

Session Code: PFL510
Room 140 E  Session Time: 1:00 p.m.

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

Organizers - Jeffrey Naber; Bryon Wasacz, Chrysler Engineering

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<tr>
<th>Time</th>
<th>Paper No.</th>
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<tr>
<td>1:00 p.m.</td>
<td>2014-01-1627</td>
<td>Geometric Parameter Design of a Multiple-Link Mechanism for Advantageous Compression Ratio and Displacement Characteristics</td>
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<td>Zhenyu Zhang, Changlu Zhao, Dan Wu, Fujun Zhang, Guoliang Luo, Beijing Institute of Technology</td>
</tr>
<tr>
<td>1:40 p.m.</td>
<td>2014-01-1632</td>
<td>Investigation and Development of Fuel Slosh CAE Methodologies</td>
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<td>Dhaval Vaishnav, Mike Dong, Mayur Shah, Francisco Gomez, Mohammad Usman, Ford Motor Co.</td>
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<tr>
<td>2:00 p.m.</td>
<td>2014-01-1635</td>
<td>Development of Nu 2.0L CVVL Engine</td>
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<td>Kyoung-Pyo Ha, Hyundai Motor Co.</td>
</tr>
<tr>
<td>2:20 p.m.</td>
<td>2014-01-1636</td>
<td>Design Optimization of FEAD System to Meet Durability Target in a New Vehicle Development Program</td>
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<td>Narinder Kumar, Amit Gautam, Vineet Gupta, Maruti Suzuki India Ltd.</td>
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<tr>
<td>2:40 p.m.</td>
<td>2014-01-1637</td>
<td>Rolling Elements Assessment on Crankshaft Main Bearings of Light Duty Diesel Engine</td>
</tr>
<tr>
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<td></td>
<td>Yannick Baubet, SKF; Carl Pisani, Phil Carden, Ricardo UK Ltd.; Lex Molenaar, Adam Reedman, SKF</td>
</tr>
</tbody>
</table>
Tuesday, April 8

Advanced Hybrid and Electric Vehicle Powertrains (Part 1 of 4)

Session Code: PFL710
Room 140 G
Session Time: 9:30 a.m.

This session covers new production and near-production hybrid powertrains, hybrid architecture, and testing.


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<tr>
<th>Time</th>
<th>Paper No.</th>
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<tbody>
<tr>
<td>9:30 a.m.</td>
<td>2014-01-1788</td>
<td>Development of Jatco CVT8 Hybrid for Infiniti JX and Nissan Pathfinder</td>
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<td>Tatsuya Osone, JATCO, Ltd.; Terauchi Seiji, Nissan Motor Co. Ltd.; Takeshi Yamamoto, Geely Group; Xianjun Dai, Xiyue Yuan, Tongji Univ.</td>
</tr>
<tr>
<td>9:50 a.m.</td>
<td>2014-01-1793</td>
<td>Development of a Compact Compound Power-Split Hybrid Transmission Based on Altered Ravigneaux Gear Set</td>
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<td>Chen Wang, Tongji Univ.; Zhiguo Zhao, Tongji Univ.; Tong Zhang, Geely Group; Xanjun Dai, Xiyue Yuan, Tongji Univ.</td>
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<tr>
<td>10:10 a.m.</td>
<td>2014-01-1797</td>
<td>Performance Evolution of a One-motor Two-Clutch Parallel Full Hybrid System</td>
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<td>Kayo Otokawa, Koichi Hayasaki, Tatsuo Abe, Kenichiro Gunji, Nissan</td>
</tr>
<tr>
<td>10:30 a.m.</td>
<td>2014-01-1799</td>
<td>Study of Power Losses in a Two-Speed Dual Clutch Transmission</td>
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<td>Xingxing Zhou, Paul Walker, Nong Zhang, Univ. of Technology Sydney; Bo Zhu, Beijing Electric Vehicle Co. Ltd.; Jiageng Ruan, Univ. of Technology Sydney</td>
</tr>
<tr>
<td>10:50 a.m.</td>
<td>2014-01-1821</td>
<td>Electric Drive System for SPORT HYBRID SH-AWD</td>
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<td>Koichi Ono, Honda R&amp;D Co., Ltd.</td>
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The papers in this session are available in SAE Technical Paper Collection, COLL-GTL-00001, COLL-TP-00379 and TP-00003, and also individually. To purchase visit collections.sae.org

Planned by Hybrid and Electric Powertrains Committee / Powertrain Fuels and Lubricants Activity

Tuesday, April 8
Advanced Hybrid and Electric Vehicle Powertrains (Part 2 of 4)

Session Code: PFL710  
Room 140 G  
Session Time: 1:00 p.m.

This session covers new production and near-production hybrid powertrains, hybrid architecture, and testing.


Time | Paper No. | Title
---|---|---
1:00 p.m. | 2014-01-1801 | A Framework for Optimization of the Traction Motor Design Based on the Series-HEV System Level Goals  
Andrej Ivanco, Clemson-ICAR; Kan Zhou, Heath Hofmann, University of Michigan; Zoran Filipi, Clemson-ICAR

1:20 p.m. | 2014-01-1789 | Contribution of Road Grade to the Energy Use of Modern Automobiles Across Large Datasets of Real-World Drive Cycles  
Eric Wood, Evan Burton, Adam Duran, Jeffrey Gonder, National Renewable Energy Laboratory

1:40 p.m. | 2014-01-1813 | Powersplit HEV Performance Simulation Capability  
Sharon Leach, Mark Jennings, Ford Motor Co.

2:00 p.m. | 2014-01-1820 | Power Management of Hybrid Electric Vehicles based on Pareto Optimal Maps  
Alexander T. Zaremba, Ciro Soto, Mohammad Shakiba-herfeh, Mark Jennings, Ford Motor Co.

2:20 p.m. | 2014-01-1811 | Development of Power Management Strategy using Dynamic Programming for BSG Mild HEV  
Feng-Chi Hsieh, Ta-Wei Chou, Yuan-Chun Chen, Yin-Dar Huang, Yu-Wei Lin, Yu-Wen Peng, Hua-Chuang Auto Info Tech. Ctr. (HAITEC)

2:40 p.m. | 2014-01-1790 | Application of 48 Volt for Mild Hybrid Vehicles and High Power Loads  
Malte Kuypers, Delphi Automotive

3:00 p.m. | 2014-01-1794 | Conceptual Powertrain Components Matching for a Hybrid Electric Vehicle with a Single Clutch-Coupled Traction Motor  
Calvin C. Lee, Yuan Li, Guopeng Luo, Jiankun Yin, Liyuan Liu, China FAW R&D Center

3:20 p.m. | 2014-01-1795 | Analysis and Optimization of a Parallel Hydraulic Hybrid  
Justin T. Wagner, Thomas Bradley, Colorado State Univ.

The papers in this session are available in SAE Technical Paper Collection, COLL-GTL-00001 and COLL-TP-00379, also individually. To purchase visit collections.sae.org

Planned by Hybrid and Electric Powertrains Committee / Powertrain Fuels and Lubricants Activity

Tuesday, April 8

Chat with the Experts: The Role of Semiconductors in the Future of Transportation

Session Code: AECHAT  
Room 330 A/B  
Session Time: 4:00 p.m.
Every year, Americans spend an average of 38 hours stuck in traffic. As the wait time refuses to hit the brakes, technologists and automobile manufacturers have continued to pioneer advancements that allow drivers to stay connected on the road. In fact, 55 percent of connected devices on the market will be car-related by 2020 and driver assistant systems will be in 50 percent of all new cars. The overall value of the connected car industry is expected to rise to $600 billion over the next seven years alone. This means the greatest potential for growth in smart devices lie not in household or consumer items, such as smart TVs or wearable technologies, but in the automotive industry and the continued development of the connected car. Government regulation on energy, intelligent traffic management and policy prevention of accidents and car hacking are driving manufacturers to implement electronics powered by semiconductor technology.

During this chat session, Drue Freeman, Senior Vice President of Global Automotive Sales and Marketing, NXP Semiconductors, will discuss the major trends shaping the future of transportation and the automotive industry in a connected world, specifically energy efficiency, connected devices, security and safety.

**Presenters** - Leland Jeffrey Key, NXP Semiconductors

**Tuesday, April 8**

**Chat with the Experts: Connected Car**

**Session Code:** AECHAT

**Room 330 A/B**  
**Session Time:** 4:00 p.m.

This session will discuss why no manufacturer has it quite right yet because they are not creating the opportunity for a ubiquitous app ecosystem. It will explain how an app ecosystem can be specifically tailored for in-vehicle head unit systems and what the ecosystem would look like from a software perspective. It will outline the benefits for automobile OEMs, who can leverage the ever-improving web browser on smartphones to stay relevant with a rich and dynamic app portfolio, and also the benefits for developers, who can leverage the flexibility of HTML5 code to create apps for various mobile operating systems and devices.

**Presenters** - Michael O'Shea, Albalta Technologies Inc.

**Tuesday, April 8**

**Chat with the Experts: Advances in Automotive Real-time Software Architecture**

**Session Code:** AECHAT

**Room 330 A/B**  
**Session Time:** 4:00 p.m.

Interactive distributed automotive real time systems are typically used due to the increase in the complexity of automotive system design. The software development of these systems is very challenging and has many real-time constraints distributed in several electronic control units (ECUs) and communication bus(es). This Chat will discuss the challenges in the real time software architectures due to the stated challenges. The AUTOSAR timing extension will be explored as a good practice to provide clear timing requirements for each ECU and provide sufficient timing information for real time measurements and for efficient validation of the system real time requirements. Furthermore, the new trends of real time measurements and profiling to validate the real time architecture will be covered. Finally, the impact of using multi-core for such distributed automotive real time systems could be discussed taking AUTOSAR Release 4 operating system as an example.

**Presenters** - Mostafa Anwar Taie, MTAie

**Tuesday, April 8**

**Chat with the Experts: Misleading Testing Definitions Lead to Poor Quality, Reliability, Durability, and Profit. How Can This Situation Be Improved?**

**Session Code:** IDMCHAT

**Room 330 A/B**  
**Session Time:** 4:00 p.m.

Many professionals do not know the precise differences between fatigue testing, proving ground testing, vibration testing, durability testing, reliability testing, and accelerated reliability testing. The basic problem is not only in definitions, but in incorrect evaluation and prediction after testing. The Chat will discuss how one could eliminate the above problem.

**Presenters** - Lev Klyatis, Sohar Inc.; Bryan Dodson, SKF

**Tuesday, April 8**
Chat with the Experts: Light Metals and Manufacturing for Vehicle Lightweighting

**Session Code:** MCHAT

**Room 330 A/B**  
**Session Time:** 4:00 p.m.

Advanced light metals are increasingly being used in the transportation industries for weight reduction and energy efficiency. This topic will discuss the current aluminum and magnesium alloys, manufacturing processes (casting, forming and joining) and design integration of light metal components and subsystems for automotive powertrain, interior, chassis and body structures.

**Presenters** - Alan Luo, Ohio State University

Tuesday, April 8

Chat with the Experts: Integration of High Strength and High Ductility Metals for Light Weight Automotive Applications

**Session Code:** MCHAT

**Room 330 A/B**  
**Session Time:** 4:00 p.m.

The ability to create structural materials of high yield strength and yet high ductility has been a dream for materials scientists for a long time. The study of the mechanical behavior of the surface nanostructured materials using SMAT (Surface Mechanical Attrition Treatment) shows significant enhancements in mechanical properties of the nanostructured surface layer in different materials. We summarize our recent works on the advanced metallic nanomaterials with exceptional dual mechanical properties using multiscale metallurgical structure-driven design combined with advanced mechanical simulation. The effect of surface nanostructures on the mechanical behavior and on the failure mechanism of metallic material shows the possibility to develop a new strength gradient composite. The results show three key mechanisms for the enhancement and the extraordinary properties of layered and nanostructured metallic stainless steel sheet. The computational models and experimental results successfully provide valuable information about the nanomaterials properties as a function nanostructure configuration (nanograins and nanotwins). The processing of nanomaterials using mechanical processing and heat treatment have been studied at nanoscale and atomic scale. With a detailed knowledge of the processing using high speed camera, we were able to accurately estimate the strain rate at different depths by analytical modeling and to study the correlation between the resulting microstructures and the strain/strain rate history of the material. The material studies using nanomechanics based experimental investigations (nanoindentation and nano-pillar tests) can reveal the effects of the atomic structure and nanostructure gradient on the mechanical behaviors. The failure mechanisms studies at nano-, micro- and macroscopic scale can provide efficient ways to enhance the ductility of materials using the general approach of non localization. The potential applications for automotive industry will be shown. The delay fracture of nanostructural TWIP steels and associated technological challenges will be addressed and we will show the possible technical solutions. We will also present two design examples for the integration advanced nanosteels for the crash box and roof. Finally other potential materials such as nanostructured Mg alloys and advanced design solution with lattice structure will be introduced.

**Presenters** - Jian Lu, City Univ. of Hong Kong

Tuesday, April 8

Chat with the Experts: Silicone Science Supports Design Initiatives for Sustainable Innovation

**Session Code:** MCHAT

**Room 330 A/B**  
**Session Time:** 4:00 p.m.

Sustainable innovation is a key need for meeting automotive design trends. Silicone science is stepping up to the challenge with optimized solutions for cost-effective reliability. CVJ boots can benefit from a new silicone rubber that combines excellent heat resistance with high levels of flex-fatigue life. Liquid silicone rubber and new options in fluoro liquid silicone rubber can boost process efficiency. Next-generation fluorosilicone rubber and high-consistency silicone rubber can be co-extruded for more durable turbocharger hoses; a special interlayer adhesion technology increases peel strength. Silicone science focuses on innovation.

**Presenters** - Gabriel Knee, Dow Corning

Tuesday, April 8

Chat with the Experts: What are the Challenges of Developing Increasingly Efficient Gasoline Engines of the Future?

**Session Code:** PFLCHAT

**Room 331 B/C**  
**Session Time:** 3:30 p.m.
Advances in automotive gasoline engine technology will continue to play a pivotal role in the reduction of greenhouse gases. A key enabler for improved efficiency is increased power density, but this is restrained by the limits of knock and pre-ignition. Experts will share their experience and thoughts on technologies that can be collectively combined to push beyond the current knock/pre-ignition ceiling. They will also examine how these technologies contribute to greater engine efficiency.

**Moderators** - Mazen Hammoud, Ford Motor Co.

**Presenters** - Thomas Grissom, BorgWarner Automotive; Marc Sens, IAV GmbH; Matti Vint, VALEO; Akram Zahdeh, GM; James Zizelman, Delphi Corp.

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**Tuesday, April 8**

### Multi-Media Systems

**Session Code:** AE307  
**Room 332**  
**Session Time:** 9:30 a.m.

This session covers topics relating to vehicular entertainment and information systems. Specific subjects include multiband antennas, satellite radio reception, measuring and evaluating audio systems, navigation, displays, infotainment busses, audio amplifiers, and loudspeakers.

**Organizers** - Thomas Hermann, Ford Motor Co.; Robert Klacza, Chrysler Group LLC (retired); Richard S. Stroud, Stroud Audio Inc.

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<tr>
<th>Time</th>
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<tr>
<td>9:30 a.m.</td>
<td>2014-01-0261</td>
<td>Sample-Rate Conversion for Non-Clocked Audio Sources</td>
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<td>Bill Whikehart, Visteon Electronic Systems Div.</td>
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<td>9:50 a.m.</td>
<td>2014-01-0262</td>
<td>Technical Approach in Reducing GUI Development Cycle Time for</td>
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<td>Adopting the Connectivity Solutions in Automotive Infotainment</td>
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<td>Kasiraja Thangapandian, Visteon Technical and Services Centre; Kumaran</td>
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<td>Bharaheesadan, Visteon Automotive Systems India Ltd.; Binoy Melatt</td>
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<td>Vythakkatt, Visteon Technical and Services Centre</td>
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<td>10:10 a.m.</td>
<td>2014-01-0263</td>
<td>A Study of Cultural Influence in Automotive HMI: Measuring</td>
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<td>Correlation between Culture and HMI Usability</td>
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<td>Tawhid Khan, TATA Motor European Technical Centre Plc; Mark Williams,</td>
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<td>University of Warwick</td>
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<td>10:30 a.m.</td>
<td>2014-01-0266</td>
<td>In-Vehicle Touchscreen Concepts Revisited: Approaches and</td>
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<td>Possibilities</td>
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<td>Jason Lisseman, Takata Holdings Inc.; Lisa Diwischek, Stefanie Essers,</td>
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<td>Takata AG; David Andrews, Takata Holdings Inc.</td>
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<td>10:50 a.m.</td>
<td>2014-01-0264</td>
<td>Multi-Notch Filter (MNF) Algorithm for Automotive Radio-Frequency</td>
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<td>(RF) Signal Processing and Applications</td>
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<td>Yao H. Kuo, Visteon Electronic Systems Div.</td>
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Planned by Testing and Instrumentation Committee / Automobile Electronics Activity

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**Tuesday, April 8**

### Smart Grid Technologies and Infrastructure

**Session Code:** AE400  
**Room 332**  
**Session Time:** 1:00 p.m.

This session will provide real world updates on consumer behavior who are part of the DOE awarded EV Project as well as other research using models and consumer data to analyze the affect on the grid during PEV charging. Also presented will be strategies for PEV charging and synergies for integrating PEV's into the grid by way of existing infrastructure.

**Organizers** - Donna Bell, Ford Motor Co.; Scott Craig, Infineon Technologies North America Corp.; Alex Escutia,
### Optimization Driven Design Automation of E/E Architectures

**Session Code:** AE318  
**Room 333**  
**Session Time:** 9:30 a.m.

This session addresses methodologies, methods, and tools for the systematic optimization of E/E control architectures with respect to cost, mass, weight, latency, and energy, among others. The session covers the progress made both in the academia and in the automotive and tool industry. The session will also include a keynote speaker from the aerospace industry presenting the lessons learned in this key area and how they could be applied to the automotive industry.

**Organizers:**  
Amit Choudhury, ADVICS North America Inc.; Paolo Giusto, General Motors Co.

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<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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| 1:00 p.m.| 2014-01-0342 | Second Life Battery Pack as Stationary Energy Storage for Smart Grid  
Shijie Tong, Matthew Klein, Univ. of California |
| 1:20 p.m.| 2014-01-0343 | Assessing Grid Impact of Battery Electric Vehicle Charging Demand Using GPS-Based Longitudinal Travel Survey Data  
Jing Dong, Iowa State University; Zhenhong Lin, Changzheng Liu, Oak Ridge National Laboratory; Yanghe Liu, Entergy |
| 1:40 p.m.| 2014-01-0344 | Electric Grid Integration Costs for Plug-In Electric Vehicles  
Jeff Berkheimer, Jeff Tang, Bill Boyce, Deepak J. Aswani, Sacramento Municipal Utility District |
| 2:00 p.m.| 2014-01-0345 | Integration of Electric Vehicle Charging into an International and Environment-friendly Context  
Moritz Weigand, Sven Bohn, Daniel Beyer, Michael Agsten, Fraunhofer IOSB-AST |
| 2:20 p.m.| Panel    | Panel Discussion: Energy Independence and the Smart Grid  
In this panel discussion, we will explore the role of the vehicle on the grid both from a conventional viewpoint, as well as, a Grid Integrated Vehicle (GIV) with Vehicle to Grid Technology (V2G) concept. The panelists will provide their respective points of view as we look at the opportunities and challenges for a sustainable energy future.  
Moderators - Scott Craig, Global Account Executive, OEM Business Development, Infineon Technologies North America Corp.  
Hawk Asgeirsson, DTE Energy; Doug Houseman, VP of Innovation and Technology, EnerNex; Daniel Lindenmeyer, Senior Business Development Manager, Infineon Technologies North America Corp.; David A. McCreadie, Vehicle Electrification and Infrastructure, Sustainable Business Strategies, Ford Motor Co.; Matthew Nielsen, Principal Scientist, Platform Technologies Leader Controls, Electronics & Signal Processing, GE Global Research; Caisheng Wang, Associate Professor Electrical and Computer Engineering, Wayne State University;  
Panelists - Shijie Tong, Matthew Klein, Univ. of California  
Jing Dong, Iowa State University; Zhenhong Lin, Changzheng Liu, Oak Ridge National Laboratory; Yanghe Liu, Entergy  
Jeff Berkheimer, Jeff Tang, Bill Boyce, Deepak J. Aswani, Sacramento Municipal Utility District  
Moritz Weigand, Sven Bohn, Daniel Beyer, Michael Agsten, Fraunhofer IOSB-AST |

The papers in this session are available in SAE Technical Paper Collection, COLL-GTL-00001, and also individually. To purchase visit collections.sae.org

Planned by Testing and Instrumentation Committee / Automobile Electronics Activity

**Tuesday, April 8**
This session focuses on cybersecurity for cyber-physical vehicle systems. Topics include: design, development and implementation of security-critical cyber-physical vehicle systems, cybersecurity design, development, and implementation strategies, analysis methodologies, process and life-cycle management, comparisons of system safety and cybersecurity, etc. Application areas include: security-critical automotive systems as well as other security-critical ground vehicle and aviation systems.

**Organizers** - Amit Choudhury, ADVICS North America Inc.; Barbara J. Czerny, Chrysler Group LLC

**Chairpersons** - Barbara J. Czerny, Di Jin, Chrysler Group LLC

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<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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| 9:30 a.m. | ORAL ONLY | **Technical Keynote: Achieving Systems Understanding through MBSE-centric Analytics**  
Christopher Oster, Lockheed Martin Space Systems Co. |
| 10:10 a.m. | 2014-01-0320 | **Electrical Architecture Optimization and Selection - Cost Minimization via Wire Routing and Wire Sizing**  
Chung-Wei Lin, University of California; Lei Rao, Joseph D'Ambrosio, General Motors Co.; Alberto Sangiovanni-Vincentelli, University of California |
| 10:30 a.m. | 2014-01-0319 | **Combinatorial Design Optimization of Automotive Systems by Connecting System Architecture Models with Parts Catalog**  
Hongman Kim, David Fried, Grant Soremekun, Phoenix Integration Inc. |
| 10:50 a.m. | ORAL ONLY | **Redistribution of Software Functions to Optimize E/E Architectures**  
Scott Stevens, Steffen Nass, Vector CANtech Inc. |
| 11:10 a.m. | 2014-01-0318 | **Key Attributes of an EDS Design Environment Built for Optimization**  
Sjon Moore, Mentor Graphics Corp. |
| 11:30 a.m. | 2014-01-0317 | **Timing Evaluation in E/E Architecture Design at BMW (Written Only -- No Oral Presentation)**  
Dan Gunnarsson, Matthias Traub, Christian Pigorsch, BMW AG |

Planned by Testing and Instrumentation Committee / Automobile Electronics Activity

**Tuesday, April 8**

**CyberSecurity For Cyber-Physical Vehicle Systems**

**Session Code:** AE321

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

**Organizers** - Amit Choudhury, ADVICS North America Inc.; Barbara J. Czerny, Chrysler Group LLC

**Chairpersons** - Barbara J. Czerny, Di Jin, Chrysler Group LLC

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<tr>
<th>Time</th>
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| 1:00 p.m. | ORAL ONLY | **The ARTEMIS SESAMO Project**  
Joseph G. D'Ambrosio, Rami Ismail Debouk, GM R&D Center |
| 1:20 p.m. | ORAL ONLY | **Guidelines for Vehicle Cyber Security**  
Hirofumi Onishi, Alpine Electronics of America Inc. |
| 1:40 p.m. | ORAL ONLY | **An Approach to Safety and Security Analysis for Automotive Systems**  
Marc Born, IKV Technologies AG |
| 2:00 p.m. | 2014-01-0334 | **Adapted Development Process for Security in Networked Automotive Systems**  
Karsten Schmidt, Audi Electronics Venture GmbH; Peter Tröger, Hasso Plattner Institute; Hans-Martin Kroll, FTI, Technische Universität München; Thomas Bünger, Hasso Plattner Institute; Florian Krueger, Audi AG; Christian Neuhaus, Hasso-Plattner-Institut |
| 2:20 p.m. | ORAL ONLY | **Threat Analysis and Risk Assessment Overview**  
Barbara J. Czerny, Chrysler Group LLC; David Ward, MIRA, Ltd. |
| 2:40 p.m. | 2014-01-0338 | **Protection of Intellectual Property Rights in Automotive Control Units**  
Armin Wasicek, University of California |
Embedded software is a key enabler for technical innovations in the automotive industry. This session is designed to cover new processes, methods, and applications of new processes/methods to reduce development time and improve the quality of embedded software. A particular emphasis will be placed on methods such as executable specification, design through simulation, early verification, automatic code generation, and PC-based model in-the-loop and software in-the-loop testing.

Vivek Jaikamal, ETAS Inc.; Wensi Jin, MathWorks Inc.; Robert Miller, Vector CANtech Inc.

Organizers - Vivek Jaikamal, ETAS Inc.; Robert Miller, Vector CANtech Inc.

Chairpersons - Vivek Jaikamal, ETAS Inc.; Robert Miller; Christopher J. Fillyaw, MathWorks Inc.

The papers in this session are available in SAE Technical Paper Collection, COLL-GTL-00001 and COLL-TP-00417, also individually. To purchase visit collections.sae.org

Planned by Testing and Instrumentation Committee / Automobile Electronics Activity

Tuesday, April 8

Model-Based Design and In-Vehicle Software (Part 1 of 2)

Session Code: AE316

Room 338

Session Time: 9:30 a.m.

Embedded software is a key enabler for technical innovations in the automotive industry. This session is designed to cover new processes, methods, and applications of new processes/methods to reduce development time and improve the quality of embedded software. A particular emphasis will be placed on methods such as executable specification, design through simulation, early verification, automatic code generation, and PC-based model in-the-loop and software in-the-loop testing.


Chairpersons - Vivek Jaikamal, ETAS Inc.; Robert Miller; Christopher J. Fillyaw, MathWorks Inc.

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<tr>
<th>Time</th>
<th>Paper No.</th>
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<tr>
<td>9:30 a.m.</td>
<td>2014-01-0308</td>
<td>A Pragmatic Model-Based Product Engineering Process</td>
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<td>Alexandros Mouzakitis, Jaguar Land Rover; Paul Jennings, Gunwant Dhadyalla, University of Warwick; Gerard Lancaster, Jaguar Land Rover</td>
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<tr>
<td>9:50 a.m.</td>
<td>2014-01-0310</td>
<td>Physical Modeling Considerations for Control System Development</td>
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<td>Thomas Egel, Scott Furry, MathWorks Inc.</td>
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<tr>
<td>10:10 a.m.</td>
<td>2014-01-0189</td>
<td>Desktop Simulation and Calibration of Diesel Engine ECU Software</td>
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<td>using Software-in-the-Loop Methodology</td>
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<td>Bjorn Lumpp, MAN Truck &amp; Bus AG; Mouham Tanimou, Robert Bosch GmbH; Martin McMackin, Eva Bouillon, Erica Trapel, MAN Truck &amp; Bus AG; Micha Muenzenmay, Klaus Zimmermann, Robert Bosch GmbH</td>
</tr>
<tr>
<td>10:30 a.m.</td>
<td>2014-01-0304</td>
<td>Model-Based Design Methods for the Development of Transmission Control Systems</td>
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<td>Markus Schnabler, Christoph Stifter, Hofer f&amp;e GmbH</td>
</tr>
</tbody>
</table>
Model-Based Design and In-Vehicle Software (Part 2 of 2)

Session Code: AE316

Room 338

Session Time: 1:00 p.m.

Embedded software is a key enabler for technical innovations in the automotive industry. This session is designed to cover new processes, methods, and applications of new processes/methods to reduce development time and improve the quality of embedded software. A particular emphasis will be placed on methods such as executable specification, design through simulation, early verification, automatic code generation, and PC-based model-in-the-loop and software-in-the-loop testing.


Chairpersons - Vivek Jaikamal, ETAS Inc.; Robert Miller; Christopher J. Fillyaw, MathWorks Inc.

Time | Paper No. | Title
--- | --- | ---
1:00 p.m. | 2014-01-0315 | Automated Test Case Generation for Automotive Embedded Software Testing Using XMI-Based UML Model Transformations
| | | Ki-Wook Shin, Hanyang University; Shim soo Kim, Sam Min Park, Daedong Co., Ltd.; Dong-Jin Lim, Hanyang University
1:20 p.m. | 2014-01-0313 | Distributed Development of Large-Scale Model-Based Designs in Compliance with ISO 26262
| | | Ingo Stuermer, Model Engineering Solutions; Ulrich Eisemann, dSPACE GmbH; Elke Salecker, Model Engineering Solutions
1:40 p.m. | 2014-01-0305 | Application of Auto-Coding for Rapid and Efficient Motor Control Development
| | | James Walters, Cahya Harianto, Edward Kelly, Tanto Sugiarto, Delphi Automotive
2:00 p.m. | ORAL ONLY | Efficient Model Management for Model-based Development
| | | Dirk Fleischer, Michael Beine, Salah AKSAS, dSPACE GmbH
| | | Rupesh Sonu Kakade, Jitesh Patel, Automotive Design

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00424, and also individually. To purchase visit collections.sae.org

Planned by Testing and Instrumentation Committee / Automobile Electronics Activity

Tuesday, April 8

Chat with the Experts: Vibration Isolation Mounting Techniques in the Ground Vehicles

Session Code: MCHAT
A travelling vehicle vibrates due to the road irregularities and powertrain internal excitation. These vibrations are transmitted from one component to the other and transferred to the occupants. These vibrations could cause high loads affecting vehicle durability and reduce the ride comfort. There are many mounts, such as engine mounts, shock tower mounts, cab mounts, seat mounts, used to isolate these vibrations. This talk will address the different types of mounts, such as rubber mount, hydro mount and friction-type mount applied on the ground vehicle. Their characteristics modeling will be discussed. Some examples on component vibration isolation mounting design will be presented.

Presenters - Peijun Xu, Ebco Inc.

Tuesday, April 8

Panel Discussion: Managing Different Life Cycles for Embedded Software, Embedded Hardware, Enterprise Software, User Devices and Apps, Navigation and Infotainment

Session Code: AE199

Room 338  Session Time:  4:00 p.m.

In-Vehicle Infotainment, telematics, and connected vehicle systems have become the most complex systems in most passenger cars. The amount of code in these products now dwarfs other systems. Driven by the rapid development cycles from consumer electronic products and the vehicle owner’s desire to replicate these features in their cars, vehicle manufacturers struggle to keep their offerings fresh or current. Open source software collaboration not only offers a methodology for reducing connected vehicle development cycles but is also driving innovation and a new industry paradigm.

Organizers - Michael J. Nunnery
Moderators - Matt Jones, Jaguar Land Rover
Panelists - Thomas Bloor, Intel Corp.; Walter Buga, Arynga; Kyle Walworth, Symphony Teleca; Doug Welk, Delphi Electronics & Safety;

Tuesday, April 8

Modeling and Simulation Techniques for Dynamic System Analysis and Design

Session Code: AE201

Room 353  Session Time:  1:00 p.m.

Historically, modeling and simulation efforts of dynamic systems have typically been domain specific, that is, independently modeling the individual domain behavior of the various subsystems (electrical, mechanical, hydraulic, magnetic, thermal, etc.). As the complexity of these subsystems and their inter-domain interactions increase, it is imperative that the inter-domain behaviors and effects are taken into account when modeling and simulating the resulting dynamic system. This session will focus on the latest techniques used in the Automotive industry for modeling and simulation of these systems.


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<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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</table>
| 1:00 p.m. | 2014-01-0195 | Modeling and Experimental Validation of the Solenoid Valve of a Common Rail Diesel Injector  
Benedikt Huber, Heinz Ulbrich, Technische Universität München |
| 1:20 p.m. | 2014-01-0196 | Modeling and Identification of a Gasoline Common Rail Injection System  
Remko Baur, Jan Peter Blath, Hannover University of Applied Sciences; Christian Bohn, Clausthal University of Technology; Franz Kallage, Matthias Schultalbers, IAV GmbH |
| 1:40 p.m. | 2014-01-0197 | A Neural Network-Based Direct Inverse Model Application to Adaptive Tracking Control of Electronic Throttle Systems  
Salem Al-Assadi, IAV Automotive Engineering Inc. |
Tuesday, April 8

Occupant Protection: Safety Test Methodology

Session Code: B407

Room 354

Safety Test Methodology Session in 2014 presents papers in advancement of auto-safety-related analytical/testing methods in frontal, side and rollover impacts, and energy-absorbing materials.

Organizers - Clifford C. Chou; Jason R. Kerrigan, Univ. of Virginia; Jerry Le, Ford Motor Co.; P. Miller II, MGA Research Corp.; Anindya Deb, Indian Institute of Science


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<th>Time</th>
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<tr>
<td>1:00 p.m.</td>
<td>2014-01-0534</td>
<td>Scalable Multi-Purpose Virtual Human Model for Future Safety Assessment</td>
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<td>Jan Vychytil, University of West Bohemia; Jaroslav Manas, MECAS ESI s.r.o.; Hana Cechova, Stanislav Spirk, Ludek Hyncik, University of West Bohemia; Ludek Kovar, MECAS ESI s.r.o.</td>
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<tr>
<td>1:20 p.m.</td>
<td>2014-01-0538</td>
<td>Pulse Sensitivity of a Child Restraint System, Near-Side Impact Fixture</td>
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<td>Janet Brelin-Fornari, Sheryl Janca, Kettering Univ.</td>
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<tr>
<td>1:40 p.m.</td>
<td>2014-01-0537</td>
<td>A Comparison of the NHTSA Research Offset Oblique and Small Overlap Impact Tests and the IIHS Moderate and Small Overlap Tests</td>
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<td>Joyce Lam, Nate J. Dennis, Jeff Dix, Martin Lambrecht, Nissan North America, Inc.; Ryuuji Ootani, Nissan Motor Co., Ltd.</td>
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<td>2:00 p.m.</td>
<td>2014-01-0540</td>
<td>Design and Evaluation of a Guided Dynamic Rollover Test Device</td>
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<td>Shai Cohen, Dhafer Marzougui, Cing-Dao Kan, George Mason Univ.; Fadi Tahan, George Washington Univ.</td>
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<td>2:40 p.m.</td>
<td>ORAL ONLY</td>
<td>High Strain Rate Tensile Testing of Long Fiber Filled Polymers: Steps towards Development of a Standard</td>
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<td>Susan I. Hill, Univ. of Dayton Research Institute</td>
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<td>3:00 p.m.</td>
<td>2014-01-0569</td>
<td>A Neural Network Approach for Predicting Collision Severity</td>
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<td>Ishika Zonina Towfic, Jennifer Johrendt, University of Windsor</td>
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Tuesday, April 8

Transmission and Driveline (Part 1 of 7): Driveline NVH

Session Code: PFL660  
Session Time: 9:30 a.m.

This session addresses transmission noise, vibration, and harshness (NVH) issues and design solutions.

Organizers - Rakan Chabaan, Gang Chen, John C. Collins, Chrysler Group LLC; Patrick Robert Darmstadt, Boeing Helicopters; Hussein Dourra, Chrysler Group LLC; Fabio Ferreira, Schaeffler Brasil, Ltd.; Michael E. Fingerman, John A. Frait, Chrysler Group LLC; Joel Gunderson, James Hendrickson, Chunhao Lee, Dongxu Li, General Motors Co.; Berthold Martin, Chrysler Group LLC; Thomas Martin, General Motors Co.; David Popejoy, Craig Renneker, Ford Motor Co.; Farzad Samie, General Motors Co.; Brian Carl Schneidewind, Toyota Technical Center USA Inc.; Tejinder Singh, General Motors Co.; Robert A. Smithson, Dana Holding Corporation; Erich L. Wilfinger, Jatco USA Inc.

Chairpersons - Chunhao Lee, General Motors Co.; Fabio Da Silva Ferreira

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<th>Time</th>
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<tr>
<td>9:30 a.m.</td>
<td>2014-01-1758</td>
<td>Experimental Investigation of the Low Pass Filtering Effect of a Hydrostatic Bearing</td>
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<td>Zamir Zulkefli, Universiti Putra Malaysia; Maurice Adams, Case Western Reserve University</td>
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<tr>
<td>9:50 a.m.</td>
<td>2014-01-1756</td>
<td>A Direct Comparison between Numerical and Experimental Results for Airborne Noise Levels in Automotive Transmission Rattle</td>
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<td>Miguel De la Cruz, Stephanos Theodossiades, Loughborough University</td>
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<tr>
<td>10:10 a.m.</td>
<td>2014-01-1757</td>
<td>The Study of Torque Control Characteristics for the Optimization of the NVH of an Electric Vehicle</td>
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<td>Marco Mammetti, Marina Roche Arroyos, Applus Idiada</td>
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<tr>
<td>10:30 a.m.</td>
<td>ORAL ONLY</td>
<td>Modeling A NVH Phenomenon in Driveline Caused By Axial Vibrations of Automotive Clutch</td>
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<td>Yasser Aktir, Valeo Clutches/LML; Jean-Francois Brunel, Philippe Dutrenoy, Lille Mechanical Laboratory; Herve Mahe, Valeo Clutches</td>
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<tr>
<td>10:50 a.m.</td>
<td>2014-01-1755</td>
<td>Application of CAE in Design Optimization of a Wet Dual Clutch Transmission and Driveline</td>
</tr>
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<td>Ming Chen, Dong Wang, Huiqiang Lee, Chao Jiang, Jun Xin, SAIC Motor Corp. Ltd.</td>
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Planned by Transmission and Driveline Committee / Powertrain Fuels and Lubricants Activity

Tuesday, April 8

Transmission and Driveline (Part 2 of 7): Driveline Components/Subsystems
This session includes papers on the full array of transmission and driveline related components. Here we dig deeper into the design and development of transmission and driveline sub-systems and individual components by examining the design iterations, development details and other facets of the actual hardware.

Organizers - Rakan Chabaan, Gang Chen, John C. Collins, Chrysler Group LLC; Patrick Robert Darmstadt, Boeing Helicopters; Hussein Dourra, Chrysler Group LLC; Fabio Ferreira, Schaeffler Brasil, Ltd.; Michael E. Fingerman, John A. Frait, Chrysler Group LLC; Joel Gunderson, James Hendrickson, Chunhao Lee, Dongxu Li, General Motors Co.; Berthold Martin, Chrysler Group LLC; Thomas Martin, General Motors Co.; David Popejoy, Craig Renneker, Ford Motor Co.; Farzad Samie, General Motors Co.; Brian Carl Schneidewind, Toyota Technical Center USA Inc.; Tejinder Singh, General Motors Co.; Robert A. Smithson, Dana Holding Corporation; Erich L. Wilfinger, Jatco USA Inc.

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<tr>
<td>1:00 p.m.</td>
<td>2014-01-1749</td>
<td>Design of Shift Select Mechanism for Automation of Manual Transmission</td>
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<td>Sriram Muralidharan, Univ. of Wisconsin; Suryanarayana A N Prasad,</td>
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<td>Nissan-Ashok Leyland Technologies Ltd.</td>
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<td>1:20 p.m.</td>
<td>2014-01-1766</td>
<td>Development of Two Oil Pumping System for Automatic Transmission</td>
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<td>Jin Young Hwang, Se Hwan Jo, Tae Hwan Wi, Woo Churl Son, Hyundai</td>
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<td>Motor Co.</td>
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<td>1:40 p.m.</td>
<td>2014-01-1988</td>
<td>Shudder and Frictional Characteristics Evaluation of Dual Clutch</td>
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<td>Transmission Fluids</td>
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<td>Hiroko Ohtani, Ford Motor Co.; Khaled Zreik, General Motors Co.;</td>
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<td>Edgar Steigerwald, Martin Knaffel, Robert Neumann, Gordon P. Small,</td>
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<td>Deutsche Pentosin-Werke GmbH; Gregory Mordukhovich, AVL Powertrain</td>
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<td>Engineering Inc.; Tracey E. King, J Haltermann Ltd.</td>
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<tr>
<td>2:00 p.m.</td>
<td>2014-01-1769</td>
<td>Gear Train Mesh Efficiency Study: The Effects of an Anti-Backlash</td>
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<td>Gear</td>
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<td>Yashodhan V. Joshi, Jordan E. Kelleher, Cummins Inc.</td>
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<tr>
<td>2:20 p.m.</td>
<td>2014-01-1763</td>
<td>Assessment of Planetary Gear Train with Multiple-Pinion Arrangements</td>
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<td>Joseph Y. Chen</td>
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<tr>
<td>2:40 p.m.</td>
<td>2014-01-1762</td>
<td>Improved Power Density through Use of Powder-Forged Helical Gears in</td>
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<td>Transmissions</td>
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<td>Gary L. Anderson, Pete G. Imbrogno, Keystone Powdered Metal Co.</td>
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<tr>
<td>2014-01-1764</td>
<td>Variation in Driving Torque and Vane Friction Torque in a Balanced Vane Pump (Written Only -- No Oral Presentation)</td>
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<tr>
<td>2014-01-1765</td>
<td>Involute Straight Bevel Gear Surface and Contact Lines Calculation Utilizing Ease-Off Topography Approach (Written Only -- No Oral Presentation)</td>
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<td>Ali Kolivand, Azad Univ.</td>
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<tr>
<td>2014-01-1770</td>
<td>Optimizing the Geometric Parameters of New Gear Pair using Existing Gear Pairs (Written Only -- No Oral Presentation)</td>
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<td>Sandeep Kognole, Mahindra Trucks &amp; Buses Ltd.</td>
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The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00431 and SUB-TP-00003, or individually. To purchase visit collections.sae.org

Planned by Transmission and Driveline Committee / Powertrain Fuels and Lubricants Activity

Tuesday, April 8

Panel Discussion: Leadership Lessons Young Professionals

Session Code: CONG101

Room 360  Session Time: 11:30 a.m.

Developing the next generation of leaders is vital to the automotive industry. SAE International recognizes the importance of providing unique settings where young professionals can learn. As part of the initiative to promote YP activity at World Congress, the Leadership Lessons Young Professional Luncheon is an open forum discussion for YPs to engage with accomplished industry professionals. The event will provide an opportunity for a group of industry experts to answer questions like: What is your brand? How did you end up where you are today? What and/or who taught you leadership? What are current leaders looking for from YPs? What do organizations need from YPs? Other topics like volunteer history, mistakes made, and accounts of personal and professional development will also be discussed.

Moderators - Lindsay Brooke, SAE International


Tuesday, April 8

Exhaust Emissions Control - New Developments (Part 1 of 2)

Session Code: PFL410

Room 410 A  Session Time: 9:30 a.m.

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 sensors and control systems will also be considered.

Organizers - Jong Lee, Daimler Trucks North America LLC; Kenneth S. Price, Umicore Autocat USA Inc.; Ron Silver, Caterpillar Inc.; Roger A. Van Sickle, FEV Inc.

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<th>Time</th>
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<tr>
<td>9:30 a.m.</td>
<td>2014-01-1491</td>
<td>Vehicular Emissions in Review</td>
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<td>Timothy Johnson, Corning Inc.</td>
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<td>10:30 a.m.</td>
<td>ORAL ONLY</td>
<td>With Diesel into the Age of Super Ultra Low Emission Vehicles</td>
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<td>Alexander Freitag, Robert Bosch LLC</td>
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Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity

Tuesday, April 8

Exhaust Emissions Control - New Developments (Part 2 of 2)

Session Code: PFL410

Room 410 A  Session Time: 1:00 p.m.

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 sensors and control systems will also be considered.

Organizers - Jong Lee, Daimler Trucks North America LLC; Kenneth S. Price, Umicore Autocat USA Inc.; Ron Silver, Caterpillar Inc.; Roger A. Van Sickle, FEV Inc.

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<tr>
<td>1:00 p.m.</td>
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</table>
1:00 p.m.  ORAL ONLY  The Role of High Efficiency Exhaust Particle Filters in Emissions Reduction: Current State and a Look into the Future
Imad A. Khalek, Southwest Research Institute

1:20 p.m.  2014-01-1486  Direct Measurements of Soot/Ash Affinity in the Diesel Particulate Filter by Atomic Force Microscopy and Implications for Ash Accumulation and DPF Degradation
Carl Justin Kamp, Alexander Sappok, Yujun Wang, William Bryk, Avery Rubin, Victor Wong, Massachusetts Institute of Technology

1:40 p.m.  2014-01-1484  Dual Layer Coated High Porous SiC - A New Concept for SCR Integration into DPF
Thomas Wolff, Ramona Deinlein, Dinex GmbH; Henrik Christensen, Lars Larsen, Dinex A/S

2:00 p.m.  2014-01-1487  Sensing Exhaust NO2 Emissions Using the Mixed Potential Principle
Da Yu Wang, David M. Racine, Harry Husted, Sheng Yao, Delphi Automotive

2:20 p.m.  2014-01-1490  Development of a Unique Plasma Burner System for Emission Reduction During Cold Start of Diesel Engines
Sung Hyun Pyun, Dae Hoon Lee, Kwan Tae Kim, Korea Institute of Machinery & Materials

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00441 and SUB-TP-00010, or individually. To purchase visit collections.sae.org

Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity

Tuesday, April 8

Diagnostic Development

Session Code:  PFL150

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.

Organizers -  Oivind Andersson, Lund University; Matthew J. Hall, Univ. of Texas-Austin; Benjamin Petersen, Ford Motor Co.

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<tr>
<td>9:30 a.m.</td>
<td>2014-01-1178</td>
<td>Endoscopic Imaging of Early Flame Propagation in a Near-Production Engine</td>
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<td>Martin Goschütz, Christof Schulz, Sebastian A. Kaiser, University of Duisburg-Essen</td>
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<td>9:50 a.m.</td>
<td>2014-01-1175</td>
<td>On the Accuracy of Dissipation Scale Measurements in IC Engines</td>
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<td>Michael Tess, Jaal Ghandhi, University of Wisconsin</td>
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<td>10:10 a.m.</td>
<td>2014-01-1176</td>
<td>A New Technique to Determine the Burning Velocity in a Gasoline Direct Injection Engine</td>
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<td>Shenouda Mekhail, Fadi Estefanous, Naeim Henein, Wayne State Univ.; Akram Zahdeh, GM</td>
</tr>
<tr>
<td>10:30 a.m.</td>
<td>ORAL ONLY</td>
<td>Cycle-Resolved Intake Residual Back Low Measurements Using Laser Absorption Spectroscopy</td>
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<td>Ji Hyung Yoo, SUNY-Buffalo; Derek Splitter, James Szybist, William Partridge, Oak Ridge National Laboratory</td>
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</table>
While we can make and demonstrate very efficient engines, the energy saving potential for a vehicle is realised through the whole propulsion system design that also includes the choice of transmission, electrification and control methods. We will start our discussion with a debate about the maximum achievable efficiency in SI, DI and novel types of cycle. Starting with the theoretical maximum we will debate the limiting factors and their significance before proposing propulsion architectures that help realize the engine's full efficiency potential.

**Moderators** - Patrick Leteinturier, Infineon Technologies AG; Richard K. Stobart, Loughborough Univ.

**Panelists** - Paolo Di Martino, IAV Automotive Engineering Inc.; Zoran S. Filipi, Clemson-ICAR; Robert Gruszczynski, Volkswagen of America; Dimitri N. Kazarinoft, AVL North America Inc.; David B. Roth, BorgWarner Inc.; Matti Vint, VALEO; Bruce Woodrow, Ricardo Inc.;

Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity

**Tuesday, April 8**

**Panel Discussion: Are We Done with Efficiency Improvements in Internal Combustion Engine Development?  Maybe Not!"**

**Session Code:** PFL199

**Room 410 B  Session Time:** 2:00 p.m.

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 General Powertrain Development / Powertrain Fuels and Lubricants Activity

**Tuesday, April 8**

**Combustion in Compression-Ignition Engines: Efficiency and Emissions**

**Session Code:** PFL221

**Room 411 A  Session Time:** 1:00 p.m.

Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity

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<tr>
<td>1:00 p.m.</td>
<td>2014-01-1243</td>
<td>Radiocarbon and Hydrocarbon Analysis of PM Sources During WHTC Tests on a Biodiesel-Fueled Engine</td>
</tr>
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<td>Johan Genberg, Lund Univ.; Petter Tornehed, Scania CV AB; Oivind Andersson, Kristina Stenstrom, Lund Univ.</td>
</tr>
<tr>
<td>1:20 p.m.</td>
<td>2014-01-1244</td>
<td>Dual Loop EGR in Retrofitted Heavy-Duty Diesel Application</td>
</tr>
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<td></td>
<td></td>
<td>Yiqun Huang, John Colvin, Asanga Wijesinghe, Meng Wang, Houston Advanced Research Center; Deyang Hou, QuantLogic Corp.; Zuhua Fang, Shanghai Normal Univ.</td>
</tr>
</tbody>
</table>
Advanced Emission Components and Systems for Gasoline Vehicles

Session Code: PFL422

Room 411 B

Papers are invited for this session covering the systems engineering experience required to achieve ultra-low emission levels on light-duty vehicles. Emission system component topics for this session include the development of advanced three-way catalysts, the development of NOX control strategies for gasoline lean burn engines, the application of high cell density substrates to advanced emission systems, and the integration of these components into full vehicle emission systems.

Organizers - Rasto Brezny, Joseph E. Kubsh, Manufacturers of Emission Controls Assoc.

Time Paper No. Title

1:00 p.m. 2014-01-1502 Strategies Toward the Sustainable and Cost-Effective Use of the Platinum Group Metals: An Analysis of Critical Topics Affecting the PGM and Automotive Industries
Erica King, David Wallace, E. Robert Becker, Environex Inc.

1:20 p.m. 2014-01-1503 Impact of Pd-Rh Interaction on the Performance of Three-Way Catalysts
Hideki Goto, Kazuyoshi Komata, Shigekazu Minami, Umicore Shokubai Japan Co., Ltd.

1:40 p.m. 2014-01-1504 A Comparison of Fuel-Cut Ageing during Retardation and Fuel-Cut during Acceleration
Anna Fathali, Mats Laurell, Fredrik B. Ekström, Annika Kristoffersson, Volvo Car Corp.; Bengt Andersson, Louise Olsson, Chalmers Univ. of Technology

2:00 p.m. 2014-01-1509 Gasoline Cold Start Concept (gCSC\textsuperscript{2}) Technology for Low Temperature Emission Control
Hsiao-Lan Chang, Hai-Ying Chen, Kwangmo Koo, Jeffery Rieck, Philip Blakeman, Johnson Matthey Inc.

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 Engine Combustion / Powertrain Fuels and Lubricants Activity
Tuesday, April 8

Fuel and Additive Effects on Engine Systems (Part 1 of 3)

**Session Code:** PFL310  
**Room 412 A**  
**Session Time:** 9:30 a.m.

This session includes presentations considering how fuel characteristics affect SI engine performance. The inclusion of alcohols in the fuel is also considered.

**Organizers:** Barbara Goodrich, John Deere Product Engineering Center; Gerald Micklow, Florida Institute of Technology; Paul Richards

**Chairpersons:** Barbara Goodrich, John Deere Product Engineering Center; Paul Richards

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<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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<tr>
<td>9:30 a.m.</td>
<td>2014-01-1398</td>
<td>Does Magnetic Fuel Treatment Affect Engine’s Performance?</td>
</tr>
<tr>
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<td>Ahmed A. Abdel-Rehim, Ahmed A.A. Attia, Benha University</td>
</tr>
<tr>
<td>9:50 a.m.</td>
<td>2014-01-1397</td>
<td>Octane Response in a Downsized, Highly Boosted Direct Injection Spark Ignition Engine</td>
</tr>
<tr>
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<td>S.M. Remmert, R.F. Cracknell, R. Head, A. Schuetze, Shell Global Solutions; A.G.J. Lewis, S. Akehurst, Univ. of Bath; J.W.G. Turner, A. Poplewell, Jaguar Land Rover</td>
</tr>
<tr>
<td>10:10 a.m.</td>
<td>2014-01-1393</td>
<td>Effects of Ethanol on Performance and Exhaust Emissions from a DI Spark Ignition Engine with Throttled and Unthrottled Operations</td>
</tr>
<tr>
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<td>Mohammed Moore Ojapah, Hua Zhao, Yan Zhang, Brunel Univ.</td>
</tr>
<tr>
<td>10:30 a.m.</td>
<td>2014-01-1382</td>
<td>Characterization of Ethanol-Gasoline Blends Combustion processes and Particle Emissions in a GDI/PFI Small Engine</td>
</tr>
<tr>
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<td>Francesco Catapano, Silvana Di Iorio, Paolo Sementa, Bianca Maria Vaglieco, Istituto Motori CNR</td>
</tr>
<tr>
<td></td>
<td>2014-01-1390</td>
<td>Performance and Emission Characteristics of a MPI Engine Fueled with Iso-Butanol/Gasoline Blends (Written Only -- No Oral Presentation)</td>
</tr>
<tr>
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<td>Shashank Sakleshpur Nagaraja, Vinay Ravi, Ravi Teja, Vighnesha Nayak, Kumar G N, NITK Surathkal</td>
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</table>

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00388 and SUB-TP-00010, and individually. To purchase visit collections.sae.org

Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity
Tuesday, April 8

Fuel and Additive Effects on Engine Systems (Part 2 of 3)

Session Code: PFL310

Room 412 A

This session includes presentations covering the use of fuel additives and discussion of engine deposits, plus two presentations on the development of a surrogate fuel for modelling work.

Organizers - Barbara Goodrich, John Deere Product Engineering Center; Gerald Micklow, Florida Institute of Technology; Paul Richards

Chairpersons - Paul Richards; Gerald Micklow, Florida Institute of Technology

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<tr>
<th>Time</th>
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<th>Title</th>
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<tbody>
<tr>
<td>1:40 p.m.</td>
<td>2014-01-1389</td>
<td>Role of Volatility in the Development of JP-8 Surrogates for Diesel Engine Application</td>
</tr>
<tr>
<td>2:00 p.m.</td>
<td>2014-01-1388</td>
<td>Internal Injector Deposits From Sodium Sources</td>
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<td>Jacqueline Reid, Stephen Cook, Jim Barker, Innospec</td>
</tr>
<tr>
<td>2:20 p.m.</td>
<td>2014-01-1387</td>
<td>Information on the Aromatic Structure of Internal Diesel Injector Deposits From Time of Flight Secondary Ion Mass Spectrometry (ToF-SIMS)</td>
</tr>
<tr>
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<td>Jim Barker, Innospec; Colin Snape, David Scurr, University of Nottingham</td>
</tr>
<tr>
<td>2:40 p.m.</td>
<td>2014-01-1383</td>
<td>Effects of Gasoline and Ethanol Fuel Corrosion Inhibitors and Fuel Detergents on Powertrain Intake Valve Deposits</td>
</tr>
<tr>
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<td>Elana Chapman, Jill Cummings, Mark Winston-Galant, General Motors Co.</td>
</tr>
<tr>
<td>3:00 p.m.</td>
<td>2014-01-1380</td>
<td>Influence of Metal-Based Additives in Gasoline Fuel on the Exhaust Gas Emission System Components Over Useful Life Period Using the Example of Manganese-Containing Additive</td>
</tr>
<tr>
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<td>Christian Lohfink, Dennis Wiese, Wolfgang Reiser, ADA Abgaszentrum der Automobilindustrie</td>
</tr>
<tr>
<td>3:20 p.m.</td>
<td>2014-01-1401</td>
<td>Validation of Fuel Borne Catalyst Technology in Advanced Diesel Applications</td>
</tr>
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<td>Romaeo Dallanegra, Rinaldo Caprotti, Infineum UK Ltd.</td>
</tr>
<tr>
<td>3:20 p.m.</td>
<td>2014-01-1391</td>
<td>An Experimental Analysis of a Diesel Engine Using Alumina Nanoparticles Blended Diesel Fuel (Written Only -- No Oral Presentation)</td>
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<td>J. Sadhik Basha, King Khalid Univ.</td>
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Planned by Fuels and Lubricants / Powertrain Fuels and Lubricants Activity
Automotive Gasoline Engine Lubricants

Session Code: PFL340

Room 412 B  Session Time: 1:00 p.m.

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

Organizers - Ewa Alice Bardasz, Lubrizol Corp.; Simon C. Tung, Vanderbilt Chemical Company

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<tr>
<th>Time</th>
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<tr>
<td>1:00 p.m.</td>
<td>2014-01-1476</td>
<td>Understanding Lubricant Requirements of Hybrid-Electric Vehicles</td>
</tr>
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<td>Dean Clarke, Infineum USA LP</td>
</tr>
<tr>
<td>1:20 p.m.</td>
<td>2014-01-1477</td>
<td>Studying Synthesis of Thermally and Chemically Modified Plant Oil and their Tribological Evaluation for Use as a Base Stock for Environmentally Friendly Bio-Lubricant</td>
</tr>
<tr>
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<td>Varun Pathak, Dileep Gupta, Naveen Kumar, Delhi Technological University</td>
</tr>
<tr>
<td>1:40 p.m.</td>
<td>2014-01-1478</td>
<td>Development of GF-5 0W-20 Fuel-Saving Engine Oil for DLC-Coated Valve Lifters</td>
</tr>
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<td>Takumaru Sagawa, Takuya Katayama, Rika Suzuki, Sachiko Okuda, Nissan Motor Co., Ltd.</td>
</tr>
</tbody>
</table>

Planned by Fuels and Lubricants / Powertrain Fuels and Lubricants Activity

Tuesday, April 8

Diesel Engine Lubricants

Session Code: PFL350

Room 412 B  Session Time: 2:40 p.m.

This session addresses advancements in diesel engine oil formulations technology and used lubricants testing methodologies. Special focus is on understanding fundamental knowledge in achieving combination of the green gases emissions limits, hardware/lubricant durability and overall fuel efficiency expectations from the perspective of OEMs, legislators and end users.

Organizers - Ewa Alice Bardasz, Lubrizol Corp.

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<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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<tr>
<td>2:40 p.m.</td>
<td>2014-01-1479</td>
<td>A Novel Diagnostics Tool for Measuring Soot Agglomerates Size Distribution in Used Automotive Lubricant Oils</td>
</tr>
<tr>
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<td>Antonino La Rocca, Gianluca Di Liberto, Paul Shayler, Christopher Parmenter, Mike Fay, University of Nottingham</td>
</tr>
<tr>
<td>3:00 p.m.</td>
<td>2014-01-1481</td>
<td>Investigating the Effect of Carbon Nanoparticles on the Viscosity of Lubricant Oil from Light Duty Automotive Diesel Engines</td>
</tr>
<tr>
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<td>Achombili Asango, Antonino La Rocca, Paul Shayler, University of Nottingham</td>
</tr>
<tr>
<td>3:20 p.m.</td>
<td>2014-01-1483</td>
<td>Extended Shear Stability of Viscosity Index Improvers in Lubricating Oils</td>
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<td>Carrie B. Sims, Maryam Sepehr, Mark Sztenderowicz, Alexander Boffa, Chevron Oronite Co. LLC</td>
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Planned by Fuels and Lubricants / Powertrain Fuels and Lubricants Activity

Tuesday, April 8
Dilute SI Combustion

Session Code: PFL216

Session Time: 1:00 p.m.

Room 413 A

This session focuses on the dilute SI combustion processes including lean, stratified, and EGR operation. Papers cover both 4-stroke and 2-stroke engines characterized by 1) ignition by an external energy source that serves to control combustion phasing, and 2) a combustion rate that is limited by flame propagation.

Organizers - Christopher J. Chadwell, Southwest Research Institute; Richard S. Davis, General Motors Co.; Mark C. Sellnau, Delphi Corp.; Ruonan Sun, US Environmental Protection Agency

Chairpersons - Mark C. Sellnau, Delphi Corp.; Christopher J. Chadwell, Southwest Research Institute

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<tr>
<th>Time</th>
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<tr>
<td>1:00 p.m.</td>
<td>2014-01-1240</td>
<td>Low Pressure Cooled EGR for Improved Fuel Economy on a Turbocharged PFI Gasoline Engine</td>
</tr>
<tr>
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<td>Dongxian Song, Ning Jia, Xiangyang Guo, Xingxing Ma, Zhigang Ma, Dingwei Gao, Kejun Li, Haipeng Lai, Chunhui Zhang, Great Wall Engine R&amp;D Center</td>
</tr>
<tr>
<td>1:20 p.m.</td>
<td>2014-01-1236</td>
<td>Effects of External EGR Loop on Cycle-to-Cycle Dynamics of Dilute SI Combustion</td>
</tr>
<tr>
<td>1:40 p.m.</td>
<td>2014-01-1238</td>
<td>Analysis of Cyclic Variability and the Effect of Dilute Combustion in a Gasoline Direct Injection Engine</td>
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<td>Nicholas Matthias, Thomas Wallner, Riccardo Scarcelli, Argonne National Lab.</td>
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<tr>
<td>2:00 p.m.</td>
<td>2014-01-1241</td>
<td>Role of Engine Speed and In-Cylinder Flow Field for Stratified and Well-Mixed DISI Engine Combustion Using E70</td>
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<td>Magnus Sjöberg, Wei Zeng, Sandia National Labs.; David Reuss, Sandia National Labs., Univ. of Michigan</td>
</tr>
<tr>
<td>2:20 p.m.</td>
<td>2014-01-1237</td>
<td>Using PIV Measurements to Determine the Role of the In-Cylinder Flow Field for Stratified DISI Engine Combustion</td>
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<td>Wei Zeng, Magnus Sjöberg, Sandia National Labs.; David Reuss, Sandia National Labs., Univ of Michigan</td>
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<tr>
<td>2014-01-1235</td>
<td></td>
<td>Fuel Consumption Evaluation of Cooled External EGR for a Downsized Boosted SIDI DICP Engine (Written Only -- No Oral Presentation)</td>
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<td>Zhimin Liu, David Cleary, General Motors Co.</td>
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Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity

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Tuesday, April 8

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SI Combustion Ignition

Session Code: PFL215

Session Time: 3:00 p.m.

Room 413 A

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

Organizers - William P. Attard; Thomas Edward Briggs, Southwest Research Institute; Richard S. Davis, General Motors Co.
There has never been a time when the demand for engineers has been greater. The skills shortage has afflicted the Auto sectors in particular, but no branch of engineering has been untouched. With the demand for engineering skills in general comes a specific requirement for skills in systems, electronics, power management and new design methods and processes. At the same time engineers are expected to be accomplished in project and team skills in addition to demonstrating a substantial technical depth. In this session we will consider the factors that cause change in the requirement for engineering skills, and how both employers and higher education is meeting those needs. Factors that influence the complete pipeline from early education to graduation are of great interest. Topics will include: how the demand for skills develops as industry changes; of particular interest is how companies are addressing the lack of graduates in electrical and systems disciplines, how re-profiling of skills is being done in order to bring then engineering function up to date, how the higher education sector is addressing new skills needs, what new teaching and learning methods are under development, benchmarking with other industry sectors, and observations on the acquisition of soft skills.

Organizers - David A. Finch, Raetech Corp.; Michael Royce; Richard K. Stobart, Loughborough Univ.; Massoud Tavakoli, Kettering Univ.

Engineering Education
Session Code: B600
Room 413 B  Session Time: 9:30 a.m.

There has never been a time when the demand for engineers has been greater. The skills shortage has afflicted the Auto sectors in particular, but no branch of engineering has been untouched. With the demand for engineering skills in general comes a specific requirement for skills in systems, electronics, power management and new design methods and processes. At the same time engineers are expected to be accomplished in project and team skills in addition to demonstrating a substantial technical depth. In this session we will consider the factors that cause change in the requirement for engineering skills, and how both employers and higher education is meeting those needs. Factors that influence the complete pipeline from early education to graduation are of great interest. Topics will include: how the demand for skills develops as industry changes; of particular interest is how companies are addressing the lack of graduates in electrical and systems disciplines, how re-profiling of skills is being done in order to bring then engineering function up to date, how the higher education sector is addressing new skills needs, what new teaching and learning methods are under development, benchmarking with other industry sectors, and observations on the acquisition of soft skills.

Organizers - David A. Finch, Raetech Corp.; Michael Royce; Richard K. Stobart, Loughborough Univ.; Massoud Tavakoli, Kettering Univ.

Time Paper No. Title

3:00 p.m. 2014-01-1234 Numerical Simulation for Ignitability of Spark Plug using Detailed Chemical Kinetics
Takafumi Shichida, Hirotoshi Yoshizaki, Shunsuke Tsuga, Noriyasu Sugimoto, Hiroyuki Kameda, NGK Spark Plug Co., Ltd.

3:20 p.m. 2014-01-1233 Impact of Operating Parameters on Ignition System Energy Consumption
Raphael Guelberlet, Terrence Alger, Jess Gingrich, Barrett Mangold, Southwest Research Institute

Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity

Tuesday, April 8

Examination of an Alternative Suspension Configuration for a Sprint Car
Anthony Barkman, Kelvin Tan, Arin McIntosh, Peter Hylton, Wendy Otupal-Hylton, Indiana Univ., Purdue Univ.

Product Cost Management in the Product Development Process
Edward E. Mabley, Siemens

Integrating the Curriculum using a Bench-Scale Hybrid Power Train
Mariaeugenia Salas Acosta, Krishan Bhatia, Eric Constans, Jennifer Kadiowec, Thomas Merrill, Hong Zhang, Rowan Univ.

Starting and Developing an Engineering Career: The Barriers and Opportunities
Richard K. Stobart, Xunzhe Zhang, Loughborough Univ.

Panel Discussion
Organizers - Michael Royce; Richard K. Stobart, Loughborough Univ.
Moderators - Richard K. Stobart, Loughborough Univ.
Panelists - Christopher M. Ciuca, SAE International; Jose Lopes, Jaguar Land Rover Limited; Michael Royce;

Planned by Automobile Body Activity / EMB Land and Sea Group; Faculty Advisors Committee / Education Board
**Tuesday, April 8**

**Particle Emissions from Combustion Sources (Part 1 of 3)**

**Session Code:** PFL450  
**Room 413 B**  
**Session Time:** 1:00 p.m.

Papers in Session 1 include PM measurement methods, soot generation, alternative methods of PM mass determination, and in-cylinder control of emissions.

**Organizers:**  
Imad A. Khalek, Southwest Research Institute; Matti Maricq, Ford Motor Co.; Andrea Strzelec, Texas A&M University

**Chairpersons:**  
Matti Maricq, Ford Motor Co; Andrea Strzelec, Texas A&M University; Imad Khalek, Southwest Research Institute

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<th>Time</th>
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<th>Authors</th>
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<tbody>
<tr>
<td>1:00 p.m.</td>
<td>2014-01-1604</td>
<td>A Solid Particle Number Measurement System Including Nanoparticles Smaller than 23 Nanometers</td>
<td>Yoshinori Otsuki, Kenji Takeda, Kazuhiko Haruta, Horiba Ltd.; Nobuhisa Mori, Toyota Motor Corp.</td>
</tr>
<tr>
<td>1:40 p.m.</td>
<td>2014-01-1594</td>
<td>Determination of Suspended Exhaust PM Mass for Light-Duty Vehicles</td>
<td>Yang Li, Jian Xue, Kent Johnson, Thomas Durbin, Mark Villela, Liem Pham, Seyedehsan Hosseini, Zhongqing Zheng, Daniel Short, George Karavalakis, Akua Asa-Awuku, Heejung Jung, University of California; Xiaoliang Wang, Desert Research Institute; David Quiros, Shaohua Hu, Tao Huai, Alberto Ayala, California Air Resources Board</td>
</tr>
<tr>
<td>2:00 p.m.</td>
<td>2014-01-1601</td>
<td>Use of a PPS Sensor in Evaluating the Impact of Fuel Efficiency Improvement Technologies on the Particle Emissions of a Euro 5 Diesel Car</td>
<td>Stavros Amanatidis, Leonidas Ntziachristos, Zissis Samaras, Aristotle University of Thessaloniki; Chariton Kouridis, EMISIA SA; Kauko Janka, Juha Tikkanen, Pegasor Oy</td>
</tr>
<tr>
<td>2:20 p.m.</td>
<td>2014-01-1589</td>
<td>Development and Demonstration of a Soot Generator Integrated Bench Reactor</td>
<td>Xu Chen, Ashok Kumar, David Klippstein, Randy Stafford, Changsheng Su, Ying Yuan, Cummins Inc.; James Zokoe, Paul McGinn, Univ. of Notre Dame</td>
</tr>
<tr>
<td>2:40 p.m.</td>
<td>2014-01-1597</td>
<td>Efficacy of In-Cylinder Control of Particulate Emissions to Meet Current and Future Regulatory Standards</td>
<td>Glenn Lucachick, Aaron Avenido, Winthrop Watts, David Kittelson, William Northrop, University of Minnesota</td>
</tr>
<tr>
<td>3:00 p.m.</td>
<td>ORAL ONLY</td>
<td>Denuder for Particulate Matter Artifacts Removal: Development and Applications</td>
<td>Imad A. Khalek, Southwest Research Institute</td>
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Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity
Tuesday, April 8

Combustion in Compression-Ignition Engines: Fuel/Additive Effects

Session Code: PFL223

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 PFL110 or PFL120 modeling sessions.

Organizers - Jose M Garcia-Oliver, Universitat Politecnica de Catalunya; Song-Chang Kong; Budhadeb Mahakul, Navistar; Robert M. McDavid, Caterpillar Inc.; Paul C. Miles, Mark Musculus, Sandia National Laboratories; Raul Payri, Universidad Politecnica de Valencia; Yongli Qi, Caterpillar Inc.; Stefan Simescu, Southwest Research Institute; Dale R. Tree, Brigham Young Univ.; Rishikesh Venugopal, Achates Power Inc.; John F. Wright, Cummins Inc.; Ming Zheng, Univ. of Windsor

Chairpersons - Ming Zheng, Univ of Windsor; Kan Zha, Sandia National Laboratories

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<tr>
<td>9:30 a.m.</td>
<td>2014-01-1263</td>
<td>Experimental Study for the Effect of Fuel Properties on the Ion Current, Combustion, and Emission in a High Speed Diesel Engine</td>
</tr>
<tr>
<td>9:50 a.m.</td>
<td>2014-01-1266</td>
<td>Ignition Delay and Soot Oxidative Reactivity of MTBE Blended Diesel Fuel</td>
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<tr>
<td>10:10 a.m.</td>
<td>2014-01-1265</td>
<td>Poultry Fat FAME Biodiesel Blends Characteristics and Performance in an IDI Engine for APU Applications</td>
</tr>
<tr>
<td>10:30 a.m.</td>
<td>2014-01-1262</td>
<td>Novel Renewable Additive for Diesel Engines</td>
</tr>
<tr>
<td>10:50 a.m.</td>
<td>ORAL ONLY</td>
<td>Predicted Diesel Ignitability Index Based on Carbon Bond Structures in Hydrocarbons</td>
</tr>
<tr>
<td></td>
<td>2014-01-1261</td>
<td>Investigation on the Performance and Emission Characteristics of Biodiesel and Its Blends with Oxygenated Additives in a Diesel Engine (Written Only -- No Oral Presentation)</td>
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Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity

Dual Fuel Combustion Process

Session Code: PFL261

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<tr>
<td>1:00 p.m.</td>
<td>Plural Fuel Combustion Process Session</td>
</tr>
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</table>

Tuesday, April 8
Mixed mode using more than one fuel not fully mixed before combustion. Most often with auto ignition of spray injected late. Papers describing experiments and test data, simulation results focused on applications, fuel/additive effects, and RCCI (Reactivity-Controlled Compression Ignition) are invited and will be placed in appropriate sub-sessions. Papers with an emphasis on the modeling aspects of combustion are encouraged to be submitted into PFL110 or PFL120 modeling sessions.

**Organizers** - Scott Curran, Oak Ridge National Laboratory; Sage Kokjohn, University Of Wisconsin Madison; William F. Northrop, Univ. of Minnesota-Twin Cities

**Chairpersons** - Sage Kokjohn, University Of Wisconsin Madison

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<th>Time</th>
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<tr>
<td>1:00 p.m.</td>
<td>2014-01-1307</td>
<td>An Experimental Study of EGR-Controlled Stoichiometric Dual-fuel</td>
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<td>Compression Ignition (SDCI) Combustion</td>
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<td>Xiao Ma, Yunliang Qi, Zhi Wang, Tsinghua Univ.; Hongming Xu, Tsinghua</td>
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<td>Univ., University of Birmingham; Jian-Xin Wang, Tsinghua Univ.</td>
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<td>1:20 p.m.</td>
<td>2014-01-1310</td>
<td>An Optical Investigation on the Combustion Characteristics of</td>
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<td>Gasoline-Diesel Dual-Fuel Applications</td>
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<td>Meixia Rong, Xu He, Hai Liu, Yong Shang, Weilin Zeng, Xiangrong Li,</td>
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<td>Fushui Liu, Beijing Institute of Technology</td>
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<td>1:40 p.m.</td>
<td>2014-01-1313</td>
<td>Optical Investigation of Dual-fuel CNG/Diesel Combustion Strategies</td>
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<td>to Reduce CO$_2$ Emissions</td>
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<td>Nicolas Dronniou, Julian Kashdan, Bertrand Lecointe, IFP Energies</td>
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<td>Nouvelles; Kyle Sauve, Dominique Soleri, Westport Innovations Inc.</td>
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<td>2:00 p.m.</td>
<td>2014-01-1309</td>
<td>Impact of Cetane Number on Combustion of a Gasoline-Diesel Dual-</td>
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<td>Fuel Heavy-Duty Multi-Cylinder Engine</td>
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<td>Andrew Ickes, Thomas Wallner, Argonne National Lab.; Yu Zhang, William</td>
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<td>De Ojeda, Navistar</td>
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<td>2:20 p.m.</td>
<td>2014-01-1308</td>
<td>Investigation of Diesel and CNG Combustion in a Dual Fuel Regime</td>
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<td>and as an Enabler to Achieve RCCI Combustion</td>
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<td>Mufaddel Dahodwala, Satyum Joshi, Erik W. Koehler, Michael Franke, FEV</td>
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<td>Inc.</td>
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<td>2:40 p.m.</td>
<td>2014-01-1311</td>
<td>Investigation on Performance and Exhaust Emissions Characteristics</td>
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<td>of a DI Diesel Engine Fueled with Karanja Methyl Ester and Biogas in</td>
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<td>Dual Fuel Mode</td>
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<td>Debabrata Barik, Murugan Sivalingam, NIT Rourkela</td>
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<td>3:00 p.m.</td>
<td>2014-01-1315</td>
<td>Influence of Methanol Induction on Performance, Emission and</td>
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<td>Combustion Behavior of a Methanol - Diesel Fuel Engine</td>
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<td>Senthil Kumar Masimalai, MIT, Anna University Chennai</td>
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<tr>
<td>3:20 p.m.</td>
<td>2014-01-1317</td>
<td>Combustion Simulation of a Direct Injection Diesel Engine with</td>
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<td>Hydrogen Fuel Using a 3D Model with Multi-Fuel Chemical Kinetics</td>
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<td>Hassan Ali Khairallah, Umit Koylu, Missouri University of Science and</td>
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<td>Tech.</td>
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<td>3:40 p.m.</td>
<td>2014-01-1316</td>
<td>Development and Validation of Power Performance Prediction Chart</td>
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<td>for Conversion of Diesel Engine to Dual Fuel Engine</td>
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<td>Avinash Kolekar, Sagar Laddha, Sunee Singhe, Anuradha Ganesh,</td>
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<td>Sudarshan Kumar, IIT Bombay</td>
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<td>2014-01-1312</td>
<td>Combustion and Gaseous Emissions Characteristics of a Six-Cylinder</td>
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<td>Diesel Engine Operating within Wide Range of Natural Gas Substitutions</td>
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<td>at Different Operating Conditions for Generator Application (Written</td>
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<td>Only -- No Oral Presentation)</td>
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<td>Mayank Mittal, Ron Donahue, Peter Winnie, Allen Gillette, Generac Power</td>
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<td>Systems</td>
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</table>
Tuesday, April 8

Creating New Possibilities for Innovation Through Mobility History (Part 1 of 2)

Session Code: CONG200

Room 415 A

Session Time: 10:00 a.m.

Organizers - Barbara M. Fronczak; Jeremy Goddard, IDIADA Automotive Technology SA

Chairpersons - Donald L. Wood; Robert Siewert

Time

Paper No.

Title

10:00 a.m. ORAL ONLY

Homogeneous Charge Compression Ignition (HCCI) Combustion: The Last Forty Years
Robert M. Siewert, General Motors Co. (Retired)

11:00 a.m. ORAL ONLY

Sunoco Custom Blending
William D. Preston, Sunoco Inc. (Retired)

Planned by Mobility History Committee / Engineering Meetings Board

Tuesday, April 8

Creating New Possibilities for Innovation Through Mobility History (Part 2 of 2)

Session Code: CONG200

Room 415 A

Session Time: 1:00 p.m.

Organizers - Barbara M. Fronczak; Jeremy Goddard, IDIADA Automotive Technology SA

Chairpersons - Donald L. Wood; Robert Siewert

Time

Paper No.

Title

1:00 p.m. ORAL ONLY

The Road Less Traveled: The Air-Cooled Automobile
Sinclair Powell, Automotive Historian

2:00 p.m. ORAL ONLY

The History of Variable Valve-Timing Systems
Thomas W. Asmus, Chrysler Group LLC (Retired)

3:00 p.m. ORAL ONLY

The Genius of Magnus Hendrickson and its Lasting Impact on the Commercial Vehicle Industry
Ashley Dudding, Hendrickson Truck Suspension Systems; William Wilson, ex-Hendrickson Truck Suspension Systems

Planned by Mobility History Committee / Engineering Meetings Board
Tuesday, April 8

Noise and Vibration (Part 1 of 8): Intake / Exhaust

Session Code: AC200
Room 415 B
Session Time: 9:30 a.m.

This session will cover intake/exhaust/powertrain and chassis noise and vibration. Papers covering vehicle interior comfort, advanced methods and subjective response are also welcome.

Organizers - David W. Herrin, Univ. of Kentucky; Christopher Shaw, Visteon Climate Control

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<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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<tr>
<td>9:50 a.m.</td>
<td>2014-01-0006</td>
<td>Systematic Optimization of an Exhaust System to Meet Noise Radiation Criteria at Idle</td>
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<td>Tamer Elnady, Ain Shams University; Mats Abom, KTH Royal Institute of Technology; Yong Yang, ts-tech</td>
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<tr>
<td>10:50 a.m.</td>
<td>2014-01-0026</td>
<td>Muffler Sound Development Using Analysis of Acoustic Source of Engine Exhaust System</td>
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<td>HakSon Han, ChulMin Park, JeongHoi Heo, Sang Kyu Kang, Hyundai Motor Co.</td>
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<tr>
<td>11:10 a.m.</td>
<td>2014-01-0016</td>
<td>The Proper Use of Plane Wave Models for Muffler Design</td>
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<td>David W. Herrin, Xin Hua, Yitian Zhang, University of Kentucky; Tamer Elnady, Ain Shams University</td>
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<tr>
<td>10:50 a.m.</td>
<td>2014-01-0011</td>
<td>An Initial Analysis on Sound Insulation Behavior of a Rubber Pipe between Turbocharger Compressor Outlet and Intercooler (Written Only -- No Oral Presentation)</td>
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<td>Xiaozhen Sheng, Shouhui Huang, Sheng Tian, Xia Cao, Youlin Huang, Hunan Tyen Machinery Company Co. Ltd.</td>
</tr>
<tr>
<td>11:10 a.m.</td>
<td>2014-01-0015</td>
<td>Experimental Determination of Acoustic Cavity Resonances of Vehicle Sub-Systems (Written Only -- No Oral Presentation)</td>
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<td>Mohit Kohli, S Nataraja Moorthy, Manchi Venkateswara Rao, Prasath Raghavendran, Mahindra &amp; Mahindra, Ltd.</td>
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<tr>
<td>10:50 a.m.</td>
<td>2014-01-0019</td>
<td>Air Intake System NVH Performance Development for Commercial Vehicle (Written Only -- No Oral Presentation)</td>
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<td>Vijay Antony John Britto, Kalyankumar Sidram Hatti, Ashok Leyland Technical Center; Sai Sankaranarayana, Ashok Leyland Ltd.; Sivasankaran Sadasivam, Ekambaram Loganathan, Ashok Leyland Technical Center</td>
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<td>11:10 a.m.</td>
<td>2014-01-0020</td>
<td>Coupled Fluid-Structure Analysis for Exhaust System NVH (Written Only -- No Oral Presentation)</td>
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<td>Hangsheng Hou, Ford Motor Co.</td>
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The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00380, and also individually. To purchase visit collections.sae.org

Planned by Noise and Vibration Committee / Automobile Chassis Activity

Tuesday, April 8

Noise and Vibration (Part 2 of 8): Engine / Powertrain

Session Code: AC200
Room 415 B
Session Time: 1:00 p.m.

This session will cover intake/exhaust/powertrain and chassis noise and vibration. Papers covering vehicle interior comfort, advanced methods and subjective response are also welcome.

Organizers - Mohamad Qatu, Central Michigan Univ.; Christopher Shaw, Visteon Climate Control

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<th>Time</th>
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Planned by Noise and Vibration Committee / Automobile Chassis Activity
Tuesday, April 8

Noise and Vibration (Part 3 of 8): Chassis

Session Code: AC200
Room 415 B

This session covers the source identification, panel vibration, torsional stiffness and other NVH subjects dealing with BIW and the trim vehicle. It also covers some solutions to BIW NVH issues and concerns to improve the vehicle comfort.

Organizers - James M. Nieters, Sound Resources II LLC; Christopher Shaw, Visteon Climate Control

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<th>Time</th>
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<th>Title</th>
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<tr>
<td>2:40 p.m.</td>
<td>2014-01-0030</td>
<td>Study on Statistical Analysis of Uncertainty of Disc Brake Squeal</td>
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<td>Kun Diao, Lijun Zhang, Dejian Meng, Tongji Univ.</td>
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<tr>
<td>3:00 p.m.</td>
<td>2014-01-0022</td>
<td>Development of a New On-Wheel Resonator for Tire Cavity Noise</td>
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<td>Youichi Kamiyama, Honda R&amp;D Co. Ltd.</td>
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<tr>
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<td>2014-01-0027</td>
<td>Statistical Analysis of Impacts of Surface Topography on Brake Squeal in Disc-Pad System (Written Only -- No Oral Presentation)</td>
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<td>Meng Huang, Tongji University</td>
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<td>2014-01-0043</td>
<td>Diagnosis and Elimination of Disc Brake Groan in a Utility Vehicle (Written Only -- No Oral Presentation)</td>
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<td>Manchi Venkateswara Rao, Mahindra &amp; Mahindra, Ltd.; Jos Frank, Mohit Kohli, Mahindra &amp; Mahindra Ltd</td>
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<tr>
<td>2014-01-1975</td>
<td>Analysis of Drive Line Vibration and Boom Noise in an All Wheel Drive Utility Vehicle (Written Only -- No Oral Presentation)</td>
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<td>Manchi Venkateswara Rao, Mahindra &amp; Mahindra, Ltd.; Jos Frank, Mahindra &amp; Mahindra Ltd; Prasath Raghavendran, Automotive OEM</td>
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The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00380, and also individually. To purchase visit collections.sae.org

Planned by Noise and Vibration Committee / Automobile Chassis Activity
Vehicle Aerodynamics (Part 1 of 10): Fundamental Aerodynamics

Session Code: B500

Room 430 A Session Time: 9:30 a.m.

Vehicle aerodynamic development, drag reduction and fuel economy, handling and stability, cooling flows, surface soiling and water management, vehicle internal environment, tyre aerodynamics and modelling, aeroacoustics, structural response to aerodynamic loading, simulating the on-road environment, onset flow turbulence, unsteady aerodynamics, fundamental flow structures, new test methods and facilities, new applications of computational fluid dynamics simulation, competition vehicle aerodynamics.

Organizers - Taeyoung Han, General Motors Co.; Arturo Guzman, Chrysler Group LLC; Bahram Khalighi, General Motors Co.; Raymond Leto; Todd Lounsberry, Chrysler Group LLC; Thomas N. Ramsay, Honda R & D Americas Inc.; David Sims-Williams, Durham Univ.; Sandeep Sovani, ANSYS Inc.; Mesbah Uddin, UNC Charlotte Motorsports Engineering; H. Robert (Bob) Welge, Robert's Engineering Development; James T. McKillen, Honda R & D Americas Inc.; Adrian P. Gaylard, Jaguar Land Rover; Kurt Zielinski, Honda R & D Americas Inc.; Edward G. Duell, Jacobs Technology Inc.; Gary M. Ellstrom, Univ. of Ontario Institute of Technology; Gregory Fadler, Navistar; Mark E. Gleason, Chrysler Group LLC; Kevin Golsch, Navistar

Time Paper No. Title

9:30 a.m. 2014-01-0590 Experimental Data for the Validation of Numerical Methods - SAE Reference Notchback Model
Daniel Wood, Martin A. Passmore, Anna-Kristina Perry, Loughborough Univ.

9:50 a.m. 2014-01-0613 Experimental Comparison of the Aerodynamic Behavior of Fastback and Notchback DrivAer Models
Dirk Wieser, Hanns-Joachim Schmidt, Stefan Müller, Christoph Strangfeld, Christian Nayeri, Christian Paschereit, Technische Universität Berlin

10:10 a.m. ORAL ONLY Active Wake Refinement of a 25° Ahmed Body
Domenic Leo Barsotti, Sandra Boetcher, Embry-Riddle Aeronautical Univ.

2014-01-0603 Aerodynamic Shape Optimization Based on the MIRA Reference Car Model (Written Only -- No Oral Presentation)
Yingchao Zhang, Wei Ding, Yu Zhang, Jilin Univ.

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00378 and SUB-TP-00004, or individually. To purchase visit collections.sae.org

Planned by Vehicle Aerodynamics Committee / Automobile Body Activity

Tuesday, April 8

Vehicle Aerodynamics (Part 2 of 10): Aeroacoustics

Session Code: B500

Room 430 A Session Time: 1:00 p.m.

Vehicle aerodynamic development, drag reduction and fuel economy, handling and stability, cooling flows, surface soiling and water management, vehicle internal environment, tyre aerodynamics and modelling, aeroacoustics, structural response to aerodynamic loading, simulating the on-road environment, onset flow turbulence, unsteady aerodynamics, fundamental flow structures, new test methods and facilities, new applications of computational fluid dynamics simulation, competition vehicle aerodynamics.

Organizers - David Sims-Williams, Durham Univ.; Kevin Golsch, Navistar; Arturo Guzman, Chrysler Group LLC; Taeyoung Han, Bahram Khalighi, General Motors Co.; Todd Lounsberry, Chrysler Group LLC; James T. McKillen, Thomas N. Ramsay, Honda R & D Americas Inc.; Sandeep Sovani, ANSYS Inc.; H. Robert (Bob) Welge, Robert's Engineering Development; Mesbah Uddin, UNC Charlotte Motorsports Engineering; Raymond Leto, TotalSim LLC; Adrian P. Gaylard, Jaguar Land Rover; Kurt Zielinski, Honda R & D Americas Inc.; Edward G. Duell, Jacobs Technology Inc.; Gary M. Ellstrom, Univ. of Ontario Institute of Technology; Gregory Fadler, Navistar; Mark E. Gleason, Chrysler Group LLC

Time Paper No. Title
1:00 p.m.  2014-01-0584  Low Drag Automotive Mirrors Using Passive Jet Flow Control  
Jianlei Wang, Northwestern Polytechnical Univ.; William Bartow, Andres Moreyra, Gregory Woyczynski, Alexis Lefebvre, Edward Carrington, Gecheng Zha, University of Miami

1:20 p.m.  2014-01-0591  Assessing the Aeroacoustic Response of a Vehicle to Transient Flow Conditions from the Perspective of a Vehicle Occupant  
Nicholas Oettle, Jaguar Land Rover; David Sims-Williams, Robert Dominy, Durham Univ.

1:40 p.m.  2014-01-0592  CAE-Based Prediction of Aero-Vibro-Acoustic Interior Noise Transmission for a Simple Test Vehicle  
Fred G. Mendonca, Terence Connelly, Satish Bonthu, Philip Shorter, CD-adapco

2:00 p.m.  2014-01-0619  Computational Process for Wind Noise Evaluation of Rear-View Mirror Design in Cars  
L.A. Raghu Mutnuri, Sivapalan Senthooran, Robert Powell, Zen Sugiyama, David Freed, Exa Corp.

2:40 p.m.  2014-01-0593  CAA Application to Automobile Wind Throb Prevention Design (Written Only -- No Oral Presentation)  
Hangsheng Hou, Ford Motor Co.

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00378 and SUB-TP-00004, and individually. To purchase visit collections.sae.org

Planned by Vehicle Aerodynamics Committee / Automobile Body Activity

**Tuesday, April 8**

**Vehicle Aerodynamics (Part 3 of 10): Rotating Flows**

**Session Code:**  B500  
**Room 430 A**  
**Session Time:**  2:40 p.m.

Vehicle aerodynamic development, drag reduction and fuel economy, handling and stability, cooling flows, surface soiling and water management, vehicle internal environment, tyre aerodynamics and modelling, aeroacoustics, structural response to aerodynamic loading, simulating the on-road environment, onset flow turbulence, unsteady aerodynamics, fundamental flow structures, new test methods and facilities, new applications of computational fluid dynamics simulation, competition vehicle aerodynamics.

**Organizers -**  
Bahram Khalighi, General Motors Co.; Arturo Guzman, Chrysler Group LLC; Taeyoung Han, General Motors Co.; Raymond Leto; Todd Lounsberry, Chrysler Group LLC; James T. McKillen, Honda R & D Americas Inc.; David Sims-Williams, Durham Univ.; Sandeep Sovani, ANSYS Inc.; Mesbah Uddin, UNC Charlotte Motorsports Engineering; H. Robert (Bob) Welge, Robert’s Engineering Development; Thomas N. Ramsay, Honda R & D Americas Inc.; Adrian P. Gaylard, Jaguar Land Rover; Kurt Zielinski, Honda R & D Americas Inc.; Edward G. Duell, Jacobs Technology Inc.; Gary M. Elfstrom, Univ. of Ontario Institute of Technology; Gregory Fadler, Navistar; Mark E. Gleason, Chrysler Group LLC; Kevin Golsch, Navistar

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<tr>
<td>2:40 p.m.</td>
<td>2014-01-0585</td>
<td>Model Scale Based Process for the Development of Aerodynamic Tire Characteristics</td>
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<td>3:00 p.m.</td>
<td>2014-01-0606</td>
<td>Investigation of Wheel Aerodynamic Resistance of Passenger Cars</td>
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The great convergence of global CO2 and emissions mandates is driving powertrain technology solutions worldwide. Similarly, the impact of driver distraction, V2X and smart phones is influencing advances in active safety and connectivity solutions. How are these forces shaping global automotive decisions? Expert panelists will discuss how the industry is leveraging the convergence of regulations to develop more common safety, powertrain, and connectivity solutions. The session will also address the potential opportunities and benefits that further alignment of fuel economy regulations, CO2 mandates, driver distraction guidelines, and connectivity solutions could bring to the global industry.

Deborah Bakker, Director, Regulatory Affairs, Hyundai America Technical Center Inc.

Moderators - Jay Joseph, Assistant Vice President, Product Regulatory Office, American Honda Motor Co. Inc.; Stephen Ridella, Director, Office of Vehicle Crashworthiness Research, National Highway Traffic Safety Administration; Swamy Kotagiri, Executive Vice President of Corporate Engineering, Magna Intl, Inc.; Mike Mansuetti, President, Robert Bosch LLC; Douglas Patton, Senior Vice President Engineering, DENSO International America Inc.;

Panelists - Jeff Hemphill, SAE International Automotive Vice President, Chief Technical Officer, Schaeffler Group USA Inc.; Helmut List, AVL LIST GmbH; Chung Park, Hyundai-Kia America Technical Center Inc.; The Honorable, Rick Snyder, Governor of Michigan

Planned by Vehicle Aerodynamics Committee / Automobile Body Activity

Tuesday, April 8

Grand Opening and Keynote Address

Session Code: CONG300

Room AVL Technology Leadership Center/G  Session Time: 8:30 a.m.

Presenters - Kevin Vincent, Chief Counsel, National Highway Traffic Safety Administration

Tuesday, April 8

Leveraging the Great Convergence

Session Code: ANN100

Room AVL Technology Leadership Center/G  Session Time: 9:30 a.m.

The great convergence of global CO2 and emissions mandates is driving powertrain technology solutions worldwide. Similarly, the impact of driver distraction, V2X and smart phones is influencing advances in active safety and connectivity solutions. How are these forces shaping global automotive decisions? Expert panelists will discuss how the industry is leveraging the convergence of regulations to develop more common safety, powertrain, and connectivity solutions. The session will also address the potential opportunities and benefits that further alignment of fuel economy regulations, CO2 mandates, driver distraction guidelines, and connectivity solutions could bring to the global industry.

Moderators - Deborah Bakker, Director, Regulatory Affairs, Hyundai America Technical Center Inc.

Panelists - Jay Joseph, Assistant Vice President, Product Regulatory Office, American Honda Motor Co. Inc.; Stephen Ridella, Director, Office of Vehicle Crashworthiness Research, National Highway Traffic Safety Administration; Swamy Kotagiri, Executive Vice President of Corporate Engineering, Magna Intl, Inc.; Mike Mansuetti, President, Robert Bosch LLC; Douglas Patton, Senior Vice President Engineering, DENSO International America Inc.;

Tuesday, April 8

Building Bridges between the Motor City and Silicon Valley

Session Code: ANN101

Room AVL Technology Leadership Center/G  Session Time: 1:30 p.m.
The Motor City is stepping on the gas to keep up with Silicon Valley. Pundits believe success for Detroit’s automakers will depend on the industry bridging the gap between its traditional incremental innovation and the lightning fast breakthroughs in consumer electronics. Can automakers step up the pace in implementing new technologies into vehicles? This panel will answer this question as they explore how to make the technological shift happen in proven and practical ways.

**Moderators** - Jeffrey J. Owens, Chief Technology Officer & Executive Vice President, Delphi Automotive

**Panelists** - Rob Csongor, Vice President & General Manager, Automotive, NVIDIA; Dirk Hoheisel, Member of the Board of Management, Robert Bosch GmbH; Takeshi Mitamura, General Manager, Nissan Motor Co.; Naoki Sugimoto, Senior Program Director, Honda Silicon Valley Lab.; John Suh, Director, Hyundai Ventures;

---

**Tuesday, April 8**

**Michigan’s Automotive Strategy**

**Session Code:** ANN300

**Room AVL Technology Leadership Center/G**

**Session Time:** 3:50 p.m.

In Fall 2013, Governor Rick Snyder established an office dedicated to supporting Michigan’s automotive industry. Industry veteran Nigel Francis was named both Special Advisor to the Governor and Senior Vice President of the Automotive Office at the Michigan Economic Development Corporation. As his first order of business, Francis convened a taskforce of auto industry consultants to collaborate on a 30-year strategic analysis and forecast that mapped changing consumer demographics, global manufacturing trends, technology imperatives and innovation priorities. This forecast is the foundation of the Michigan’s Automotive Office strategic plan being implemented by Francis and his team. The future of the industry requires Michigan’s auto industry stakeholders to be evolutionary in our willingness to work together and revolutionary in our ability to drive innovation.

Francis will review highlights from the strategic plan and present an update on the operational plan that is already being implemented. He will also discuss some of the early successes that are a result of Michigan’s commitment to its most important industry.

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<tr>
<td>3:50 p.m.</td>
<td>ORAL ONLY</td>
<td>Introductions</td>
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<td>Donald Manvel, AVL North America Inc.</td>
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<td>4:00 p.m.</td>
<td>ORAL ONLY</td>
<td>Building the Future on the Strong Foundation of Today’s Collaboration</td>
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<td></td>
<td>Nigel J. Francis, Michigan Economic Development Corp.</td>
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**New Possibilities with the Connected Vehicle**

**Session Code:** ANN200

**Room FEV Powertrain Innovation Forum/Gr**

**Session Time:** 10:00 a.m.

What’s your neighbor’s vehicle doing? Find out in this session that focuses on the future of connected vehicle technologies, including infotainment and V2X Vehicle connectivity. This session will focus on the challenges OEMs and suppliers are facing with the rapid development and deployment of new technologies related to the Connected Vehicle, including the continuously constricting development time window that is available for such systems. This is complicated by the fact that feature content is increasing rapidly. Speakers will address approaches that are being taken to handle the large variety of consumer devices and how companies can ensure data integrity and consumer satisfaction.

**Moderators** - Katherine S. Winter, Vice President, Advanced Engineering and Software & Services, Electronics & Safety, Delphi Corporation

**Panelists** - Bruce M. Belzowski, Director-Automotive Analysis, University of Michigan Transportation Research Institute (UMTRI); Meredith Guerriero, Global Head of Automotive, Google Inc.; Timothy Nixon, Global Connected Consumer, OnStar LLC; John Robb, Senior Manager, Electronic Systems Development, Hyundai American Technical Center, Inc.; Stephan Tarnutzer, COO, DGE Inc.;

---

**Tuesday, April 8**
The Changing Face and Complexity of OBD

Session Code: ANN201

Room FEV Powertrain Innovation Forum/Gr  Session Time:  1:00 p.m.

There's a new level of On Board Diagnostics coming. OBD is shifting from the engine and exhaust after treatment system to in-cylinder measures, such as miss-fire detection. As OEMs further pursue downsized and highly boosted engines, pre-ignition is becoming a major topic that is driving emissions system performance and durability. In this session, industry experts will examine the influence of this trend and as well as the likely impact on future compliance requirements.

Moderators - Darren Gosbee, Director, Powertrain Calibration, Navistar Inc.


Wednesday, April 9

Climate Control (Part 1 of 2)

Session Code: HX104  Session Time:  8:00 a.m.

Room 110 A/B

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

Organizers - Bashar AbdulNour, General Dynamics Land Systems; Jeffrey Bozeman, General Motors Co.; Tao Zhan, California Air Resources Board

<table>
<thead>
<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00 a.m.</td>
<td>2014-01-0703</td>
<td>Evaluation on the Solar Reduction Glass in an Electric Vehicle by Experimental Measurements in a Climate Chamber</td>
</tr>
<tr>
<td></td>
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<td>Yoshichi Ozeki, Yuko Harita, Akira Hirano, Jiro Nishihama, Asahi Glass Co., Ltd.</td>
</tr>
<tr>
<td>8:20 a.m.</td>
<td>2014-01-0697</td>
<td>Ways to Determine Vehicle Dual AC System Charge Level</td>
</tr>
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<td></td>
<td>Yinhua Zheng, Hall Visteon Climate Control USA, LLC</td>
</tr>
<tr>
<td>8:40 a.m.</td>
<td>2014-01-0681</td>
<td>Performance Evaluation of Automotive HVAC System with the Use of Liquid Cooled Condenser</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shivakumar Banakar, Mercedes Benz R&amp;D; Dirk Limperich, Daimler AG; Ramesh Asapu, Vaishnavi Panneerselvam, Madhu Singh, Mercedes Benz R&amp;D</td>
</tr>
<tr>
<td>9:00 a.m.</td>
<td>2014-01-0706</td>
<td>Lubricant Impact on R134a Distribution and Microchannel Heat Exchanger Performance</td>
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<tr>
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<td>Yang Zou, Huize Li, Predrag Hrnjak, University of Illinois</td>
</tr>
<tr>
<td>9:20 a.m.</td>
<td>2014-01-0689</td>
<td>Comparison of CO&lt;sub&gt;2&lt;/sub&gt; and R134a Two-Phase Ejector Performance for Use in Automotive Air Conditioning Applications</td>
</tr>
<tr>
<td></td>
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<td>Neal Lawrence, Stefan Elbel, University of Illinois</td>
</tr>
<tr>
<td>9:40 a.m.</td>
<td>2014-01-0692</td>
<td>Lubricant Effect on Performance of R134a MAC Microchannel Evaporators</td>
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<td>Huize Li, Predrag Hrnjak, University of Illinois</td>
</tr>
<tr>
<td>10:00 a.m.</td>
<td>2014-01-0701</td>
<td>Effect of Flow Regime in the Horizontal Inlet Header on Refrigerant-Oil Mixture Distribution in a MAC Microchannel Evaporator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Huize Li, Predrag Hrnjak, University of Illinois</td>
</tr>
</tbody>
</table>
Climate Control (Part 2 of 2)

Session Code: HX104
Room 110 A/B Session Time: 1:00 p.m.

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

Organizers - Bashar AbdulNour, General Dynamics Land Systems; Jeffrey Bozeman, General Motors Co.; Tao Zhan, California Air Resources Board

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<tr>
<th>Time</th>
<th>Paper No.</th>
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<tbody>
<tr>
<td>1:00 p.m.</td>
<td>2014-01-0690</td>
<td>Integrated Front and Rear HVAC Unit</td>
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<tr>
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<td>Kevin Cheung, Honda R &amp; D Americas Inc.; Erich Becker, Delphi Automotive</td>
</tr>
<tr>
<td>1:20 p.m.</td>
<td>2014-01-0685</td>
<td>Real World Customer Usage of the Hyundai Genesis Climate Control System in the USA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Devin Furse, SeKil Park, Lee Foster, Hyundai America Technical Center; Simon Kim, Hyundai Motor America</td>
</tr>
</tbody>
</table>
We are seeking papers related to welding and joining of similar or dissimilar materials of plastics, composites, aluminum, magnesium, titanium, and conventional and advanced high strength steels. Papers related to friction stir (spot) welding, ultrasonic welding, resistance welding, arc welding, laser welding, brazing or soldering, riveting and bolting, and adhesive joining are welcome. Papers related to strength, fracture and fatigue of welds, joints and fasteners are also welcome.

Organizers - Jwo Pan; Michael Santella; Tau Tyan, Ford Motor Co.

Wednesday, April 9

Welding and Joining and Fastening

Session Code: M102

Room 111 A

Session Time: 8:00 a.m.

We are seeking papers related to welding and joining of similar or dissimilar materials of plastics, composites, aluminum, magnesium, titanium, and conventional and advanced high strength steels. Papers related to friction stir (spot) welding, ultrasonic welding, resistance welding, arc welding, laser welding, brazing or soldering, riveting and bolting, and adhesive joining are welcome. Papers related to strength, fracture and fatigue of welds, joints and fasteners are also welcome.

Organizers - Jwo Pan; Michael Santella; Tau Tyan, Ford Motor Co.

8:00 a.m. 2014-01-0791 Comparing Laser Welding Technologies with Friction Stir Welding for Production of Aluminum Tailor-Welded Blanks
Yuri Hovanski, Pacific Northwest National Laboratory; John Carsley, Blair Carlson, Susan Hartfield-Wunsch, General Motors Co.; Siva Pilli, Pacific Northwest National Laboratory

8:20 a.m. 2014-01-0793 Friction Stir Spot Welding of a High Ductility Aluminum Alloy
Joy H Forsmark, Ford Motor Co.
Wednesday, April 9

Vehicle Elecrification Strategies for Sustainability

Session Code: SDP117

Room 111 A

Session Time: 1:00 p.m.

In this session speakers will explore the issues and design strategies of bringing sustainable EV, PHEV and vehicle electrification technologies to market. Identifying the customer value of these sustainable technologies is key to their success and growth. The design models and systems presented in this session highlight ways to optimize customer value to make these technologies successful.

Organizers - Richard T. Paul, Environmental Consultant; Nakia Simon, Chrysler Group LLC

Time | Paper No. | Title
--- | --- | ---
1:00 p.m. | ORAL ONLY | Derivation of Electric Vehicle Concepts for Megacities
Stephan Schickram, Lukas Fella, Teresa Kübel, TUM CREATE; Markus Lienkamp, Technische Universität München

Zhenhong Lin, Jan-Mou Li, Oak Ridge National Laboratory; Jing Dong, Iowa State Univ.

1:40 p.m. | ORAL ONLY | Data Analysis of Plug-in Hybrid Electric Vehicle Driver Behavior
Bert Bras, Daniel Boston, Georgia Institute of Technology; David McCreadie, Donna Bell, Michael Tinskey, Ford Motor Co.

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00432, and also individually. To purchase visit collections.sae.org

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity
Fire Safety
Session Code: B200
Room 111 B

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

Organizers - Steven Hodges, Alion Science & Technology; Jeffrey Santrock, General Motors Co.

<table>
<thead>
<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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<tbody>
<tr>
<td>8:00 a.m.</td>
<td>ORAL ONLY</td>
<td>Technical Keynote: Fire Suppression 101 for Hybrid and Ev’s; A Responders Perspective</td>
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<td>Jason Emery, NFPA</td>
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<tr>
<td>8:20 a.m.</td>
<td>2014-01-0428</td>
<td>Comparison of Fires in Lithium-Ion Battery Vehicles and Gasoline Vehicles</td>
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<td>Masashi Takahashi, Masayuki Takeuchi, Kiyotaka Maeda, Shouma Nakagawa, Japan Automobile Research Institute</td>
</tr>
<tr>
<td>8:40 a.m.</td>
<td>2014-01-0426</td>
<td>Full-Scale Burn Test of a 1998 Compact Passenger Car</td>
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<td>Jeff D. Colwell, Exponent</td>
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<tr>
<td>9:00 a.m.</td>
<td>2014-01-0423</td>
<td>Detection of Fires in the Engine Compartment of Heavy Duty Vehicles, A Theoretical Study</td>
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<td>Raúl Ochoterena, Maria Hjohlman, Michael Försth, SP Technical Research Inst of Sweden</td>
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<tr>
<td>9:20 a.m.</td>
<td>2014-01-0421</td>
<td>Validation of the Localized Fire Test Method for On-Board Hydrogen Storage Systems</td>
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<td>Yohsuke Tamura, Masayuki Takeuchi, Kiyotaka Maeda, Noriaki Ohtsuka, Japan Automobile Research Institute; Kenji Sato, Toho Univ.</td>
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</tbody>
</table>

The papers in this session are available in SAE Technical Paper Collection, COLL-GTL-00001, and also individually. To purchase visit collections.sae.org

Wednesday, April 9

2:00 p.m. 2014-01-1969 Retail Infrastructure Costs Comparison for Hydrogen and Electricity for Light-Duty Vehicles
Marc W. Melaina, National Renewable Energy Laboratory

2:20 p.m. 2014-01-1968 Conversion of a CNG Powered Auto Rickshaw to an Electric Rickshaw Designed for Indian Conditions

2:40 p.m. 2014-01-1967 The ELVA Project's EV Design Support Tool
Arturo Davila, Emilia Romero, Marina Roche, Marco Mammetti, Javier Gutierrez, Applus Idiada; Micha Lesemann, IKA

3:20 p.m. ORAL ONLY xEV Incentive Program: Analysis and Proposed Way to Maximize Saving in Fuel Consumption Per Every $ Spend, In Indian Context
Haresh P. Bhere, Vinay Ranganath, Tata Motors Ltd.

3:40 p.m. ORAL ONLY Design and Modelling of Re Configurable Electric Vehicle
Arka Das, Srm University Vadapalani

Planned by Sustainable Development Program Committee / Engineering Meetings Board
### Key Success Factors for DFSS and Lean Manufacturing

**Session Code:**  IDM400  
**Room 111 B**

This technical session deals with research and development efforts addressing the advancement and applications of Lean methodologies and Quality improvement in the mobility Industry. Papers presented in this session will portray the latest developments in the principles, practices, tools, processes, and applications of Lean and Quality improvement methodologies.

**Organizers:** Richard Amori, Ford Motor Co.; Mohamed El-Sayed, Kettering University; Mohammad Hijawi, Chrysler Group LLC; Robert Lust; Yih-Chyun Sheu, Chery Automobile Co., Ltd.; Beena Anand, Norma Group

<table>
<thead>
<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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</table>
| 1:00 p.m.  | 2014-01-0737| **A Methodology for Investigating and Modelling Laser Clad Bead Geometry and Process Parameter Relationships**  
Kush Aggarwal, Ruth Urbanic, Luv Aggarwal, University of Windsor |
| 1:20 p.m.  | 2014-01-0740| **A Systems Approach to the Development and Use of FMEA in Complex Automotive Applications**  
Ed Henshall, Ioan Felician Campean, University of Bradford; Brian Rutter, Ford Motor Co. |
| 1:40 p.m.  | 2014-01-0769| **Implementation of Lean Transactional in Tenneco’s Ride Performance Europe Division - Review after Three Years of Implementation**  
Patrick Garcia, Tenneco; Sandro Paparelli, Tenneco Ride Performance |
Thermal System Components

Session Code: HX101

Room 112 A    Session Time: 8:00 a.m.

This session features components used for thermal management. The papers address design, application and systems related topics.

Organizers - Ronald Semel, General Motors Co.; Gursaran D. Mathur, CalsonicKansei North America Inc.; Ramesh Kumar Goyal, General Motors Co. (retired); Alaa El-Sharkawy, Chrysler Group LLC; Andrew Sutherland, BorgWarner Inc.

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<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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<tr>
<td>8:00 a.m.</td>
<td>2014-01-0635</td>
<td>Development of High Performance Radiators by Fin Optimization</td>
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<td>Toshihide Ninagawa, DENSO International America Inc.; Osamu Hakamata,</td>
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<td>DENSO Corp.; Sergio Pujols, DENSO International America Inc.</td>
</tr>
<tr>
<td>8:20 a.m.</td>
<td>2014-01-0638</td>
<td>Integrated Low Temperature Cooling System Development in Turbo</td>
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<td>Charged Vehicle Application</td>
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<td></td>
<td>Xu Song, John Myers, Scott Sarnia, Hyundai-Kia America Technical Center</td>
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<td></td>
<td>Inc.</td>
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<tr>
<td>8:40 a.m.</td>
<td>2014-01-0632</td>
<td>ACT Valve: Active Cooling Thermomangement Valve</td>
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<td>Mickael Cormerais, Thierry Marimborde, Stephane Warnery, Mann &amp;</td>
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<td>Hummel GmbH; David Chalet, Haitham Mezher, Ecole Centrale De Nantes;</td>
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<td>Laurent Roussel, EFI Automotive</td>
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<td>9:00 a.m.</td>
<td>2014-01-0633</td>
<td>Evolution of Active Grille Shutters</td>
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<td>Cornelius Pfeiter, Röchling Automotive SE &amp; Co. KG</td>
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<td>9:20 a.m.</td>
<td>2014-01-0634</td>
<td>PCM Evaporator with Thermosiphon</td>
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<td>Carrie Kowsky, Edward Wolfe, Sourav Chowdhury, Debashis Ghosh, Mingyu</td>
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<td>Wang, Delphi Automotive</td>
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</table>

Planned by Lean - Six Sigma Committee / Integrated Design and Manufacturing Activity

Wednesday, April 9
Wednesday, April 9


Session Code: HX102

Room 112 A  Session Time: 1:00 p.m.

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

Organizers - Ales Alajbegovic, Exa Corp.; Jason Aaron Lustbader, National Renewable Energy Laboratory; Gursaran D. Mathur, CalsonicKansei North America Inc.; Kumar Srinivasan, Chrysler Group LLC

Time  Paper No.  Title

1:00 p.m.  2014-01-0659  An Approach for Water Jacket Flow Simulations
Nikolaos Karras, Timo Kuthada, Jochen Wiedemann, IVK / FKFS University of Stuttgart

1:20 p.m.  2014-01-0660  Optimization of TOC Plumbing Line Pressure Drop using 1D Modeling
V. Sundaram, Tharunnarayanan Arthanari, Sathish Kumar S, Chrysler India Automotive Pvt. Ltd.
**Design Optimization - Methods and Applications (Part 1 of 2)**

**Session Code:** B103  
**Room 112 B**  
**Session Time:** 8:00 a.m.

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

**Organizers** - Mallikarjuna Bennur, General Motors Co.; James De Clerck, Michigan Technological Univ.; Vesna Savic, General Motors Co.

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<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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</table>
| 8:00 a.m.  | ORAL ONLY | **Technical Keynote: Multi-disciplinary Optimization using Parametric CAE Models to meet Weight & Performance Objectives**  
Radha Krishnan, Detroit Engineered Products Inc. |
| 9:00 a.m.  | 2014-01-0400 | **Comparative Benchmark Studies of Response Surface Model-Based Optimization and Direct Multidisciplinary Design Optimization**  
Hongyi Xu, Northwestern Univ.; Monica T. Majcher, Oakland Univ.; Ching-Hung Chuang, Yan Fu, Ren-Jye Yang, Ford Motor Co. |
9:20 a.m. 2014-01-0392 Collaborative Design Optimization for Light Weight Design
Velayudham Ganesan, Javier Rodriguez, Robert Johnston, EDAG Inc.

9:40 a.m. 2014-01-0410 Development of Optimization Method for Automotive Parts and Structures
Takanobu Saito, Jiro Hiramoto, Toshiaki Urabe, JFE Steel Corp.

10:00 a.m. 2014-01-0388 Body Optimization for Front Loading Design Process
Wookjin Na, SangKyu Lee, Jongchan Park, Hyundai Motor Co.

10:20 a.m. 2014-01-0397 Robust Optimization of Vehicle Crashboxes
Pit Schwanitz, Sebastian Werner, Johannes Zerbe, Dietmar Gölich, Technical Univ., Berlin

10:40 a.m. 2014-01-0407 Structural Optimization with Contact Constraints Applied to the Design of Automatic Transmission of Vehicles
Hiroyuki Kitajima, AW Engineering Co., Ltd.; Takanori Ide, Aisin AW Co., Ltd.; Juan Leiva, Brian Watson, Shrinivas Lankalapalli, Vanderplaats R&D

11:00 a.m. 2014-01-0399 Simplified Approach of Chassis Frame Optimization for Durability Performance
Mohamed Sithik, Rama Vallurupalli, Chrysler India Automotive Pvt, Ltd.; Barry (Baizhong) Lin, Chrysler Group LLC; Subash Sudalaimuthu, Chrysler India Automotive Pvt, Ltd.

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00394, and also individually. To purchase visit collections.sae.org

Wednesday, April 9

Design Optimization - Methods and Applications (Part 2 of 2)

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<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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<tr>
<td>1:00 p.m.</td>
<td>2014-01-0412</td>
<td>Application of Time Symmetry Preserving Adjoint Solver in External Car Aerodynamics</td>
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<td>Aleksandar Jemcov, University of Notre Dame; Darrin Stephens, Chris Sideroff, Applied CCM</td>
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<tr>
<td>1:20 p.m.</td>
<td>2014-01-0415</td>
<td>Application of 3D Inverse Design Based Multi-Objective Optimization of Axial Cooling Fan with Large Tip Gap</td>
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<td>Matthieu De Maillard, Advanced Design Technology, Ltd.; Mehrdad Zangeneh, University College London</td>
</tr>
<tr>
<td>1:40 p.m.</td>
<td>2014-01-0385</td>
<td>Parameter Identification of a Quasi-Dimensional Spark-Ignition Engine Combustion Model</td>
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<td>Ramin Masoudi, Hadi Adibi asl, Nasser Lashgarian Azad, John McPhee, University of Waterloo</td>
</tr>
</tbody>
</table>
### Wednesday, April 9

#### Session Code: M303  
Room 112 C/D  
Session Time: 8:00 a.m.

This session contains papers which describe the use of modern automotive composites in structural applications. Design, process, and analytical presentations are included, as well as papers presenting results of bonding strategies and techniques. Engineers involved in the design and use of advanced composites will find this session of particular value.

**Organizers**: Y. Charles Lu, Univ. of Kentucky; Srikanth Pilla, Clemson Univ.; Michael Royce; Richard Dale Tonda, SEA, Ltd.

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<th>Time</th>
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<tr>
<td>8:00 a.m.</td>
<td>2014-01-1059</td>
<td>Advancements in Composite Structural Closures</td>
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<td>Aaron C. Tenorio, David D. Lipka, Nissan Technical Center NA</td>
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<tr>
<td>8:20 a.m.</td>
<td>2014-01-1057</td>
<td>Development of a Lightweight CFRP Coil Spring</td>
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<td>Daewon Jang, Sungbae Jang, Hyundai Motor Co.</td>
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</tbody>
</table>
### Time | Paper No. | Title                                                                 |
--- | --- | ---
8:40 a.m. | 2014-01-1056 | High Strain Rate Mechanical Properties of Long Glass Fiber Filled Polypropylene and Nylon |
Sarah J.H. Kuhlman, Susan I. Hill, Univ. of Dayton Research Institute

9:00 a.m. | 2014-01-1051 ORAL ONLY | Development and Characterization of a Composite Cylindrical Column with an Aluminum Foam Core |
Mohamed Eghfaier, Nassif E. Rayess, Univ. of Detroit Mercy

9:20 a.m. | ORAL ONLY | Characterizing the Structural Behavior of Single and Stacked Composite Disk Springs |
Peng Yang, Stacy Van Dyke, Rani Elhajjar, Univ. of Wisconsin Milwaukee

9:40 a.m. | 2014-01-1050 | City Vehicle XAM 2.0: Design and Optimization of the Composite Suspension System |
Massimiliana Carello, Andrea Giancarlo Airale, Alessandro Ferraris, Politecnico di Torino

10:00 a.m. | 2014-01-1054 ORAL ONLY | Automotive & Railways, Light & Green Body in White |
Max Sardou, Sardou Sa; Patricia Djomseu, Qip Sarl

10:20 a.m. | 2014-01-1053 | Material Properties of Hollow Sectioned Steel Tubes and Wood Filled Hollow Sectioned Steel Tubes under Compression (Written Only -- No Oral Presentation)
Bharatesh Adappa Danawade, Gogte Institute of Technology; Ravindra Rachappa Malagi, Visvesvaraya Tech. Univ.

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00401, and also individually. To purchase visit collections.sae.org

Planned by Motorsports Engineering Activity / EMB Land and Sea Group; Polymers and Coatings Committee / Materials Engineering Activity; Motorsports Engineering Committee / Motorsports Engineering Activity

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**Wednesday, April 9**

Automotive Composites (Part 2 of 2)

**Session Code:** M303

**Room 112 C/D**

**Session Time:** 1:00 p.m.

This session contains papers which describe the use of modern automotive composites in structural applications. Design, process, and analytical presentations are included, as well as papers presenting results of bonding strategies and techniques. Engineers involved in the design and use of advanced composites will find this session of particular value.

**Organizers** - Y Charles Lu, Univ. of Kentucky; Srikanth Pilla, Clemson Univ.; Michael Royce; Richard Dale Tonda, SEA, Ltd.

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<tbody>
<tr>
<td>1:00 p.m.</td>
<td>2014-01-1068 ORAL ONLY</td>
<td>Production of a Composite Monocoque Frame for a Formula SAE Racecar</td>
</tr>
</tbody>
</table>
Leonard Hamilton, Peter Joyce, US Naval Academy

| 1:20 p.m.  | 2014-01-1052 | Design, Analysis, and Simulation of an Automotive Carbon Fiber Monocoque Chassis |
Jingsi Wu, Owusu Agyeman Badu, Yonchen Tai, Albert R. George, Cornell Univ.

| 1:40 p.m.  | ORAL ONLY | Tepex® Composite Sheets: New Generation Materials for Light Weighting Airbag Housings |
Vasant Pednekar, Lanxess Corp. |
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<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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<tbody>
<tr>
<td>1:00 p.m.</td>
<td>2014-01-1008</td>
<td>Investigation of Wear Behavior of Aluminum Alloy Reinforced with Carbon Nanotubes</td>
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<td>Deniz Uzunsoy, Bursa Technical University; Tao Peng, Isaac Chang, Univ. of Birmingham; Ilyas Istit, Yildiz Technical University</td>
</tr>
<tr>
<td>1:20 p.m.</td>
<td>2014-01-0995</td>
<td>Development of Lead-Free Al-Sn-Si Alloy Bearing for Recent Automotive Engines</td>
</tr>
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<td>Akihiro Kose, Motohiko Koushima, Daido Metal Co. Ltd.; Tomohiro Ukai, Daido Metal USA Inc.; Yuki Kawashima, Kouji Zushi, Daido Metal Co. Ltd.</td>
</tr>
<tr>
<td>1:40 p.m.</td>
<td>2014-01-1012</td>
<td>Cyclic Behavior of an Al-Si-Cu Alloy under Thermo-Mechanical Loading</td>
</tr>
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<td>Jianghui Mao, Carlos Engler-Pinto, Xuming Su, Ford Motor Co.; Scott Kenningley, Federal-Mogul Corp.</td>
</tr>
<tr>
<td>2:00 p.m.</td>
<td>2014-01-1002</td>
<td>Development of Aluminum Powder Metal Composite Material Suitable for Extrusion Process used for Cylinder Sleeves of Internal Combustion Engines</td>
</tr>
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<td>Eiichi Sato, Hirotoshi Inui, Honda R&amp;D Co., Ltd.; Shinichiro Shigezumi, Toshihiko Kaji, Sumitomo Electric Sintered Alloy, Ltd.</td>
</tr>
</tbody>
</table>
Load Simulation and Vehicle Performance (Part 5 of 5): Handling and Dynamics Controls

Session Code: M107
Room 113 C

Focusing on analysis and enhancement of vehicle dynamics performance including handling / braking / traction characteristics, operational robustness and active stability under the influence of loading, tire forces and other variants; development and applications of intelligent tire technology; modeling, simulation, testing and optimization; correlation of analyses, simulations, objective measurements and subjective judgments of vehicle dynamics characteristics; chassis control development and control system cooperation for enhancing overall vehicle system dynamics and safety characteristics and robustness taking into considerations of load variations and other uncertainties; impact of system hybridization and electrification on vehicle dynamics and controls.

Organizers - Ken Kang, Honda R & D Americas Inc.; Dongpu Cao, Lancaster University; Jianmin Gu, Changan Automobile Co., Ltd.

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<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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<tbody>
<tr>
<td>2:20 p.m.</td>
<td>2014-01-0998</td>
<td>Development of Hypereutectic Aluminum Cylinder Liner for HPDC Cylinder Block</td>
</tr>
<tr>
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<td>Young-gi Kim, Seung-Woo Choi, Jin-Woo Cho, Seung-Won Min, Seok-jun Kim, Byung-jun Jung, Hyundai-Kia Motors</td>
</tr>
<tr>
<td>2:40 p.m.</td>
<td>2014-01-0997</td>
<td>A Study on Corrosion Occurring at the Sealing Gap between Aluminum Alloy and Rubber Gasket</td>
</tr>
<tr>
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<td></td>
<td>Norihiro Hamada, Kiyohiro Suzuki, NOK Corp.</td>
</tr>
<tr>
<td>3:00 p.m.</td>
<td>2014-01-1009</td>
<td>Improvement of Manufacturing and Evaluation Technology for the Light Weight Brake Disc Composed of Hybrid Type Material</td>
</tr>
<tr>
<td>3:20 p.m.</td>
<td>2014-01-0999</td>
<td>Development of a New High Strength Aluminum Casting Alloy for the Production of Suspension Components</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Klaus Greven, Manikandan Loganathan, KSM Castings Group GmbH</td>
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</tbody>
</table>

Wednesday, April 9

Load Simulation and Vehicle Performance (Part 5 of 5): Handling and Dynamics Controls

Session Time: 8:00 a.m.

Time  | Paper No.     | Title                                                                 |
<table>
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<tbody>
<tr>
<td>8:00 a.m.</td>
<td>2014-01-0862</td>
<td>Influence of Active Suspension Preview Control on Vehicle Ride and Braking Performance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mina M.S. Kaldas, IAE, TU Braunschweig; Aref M.A. Soliman, South Valley University</td>
</tr>
<tr>
<td>8:20 a.m.</td>
<td>2014-01-0863</td>
<td>Application of Road Load Prediction Technique for Suspension Durability Input Condition</td>
</tr>
<tr>
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<td></td>
<td>Takamasa Shimodaira, Honda R&amp;D Co., Ltd.</td>
</tr>
<tr>
<td>8:40 a.m.</td>
<td>2014-01-0839</td>
<td>Gyroscopic Bearing Loads in Vehicular Flywheel-Based KERS</td>
</tr>
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<td>Guenter Bischof, Karl Reisinger, Thomas Singraber, Andreas Summer, FH Joanneum</td>
</tr>
<tr>
<td>9:00 a.m.</td>
<td>ORAL ONLY</td>
<td>Vehicle Handling with Uncertain Parameters Using Chebyshev Interval Method</td>
</tr>
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<td>Yunqing Zhang, Huazhong University of Science and Tech.</td>
</tr>
<tr>
<td>9:20 a.m.</td>
<td>2014-01-0875</td>
<td>Modeling Real People in Real Buses: Implications Concerning Tire, Axle and Vehicle Weights</td>
</tr>
<tr>
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<td>Mark William Arndt, Transportation Safety Tech. Inc.</td>
</tr>
<tr>
<td>Time</td>
<td>Session Code</td>
<td>Title</td>
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</tr>
<tr>
<td>9:40 a.m.</td>
<td>2014-01-0840</td>
<td>Suitable Load Case for Structural Analysis of Outriggers Applied for Vehicle Handling and Stability Field Test</td>
</tr>
<tr>
<td>10:00 a.m.</td>
<td>2014-01-0879</td>
<td>Modeling the Impact of Road Grade and Curvature on Truck Driving for Vehicle Simulation</td>
</tr>
<tr>
<td>10:20 a.m.</td>
<td>2014-01-0841</td>
<td>Development of Effective Bicycle Model for Wide Ranges of Vehicle Operations</td>
</tr>
<tr>
<td>10:40 a.m.</td>
<td>2014-01-0866</td>
<td>Allocation-Based Fault Tolerant Control for Electric Vehicles with X-by-Wire</td>
</tr>
<tr>
<td>11:00 a.m.</td>
<td>2014-01-0859</td>
<td>Development of Active Control Strategy for Flat Tire Vehicles</td>
</tr>
<tr>
<td>11:20 a.m.</td>
<td>ORAL ONLY</td>
<td>Technical Keynote: The Vehicle Dynamics and Set-up of the Modern Formula One Car</td>
</tr>
<tr>
<td>1:00 p.m.</td>
<td>2014-01-0848</td>
<td>Experimental Research on the Pressure Following Control of Electro-Hydraulic Braking System (Written Only -- No Oral Presentation)</td>
</tr>
<tr>
<td>2014-01-0860</td>
<td>Comparison of Torque Vectoring Control Strategies for a IWM Vehicle (Written Only -- No Oral Presentation)</td>
<td>Edoardo Sabbioni, Federico Cheli, Michele Vignati, Stefano Melzi, Politecnico di Milano</td>
</tr>
<tr>
<td>2014-01-0864</td>
<td>On The Integration of Actively Controlled Longitudinal/Lateral Dynamics Chassis Systems (Written Only -- No Oral Presentation)</td>
<td>Walid Oraby, Mahmoud Atef Aly, Samir El-demerdash, M. El-Nashar, Helwan University</td>
</tr>
<tr>
<td>2014-01-0865</td>
<td>A Sliding Mode Observer for Vehicle Slip Angle and Tire Force Estimation (Written Only -- No Oral Presentation)</td>
<td>Yuhang Chen, Yunfeng Ji, Konghui Guo, Jilin University</td>
</tr>
<tr>
<td>2014-01-0876</td>
<td>Influence of Active Subsystems on Electric Vehicle Behavior and Energy Characteristics (Written Only -- No Oral Presentation)</td>
<td>Barys Shyroka, Nanyang Technological University; Dzmitry Savitski, Ilmenau University of Technology; Danwei Wang, Nanyang Technological University</td>
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The papers in this session are available in SAE Technical Paper Collection, COLL-GTL-00001 and COLL-TP-00377, also individually. To purchase visit collections.sae.org

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

**Wednesday, April 9**

**Load Simulation and Vehicle Performance (Part 4 of 5): Multi-body Dynamics**

**Session Code:** M107

**Room 113 C**

**Session Time:** 1:00 p.m.
Focusing on multibody system modeling and simulation results, rigid and flexible body modeling, mount loads predictions for vehicle body, frame/subframe, leaf-spring, exhaust system, driveline, and powertrain, the comparison of modeling techniques between vehicle dynamics simulation and durability loads simulation, optimal development process considering vehicle dynamics and durability loads, data processing and analysis techniques, loads sensitivity analyses for various model parameters, DOE and optimal design techniques for loads minimization, prediction of manufacturing tolerance effects on loads, robust design methods, driver modeling, and FE-based system modeling.

Organizers - Paramsothy Jayakumar, TARDEC; Jesper Slattengren, Pratt & Miller Engineering

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<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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<tbody>
<tr>
<td>1:00 p.m.</td>
<td>2014-01-0847</td>
<td>Automation of Adams/Car K&amp;C Correlation using MATLAB</td>
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<td>Andrew Hall, John McPhee, University of Waterloo</td>
</tr>
<tr>
<td>1:20 p.m.</td>
<td>2014-01-0856</td>
<td>Development in the Acquisition of Vehicle Loads Integrated with a Rigid and Flexible Multi-Body Model</td>
</tr>
<tr>
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<td>Tao Wang, Liangmo Wang, School of Mechanical Engineering, NUST; Chenzhi Wang, University of Pittsburgh; Tongfu Liu, Liukai Yuan, Tangyun Zhang, NAVECO Ltd.</td>
</tr>
<tr>
<td>1:40 p.m.</td>
<td>ORAL ONLY</td>
<td>Efficient Modeling of Machinery Components and Systems Using Multi-Body Analysis Tools</td>
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<td>Uday Prasade, MSC Software Corp.; Kyle Indermuehle, MSC Software Corp</td>
</tr>
<tr>
<td>2:00 p.m.</td>
<td>2014-01-0870</td>
<td>Characteristic Analysis of Roll and Pitch Independently Controlled Hydraulically Interconnected Suspension</td>
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<td>Guangzhong Xu, Nong Zhang, Univ. of Technology Sydney</td>
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<tr>
<td>2:20 p.m.</td>
<td>ORAL ONLY</td>
<td>New Computational Framework for the Treatment of Joint Constraints and Connectivity Conditions in Finite Element/Multibody System Algorithms</td>
</tr>
<tr>
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<td>Ahmed A. Shabana, University of Illinois - Chicago; Paramsothy Jayakumar, Michael Letherwood, David Gorsich, US Army TARDEC</td>
</tr>
<tr>
<td>2:40 p.m.</td>
<td>2014-01-0873</td>
<td>A Multibody Dynamics-Enabled Mobility Analysis Tool for Military Applications</td>
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<td>Daniel J. Melanz, Hammad Mazhar, Dan Negrut, Univ. of Wisconsin</td>
</tr>
<tr>
<td>2:40 p.m.</td>
<td>2014-01-0883</td>
<td>Multi-objective Optimization of the Variable Stiffness Suspension of a Light Bus Based on Artificial Immune Algorithm (Written Only -- No Oral Presentation)</td>
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<td>Wenku Shi, Changxin Wang, Jilin Univ.</td>
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The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00377, and also individually. To purchase visit collections.sae.org

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Wednesday, April 9

CAE Durability Analysis and Applications (Part 2 of 3)

Session Code: M109

Room 114 A

Session Time: 8:00 a.m.

This technical session focuses on state-of-the-art fatigue theory and advanced development in fatigue analysis methodology and research. Studies and discussions on innovative and improved fatigue theory/methods in material constitutive modeling, damage rules/fatigue damage calculation, and fatigue life predictions will be addressed.

Organizers - Mingchao Guo, Chrysler Group LLC; Guofei Chen, United States Steel Corp.; Ali Fatemi, Univ. of Toledo; Abolhassan Khosrovaneh, GM; Zhigang Wei, Tenneco Automotive Co., Ltd.; Guangtian Gavin Song, AM General LLC; Mark A. Pompetzki, HBM-nCode; Yung-Li Lee, Chrysler Group LLC

Chairpersons - Mingchao Guo, Chrysler Group LLC; Guofei Chen, United States Steel Corporation; Guangtian Gavin Song, AM General LLC

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<tr>
<th>Time</th>
<th>Paper No.</th>
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<tr>
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Wednesday, April 9

CAE Durability Analysis and Applications (Part 3 of 3)

Session Code: M109

Room 114 A

Session Time: 1:00 p.m.

This technical session focuses on state-of-the-art fatigue theory and advanced development in fatigue analysis methodology and research. Studies and discussions on innovative and improved fatigue theory/methods in material constitutive modeling, damage rules/damage calculation, and fatigue life predictions will be addressed.

Organizers - Mingchao Guo, Chrysler Group LLC; Guofei Chen, United States Steel Corp.; Ali Fatemi, Univ. of Toledo; Abolhassan Khosrovaneh, GM; Zhigang Wei, Tenneco Automotive Co., Ltd.; Guangtian Gavin Song, AM General LLC; Mark A. Pompetzki, HBM-ncode; Yung-Li Lee, Chrysler Group LLC

Chairpersons - Abolhassan Khosrovaneh, GM; Zhigang Wei, Tenneco Automotive Co., Ltd.

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<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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<tr>
<td>1:00 p.m.</td>
<td>2014-01-0904</td>
<td>Solver Embedded Fatigue</td>
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<td>Timothy Palmer, MSC Software Corp.; Neil Bishop, CAEfatigue Ltd.</td>
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</table>
### NVH CAE Analysis & Testing Correlations (Part 1 of 2)

**Session Code:** M108  
**Room 114 B**  
**Session Time:** 8:00 a.m.

M108 covers the development and application of numerical methods along with test correlation and optimization for NVH issues of full vehicle and vehicle subsystems. All structural components, subsystems and complete systems found in automotive vehicles will be considered. Topics include structure NVH, vibro-acoustics, wind noise and aeroacoustics, intake/exhaust and vehicle interior noise, sound quality etc.

**Organizers:**  
Kuang-Jen Liu, Chrysler Group LLC; Luohui Long, Ford Motor Co.; Christopher Morgan, Autoliv ASP; Nammalwar Purushothaman, BAE Systems; Guangtian Gavin Song, AM General LLC; Weiguo Zhang, Chrysler LLC

**Chairpersons:**  
Kuang-Jen Liu, Chrysler Group LLC; Weiguo Zhang, Chrysler LLC

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<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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</table>
| 8:00 a.m.   | ORAL ONLY      | Technical Keynote: Better Science, Not More Hardware, for Visualizing Noise Sources  
Sean F. Wu, Wayne State Univ. |
| 8:40 a.m.   | 2014-01-0887   | Optimization of a Porous Ducted Air Induction System Using Taguchi’s Parameter Design Method  
Weiguo Zhang, Rakesh Khurana, Mark Likich, Mac Lynch, Chrysler Group LLC |
| 9:00 a.m.   | 2014-01-0892   | Tonal Metrics in the Presence of Masking Noise and Correlation to Subjective Assessment  
Eric Frank, Sound Answers Inc.; Peter Jacobsen, Chrysler Group LLC |
| 9:20 a.m.   | 2014-01-0889   | Prediction of the Sound Absorption Performance of Polymer Wool by Using Artificial Neural Networks Model  
Shuming Chen, Yawei Huang, Dengfeng Wang, Dengzhi Peng, Xuewei Song, Jilin University |
9:40 a.m. 2014-01-0895  Prediction and Analysis Technology Development for Impact Noise
Hiroyuki Tanaka, Hisashi Ihara, Akira Satomura, Yasuhiro Wada, Nissan Motor Co., Ltd.; Hideto Momii, Tatsuya Suma, ESTECH Corp.

10:00 a.m. 2014-01-0896  A Research on the Sound Quality Contribution of Vehicle Body Panel
Li Yan, Weikang Jiang, Shanghai Jiao Tong University; Zongbin Huang, Jiangqi Zhou, SAIC-GM-WULING Automobile Co., Ltd.

10:20 a.m. 2014-01-0893  Acoustics Based Vehicle Environmental Information
Adarsh Venkata Padmanabhan, Hariram Ravichandran, Lokendra Pavan Kumar Pappala, Rangaraj Ramanan Durai, Robert Bosch India Ltd.

10:40 a.m. 2014-01-0890  Computational Accuracy and Efficiency of the Element Types and Sizes for Car Acoustic Finite Element Model
Shuming Chen, Dengzhi Peng, Dengfeng Wang, Jilin University

11:00 a.m. 2014-01-0888  An Experimental and Multiphysics Based Numerical Study to Predict Automotive Fuel Tank Sloshing Noise
V. Jadon, G. Agawane, A. Baghel, Venkatesham Balide, R. Banerjee, IIT Hyderabad; A. Getta, H. Viswanathan, A. Awasthi, Mercedes Benz R&D India

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Wednesday, April 9

NVH CAE Analysis & Testing Correlations (Part 2 of 2)

Session Code: M108

Room 114 B  Session Time: 1:00 p.m.

M108 covers the development and application of numerical methods along with test correlation and optimization for NVH issues of full vehicle and vehicle subsystems. All structural components, subsystems and complete systems found in automotive vehicles will be considered. Topics include structure NVH, vibro-acoustics, wind noise and aeroacoustics, intake/exhaust and vehicle interior noise, sound quality etc.

Organizers - Kuang-Jen Liu, Chrysler Group LLC; Luohui Long, Ford Motor Co.; Christopher Morgan, Autoliv ASP; Nammalwar Purushothaman, BAE Systems; Guangtian Gavin Song, AM General LLC; Weiguo Zhang, Chrysler Group LLC

Chairpersons - Kuang-Jen Liu, Chrysler Group LLC; Weiguo Zhang, Chrysler Group LLC

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<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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<tr>
<td>1:00 p.m.</td>
<td>Panel</td>
<td>Challenges in Diagnosing Vehicle Noise in Non-Ideal Environment</td>
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</table>

This panel discussion will be focused on issues facing engineers in locating undesirable automobile noise sources under non-ideal environment and mitigating their levels in the most cost-effective manner. The panelists will include experts from academia and industry with years of experience in dealing with various complex noise and vibration problems.

Moderators - Sean F. Wu, Wayne State Univ.
Panelists - Gunnar Heilmann, GfaiTech GmbH; Wen Li, Wayne State Univ.; Kuang-Jen Liu, Chrysler Group LLC; Guangtian Gavin Song, AM General LLC; Robert L. Ussery, Crown Equipment Corporation;

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Wednesday, April 9
LCA and Sustainable Materials/Manufacturing

Session Code: SDP114

This session reviews life cycle assessments on materials, technologies, and processes as well as sustainable materials and manufacturing. The topics include but are not limited to updates on the development of life cycle analysis databases for use by the national and international community, advance material recycling technologies, remanufacturing and serviceability, materials or components reuse, as well as reduction and/or elimination of substances of concern and volatile organic compound.

Organizers - Deepak Gupta, Wichita State University; Susan Sawyer-Beaulieu, Univ. of Windsor; Bhaskaran Gopalakrishnan, West Virginia University

Chairpersons - Deepak Gupta, Wichita State University; Bhaskaran Gopalakrishnan, West Virginia University; Subodh Chaudhari, Hudson Technologies

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<tr>
<th>Time</th>
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<tbody>
<tr>
<td>8:00 a.m.</td>
<td>2014-01-1960</td>
<td>Design for Compliance of Mechatronics Systems in Automotive: Material Tracking and Product Data Management Considerations</td>
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<td>Vukica Jovanovic, Mileta Tomovic, Old Dominion University; Lisa Ncube, AT Still University; Ana Djuric, WSU SSIM; Petros Katsioloudis, Old Dominion University; Filip Cuckov, University of Massachusetts Boston</td>
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<td>Sujit Das, Oak Ridge National Laboratory</td>
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<td>8:40 a.m.</td>
<td>2014-01-1959</td>
<td>A Life Cycle Assessment of Natural Fiber Reinforced Composites in Automotive Applications</td>
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<td>Claire Boland, Robb DeKleine, Aditi Moorthy, Gregory Keoleian, Univ. of Michigan; Hyung Chul Kim, Ellen Lee, Timothy J. Wallington, Ford Motor Co.</td>
</tr>
<tr>
<td>9:00 a.m.</td>
<td>2014-01-1964</td>
<td>Life Cycle Land Requirement, Energy Consumption and GHG Emissions of Biodiesel Derived from Microalgae and Jatropha &lt;italic&gt;curcas&lt;/italic&gt; Seeds in China</td>
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<td>Tingting Zhang, Xiaomin Xie, Zhen Huang, Shanghai Jiao Tong University</td>
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<tr>
<td>9:20 a.m.</td>
<td>ORAL ONLY</td>
<td>GREET Life-Cycle Analysis for Natural Gas Use in Transportation: Natural Gas Vehicles, Hydrogen Fuel-Cell Vehicles, and Battery Electric Vehicles</td>
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<td>Michael Wang, Argonne National Laboratory</td>
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<tr>
<td>9:40 a.m.</td>
<td>2014-01-1005</td>
<td>The Potential of New Vehicle Concepts For Transport Optimization and GHG Emission Reduction in Urban Areas</td>
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<td>Helmut Brunner, Mario Hirz, Graz University of Technology</td>
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<td>10:00 a.m.</td>
<td>2014-01-1956</td>
<td>Food Processing and Automotive Manufacturing: an Environmental Friendly Approach to Synthetic Rubber</td>
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<td>Alessandro Libriani, Henniges Automotive</td>
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<td>Bert Bras, Andrew Carlile, Georgia Institute of Technology; Thomas Niemann, Sherry Mueller, Hyung Chul Kim, Timothy Wallington, Heidi McKenzie, Susan Rokosz, Ford Motor Co.</td>
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<td>10:40 a.m.</td>
<td>ORAL ONLY</td>
<td>Bio-based Thermoplastic Polyurethane (TPU) from BASF</td>
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<td>Emre Kurtoglu, BASF</td>
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<td>11:00 a.m.</td>
<td>ORAL ONLY</td>
<td>CSA 2014 Guidance Document for Life Cycle Assessment (LCA) of Auto Parts</td>
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<td>Alain Dubreuil, Natural Resources Canada; Lindita Bushi, Athena Institute; Steven B. Young, Univ. of Waterloo</td>
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</table>
Wednesday, April 9

Sheet / Hydro / Gas Forming Technology and Modeling (Part 3 of 3)

Session Code: M201
Room 115 A
Session Time: 1:00 p.m.

Failure modes, phase change materials, hydro-forming, hot stamping, warm forming and super plastic forming issues and applications in sheet metal forming are interests in this session. Papers for the Sheet/ Hydro/ Gas Forming Technology and Modeling Session advance the knowledge in the state of the art in all types of sheet metal forming. Topics include using simulated, analytical, numerical and experimental tools and sheet metals for the various forming technologies.


Time Paper No. Title
1:00 p.m. ORAL ONLY Technical Keynote: The Many Aspects of Orchestrating a Material Substitution on a Very Large Scale
Laurent B. Chappuis, Ford Motor Co.
1:20 p.m. Panel Expert Panel Discussion: Measurement and Analysis of Forming Limit Diagrams Using DIC Techniques: One Year Later
Digital image correlation (DIC) techniques are increasingly being applied by engineers and researchers at automotive OEMs, Tier 1’s, sheet suppliers, research laboratories and universities to characterize sheet metal formability. DIC enables improvements in strain measurement efficiency and accuracy directly supporting the development of more robust formability metrics such as forming limit diagrams (FLD’s). While DIC results are commonly used by stamping researchers and engineers to support product and manufacturing feasibility, there are no generally accepted industry test specifications and methods. This panel discussion will review DIC technology and applications as well as consider next steps toward industry standardization.

Moderators - Z. Cedric Xia, Ford Motor Co.
Panelists - John Carsley, General Motors Co.; Edmund W. Chu, Alcoa Inc.; Changqing Du, Chrysler Group LLC; Brandon M. Hance, Novelis Inc.; Gang Huang, ArcelorMittal USA; Mark Iadicola, National Institute Standards & Tech.; Jidong Kang, CanmetMATERIALS; Ming F. Shi; Thomas Stoughton, General Motors Co.; John Tyson, Trilion Quality Systems; Lianxiang Yang, Oakland University; Danielle Zeng, Ford Research and Innovation Center;

Planned by Sustainable Development Program Committee / Engineering Meetings Board

Wednesday, April 9

Planned by Metallic Materials Committee / Materials Engineering Activity

Wednesday, April 9
**Advances in Coating and Paints**

**Session Code:** M302

**Room 115 B**  
**Session Time:** 8:00 a.m.

This session will provide a look at research on coatings for exterior body and plastics (including polycarbonate) as well as vehicle interiors and underbody/underhood. Focus will be on mid-term and future research.

**Organizers** - Todd Fitz, Honda R & D Americas Inc.; Daniel G. Wright, BASF Corp.; James Keller, United Paint & Chemical Corporation

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<tr>
<th>Time</th>
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<tr>
<td>8:00 a.m.</td>
<td>2014-01-1044</td>
<td>Research on Improving Throwing Power of Electrodeposition Coating by Optimizing Paint Properties</td>
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<td>Katsuyoshi Kaneko, Toshikazu Hirobe, Yusuke Kawada, Tatsumasa Hidaka, Honda R&amp;D Co., Ltd.</td>
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<tr>
<td>8:20 a.m.</td>
<td>2014-01-1048</td>
<td>Development of 3-Wet Paint System with Improved Appearance - Paint Design Based on Transfer Mechanism of Unevenness from Under Layers</td>
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<td>Hisao Hayashi, Masahiko Ishii, Toyota Motor Corp.</td>
</tr>
<tr>
<td>8:40 a.m.</td>
<td>2014-01-1046</td>
<td>The Development of Primer Process-less Paint System (4WET Paint System by Using Waterborne Chipping Primer)</td>
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<td>Keisuke Kojima, Takeshi Ogawa, Honda R&amp;D Co., Ltd. Automobile R&amp;D Center</td>
</tr>
<tr>
<td>9:00 a.m.</td>
<td>ORAL ONLY</td>
<td>Building Durable Scratch Resistance in Automotive Clearcoats</td>
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<td>Timothy S. December, Donald H. Campbell, BASF Corp.</td>
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<tr>
<td>9:40 a.m.</td>
<td>ORAL ONLY</td>
<td>Decorative Plating on plastics &amp; Russia corrosion of hexavalent (CrVI) vs. trivalent (CrIII) chrome</td>
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<td>Federico Gambina, Honda Of America R&amp;D</td>
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Planned by Polymers and Coatings Committee / Materials Engineering Activity

**Wednesday, April 9**

**Trends in Development of Accelerated Reliability and Durability Testing Technology**

**Session Code:** IDM300

**Room 115 B**  
**Session Time:** 10:00 a.m.

This session presents the theory, practices and technology used in development of trends in reliability and durability testing (ART/ADT) technology and accurate physical simulation for accurate efficiency prediction. The purpose is covering a new ideas and unique approaches to simulation interaction of full field inputs, safety, and human factors, improvement the ART/ADT steps-components, implementation that leads to development dependability, reduce recalls, life cycle cost, and time.

**Organizers** - Lev Klyatis, Sohar Inc.; Efstratios Nikolaidis, University Of Toledo

**Chairpersons** - Lev Klyatis, Sohar Inc.

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<th>Time</th>
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<tr>
<td>10:00 a.m.</td>
<td>2014-01-0746</td>
<td>The Role of Accurate Simulation of Real World Conditions and ART/ADT Technology for Accurate Efficiency Predicting of the Product/Process</td>
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<tr>
<td></td>
<td></td>
<td>Lev Klyatis, Sohar Inc.</td>
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</tbody>
</table>
Applications of Advanced High-Strength Steels and Press Hardening for Automotive Structures

**Session Code:** M202

**Room 115 B**

**Session Time:** 1:00 p.m.

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

**Organizers** -

David W. Anderson, American Iron and Steel Institute; Constantin Chiriac, United States Steel Corp.; Jason Coryell, General Motors Co.; Brandon M. Hance, Novelis Inc.; Alan Luo, Ohio State University; Michael L. Shaw, Chrysler Group LLC; Jatinder P. Singh, General Motors Co.

**Time** | **Paper No.** | **Title**
--- | --- | ---
1:00 p.m. | ORAL ONLY | Technical Keynote: Integrated Computational Materials Engineering (ICME) in the Automotive Industry: Successes and Opportunities
Louis G. Hector, Jr., General Motors Co.

1:20 p.m. | 2014-01-0993 | Strain Rate Effect on Forming Limit Diagram for Advanced High Strength Steels
Rendong Liu, Angang Steel Co., Ltd.; Li Sun, GM China Science Lab; Xu Wang, Li Lin, Angang Steel Co., Ltd.; Ling Zhang, Jianping Lin, Tongji Univ.

1:40 p.m. | 2014-01-0991 | 1.2GPa Advanced High Strength Steel with High Formability
Takaaki Kondo, Kentarou Ishiuichi, Nissan Motor Co., Ltd.

2:00 p.m. | 2014-01-0994 | Optimal Production Trimming Process for AHSS Sheared Edge Stretchability Improvement
Hua-Chu Shih, United States Steel Corp.; Ching-Kuo Hsiung, Bill Wendt, General Motors Co.

2:20 p.m. | 2014-01-0992 | Edge Formability and Material Characterization of Hot-Rolled Multiphase Steels
Nikky Pathak, Cliff Butcher, Michael Worswick, University of Waterloo; Erika Bellhouse, Jeff Gao, ArcelorMittal Dofasco

Planned by Quality, Reliability and Robust Design Committee / Integrated Design and Manufacturing Activity
Global Supply Chain Management

Session Code: IDM401

Room 116 A

The critical role an optimized supply chain plays in every company's competitive strength and long term success. Organizations must create supply chain improvements that enable growth, efficiency, and sustainability in the global economy. This session will discuss the understanding a customer's global business strategies and supply chain goals in order to deliver quantified business value to a customer's bottom line through improvements to revenue, expense, and current or fixed assets.

Organizers - Mohamed El-Sayed, Kettering Univ; Beena Anand, DTE Energy

Time | Paper No. | Title |
--- | --- | --- |
8:00 a.m. | ORAL ONLY | Technical Keynote: Command and Control of the Global Supply Chain
David Pollard, FedEx Customer Solutions |
8:40 a.m. | 2014-01-0781 | Analysis of Technology Adoption Rates in New Vehicles
Aaron Hula, Jeffrey Alson, Amy Bunker, Kevin Bolon, US Environmental Protection Agency |
9:00 a.m. | 2014-01-0783 | Need for a Robust Asset Management Business Algorithm
Seyed M. Mirmiran, Vern Scott, Chrysler LLC; Bill Swenson, Stephen Funtig, Accelero Solutions Inc. |
Reliability and Robust Design in Automotive Engineering: Reliability and Robust Design in Automotive Aero-Thermal and Fluid Systems

Session Code: IDM105

Room 116 A  Session Time: 1:00 p.m.

The purpose of this session is to bring awareness among the automotive aerodynamics, thermal and hydraulic systems development community to address the need of reliability analysis and robust design to improve the overall product quality. This session also introduces CAE based optimization of aero-thermal and fluid systems to improve automotive fuel economy. This session presents papers covering both testing and simulation.

Organizers - Richard L. Sun, Alaa El-Sharkawy, Sadek S. Rahman, Chrysler Group LLC

Time Paper No. Title

1:00 p.m. 2014-01-0729 Design for Six Sigma (DFSS) for Optimization of Automotive Heat Exchanger and Underhood Air Temperature
Alaa El-Sharkawy, Asif Salahuddin, Brian Komarisky, Chrysler Group LLC

1:20 p.m. 2014-01-0727 Evaluation of Various Engine Control Strategy for Optimal Engine Thermal Operation
ORAL ONLY
Sudhi Uppuluri, Ajay Naiknaware, Computational Sciences Experts Group

1:40 p.m. 2014-01-0726 Development of Transient Thermal Models Based on Theoretical Analysis and Vehicle Test Data
Alaa El-Sharkawy, Ahmed Uddin, Chrysler Group LLC

Wednesday, April 9

Reliability and Robust Design in Automotive Engineering: Model Validation and Verification

Session Code: IDM106

Room 116 A  Session Time: 2:20 p.m.

Model Validation and Verification invite papers that deal with the theoretical and/or applied aspects of one or more of the following representative topics: model development, model correlation/calibration, model verification, model validation, uncertainty quantification, uncertainty propagation, validation metrics, predictive capability assessment, etc.

Organizers - Ching-Hung Chuang, Ford Motor Co.; Yan Fu, Ford Motor Company; Ren-Jye Yang, Ford Motor Co
Wednesday, April 9

Human Factors in Driver Vision and Lighting

Session Code: B301
Room 116 B

These papers highlight new results in driver perception and emphasize the enduring importance of driver perception for behavior and safety on the road. As usual, vision is central, but these papers illustrate how driver vision interacts with many domains: mechanisms of crash causation, overall geometry of driver accommodation, the acoustic environment, roadway markings, indirect vision systems, and how the complex and highly adapted human visual system functions in driving simulators.

Organizers - Michael Flannagan, Univ. of Michigan - Ann Arbor; Jianzhong Jiao, OSRAM Opto Semiconductors Inc.

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<th>Time</th>
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<tr>
<td>10:00 a.m.</td>
<td>2014-01-0439</td>
<td>Research on the Effect of Urban Road Traffic Soundscape on Drivers’ Psychological Acoustics</td>
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<td>Xingyu Liang, Kang Sun, Yuesen Wang, Gequn Shu, State Key Lab of Engines; Lin Tang, Lei Ling, Tianjin I.C. Engine Research Institute; Xu Wang, RMIT Univ.</td>
</tr>
<tr>
<td>10:20 a.m.</td>
<td>ORAL ONLY</td>
<td>Horizontally Progressive Type of Rearview Mirror to Improve the Driver’s Judgment of Near Distance</td>
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<td>Hocheol Lee, Hanbat National Univ.; Gang Lee, Sungkoo Lee, Jingu Kim, Bullsone Co., Ltd.</td>
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<tr>
<td>10:40 a.m.</td>
<td>2014-01-0441</td>
<td>Simulator Motion Sickness Evaluation Based on Eye Mark Recording during Vestibulo-Ocular Reflex</td>
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<td>Takahiro Adachi, Takashi Yonekawa, Yoshitaka Fuwamoto, Shoji Ito, Katsuhiko Iwazaki, Toyota Motor Corp.; Sueharu Nagiri, Toyota Central R&amp;D Labs.</td>
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<tr>
<td>11:00 a.m.</td>
<td>2014-01-0438</td>
<td>Visibility of Pavement Markings with LED Headlamps</td>
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<td>Mitsuhiro Uchida, Yasushi Kita, Takako Minoda(Kimura), Ryuji Ueki, Shoko Kawanobe, Stanley Electric Co., Ltd.</td>
</tr>
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</table>
**Wednesday, April 9**

**Automotive Lighting Technology Conference**

**Session Code:** B300

**Room 116 B**  
**Session Time:** 1:00 p.m.

Aging driver populations and increasingly complex driving environments present ever greater challenges, but rapid developments in automotive lighting offer hope for improvements in both safety and driver visual comfort. These papers cover developments in lighting technology, as well as human factors analyses of expected benefits for drivers. LED light sources play a major role in enabling innovations in advanced forward lighting, as well as in signaling and marking functions.

**Organizers:** Jianzhong Jiao, OSRAM Opto Semiconductors Inc.; Michael Flannagan, Univ. of Michigan - Ann Arbor

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<tr>
<th>Time</th>
<th>Paper No.</th>
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<tbody>
<tr>
<td>1:00 p.m.</td>
<td>2014-01-0435</td>
<td>Design of a Fuzzy Based AFS (Advanced Front Lighting System) to Improve Night-Time Driving for Truck Drivers: Foreseeing its Use in Emerging Markets</td>
</tr>
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<td>Luciano Lukacs, Ford Asia-Pacific Inc.; Mahendra Dassanayake, Ford Motor Co.; Iuri Pepe, UFBA</td>
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<tr>
<td>1:20 p.m.</td>
<td>2014-01-0432</td>
<td>LED Modules for Matrix and Pixel Light Solutions - On the Way to New Features in Headlight Systems</td>
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<td>Thomas Liebetrau, Infineon Technologies AG; Roland Fiederling, Maximilian Vogl, Osram GmbH; Dieter Stephan Parth, Infineon Technologies AG</td>
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<tr>
<td>1:40 p.m.</td>
<td>2014-01-0436</td>
<td>Adaptive Driving Beam - Visibility Improvement versus Glare</td>
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<td>Rainer Neumann, Varroc Lighting Systems GmbH</td>
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<td>2:00 p.m.</td>
<td>2014-01-0431</td>
<td>Adaptive High Beam Systems: Visual Performance and Safety Effects</td>
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<td>John D. Bullough, Rensselaer Polytechnic Institute</td>
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<td>2:20 p.m.</td>
<td>2014-01-1985</td>
<td>Subjective and Objective Effects of Driving with LED Headlamps</td>
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<td>Michael Flannagan, University of Michigan; Mitsuhiro Uchida, Stanley Electric Co., Ltd.; John Michael Sullivan, Mary Lynn Buonarosa, University of Michigan</td>
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<tr>
<td>2:40 p.m.</td>
<td>2014-01-0434</td>
<td>Impacts of Dynamic Rear Lighting on Driver Response</td>
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<td>Nicholas P. Skinner, John D. Bullough, Rensselaer Polytechnic Institute</td>
</tr>
</tbody>
</table>
Advanced Battery Technologies (Part 1 of 4): Battery System Modeling

Session Code: PFL730
Room 140 A

The success of HEV's, PHEV's & EV's is highly dependent on their batteries. This session focuses on advanced battery technologies, including, but not limited to: advanced materials and cell chemistries, battery management systems and controls, modeling, testing, diagnosis and health monitoring, safety, reliability, durability, battery charging, battery economics/cost reduction, and system integration/optimization. These topics can be addressed at the cell, module, pack or vehicle levels.

Organizers - Wayne Cai, General Motors Co.; Yi Ding, US Army; Neil M. Johnson, Ricardo Inc.; Alvaro Masias, Ford Motor Co.; James Miller, Argonne National Laboratory; Ramesh Rebba, General Motors Co.
Chairpersons - Ramesh Rebba, General Motors Co.; Wayne Cai, General Motors

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<tr>
<td>8:00 a.m.</td>
<td>2014-01-1842</td>
<td>A Complete Li-Ion Battery Simulation Model</td>
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<td>Xiao Hu, Scott Stanton, ANSYS Inc.</td>
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<td>8:20 a.m.</td>
<td>2014-01-1863</td>
<td>HIL Development and Validation of Lithium-Ion Battery Packs</td>
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<td>SoDuk Lee, Jeff Cherry, Byungho Lee, Joseph McDonald, Michael Safoutin, US Environmental Protection Agency</td>
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<tr>
<td>8:40 a.m.</td>
<td>2014-01-1834</td>
<td>Options for Coupled Thermal-Electric Modeling of Battery Cells and Packs</td>
</tr>
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<td>Scott Peck, ThermoAnalytics Inc.; Aditya Velivelli, Exa Corp.; Wilko Jansen, Jaguar &amp; Land Rover</td>
</tr>
<tr>
<td>9:00 a.m.</td>
<td>ORAL ONLY</td>
<td>Development of Advanced Multiscale Model for Large Capacity Battery Pack Simulation</td>
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<td>Gi-Heon Kim, National Renewable Energy Laboratory</td>
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<tr>
<td>9:20 a.m.</td>
<td>2014-01-1865</td>
<td>Physics-Based Models, Sensitivity Analysis, and Optimization of Automotive Batteries</td>
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<td>Joydeep Banerjee, John McPhee, Univ. of Waterloo; Paul Goossens, Thanh-Son Dao, Maplesoft</td>
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<td>9:40 a.m.</td>
<td></td>
<td>Networking Break</td>
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<tr>
<td>10:00 a.m.</td>
<td>2014-01-1839</td>
<td>Li-Ion Battery Pack Characterization and Equivalent Electrical Circuit Model Development</td>
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<td>Oguz H. Dagci, Ram Chandrasekaran, AVL Powertrain Engineering Inc.</td>
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<tr>
<td>10:20 a.m.</td>
<td>2014-01-1851</td>
<td>Comparison of Optimization Techniques for Lithium-Ion Battery Model Parameter Estimation</td>
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<td>Adam Ing, Ramin Masoudi, John McPhee, University of Waterloo; Thanh-Son Dao, Maplesoft</td>
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<tr>
<td>10:40 a.m.</td>
<td>2014-01-1849</td>
<td>Li-Ion Battery SOC Estimation Using Non-Linear Estimation Strategies Based On Equivalent Circuit Models</td>
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<td>Mohammed Farag, McMaster University; Matthias Fleckenstein, BMW AG; Saeid R. Habibi, McMaster University</td>
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The papers in this session are available in SAE Technical Paper Collection, SUB-TP-00006, and also individually. To purchase visit collections.sae.org

Planned by Human Factors Committee / Automobile Body Activity

Wednesday, April 9

3:00 p.m. 2014-01-0430 Merging Light, Electronics and Lamination into Automotive Lighting
Timothy W. Brooks, Don Gramlich, Grote Industries LLC
### Wednesday, April 9

**Advanced Battery Technologies (Part 2 of 4): Battery Modeling and Thermal Management**

**Session Code:** PFL730

**Room 140 A**

**Session Time:** 1:00 p.m.

The success of HEV's, PHEV's & EV's is highly dependent on their batteries. This session focuses on advanced battery technologies, including, but not limited to: advanced materials and cell chemistries, battery management systems and controls, modeling, testing, diagnosis and health monitoring, safety, reliability, durability, battery charging, battery economics/cost reduction, and system integration/optimization. These topics can be addressed at the cell, module, pack or vehicle levels.

**Organizers** - Wayne Cai, General Motors Co.; Yi Ding, US Army; Neil M. Johnson, Ricardo Inc.; Alvaro Masias, Ford Motor Co.; James Miller, Argonne National Laboratory; Ramesh Rebba, General Motors Co.

**Chairpersons** - Wayne Cai, General Motors; Ramesh Rebba, General Motors Co.

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<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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</table>
| 1:00 p.m. | ORAL ONLY | **Verification and Validation of Semi-Empirical Thermal Models for Lithium Ion Batteries**  
Ramesh Rebba, Justin McDade, Shailendra Kaushik, Jasmine Wang, Taeyoung Han, General Motors Co. |
| 1:20 p.m. | 2014-01-1843 | **Application of POD plus LTI ROM to Battery Thermal Modeling: SISO Case**  
Saeed Asgari, Xiao Hu, Michael Tsuk, ANSYS Inc.; Shailendra Kaushik, General Motors Co. |
| 1:40 p.m. | 2014-01-1864 | **Temperature Management of Li-Ion Battery Pack for Stop and Start System**  
Takao Suenaga, Takahiro Jo, DENSO Corp. |
| 2:00 p.m. | 2014-01-1858 | **Development of Battery Hardware-In-the-Loop System Implemented with Reduced-Order Electrochemistry Li-Ion Battery Models**  
| 2:20 p.m. | 2014-01-1835 | **Evaluation of Order Reduction Techniques for Porous Electrode Diffusion Equation in Lithium Ion Model**  
Yinyin Zhao, Song-Yul Choe, Auburn Univ. |
| 2:40 p.m. | 2014-01-1866 | **The Performance Effects of Edge-Based Heat Transfer on Lithium-Ion Pouch Cells Compared to Face-Based Systems**  
Matthew Klein, Shijie Tong, Jae Wan Park, University of California |
Multi-Dimensional Engine Modeling (Part 3 of 4)

Time Paper No. Title

8:00 a.m. 2014-01-1148 Effect of Electrode Tabs Configuration on the Electric-Thermal Behavior of a Li-Ion Battery
Jiangong Zhu, Zechang Sun, Xuezhe Wei, Haifeng Dai, Tongji University; Hongzhang Cen

8:20 a.m. 2014-01-1841 Prediction of Temperature Field Inside Lithium-Ion Battery Based on Similarity Theory
Lijun Zhang, Hongzheng Cheng, Kun Diao, Cheng Ruan, Tongji Univ.

8:40 a.m. 2014-01-1840 Thermal Behavior of Two Commercial Li-Ion Batteries for Plug-in Hybrid Electric Vehicles
Ehsan Samadani, Leo Gimenez, William Scott, University of Waterloo; Siamak Farhad, University of Akron; Michael Fowler, Roydon Fraser, University of Waterloo

The papers in this session are available in SAE Technical Paper Collection, COLL-GTL-00001, COLL-TP-00384 and TP-00011, and also individually. To purchase visit collections.sae.org

Planned by Hybrid and Electric Powertrains Committee / Powertrain Fuels and Lubricants Activity

Wednesday, April 9
Wednesday, April 9

Multi-Dimensional Engine Modeling (Part 4 of 4)

Session Code: PFL120

Room 140 B

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

Organizers
- Hardo Barths, General Motors; Sarah Diakhaby, Computational Dynamics, Ltd.; Allen David Gosman, CD-adapco; David Gosman, CD-adapco UK; Carl Hergart, Caterpillar Inc.

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00381, SUB-TP-00008 and SL-TP-00009, and also individually. To purchase visit collections.sae.org

Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity

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<td>9:40 a.m.</td>
<td>2014-01-1115</td>
<td>On the Performance of Biodiesel Blends - Experimental Data and Simulations Using a Stochastic Fuel Test Bench</td>
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<td>Andrea Matrisciano, Michal Pasternak, Xiaoxiao Wang, Oleksiy Antoshkiv, Fabian Mauss, Peter Berg, Brandenburg University of Technology</td>
</tr>
<tr>
<td>10:20 a.m.</td>
<td>2014-01-1143</td>
<td>Numerical Studies of Spray Combustion Processes of Palm Oil Biodiesel and Diesel Fuels using Reduced Chemical Kinetic Mechanisms</td>
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<td>Olawole Abiola Kuti, Mani Sarathy, King Abdullah University of Sci &amp; Tech.; Keiya Nishida, University of Hiroshima; William Roberts, King Abdullah University of Sci &amp; Tech</td>
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<tr>
<td>10:40 a.m.</td>
<td>2014-01-1113</td>
<td>Improved Chemical Kinetics Numerics for the Efficient Simulation of Advanced Combustion Strategies</td>
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<td>Federico Perini, Bishwadipa Das Adhikary, Jae Hyung Lim, Xingyuan Su, Youngchul Ra, Hu Wang, Rolf Reitz, University of Wisconsin</td>
</tr>
<tr>
<td>11:00 a.m.</td>
<td>2014-01-1128</td>
<td>Computations of Soot and NO in Lifted Flames under Diesel Conditions</td>
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<td>May Yen, Purdue University; John Abraham, Purdue University, University of Adelaide</td>
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<tr>
<td>1:00 p.m.</td>
<td>2014-01-1112</td>
<td>Numerical study on wall film formation and evaporation</td>
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<td>Hong Liu, Dalian University of Technology; Chia-Fon Lee, University of Illinois</td>
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<td>1:20 p.m.</td>
<td>2014-01-1116</td>
<td>Modeling Turbulent Combustion Using a RANS Model, Detailed Chemistry, and Adaptive Mesh Refinement</td>
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<td>Eric Pomraning, Keith Richards, P. K. Senecal, Convergent Science Inc.</td>
</tr>
<tr>
<td>1:40 p.m.</td>
<td>2014-01-1131</td>
<td>Automatic Mech Generation for Full-Cycle CFD Modeling of IC Engines: Application to the TCC Test Case</td>
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<td>Tommaso Lucchini, Marco Fiocco, Roberto Torelli, Gianluca D'Errico, Politecnico di Milano</td>
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<tr>
<td>2:00 p.m.</td>
<td>2014-01-1133</td>
<td>Automatic Body Fitted Hybrid Mesh Generation for Internal Combustion Engine Simulation</td>
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<td>Benjamin Reveille, Nicolas Gillet, Julien Bohbot, Olivier Laget, IFP Energies Nouvelles</td>
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</tbody>
</table>
Models for CI Combustion and Emissions

Session Code: PFL113

Room 140 C  Session Time:  8:00 a.m.

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

Organizers - Michael Bybee, Gamma Technologies Inc.; Jan Macek, Czech Technical Univ.; Federico Millo, Politecnico di Torino; Christof Schernus, FEV GmbH

Time  Paper No.  Title

8:00 a.m.  2014-01-1076  Further Development and Application of a Model for the Calculation of Heat Release in Direct Injection Diesel Engines
Peter Eilts, Claude-Pascal Stoebner-Schmidt, Technical University of Braunschweig

8:20 a.m.  2014-01-1074  A Zero-Dimensional Phenomenological Model for RCCI Combustion Using Reaction Kinetics
Johannes Ulrich Eichmeier, KIT Karlsruhe Institute of Technology; Rolf Reitz, Christopher Rutland, University of Wisconsin

8:40 a.m.  ORAL ONLY  Reduced-Order Numerical Model for Pressure-Modulated Injection Rate Shaping in Diesel-Like Sprays
Benjamin Knox, Caroline Genzale, Georgia Institute of Technology

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00381 and SUB-TP-00008, and individually. To purchase visit collections.sae.org

Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity

Wednesday, April 9

Models for Engine Turbo and Supercharging
## Models for SI Combustion and Emissions

**Session Code:** PFL112  
**Room 140 C**  
**Session Time:** 1:00 p.m.

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

**Organizers:** Federico Millo, Politecnico di Torino; Angelo Onorati; Christof Schernus, FEV GmbH; Xiaofeng Yang, General Motors Co.

**Chairpersons:** Angelo Onorati

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<th>Time</th>
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<tr>
<td>1:00 p.m.</td>
<td>2014-01-1073</td>
<td>A Numerical Simulation Study on Improving the Thermal Efficiency of a Spark Ignited Engine --- Part 1: Modeling of a Spark Ignited Engine Combustion to Predict Engine Performance Considering Flame Propagation, Knock, and Combustion Chamber Wall --- Akira Kikusato, Kusaka Jin, Yasuhiro Daisho, Waseda University</td>
</tr>
</tbody>
</table>
1:20 p.m. 2014-01-1066 A Numerical Simulation Study on Improving the Thermal Efficiency of a Spark Ignited Engine --- Part 2: Predicting Instantaneous Combustion Chamber Wall Temperatures, Heat Losses and Knock ---

Akira Kikusato, Katsuya Terahata, Kusaka Jin, Yasuhiro Daisho, Waseda University

1:40 p.m. 2014-01-1070 A Methodology to Mimic Cycle to Cycle Variations and to Predict Knock Occurrence through Numerical Simulation

Federico Millo, Luciano Rolando, Politecnico di Torino; Enrico Pautasso, Emanuele Servetto, Powertech Engineering

2:00 p.m. 2014-01-1069 Experimentally Supported Modeling of Cycle-to-Cycle Variations of SI Engine Using Cycle-Simulation Model

Momir Sjeric, Darko Kozarac, Ivan Taritas, Univ. of Zagreb

2:20 p.m. 2014-01-1065 Analysis of Knock Tendency in a Small VVA Turbocharged Engine Based on Integrated 1D-3D Simulations and Auto-Regressive Technique

Stefano Fontanesi, Elena Severi, Università degli Studi di Modena; Daniela Siano, Istituto Motori CNR; Fabio Bozza, Vincenzo De Bellis, Università di Napoli Federico II

2:40 p.m. 2014-01-1071 A Study of Hydrogen Internal Combustion Engine EGR System

Haichun Yao, Baigang Sun, Huayu Tian, Qinghe Luo, Hongyang Tang, Beijing Institute of Technology

3:00 p.m. 2014-01-1068 Development of Multi-Zone Phenomenological Model for SI Engine

Vishwajith Bhat, Intern, GE Global Research Centre; Bhaskar Tamma, GE Global Research Centre

3:20 p.m. 2014-01-1067 Multi-Zone Models of Combustion and Heat Transfer Processes in SI Engines

Jiri Hvezda

3:40 p.m. 2014-01-1072 Symbolic Sensitivity Analysis of Math-Based Spark Ignition Engine with Two-Zone Combustion Model

Hadi Adibi asl, Ramin Masoudi, Roydon Fraser, John McPhee, Univ. of Waterloo

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 General Powertrain Development / Powertrain Fuels and Lubricants Activity

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Wednesday, April 9

Powertrain NVH

Session Code: PFL550

Room 140 D Session Time: 8:00 a.m.

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

Organizers - Mikhail A. Ejakov, Ford Motor Co.; Gang Sheng Chen Sheng, Marshall University

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<th>Time</th>
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<tr>
<td>8:00 a.m.</td>
<td>2014-01-1691</td>
<td>Torsional Vibration Damper with Micro-channel Tuners</td>
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</table>

George Nerubenko, NERMAR Ltd.
8:20 a.m. 2014-01-1685 Flywheel with tuned damping
George Nerubenko, Nermar, Ltd.; Cyril Nerubenko, Ontario Ltd.

8:40 a.m. 2014-01-1693 Analysis and Design of an Intake Filter Box for a Downsized VVA Engine
Daniela Siano, Istituto Motori CNR; Luigi Teodosio, Vincenzo De Bellis, Fabio Bozza, University of Naples Federico II

9:00 a.m. 2014-01-1678 Method Using Multiple Regression Analysis to Separate Engine Radiation Noise into the Contributions of Combustion Noise and Mechanical Noise in the Time Domain
Kenji Torii, Honda R&D Co., Ltd.

9:20 a.m. 2014-01-1679 Acoustic Holography for High Pressure Fuel Injector Noise Measurements
S. Christopher Zugo, Craig D. Smith, Charles W. Braun, Joseph Kazour, Delphi Automotive

Hiroki Yamaura, Mitsubishi Automotive Engineering Co., Ltd.; Masao Ishihama, Kanagawa Institute of Technology; Kazuhide Togai, Osaka Sangyo University

10:00 a.m. 2014-01-1686 Active Control of Engine-Induced Vibrations in Automotive Vehicles through LPV Gain Scheduling
Pablo Ballesteros, Xinyu Shu, Christian Bohn, Clausthal University of Technology

10:20 a.m. 2014-01-1687 A Particle Swarm Optimization Tool for Decoupling Automotive Powertrain Torque Roll Axis
Sameer U. Kolte, David Neighguk, Abhinav Prasad, Samir Rawte, Aditya Gondhalekar, Mahindra & Mahindra, Ltd.

10:40 a.m. 2014-01-1675 Methods of Evaluating and Mitigating NVH when Operating an Engine in Dynamic Skip Fire
Joe Serrano, Geoff Routledge, Norman Lo, Mark Shost, Vijay Srinivasan, Biswa Ghosh, Tula Technology

11:00 a.m. 2014-01-1681 Rapid Design and Development of Noise Radiating Engine Components
Manivasagam Shanmugam, Raghavendra Kharatmal, Shirish Satpute, Onward Technologies Ltd.

11:40 a.m. 2014-01-1690 Experimental Study on Combustion Noise of Common Rail Diesel Engine using Different Blend Biodiesel
Chien-Hsing Li, Yong-Yuan Ku, Ko Wei Lin, Automotive Research & Testing Center

2014-01-1680 Powertrain NVH Analysis Including Clutch and Gear Dynamics (Written Only -- No Oral Presentation)
Sandeep Mahadev Jadhav, NHF (I) PL

2014-01-1682 Optimization Design of a Six-Point Powetrain Mounting System with Flexible Support Rod (Written Only -- No Oral Presentation)
Zhengfei Tang, Yongfu Chen, Huazhong University of Science and Tech.; Jian Zeng, Yu Yang, C&C Trucks Co., Ltd.; Yunqing Zhang, Huazhong University of Science and Tech.

2014-01-1692 The Refinement of a Vehicle NVH Performance by Optimizing Sub-Frame Mounts (Written Only -- No Oral Presentation)
Mehdi Safaei, Shahram Azadi, K N Toosi Univ. of Technology; Arash Keshavarz, Meghdad Zahedi, R&D Center of SAIPA (AIRIC)
Wednesday, April 9

CI & SI Power Cylinder Systems (Part 1 of 2)

Session Code: PFL530

Room 140 E Session Time: 8:00 a.m.

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

Organizers - Dan Richardson, Yong-Ching Chen, Cummins Inc.

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<th>Time</th>
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<th>Title</th>
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<tbody>
<tr>
<td>8:00 a.m.</td>
<td>2014-01-1669</td>
<td>Effect of Compression Ring Elastodynamics Behaviour upon Blowby and Power Loss</td>
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<tr>
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<td>Christopher Baker, Ramin Rahmani, Loughborough University; Ioannis Karagiannis, AVL Powertrain UK Ltd.; Stephanos Theodossiades, Homer Rahnejat, Loughborough University; Alan Frendt, Aston Martin Lagonda</td>
</tr>
<tr>
<td>8:20 a.m.</td>
<td>2014-01-1668</td>
<td>Elasto-Hydrodynamic Lubrication Performance of Cylinder Liner-Piston Ring and the Friction Experimental Verification</td>
</tr>
<tr>
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<td>Xingyu Liang, Yin Liu, Ge-Qun Shu, Zhengnan Yuhan, Yuesen Wang, State Key Lab of Engines</td>
</tr>
<tr>
<td>8:40 a.m.</td>
<td>2014-01-1085</td>
<td>A Dual Grid Curved Beam Finite Element Model of Piston Rings for Improved Contact Capabilities</td>
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<td>Camille Baelden, Tian Tian, Massachusetts Institute of Technology</td>
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<tr>
<td>9:00 a.m.</td>
<td>2014-01-1670</td>
<td>Oil Flow in Piston Oil Ring Groove</td>
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<td>Shigenori Ichinose, Kiyoshi Iwade, Nippon Soken Inc.; Yoshiharu Hata, Toyota</td>
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<tr>
<td>9:20 a.m.</td>
<td>2014-01-1658</td>
<td>Optimizing Base Oil Viscosity Temperature Dependence For Power Cylinder Friction Reduction</td>
</tr>
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<td>Michael J. Plumley, Victor Wong, Mark Molewyk, Soo-Youl Park, Massachusetts Institute of Technology</td>
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<td>9:40 a.m.</td>
<td>2014-01-1659</td>
<td>In Situ Control of Lubricant Properties for Reduction of Power Cylinder Friction through Thermal Barrier Coating</td>
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<td>Mark Molewyk, Victor W. Wong, Christopher James, Massachusetts Institute of Technology</td>
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<tr>
<td>10:00 a.m.</td>
<td>2014-01-1663</td>
<td>The Contribution of Engine Mechanics to Improved Fuel Economy</td>
</tr>
<tr>
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<td>Markus Schwaderlapp, Mirko Plettenberg, FEV GmbH; Dean Tomazic, FEV Inc.; Gregor Schuermann, Felix Ring, FEV GmbH; Stephen Bowyer, FEV Inc.</td>
</tr>
<tr>
<td>10:20 a.m.</td>
<td>2014-01-1662</td>
<td>Research into Engine Friction Reduction under Cold Conditions - Effect of Reducing Oil Leakage on Bearing Friction</td>
</tr>
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<td></td>
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<td>Akihiro Honda, Motoichi Murakami, Yuichiro Kimura, Toyota Motor Corp.; Katsuhiro Asihara, Shinichi Kato, Yuichiro Kajiki, Taiho Kogyo Co., Ltd.</td>
</tr>
<tr>
<td>10:40 a.m.</td>
<td>2014-01-1661</td>
<td>Mechanism of and Fuel Efficiency Improvement by Dimple Texturing on Liner Surface for Reduction between Piston Rings and Cylinder Bore</td>
</tr>
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<td>Mitsuru Urabe, Nippon Piston Ring Co., Ltd.; Takashi Takakura, Satoshi Metoki, Masatoshi Yanagisawa, Hino Motors, Ltd.; Hirokazu Murata, Nippon Piston Ring Co., Ltd.</td>
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Planned by New Engines, Components, Actuators and Sensors / Powertrain Fuels and Lubricants Activity
Wednesday, April 9

CI & SI Power Cylinder Systems (Part 2 of 2)

Session Code: PFL530

Room 140 E  Session Time: 1:00 p.m.

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

Organizers - Dan Richardson, Yong-Ching Chen, Cummins Inc.

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<tr>
<th>Time</th>
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<tr>
<td>1:00 p.m.</td>
<td>2014-01-1665</td>
<td>Visualization of the Rotary Engine Oil Transport Mechanisms</td>
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<tr>
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<td>Mathieu Picard, Massachusetts Institute of Technology; Hiroyuki Hidaka, Mazda Motor Corp.; Tian Tian, Massachusetts Institute of Technology; Takayuki Nishino, Eiji Arai, Masaki Ohkubo, Mazda Motor Corp.</td>
</tr>
<tr>
<td>1:20 p.m.</td>
<td>2014-01-1664</td>
<td>Oil Transport Cycle Model for Rotary Engine Oil Seals</td>
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<td>Mathieu Picard, Camille Baelden, Tian Tian, Massachusetts Institute of Technology; Takayuki Nishino, Eiji Arai, Hiroyuki Hidaka, Mazda Motor Corp.</td>
</tr>
<tr>
<td>1:40 p.m.</td>
<td>2014-01-1666</td>
<td>Development of an Advanced Compressed Air Engine Kit for Small Engine</td>
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<td>Vasu Kumar, Jayati Takkar, Manas Chitransh, Naveen Kumar, Utsav Banka, Unish Gupta, Delhi Technological Univ.</td>
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<td>2014-01-1660</td>
<td>Effects of Ceramic and Diamond Honing on Bore/Liner Surface in View of Oil Retention (Written Only -- No Oral Presentation)</td>
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<td>Mersin Hurpekli, Ford Otomotiv Sanayi AS; Rifat Yilmaz, Emin Kondakci, Nuri Solak, Istanbul Technical Univ.</td>
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</table>

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Planned by New Engines, Components, Actuators and Sensors / Powertrain Fuels and Lubricants Activity

Wednesday, April 9

Electric Motor & Power Electronics (Part 1 of 3)

Session Code: PFL740

Room 140 F  Session Time: 8:40 a.m.

Power electronics and electric motors are essential for improving vehicle efficiency through drivetrain electrification. Technologies that support high efficiency, high power density, and low cost motors and power modules are required for the success of vehicle electrification.

Organizers - John Czubay, GM; Sergey P. Gladyshev, Michigan-Dearborn University; Laura Marlino, Oak Ridge National Laboratory; Constantine N. Raptis, GM Powertrain; Serdar Yonak, Infineon Technologies North America Corp.

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<th>Time</th>
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<td>8:40 a.m.</td>
<td>2014-01-1888</td>
<td>State of the Art and Future Trends of Electric Drives and Power Electronics for Automotive Engineering</td>
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<td>Jürgen Fabian, Mario Hirz, Klaus Krischan, Graz University of Technology</td>
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The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00413, SUB-TP-00008 and 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
Wednesday, April 9

Electric Motor & Power Electronics (Part 2 of 3)

Session Code: PFL740
Room 140 F

Power electronics and electric motors are essential for improving vehicle efficiency through drivetrain electrification. Technologies that support high efficiency, high power density, and low cost motors and power modules are required for the success of vehicle electrification.

Organizers - John Czubay, GM; Sergey P. Gladyshev, Michigan-Dearborn University; Laura Marlin, Oak Ridge National Laboratory; Constantine N. Raptis, GM Powertrain; Serdar Yonak, Infineon Technologies North America Corp.

Time | Paper No. | Title
--- | --- | ---
1:00 p.m. | 2014-01-1879 | Development of an Electric Motor for a Newly Developed Electric Vehicle
Tohru Nakada, Shigeaki Ishikawa, Shunji Oki, Nissan Motor Co., Ltd.
Wednesday, April 9

Advanced Hybrid and Electric Vehicle Powertrains (Part 3 of 4)

Session Code: PFL710

Room 140 G

Session Time: 8:00 a.m.

This session covers new production and near-production hybrid powertrains, hybrid architecture, and testing.

Organizers -

Time | Paper No. | Title
--- | --- | ---
8:00 a.m. | 2014-01-1823 | Smart Charging Standards for Plug-In Electric Vehicles
Richard A. Scholer, Chrysler LLC; Hank McGlynn, Aeych LLC

8:20 a.m. | 2014-01-1824 | Test Results of the PLUGLESS® Inductive Charging System from Evatran Group, Inc.
Richard W. Carlson, Idaho National Lab.; Brian Normann, Evatran Group Inc.

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Planned by Hybrid and Electric Powertrains Committee / Powertrain Fuels and Lubricants Activity
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<td>8:40 a.m.</td>
<td>2014-01-1803</td>
<td>Actual Versus Estimated Utility Factor of a Large Set of Privately Owned Chevrolet Volts</td>
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<tr>
<td>9:00 a.m.</td>
<td>2014-01-1808</td>
<td>Analysis of Hybrid Heavy Duty Powertrains for Commercial Vehicles in the Face of Advanced Vehicle and Exhaust Energy Recovery Technologies</td>
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<tr>
<td>9:40 a.m.</td>
<td>2014-01-1816</td>
<td>Cycle Life Cost Assessment of a Hybrid Lead Acid Battery-Supercapacitor Storage for an Electric Microcar</td>
</tr>
<tr>
<td>10:00 a.m.</td>
<td>2014-01-1822</td>
<td>City Vehicle XAM 2.0: Design and Optimization of its Plug-In E-REV Powertrain</td>
</tr>
<tr>
<td>10:20 a.m.</td>
<td>2014-01-1798</td>
<td>Optimization of the Layout and Control Strategy for Parallel Through-the-Road Hybrid Electric Vehicles</td>
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<td>10:40 a.m.</td>
<td>2014-01-1807</td>
<td>Study on Optimization of Regenerative Braking Control Strategy in Heavy-Duty Diesel Engine City Bus using Pneumatic Hybrid Technology</td>
</tr>
<tr>
<td>10:40 a.m.</td>
<td>2014-01-1791</td>
<td>Regenerative Braking Control Algorithm for an Electrified Vehicle Equipped with a By-Wire Brake System (Written Only -- No Oral Presentation)</td>
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<tr>
<td>10:40 a.m.</td>
<td>2014-01-1800</td>
<td>Study of a Hybrid Refuse Truck with City Driving Cycles (Written Only -- No Oral Presentation)</td>
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Planned by Hybrid and Electric Powertrains Committee / Powertrain Fuels and Lubricants Activity
Impact of Ambient Temperature and Climate Control on Energy Consumption and Operational Behavior for Various HEVs on the Urban Drive Cycle
Abhijit Nitin Khare, Virginia Tech; Henning Lohse-Busch, Argonne National Laboratory; Douglas Nelson, Virginia Tech

Thermal Model Development and Validation for 2010 Toyota Prius
Namwook Kim, Aymeric Rousseau, Daeheung Lee, Henning Lohse-Busch, Argonne National Laboratory

Control Analysis under Different Driving Conditions for Peugeot 3008 Hybrid 4
Namwook Kim, Eric Rask, Aymeric Rousseau, Argonne National Laboratory

Development and Validation of the Ford Focus Battery Electric Vehicle Model
Daeheung Lee, Aymeric Rousseau, Eric Rask, Argonne National Laboratory

Energy Management in a Parallel Hybrid Electric Vehicle for Different Driving Conditions
Mirko Schulze, Rashad Mustafa, Benjamin Tilch, Peter Eilts, Ferit Küçükay, Technical Univ. of Braunschweig

Analyzing the Energy Consumption Variation during Chassis Dynamometer Testing of Conventional, Hybrid Electric, and Battery Electric Vehicles
Jake Bucher, Thomas Bradley, Colorado State Univ; Henning Lohse-Busch, Eric Rask, Argonne National Laboratory

Spark EV Propulsion System Integration (Written Only -- No Oral Presentation)
Trista Schieffer, Mary Ann Jeffers, Shawn Hawkins, Adam Heisel, Cindy Leahy, Edward Rapa, Christopher Twarog, GM Electrification Engineering

Characterization of Flywheel Energy Storage System for Hybrid Vehicles (Written Only -- No Oral Presentation)
Aditya Dhand, Keith Pullen, City University London

Design Optimization, Development and Manufacturing of General Motors New Battery Electric Vehicle Drive Unit (1ET35) (Written Only -- No Oral Presentation)

Effect of Driving Conditions and Auxiliaries on Mileage and CO<sub>2</sub> Emissions of a Gasoline and an Electric City Car (Written Only -- No Oral Presentation)
Teresa Donateo, Fabio Ingrosso, Daniele Bruno, Domenico Laforgia, Universita Del Salento

Energy Efficient Routing for Electric Vehicles using Particle Swarm Optimization (Written Only -- No Oral Presentation)
Rami Abousleiman, Chrysler Group LLC; Osamah Rawashdeh, Oakland Univ.

Experimental Investigation of the Energy Efficiency of an Electric Vehicle in Different Driving Conditions (Written Only -- No Oral Presentation)
Michele De Gennaro, Elena Paffumi, Giorgio Martini, Urbano Manfredi, Harald Scholz, EC Joint Research Centre; Hannes Lacher, Helmut Kuehnelt, Dragan Simic, Austrian Institute of Technology

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Wednesday, April 9

Advanced Fuel Cell Vehicle Applications

Session Code: PFL720

Room 140 G

Session Time: 3:20 p.m.

This session covers fuel cell advances optimization, modeling, and simulation of PEM fuel cell systems and hydrogen fueling.

Organizers - Jesse Schneider, BMW; Anita Chaudhari, Altran

Chairpersons - Jesse Schneider, BMW

Time | Paper No. | Title |
--- | --- | --- |
3:20 p.m. | 2014-01-1828 | Experimental Investigation of Channel Aspect Ratio on Interdigitated PEMFC Performance  
Anthony Santamaria, Nathanial Cooper, Maxwell Becton, Jae Wan Park, University of California |
3:40 p.m. | 2014-01-1827 | A Study on How to Utilize Hilly Road Information in Equivalent Consumption Minimization Strategy of FCHEVs  
Jihun Han, Youngjin Park, Dongsuk Kum, KAIST; Seongpil Ryu, Hyundai Motor Co. |
3:20 p.m. | 2014-01-1831 | A Simplified Design, Control and Power Management of Fuel Cell Vehicles (Written Only -- No Oral Presentation)  
Ienkaran Arasaratnam, McMaster Univ. |
3:20 p.m. | 2014-01-1990 | Validation and Sensitivity Studies for SAE J2601, the Light Duty Vehicle Hydrogen Fueling Standard (Written Only -- No Oral Presentation)  
Jesse Schneider, BMW AG; Graham Meadows, Powertech Labs, Inc.; Steven R. Mathison, Honda R & D Americas Inc.; Michael J. Veenstra, Ford Motor Co.; Jihyun Shim, Hyundai Motor Co.; Rainer Immel, Adam Opel AG; Morten Wistoft-Ibsen, H2 Logic A/S; Spencer Quong, QAI, Inc.; Manfred Greisel, Wenger Engineering; Timothy McGuire, Mercedes-Benz R&D NA Inc.; Peter Potzel, Daimler AG |

Planned by Hybrid and Electric Powertrains Committee / Powertrain Fuels and Lubricants Activity

Wednesday, April 9

Chat with the Experts: Developing Connected, Autonomous Vehicles as Part of an Ultra-Large Scale Safety Critical System

Session Code: AECHAT

Room 330 A/B

Session Time: 4:00 p.m.

Connected, autonomous vehicles interact with each other and diverse elements of infrastructure to form an ultra large scale system that must achieve safety critical levels of quality while meeting the industry\'s need for variety. Increasingly, software plays an essential role in those systems. To achieve that level of software quality over the scope of an ultra-large scale system in a cost-effective manner, software-intensive system development can be structured around a set of product development practices that accommodate rapidly changing requirements, continuous evolution, and exponential rates of innovation. Software supply chains are still immature and must be managed with the same engineering discipline as hardware supply chains. Suppliers and integrators collaborate to achieve a continuous integration approach in which functionality and quality are monitored continuously. This talk will present a comprehensive development strategy that has proven successful in the development of fault tolerant, safety-critical systems. The technique stresses processes for early detection and repair of defects in both the requirements and the software architecture and includes support for distributed, incremental development, and rapid deployment of validated enhancements.

Presenters - John McGregor, Clemson Univ.
Wednesday, April 9

Chat with the Experts: Connected Vehicle

Session Code: AECHAT
Room 330 A/B  Session Time: 4:00 p.m.

The "connected vehicle" is a new frontier both for the industry and for the customer. Anything from insurance data to vehicle health reports to internet connectivity, the challenges are many. The balance between connecting to and retrieving data from a vehicle, and the privacy of the customer is very delicate. The methodologies for retrieving that data and the expectations regarding the data are also currently being debated in multiple forums. This session would explore technical issues and share lessons learned in this space.

Presenters - Robert Gruszczynski, Volkswagen of America

Wednesday, April 9

Chat with the Experts: The Role of Computer Simulation in Improving Manufacturing Systems

Session Code: IDMCHAT
Room 330 A/B  Session Time: 4:00 p.m.

Engineers and managers in many industries use computer simulation to increase the efficiency of their operations. These industries include the aerospace, automotive, defense, finance, and shipbuilding. Engineering students and practitioners consistently rank computer simulation as the most useful, popular tool in the broader area of manufacturing, operations research and management.

Computer simulation is a powerful tool for assessing the performance of systems and optimizing them. This chat will discuss the use discrete and continuous simulation models to study queuing networks, and manufacturing systems. The role of correlation and its impact on accuracy will be reviewed. Commercial simulation software, such as Arena will be discussed. Tools for statistical inference to draw conclusions and to identify the best system configuration will be reviewed.

Presenters - Efstratios Nikolaidis, University Of Toledo; Vijitashwa Pandey, Oakland University

Wednesday, April 9

Chat with the Experts: Transactional Six Sigma techniques for developing High performance teams in the Automotive Industry

Session Code: IDMCHAT
Room 330 A/B  Session Time: 4:00 p.m.

The past few decades has witnessed increasing competition in the global marketplace resulting in a focused approach towards product development and delivery, supply chain and financial performance and operational processes within various organizations. This is particularly significant in organizations that operate in the Automotive Industry that have a global footprint. The objective of this focused approach has been to enhance the value proposition of the product, product quality, reduce product and operational costs and lead time towards bringing products to the market. Each of the above initiatives involves a multitude of Transactional processes being executed on a daily basis by team members within these organizations as they work towards attaining the above objectives. These transactional activities support everything from executing Engineering changes, procuring parts from Suppliers, delivering products to customers and financial reporting within a legal and statutory compliance framework. Thus, transactional processes play a critical part within these organizations and are an important element in the overall strategic plan to make the same a significant player in the global automotive space. The author has developed and implemented a series of Six Sigma based techniques for Transactional processes and deployed the same worldwide.

The focus of this session would be to examine the issues and Six Sigma based techniques to alleviate the same in the context of transactional processes being undertaken by various organizations in the automotive space. This is particularly important as transactional process improvement projects involve processes which are significantly different from those of product design and manufacturing process improvement projects in terms of methodology, approach and improvement objectives. This session would strive to address the above challenges and provide participants with a methodological approach to undertake transactional improvement projects.

Presenters - Balaji Bharadwaj, Visteon Corp.

Wednesday, April 9

Chat with the Experts: Vehicle Quality (and Brand Loyalty) Demand Effective NVH Control

Session Code: MCHAT
Quiet comfort and smooth operation are must-have standard features on today’s vehicles, regardless of brand, size or price. Less noise, vibration and harshness are critical design attributes that impact perceived quality and, ultimately, owner loyalty. The most effective NVH control strategies address both tactile and audible qualities, starting with the vehicle overall and including the sum of its parts. Both dry-film and paste-like noise-damping lubricants work well for stifling even the smallest squeaks, faintest rattles and near-imperceptible buzzing vibrations. Silicone adhesives and sealants strengthen assemblies. Silicone and fluorosilicone engineered elastomers dampen and isolate vibrations from engine mounts to exhaust hangers. Effective NVH control is challenging.

**Presenters** - Matthew Hagemeyer, Dow Corning Corp.

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**Wednesday, April 9**

**Chat with the Experts: Motorsports**

*Session Code:* MSCHAT

*Room 330 A/B *  
*Session Time:* 4:00 p.m.

The members of the SAE’s Motorsports Engineering Activity have a long and wide experience in motor sports with special expertise in aerodynamics, safety, powertrain, chassis set up and development, and student competitions. They are willing and able to discuss all aspects of motor sports.

**Presenters** - David T. Currier, Toyota Racing Development USA; Naethan Eagles, TotalSim, Ltd.; David A. Finch, Raetech Corp.; Raymond Leto, TotalSim LLC; Wiley R. McCoy, McLaren Performance Technologies; Michael Royce, Chrysler (retired); H. Robert (Bob) Welge, Robert's Engineering Development

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**Wednesday, April 9**

**Chat with the Experts: PEV Charging Standards and Interoperability Testing Activities in Support of Standards Development**

*Session Code:* PFLCHAT

*Room 330 A/B *  
*Session Time:* 4:00 p.m.

Electric vehicle charging standards development is an ongoing, evolutionary process involving many stakeholders. This Chat With the Experts topic will cover relevant PEV charging standards development, validation, and test methods for AC charging, DC charging, and wireless charging. Interoperability of PEV-to-EVSE validation methods and activities will also be discussed. International harmonization of PEV charging standards as well.

**Presenters** - Theodore Bohn, Argonne National Laboratory

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**Wednesday, April 9**

**Chat with the Experts: Managing the Challenges and Complexities of Advanced Driver Assistance and Active Safety System Development and Integration**

*Session Code:* BCHAT

*Room 331 B/C *  
*Session Time:* 3:30 p.m.

Active safety systems are typically comprised of unique camera, radar and lidar sense technologies to enable an enhanced awareness of the environment surrounding the vehicle during its operation. These unique sensors can then be leveraged by the vehicle controller to allow safety critical decisions independent from driver input or awareness. Each of these active safety features are ultimately envisioned to support a comprehensive library of features capable of enabling full autonomous operation in the future. Experts will divulge their opinions on the complexities of developing and deploying the technologies targeted to change the way we will drive and interact with our vehicles in the future.

**Moderators** - Christopher Hennessy, IAV Automotive Engineering (Shanghai) Co.

**Presenters** - John P. Capp, General Motors Co.; Glen W. De Vos, Delphi Electronics & Safety; Sharath Reddy, TRW Automotive; Karsten Schulze, IAV Automotive Engineering Inc.; Christian Schumacher, Continental Automotive Systems
Wednesday, April 9

Hardware-in-the-Loop Technology for Embedded Software Development and Testing

Session Code: AE108
Room 332
Session Time: 8:00 a.m.

Developing automotive electronic controls and embedded software is a complex undertaking. In addition to Hardware-in-the-Loop simulation, improvements in desktop computing technology show promise for early verification of embedded software using a virtual environment for electronic control units and the test infrastructure. This session highlights advances in processes, tools, and technologies to reduce design and validation time and cost, and to improve the quality of embedded software.

Organizers - Kevin Kott, Vivek Moudgal, dSPACE Inc.; Peter Waeltermann, dSPACE GmbH

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<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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<tr>
<td>8:00 a.m.</td>
<td>2014-01-0188</td>
<td>Model-Based Real-Time Testing of Embedded Automotive Systems Pawel Skruch, Gabriel Buchala, Delphi Automotive</td>
</tr>
<tr>
<td>8:20 a.m.</td>
<td>2014-01-0190</td>
<td>Timing Analysis and Tracing Concepts for ECU Development Karsten Schmidt, Audi Electronics Venture GmbH; Jens Harnisch, Infineon Technologies AG; Denny Marx, Audi Electronics Venture GmbH; Albrecht Mayer, Infineon Technologies AG; Andre Kohn, Audi Electronics Venture GmbH; Reinhard Deml, Infineon Technologies AG</td>
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<tr>
<td>8:40 a.m.</td>
<td>ORAL ONLY</td>
<td>Virtual ECUs as the Basis for an Interdisciplinary Validation Strategy Karsten Krügel, dSPACE GmbH; David Wybo, dSPACE Inc.</td>
</tr>
<tr>
<td>9:00 a.m.</td>
<td>2014-01-0193</td>
<td>Design and Application of the ECU Application Software Components Library for Diesel Engine Huan Li, Ying Huang, Xiaoyan Dai, Meiqi Hu, Beijing Institute of Technology</td>
</tr>
<tr>
<td>9:20 a.m.</td>
<td>2014-01-0191</td>
<td>Methodology for Migration of Traditional Application Software to AUTOSAR Architecture Raghavendra Anantharam, Prakash Kulkarni, KPIT Infosystems Inc.</td>
</tr>
<tr>
<td>9:40 a.m.</td>
<td>2014-01-0194</td>
<td>A Real-Time Virtual Simulation Environment for Advanced Driver Assistance System Development Fei Han, Weiwen Deng, Sumin Zhang, Jian Wu, Yu Wang, State Key Lab of Automotive Simulation &amp; Control, Jilin Univ; Bin Liu, Bingxu Shang, Shaobo Qiu, R&amp;D Center, China FAW Group</td>
</tr>
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</table>

Planned by Testing and Instrumentation Committee / Automobile Electronics Activity

Wednesday, April 9

Intelligent Vehicle Initiative (IVI) Technology, Advanced Controls, and Navigation Systems

Session Code: AE309
Room 332
Session Time: 1:00 p.m.

This session presents papers by leading experts in the field of Intelligent Vehicle Technologies, such as: vehicle communications and networks, driver drowsiness and driving pattern detection, sensors and GPS, vehicle and chassis control and autonomous vehicles, route prediction, head-up displays and power transmission for electric vehicles.

Organizers - Mohammad Naserian, Hyundai America Technical Center; Kenneth W. Webster, Transportation Research Center Inc.

Chairpersons - Jeffrey A. Sprague, Transportation Research Center Inc.

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<th>Time</th>
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<tr>
<td>1:00 p.m.</td>
<td>2014-01-0275</td>
<td>Vehicle-Based Driver Interlocks: After 50 Years of Research, can we now Design an On-Board, Real-Time System to Detect Abnormal Driving Behavior? Dennis A. Attwood, Human Factors Applications</td>
</tr>
</tbody>
</table>
1:20 p.m. 2014-01-0273 **Breadth-First Search-Based Remaining Range Estimation and Representation for Electric Vehicle**
Roman Potarusov, Jean-Patrick Lebacque, IFSTTAR/COSYS/GRETTIA

1:40 p.m. 2014-01-0277 **Path Following Control for Skid Steering Vehicles with Vehicle Speed Adaption**
Chi Jin, Lu Xiong, Zhuoping Yu, Yuan Feng, Tongji University

2:00 p.m. 2014-01-0268 **Kalman Filter Based Estimation Algorithm to Improve the Accuracy of Automobile GPS Navigation Solution**
Bhavani Srinivasalah, M/S TVS Motor Co., Ltd.; Rajesh Tiwari, Newcastle University; Samraj Dhinagar, M/S TVS Motor Co., Ltd.

2:20 p.m. 2014-01-0272 **Automatic Maneuver Boundary Detection System for Naturalistic Driving Massive Corpora**
Amardeep Sathyarayana, Seyed Omid Sadjadi, John H. L. Hansen, Univ. of Texas

2:40 p.m. 2014-01-0269 **Position Estimate Assisted by DSRC for Outdoor Wireless Environments**
Radovan Miucic, Zeljko Popovic, Sue Bai, Honda R & D Americas Inc.

3:00 p.m. 2014-01-0276 **On the Hybrid Framework of Personalization Data for the Automotive HMI**
Adeel Yusuf, John Avery, Panasonic Automotive Systems of America

3:20 p.m. **ORAL ONLY**

**Harmonized Definitions for Automated Driving Systems in Road Vehicles**
Barbara Wendling, Volkswagen Group of America Inc.

**2014-01-0267**
**Hybrid Brake System Control Strategy in Typical Transient Conditions (Written Only -- No Oral Presentation)**
Zhiting Zhu, Lu Xiong, Chi Jin, Tongji Univ.

**2014-01-0270**
**Detection of Shading of an Object in an Enclosure and its Application (Written Only -- No Oral Presentation)**
Rupesh Sonu Kakade, Prashant Mer, Automotive Design

**2014-01-0271**
**Parameter Identification of PMSM for EPS Based on an Improved MRAS Method (Written Only -- No Oral Presentation)**
Hu Zhang, JianWei Zhang, Konghui Guo, Jilin Univ.

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00433, and also individually. To purchase visit collections.sae.org

Planned by Testing and Instrumentation Committee / Automobile Electronics Activity

**Wednesday, April 9**

**Vehicle Sensors and Actuators**

**Session Code:** AE319

**Room 333**

**Session Time:** 8:00 a.m.

Modern automotive customers need safer vehicles with little or no impact to the environment. The purpose of this session is to present the latest research and development on novel sensors, actuators, and circuits that are critical to deliver the function of today’s complex automotive systems.

**Organizers:** Chenfang Chang, Sanjeev M. Naik, Sai S V Rajagopalan, General Motors Co.

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<td></td>
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<td><strong>Breadth-First Search-Based Remaining Range Estimation and Representation for Electric Vehicle</strong> Roman Potarusov, Jean-Patrick Lebacque, IFSTTAR/COSYS/GRETTIA</td>
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<td><strong>Path Following Control for Skid Steering Vehicles with Vehicle Speed Adaption</strong> Chi Jin, Lu Xiong, Zhuoping Yu, Yuan Feng, Tongji University</td>
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<td><strong>Kalman Filter Based Estimation Algorithm to Improve the Accuracy of Automobile GPS Navigation Solution</strong> Bhavani Srinivasalah, M/S TVS Motor Co., Ltd.; Rajesh Tiwari, Newcastle University; Samraj Dhinagar, M/S TVS Motor Co., Ltd.</td>
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<td><strong>Automatic Maneuver Boundary Detection System for Naturalistic Driving Massive Corpora</strong> Amardeep Sathyarayana, Seyed Omid Sadjadi, John H. L. Hansen, Univ. of Texas</td>
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<td><strong>Position Estimate Assisted by DSRC for Outdoor Wireless Environments</strong> Radovan Miucic, Zeljko Popovic, Sue Bai, Honda R &amp; D Americas Inc.</td>
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<td><strong>On the Hybrid Framework of Personalization Data for the Automotive HMI</strong> Adeel Yusuf, John Avery, Panasonic Automotive Systems of America</td>
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<td><strong>Harmonized Definitions for Automated Driving Systems in Road Vehicles</strong> Barbara Wendling, Volkswagen Group of America Inc.</td>
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<td><strong>Hybrid Brake System Control Strategy in Typical Transient Conditions (Written Only -- No Oral Presentation)</strong> Zhiting Zhu, Lu Xiong, Chi Jin, Tongji Univ.</td>
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<td><strong>Detection of Shading of an Object in an Enclosure and its Application (Written Only -- No Oral Presentation)</strong> Rupesh Sonu Kakade, Prashant Mer, Automotive Design</td>
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<td><strong>Parameter Identification of PMSM for EPS Based on an Improved MRAS Method (Written Only -- No Oral Presentation)</strong> Hu Zhang, JianWei Zhang, Konghui Guo, Jilin Univ.</td>
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<td>Time</td>
<td>2014-01-0325</td>
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<td>8:00 a.m.</td>
<td>Active Brake Pedal Feedback Simulator Based on Electric Drive</td>
<td>Michael Flad, Simon Rothfuss, Gunter Diehm, Sören Hohmann, KIT, Karlsruhe Institute of Technology</td>
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<td>8:20 a.m.</td>
<td>Motor Control in Auxiliary Drive Systems How to Choose the Best Fitting Electronic Solution</td>
<td>Thomas Liebetrau, Philip Brockerhoff, Infineon Technologies AG</td>
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<td>8:40 a.m.</td>
<td>New MEMS Process Technology for Pressure Sensors Integrated with CMOS Circuits</td>
<td>Shinya Asai, Ryuichirou Abe, Yoshiko Isobe, Noriyuki Iwamori, DENSO Corp.</td>
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<td>9:00 a.m.</td>
<td>Development of Regenerative Cooperative Braking System with Conventional ESC</td>
<td>Masayuki Naito, Yasuhiro Koike, Shintaro Osaki, ADVICS Co., Ltd.; Shinichi Morishita, Nanhao Quan, Nissan Motor Co., Ltd.</td>
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<tr>
<td>9:40 a.m.</td>
<td>On-Chip Delta-Sigma ADC for Rotor Positioning Sensor Application (Resolver-to-Digital Converter)</td>
<td>Ja-chun Han, Hyundai Motors Industries Co. Ltd.; Dian Tresna Nugraha, Infineon Technologies AG; Shi-Nian Li, Infineon Integrated Circuit Co. Ltd.</td>
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<td>10:00 a.m.</td>
<td>Evaluation of Sensor Fusion Methods for Next Generation Cars</td>
<td>Venkatesh Agaram, PTC Inc.</td>
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<td>ORAL ONLY</td>
<td>Evaluation of Sensor Fusion Methods for Next Generation Cars</td>
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<td>2014-01-0329</td>
<td>Recognition and Classification of Vehicle Target Using the Vehicle-Mounted Velodyne LIDAR (Written Only -- No Oral Presentation)</td>
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Planned by Testing and Instrumentation Committee / Automobile Electronics Activity

Testing and Instrumentation

Session Code: AE106
Room 333

All of the engineering expertise that goes into development of cutting-edge vehicle features, whether for safety, infotainment, or vehicle performance, goes for naught if those features don't work. Reliability is critical for every automaker. Presentations and papers at this session strive to improve the quality and effectiveness of electronic testing devices and procedures.

Organizers - John Day, John Day's Automotive Electronics; Ketan R. Kulkarni, Tata Consultancy Services; Chirag Sonchal, TATA MOTORS; Anand Vijay Kulkarni, Tata Motors, Ltd.; Prasad Srinivasa

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<th>Time</th>
<th>2014-01-0325</th>
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<tr>
<td>1:00 p.m.</td>
<td>Verification of Flag Usage Patterns by Static Analysis Techniques</td>
<td>Amey Zare, Advaita Datar, Tata Consultancy Services Ltd.; Mitsuhiko Kikuchi, Satoshi Ichikawa, Miwako Hasegawa, Nissan Motor Co., Ltd.; Shigenori Tsunekado, Nissan Technology Co., Ltd.</td>
</tr>
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</table>
Chat with the Experts: Composites, Aerospace Performance At Automotive Efficiency

Session Time:  4:00 p.m.

DARPA is looking to explore how to achieve aerospace properties at automotive efficiencies using composite materials. This was driven through the following observations: First, aerospace composites have reached a plateau where performance is quite high, but efficiency in terms of rate remains low due to high levels of touch labor and non-recurring engineering. The automotive sector is now innovating towards a different region where lower relative performance is reached, but efficiency is much higher. The material and processing approaches of the two market sectors has been divergent. DARPA would like to step back and evaluate any technologies that would enable aerospace composites performance, but do it at much higher efficiency. The program that they are considering looks at developing materials that enable the use of automotive infrastructure and processing techniques but produce aerospace grade performance. This is contrary has been in the past between the two sectors when transition involved both the material and process set.

Presenters - Michael Maher, Program Manager, Defense Advanced Research Projects Agency (DARPA)

Intelligent Transportation Systems - Safer, Smarter, Faster

Session Time:  8:00 a.m.

Intelligent Transportation Systems (ITS) includes smart vehicles, smart roads and infrastructure, and wired and wireless communications to link them together. This session will provide insights and progress reports on the latest ITS research, development, and deployment around the world. Time to collision estimations, embedded processor control, adaptive cruise control and image recognition along with discussion on the management of safety and safety systems.

Organizers - David Acton, The-Transformation-Network, Inc.; Jan-Mou Li, Oak Ridge National Laboratory; Mohammad Naserian, Hyundai America Technical Center; Stephan Tarnutzer, DGE Inc.
Wednesday, April 9

In-Vehicle Multi-core Software Development

Session Code: AE306

Room 338          Session Time: 1:00 p.m.

This session concentrates on the development of embedded software that resides in production vehicle electronic modules. With a focus on multi-core processing, this session covers aspects of embedded software development including requirements, architecture, implementation, algorithms, and timing analysis through simulation. Expert speakers from the embedded software community are encouraged to share their experiences and opinions.

Organizers - Amit Choudhury, ADVICS North America Inc.; Lawrence Cramer, Chrysler LLC

Chairpersons - Amit Choudhury, ADVICS North America Inc

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<tr>
<td>1:00 p.m.</td>
<td>2014-01-0255</td>
<td>Creating a Unified Runtime Platform: Considerations in Designing Automotive Electronic Systems Using Multiple Operating System Domains</td>
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<td>Patrick Shelly, Mentor Graphics</td>
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<td>1:20 p.m.</td>
<td>2014-01-0259</td>
<td>Migrating Automotive Applications To Multi-Core &amp; Hints And Tweaks</td>
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<td>ORAL ONLY</td>
<td>Rolf Schneider, AUDI AG; Udo Dannebaum, Infineon Technologies AG; Georg Hofstetter, EFS GmbH</td>
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<tr>
<td>1:40 p.m.</td>
<td>ORAL ONLY</td>
<td>Safeguarding First-Generation Multi-Core Designs through Timing-Aware Software Development</td>
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<td>Simon Schliecker, Maurice Sebastian, Symtavision Gmbh</td>
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Wednesday, April 9

Safety Critical Systems (Part 1 of 2)

Session Code: AE300

Room 353

The focus of the session is on system safety analysis and design of safety-critical systems employing electronic controls. Topics include: implementation of safety-relevant systems, fail-safe strategies, distributed fault tolerant systems and hazard analysis. Application areas include: automotive active safety and alternative energy systems as well as avionics and mission management. Finally, the session addresses application of new or revised safety standards such as ISO 26262 and DO-178C.

Organizers - Barbara J. Czerny, Chrysler Group LLC; Brian T. Murray, United Technologies Research Center; Markus Plankensteiner, TTTech. Computertechnik AG

Chairpersons - Barbara J. Czerny, Chrysler Group LLC; Brian T. Murray, United Technologies Research Center; Markus Plankensteiner, TTTech. Computertechnik AG; Robert Suchala, Chrysler Group LLC

Time Paper No. Title

8:00 a.m. 2014-01-0207 Effective Functional Safety Concept Generation in the Context of ISO 26262
Darren Sexton, Antonio Priore, John Botham, Ricardo UK Ltd.

8:20 a.m. 2014-01-0211 A Scenario-Based Approach to Assess Exposure for ASIL Determination
Barbara J. Czerny, Robert Suchala, Chrysler Group LLC; Michael Runyon, Chrysler Powertrain Engrg

8:40 a.m. ORAL ONLY Effects of Unintended Longitudinal Acceleration Profile Magnitude and Duration on Driver Performance Behaviors
Mark A. Vernacchia, General Motors Co.

9:00 a.m. 2014-01-0218 Challenges for Reuse in a Safety-Critical Context: A State-of-Practice Study
Helmut Martin, Kompetenzzentrum Das Virtuelle Fahrzeug; Stephan Baumgart, Volvo Construction Equipment; Andrea Leitner, Daniel Watzenig, Kompetenzzentrum Das Virtuelle Fahrzeug

9:20 a.m. ORAL ONLY Using Goal Structured Notation to Develop a Flexible Safety Case Framework Consistent with ISO 26262
Andrea Piovesan, Fiat Research Centre; Barbara J. Czerny, Chrysler Group LLC
Wednesday, April 9

Safety Critical Systems (Part 2 of 2)

Session Code: AE300

Room 353  Session Time: 1:00 p.m.

The focus of the session is on system safety analysis and design of safety-critical systems employing electronic controls. Topics include: implementation of safety-relevant systems, fail-safe strategies, distributed fault tolerant systems and hazard analysis. Application areas include: automotive active safety and alternative energy systems as well as avionics and mission management. Finally, the session addresses application of new or revised safety standards such as ISO 26262 and DO-178C.

Organizers - Barbara J. Czerny, Chrysler Group LLC; Joseph G. D’Ambrosio, GM R&D Center; Brian T. Murray, United Technologies Research Center; Markus Plankensteiner, TTTech. Computertechnik AG

Chairpersons - Barbara J. Czerny, Chrysler Group LLC; Brian T. Murray, United Technologies Research Center; Markus Plankensteiner, TTTech. Computertechnik AG; Robert Suchala, Chrysler Group LLC

Time  Paper No.  Title

1:00 p.m.  ORAL ONLY  Challenges in applying safety measures for ADAS
Carl Bergenhem, Hakan Sivencrona, Qamcom Research and Technology AB; Rolf Johansson, SP Technical Research Inst. of Sweden

1:20 p.m.  2014-01-0217  Model-Driven Code Generation and Analysis
Daniel Kaestner, AbsInt Angewandte Informatik GmbH; Carsten Rustemeier, Ulrich Kiffmeyer, Dirk Fleischer, dSPACE GmbH; Stefana Nenova, Reinhold Heckmann, Marc Schlickling, Christian Ferdinand, AbsInt Angewandte Informatik GmbH

1:40 p.m.  2014-01-0206  Efficient Virtualization for Functional Integration on Modern Microcontrollers in Safety-Relevant Domains
Rolf Schneider, Audi AG; Andre Kohn, Karsten Schmidt, Sven Schoenberg, Audi Electronics Venture GmbH; Udo Dannebaum, Jens Harnisch, Qian Zhou, Infineon Technologies AG
Occupant Protection: Structural Crashworthiness and Occupant Safety

**Session Code:** B409

**Room 354**

**Session Time:** 8:00 a.m.

Paper offers advancing the science of occupant safety in vehicle collisions are welcome.

**Organizers -** Saeed Barbat, Ford Motor Co.; Jason R. Kerrigan, Univ. of Virginia; Jamel E. Belwafa, Ford Motor Co.; J. Kirk Russell, Performance Events Promotion LLC; Michael Royce; Joseph Marsh

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**Time** | **Paper No.** | **Title**
---|---|---
8:00 a.m. | 2014-01-0561 | Improving Safety Structures on Sprint and Midget Race Cars
Yanan Zhao, Thomas Rambow, Chat Nguyen, Mathew Boesch, Raymond Spiteri, Kyle Post, Ford Motor Co.

8:20 a.m. | 2014-01-0565 | Optimized Rigid Side Underride Protection Device Designs for Tractor-Trailers and Straight Trucks
Patrick Galipeau-Belair, University of Ontario Institute of Tech.; Srikanth Ghantae, David Critchley, Sarathy Ramachandra, Volvo Trucks North America; Moustafa EL-Gindy, University of Ontario Institute of Tech.

8:40 a.m. | 2014-01-0567 | Dual Stage Front Underride Protection Devices (dsFUPDs): Collision Interface and Passenger Compartment Intrusion
Todd MacDonald, Moustafa EL-Gindy, UOIT; Srikanth Ghantae, Sarathy Ramachandra, David Critchley, Volvo Group Trucks Technology

9:00 a.m. | 2014-01-0556 | Under-Body Blast Mitigation: Stand-Alone Seat Safety Activation System
Sebastian Karwaczynski, TARDEC; Mehmet H. Uras, Paradigm Research and Engineering

9:20 a.m. | 2014-01-0550 | Frontal Impact Responsesof Generic Steel Front Bumper Crush Can Assemblies

9:40 a.m. | 2014-01-0564 | A Comparative Benchmark Study of using Different Multi-Objective Optimization Algorithms for Restraint System Design
Monica Majcher, Oakland Univ.; Hongyi Xu, Northwestern Univ.; Yan Fu, Ching-Hung Chuang, Ren-Jye Yang, Ford Motor Co.
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<tr>
<td>10:00 a.m.</td>
<td>2014-01-0554</td>
<td><strong>Addressing Run Off Road Safety</strong></td>
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<td>Lotta Jakobsson, Magdalena Lindman, Anders Axelson, Bengt Lokensgard, Mats Petersson, Bo Svanberg, Jordanka Kovaceva, Volvo Cars</td>
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<tr>
<td>10:20 a.m.</td>
<td>2014-01-0559</td>
<td><strong>Comparison of the THOR and Hybrid III Responses in Oblique Impacts</strong></td>
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<td>Michael Guerrero, Kapil Butala, Ravi Tangirala, Amy Klinkenberger, Hyundai America Technical Center</td>
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<tr>
<td>10:40 a.m.</td>
<td>2014-01-1989</td>
<td><strong>An Examination of Crash and NASS Data to Evaluate the Field Relevance of IIHS Small Offset Tests</strong></td>
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<td>P. Prasad, Prasad Engineering, LLC; D. Dalmotas, A. German, D. J. Dalmotas Consulting Inc.</td>
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The papers in this session are available in SAE Technical Paper Collection, SUB-TP-00006 and SUB-TP-00007, and also individually. To purchase visit collections.sae.org

Planned by Occupant Protection Committee / Automobile Body Activity; Motorsports Engineering Committee / Motorsports Engineering Activity
Transmission and Driveline (Part 3 of 7): IVT / CVT

Session Code: PFL630
Room 357
Session Time: 8:00 a.m.

This Session includes papers on IVT/CVT systems and related topics.

Organizers - Rakan Chabaan, Gang Chen, John C. Collins, Chrysler Group LLC; Patrick Robert Darmstadt, Boeing Helicopters; Hussein Dourra, Chrysler Group LLC; Fabio Ferreira, Schaeffler Brasil, Ltd.; Michael E. Fingereman, John A. Frait, Chrysler Group LLC; Joel Gunderson, James Hendrickson, Chunhao Lee, Dongxu Li, General Motors Co.; Berthold Martin, Chrysler Group LLC; Thomas Martin, General Motors Co.; David Popejoy, Craig Renneker, Ford Motor Co.; Farzad Samie, General Motors Co.; Brian Carl Schneidewind, Toyota Technical Center USA Inc.; Tejinder Singh, General Motors Co.; Robert A. Smithson, Dana Holding Corp; Erich L. Wilfinger, Jatco USA Inc.

The papers in this session are available in SAE Technical Paper Collection, SUB-TP-00006 and SUB-TP-00007, and individually. To purchase visit collections.sae.org

Planned by Occupant Protection Committee / Automobile Body Activity

Wednesday, April 9

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<th>Time</th>
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<tr>
<td>8:00 a.m.</td>
<td>2014-01-1729</td>
<td>Development of High Torque Capacity Variator System for CVT</td>
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<td>Hiromu Soya, Makoto Yoshida, Kazutaka Imai, JATCO Ltd.; Yoshitaka</td>
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<td>Miura, Yuuki Matsushita, Nissan Motor Co., Ltd.</td>
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<td>8:20 a.m.</td>
<td>2014-01-1733</td>
<td>On the Question of External Characteristic of the Inertial</td>
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<td>Continuously Variable Transmission</td>
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<td>Sergei Aliukov, Vladimir Gorshenin, South Ural State University</td>
</tr>
<tr>
<td>8:40 a.m.</td>
<td>2014-01-1736</td>
<td>A Study on Clamping Force Control in Pulley of CVT for Fuel Efficiency</td>
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<td>HoYoung Lee, TaeHee Cho, Chan-Hee Won, Byoungkee Kim, Hyundai &amp; Kia Corp.</td>
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<tr>
<td>9:00 a.m.</td>
<td>2014-01-1732</td>
<td>Measurement of Oil Film Pressure on Running Continuously Variable</td>
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<td>Transmission Pulley Part 1: Measurement Using Micro Data Logger System and Thin-Film Sensor</td>
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<td>Kenji Matsumoto, Hideharu Koga, Satoru Suzuki, Honda R&amp;D Co., Ltd.; Yuji Mihara, Tokyo City University</td>
</tr>
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</table>
Transmission and Driveline (Part 4 of 7): Transmission Systems/Drive Unit

**Session Code:** PFL610

**Room 357**

**Session Time:** 1:00 p.m.

This session deals with papers on automotive transmissions of different types, their enhancements and controls.

**Organizers:**
- Rakan Chabaan, Gang Chen, John C. Collins, Chrysler Group LLC; Patrick Robert Darmstadt, Boeing Helicopters; Hussein Dourra, Chrysler Group LLC; Fabio Ferreira, Schaeffler Brasil, Ltd.; Michael E. Fingerman, John A. Frait, Chrysler Group LLC; Joel Gunderson, James Hendrickson, Chunhao Lee, Dongxu Li, General Motors Co.; Berthold Martin, Chrysler Group LLC; Thomas Martin, General Motors Co.; David Popejoy, Craig Renneker, Ford Motor Co.; Farzad Samie, General Motors Co.; Brian Carl Schneidewind, Toyota Technical Center USA Inc.; Tejinder Singh, General Motors Co.; Robert A. Smithson, Dana Holding Corporation; Erich L. Wilfinger, Jatco USA Inc.

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<th>Time</th>
<th>Paper No.</th>
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<tr>
<td>1:00 p.m.</td>
<td>2014-01-1717</td>
<td><strong>Quasi-Continuously-Variable Transmission Provides Hydraulic Regenerative Braking for Passenger Cars, Trucks, and Buses</strong></td>
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<td>Robert Lloyd, Lloydco LLC</td>
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<tr>
<td>1:20 p.m.</td>
<td>2014-01-1719</td>
<td><strong>Development of Compact Synchronizer Technology for Manual and Automated Transmissions</strong></td>
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<td>Abhijeet Pingale, Divgi Warner Pvt. Ltd.</td>
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<tr>
<td>1:40 p.m.</td>
<td>2014-01-1716</td>
<td><strong>Development of Third-Generation Electronically Controlled AWD Coupling with New High-Performance Electromagnetic Clutch</strong></td>
</tr>
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<td>Junji Ando, Takuya Tsuda, Hiroyuki Ando, Yoshihiro Niikawa, Kunihiko Suzuki, JTEKT Corp.</td>
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The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00423 and SUB-TP-00003, and also individually. To purchase visit collections.sae.org

Planned by Transmission and Driveline Committee / Powertrain Fuels and Lubricants Activity
2:00 p.m.  2014-01-1715  Methodology to Identify and Minimize the Risks Associated with Future Design changes in the Transmission of Wheel-Loader
Parul Goyal, Feng Liang, Olof Oberg, Volvo

2:20 p.m.  2014-01-1724  Development of a New Wet Dual Clutch Transmission Transmission and Driveline
Chao Jiang, SAIC Motor Technical Center; Wenhua Huang, SAIC Motor Corp. Ltd.; Weirong Fang, SAIC Motor Technical Center; Jun Xin, SAIC Motor Corp. Ltd.

2:40 p.m.  2014-01-1721  General Motors Rear Wheel Drive Eight Speed Automatic Transmission
James Michael Hart, General Motors Co.

2014-01-1714  Simulations of Drag Torque in Multi-Plate Wet Clutch Affecting Synchronizers in a TC+AMT Transmission (Written Only -- No Oral Presentation)
Shaohua Sun, Yulong Lei, Xingzhong Li, State Key Lab of Automotive Simulation Control, Jilin Univ

2014-01-1718  GEAR SELECTION INTERLOCK MECHANISM FOR COMMERCIAL VEHICLE TRANSMISSION (Written Only -- No Oral Presentation)
Amit Sandooja, VE Commercial Vehicle Ltd.

The papers in this session are available in SAE Technical Paper Collection, SUB-TP-00003, and also individually. To purchase visit collections.sae.org

Planned by Transmission and Driveline Committee / Powertrain Fuels and Lubricants Activity

Wednesday, April 9

Transmission and Driveline (Part 5 of 7): Launch Devices

Session Code:    PFL650
Room 357         Session Time:    3:00 p.m.

This Session includes papers on torque converter, launch clutch, and damper design, development, testing, and modeling.

Organizers -    Rakan Chabaan, Gang Chen, John C. Collins, Chrysler Group LLC; Patrick Robert Darmstadt, Boeing Helicopters; Hussein Dourra, Chrysler Group LLC; Fabio Ferreira, Schaeffler Brasil, Ltd.; Michael E. Fingerman, John A. Frait, Chrysler Group LLC; Joel Gunderson, James Hendrickson, Chunhao Lee, Thomas Martin, General Motors Co.; David Popejoy, Craig Renneker, Ford Motor Co.; Farzad Samie, General Motors Co.; Erich L. Wilfinger, Jatco USA Inc.; Dongxu Li, General Motors Co.; Berthold Martin, Chrysler Group LLC

Chairpersons -  Michael E. Fingerman, Chrysler Group LLC; Dongxu Li, General Motors Co.; Brandon Otulakowski, Chrysler Corporation LLC

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<th>Time</th>
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<th>Title</th>
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<tbody>
<tr>
<td>3:00 p.m.</td>
<td>2014-01-1752</td>
<td>A Fluid Model Extension of the Torque Converter into the Overrunning Regime</td>
</tr>
<tr>
<td>3:20 p.m.</td>
<td>2014-01-1750</td>
<td>Analysis of Temperature Prediction of Friction Surface over Multi Plate Lock-Up Clutch for Torque Converter</td>
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<td>Yuya Kishi, Exedy Corporation, Ltd.; Nobuyuki Oshima, Hokkaido Univ.; Shinji Fujimoto, Tomohiro Tasaka, Exedy Corporation, Ltd.</td>
</tr>
<tr>
<td>3:40 p.m.</td>
<td>2014-01-1751</td>
<td>A Study on Friction Characteristics at Low Pressure Slip Condition of Wet - Clutch</td>
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<td>Daisuke Okamoto</td>
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</table>
Wednesday, April 9

GHG and Other Gaseous Emissions from Engines

Session Code:  PFL460

Room 410 A

Papers are invited for this session on the general topic of combustion engine gaseous emissions (regulated and non-regulated). This includes well-to-wheels CO2 production for alternative technologies, fuel economy and all greenhouse gas emission research. It also includes hydrocarbon species and specific NOx species production over aftertreatment devices as a result of changes in fuel specification and the inclusion of bio-derived components and consideration of secondary emissions production (slip) as a result of aftertreatment.

Organizers - Mansour Masoudi, Emissol LLC; Rachel L. Muncrief, The International Council on Clean Trans; Krishna Kamasamudram, Cummins Inc.; Siddiq Khan, ACEEE

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<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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<tbody>
<tr>
<td>8:00 a.m.</td>
<td>2014-01-1616</td>
<td>Comparison of Life Cycle Greenhouse Gas Emissions of Conventional, CNG-Hybrid and Electric Powertrains for Long Mileage Application in a Taxi for Singapore</td>
</tr>
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<td>Benjamin Reuter, Technische Universität München; Daniel Gleyzes, TUM Create Ltd; Markus Lienkamp, Technische Universität München</td>
</tr>
<tr>
<td>8:20 a.m.</td>
<td>2014-01-1623</td>
<td>In-Use Fuel Economy and CO2&lt;sub&gt;2&lt;/sub&gt; Emissions Measurement using OBD Data on US Light-Duty Vehicles</td>
</tr>
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<td>Timothy H. DeFries, Michael Sabisch, Sandeep Kishan, Eastern Research Group Inc; Francisco Posada, John German, Anup Bandivadekar, ICCT</td>
</tr>
<tr>
<td>8:40 a.m.</td>
<td>2014-01-1617</td>
<td>Investigation of Variation in Real World Fuel Economy of a Gasoline Car in Two Different Highway Traffic Conditions: An Indian Scenario</td>
</tr>
<tr>
<td>9:00 a.m.</td>
<td>2014-01-1614</td>
<td>Fuel Economy and Emissions Effects of Low Tire Pressure, Open Windows, Roof Top and Hitch-Mounted Cargo, and Trailer</td>
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<td>John Thomas, Shean Huff, Brian West, Oak Ridge National Laboratory</td>
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<tr>
<td>9:20 a.m.</td>
<td>2014-01-1622</td>
<td>Trailer Technologies for Increased Heavy-Duty Vehicle Efficiency: Technical, Market, and Policy Considerations</td>
</tr>
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<td>Benjamin Rodriguez Sharpe, The Intl. Council on Clean Transportation; Nigel Clark, West Virginia University Foundation Inc; Dana Lowell, MJ Bradley &amp; Associates</td>
</tr>
<tr>
<td>9:40 a.m.</td>
<td>2014-01-1615</td>
<td>Determination of GHG emissions, fuel consumption and thermal efficiency for real world urban driving using a SI probe car</td>
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<td>Hu Li, Ahmad Khalfan, Gordon Andrews, University of Leeds</td>
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<tr>
<td>10:00 a.m.</td>
<td>2014-01-1621</td>
<td>Estimation of TTW and WTW Factors for a Light Duty Dual Fuel NG-Diesel EU5 Passenger Car</td>
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<td>Pierpaolo Napolitano, Valentina Fraioli, Carlo Beatrice, Marianna Migliaccio, Chiara Guido, Istituto Motori CNR</td>
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<tr>
<td>10:20 a.m.</td>
<td>2014-01-1619</td>
<td>Semi-empirical Analysis of Cold Start Emissions</td>
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<td>Robert Anthony Giannelli, USEPA; Ryan Stubleski, Anthony Saunders, US EPA</td>
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Wednesday, April 9

Advances in NOx Reduction Technology (Part 1 of 3)

Session Code: PFL424

Room 410 A

Session Time: 1:00 p.m.

These sessions will focus on Advances in NOx Reduction Technology. The topics covered will include: new materials for lean NOx traps (LNT) and Selective Catalytic Reduction (SCR); system integration and durability; advances in NOx catalyst substrates, novel reductants and mixing designs.

Organizers - Brad Adelman, Navistar Inc.; Danan Dou, John Deere Product Engineering Center; Magdi Khair, Watlow; Jong Lee, Daimler Trucks North America LLC; Rahul Mital, General Motors Co.; Shyam Santhanam, Navistar Inc.

Time | Paper No. | Title
--- | --- | ---
1:00 p.m. | 2014-01-1546 | Development of Compact SCR Systems with Closely Coupled Injector Configurations

1:20 p.m. | 2014-01-1524 | Experimental Characterization of SCR DeNOx-Systems: Visualization of Urea-Water-Solution and Exhaust Gas Mixture
Matthieu Lecompte, Stephane Raux, Arnaud Frobert, IFP Energies Nouvelles

1:40 p.m. | 2014-01-1530 | DEF Storage and Delivery System for Operation in Extreme Winter Conditions
Joel Op de Beeck, Inergy Automotive Systems SA; Kevin Slusser, Inergy Automotive Systems LLC; Neall Booth, Inergy Automotive Systems

2:00 p.m. | 2014-01-1532 | Initial Evaluations of Injector Compatibility with an Alternative SCR Reductant Carrier - Guanidinium Formate
Nic van Vuuren, Continental Automotive Systems
Wednesday, April 9

**High Efficiency IC Engines Concepts (Part 1 of 2)**

**Session Code:** PFL170

**Room 410 B**

**Session Time:** 8:00 a.m.

This session focuses on technologies such as advanced and partially mixed combustion, cooled EGR boosting, ignition and direct injection technologies, pressure boosting, intelligent combustion, thermal efficiency, fully variable valvetrains, and other new and developing technologies. Papers focused on waste heat recovery technologies should be submitted to HX102/103.

**Organizers** - Anil Singh Bika; Philip Keller, David B. Roth, BorgWarner Inc.; James P. Szybist, Oak Ridge National Laboratory; Alok Warey, General Motors Co.

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<th>Time</th>
<th>Paper No.</th>
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| 8:00 a.m.  | ORAL ONLY | Technical Keynote: Downsizing for Fuel Efficiency: A Replacement for Displacement?  
Chris J. Brace, University Of Bath |
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<tr>
<td>8:20 a.m.</td>
<td>2014-01-1185</td>
<td><strong>Ultra Boost for Economy: Extending the Limits of Extreme Engine Downsizing</strong></td>
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<tr>
<td>8:40 a.m.</td>
<td>2014-01-1186</td>
<td><strong>Mechanically Supercharged 2.4L GDI Engine for Improved Fuel Economy and Low Speed Torque Improvement</strong></td>
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<td>Aaron Birckett, Nayan Engineer, Paul Arlauskas, Mark Shirley, Paul Neuman, Hyundai-Kia America Technical Center Inc.</td>
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<tr>
<td>9:00 a.m.</td>
<td>2014-01-1196</td>
<td><strong>Observations on the Measurement and Performance Impact of Catalyzed vs. Non Catalyzed EGR on a Heavily Downsized DISI Engine</strong></td>
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<td>Andrew Lewis, Sam Akehurst, University of Bath; James Turner, Rishin Patel, Andrew Popplewell, Jaguar Land Rover</td>
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<tr>
<td>9:20 a.m.</td>
<td>2014-01-1199</td>
<td><strong>Study of an EGR System for Downsizing Turbocharged Gasoline Engine to Improve Fuel Economy</strong></td>
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<td>Daisuke Takaki, Hirofumi Tsuchida, Tetsuya Kobara, Mitsuhiro Akagi, Takeshi Tsuyuki, Morihiro Nagamine, Nissan</td>
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<td>9:40 a.m.</td>
<td>2014-01-1192</td>
<td><strong>Economy with Superior Thermal Efficient Combustion (ESTEC)</strong></td>
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<td>Tetsu Yamada, Shouji Adachi, Koichi Nakata, Takashi Kurauchi, Isao Takagi, Toyota Motor Corp.</td>
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<td>10:00 a.m.</td>
<td>2014-01-1204</td>
<td><strong>Engine Parameter Optimization for Improved Engine and Drive Cycle Efficiency for Boosted, GDI Engines with Different Boosting System Architecture</strong></td>
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<td>Manfred Amann, Southwest Research Institute; Daniel Ouwenga, Eaton Vehicle Group</td>
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<td>10:20 a.m.</td>
<td>2014-01-1195</td>
<td><strong>Networking Break</strong></td>
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<td>10:40 a.m.</td>
<td>2014-01-1195</td>
<td><strong>The Effects of Turbulent Jet Characteristics on Engine Performance Using a Pre-Chamber Combustor</strong></td>
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<td>Michael Bunce, Hugh Blaxill, MAHLE Powertrain LLC; Waruna Kulatilaka, Naibo Jiang, Spectral Energies LLC</td>
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<td>11:00 a.m.</td>
<td>2014-01-1201</td>
<td><strong>Potential of a Variable Compression Ratio Gasoline SI Engine with Very High Expansion Ratio and Variable Valve Actuation</strong></td>
</tr>
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<td>Paul Ferrey, Yves Miehe, Cyrille Constensou, Vincent Collee, MCE-5 Development</td>
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<tr>
<td>11:20 a.m.</td>
<td>2014-01-1198</td>
<td><strong>Further Improvement in Brake Thermal Efficiency of a Single-Cylinder Diesel Engine by Means of Independent Control of Effective Compression and Expansion Ratios</strong></td>
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<td>11:40 a.m.</td>
<td>2014-01-1202</td>
<td><strong>Study of the Combustion and Emission Characteristics of a Quasi ICRC Engine Under Different Engine Loads</strong></td>
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<td>Xiao Yu, Zhijun Wu, Cheng Wang, Jun Deng, Zongjie Hu, Liguang Li, Tongji Univ.</td>
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Wednesday, April 9

High Efficiency IC Engines Concepts (Part 2 of 2)

Session Code: PFL170

Room 410 B  Session Time: 1:00 p.m.

This session focuses on technologies such as advanced and partially mixed combustion, cooled EGR boosting, ignition and direct injection technologies, pressure boosting, intelligent combustion, thermal efficiency, fully variable valvetrains, and other new and developing technologies. Papers focused on waste heat recovery technologies should be submitted to HX102/103.

Organizers - Anil Singh Bika; Philip Keller, David B. Roth, BorgWarner Inc.; James P. Szybist, Oak Ridge National Laboratory; Alok Warey, General Motors Co.

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<td>1:00 p.m.</td>
<td>2014-01-1191</td>
<td>Integration of an E85 Reforming System into a Vehicle-Ready Package and Project Results</td>
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<td>John Fowler, AVL Powertrain Engineering Inc.; David Morgenstern, Erik Sall, Monsanto Co.; Martin E. Veinbergs, AVL North America Inc.</td>
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<tr>
<td>1:20 p.m.</td>
<td>2014-01-1200</td>
<td>Onboard Gasoline Separation for Improved Vehicle Efficiency</td>
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<td>Randall D. Partridge, ExxonMobil Research and Engineering; Walter Weissman, Weissman Strategic Analysis L.L.C.; Takanori Ueda, Yoshihiro Iwashita, Toyota Motor Corp.; Paul Johnson, George Kellogg, Corning Inc.</td>
</tr>
<tr>
<td>1:40 p.m.</td>
<td>2014-01-1190</td>
<td>A Demonstration of Dedicated EGR on a 2.0 L GDI Engine</td>
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<td>Christopher Chadwell, Terrence Alger, Jacob Zuehl, Raphael Gukelberger, Southwest Research Institute</td>
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<tr>
<td>2:00 p.m.</td>
<td>2014-01-1188</td>
<td>Negative Valve Overlap Reforming Chemistry in Low-Oxygen Environments</td>
</tr>
<tr>
<td>2:20 p.m.</td>
<td>2014-01-1194</td>
<td>Prospects for High-Temperature Combustion, Neat Alcohol-Fueled Diesel Engines</td>
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<td>Gregory Roberts, Bernard Johnson, Chris Edwards, Stanford Univ.</td>
</tr>
<tr>
<td>2:40 p.m.</td>
<td>2014-01-1203</td>
<td>Development of Free Piston Engine Linear Generator System Part 1 - Investigation of Fundamental Characteristics</td>
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<td>Hidemasa Kosaka, Tomoyuki Akita, Kazunari Moriya, Shigeaki Goto, Yoshihiro Hotta, Takaji Umeno, Kiyomi Nakakita, Toyota Central R&amp;D Labs Inc.</td>
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Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity
Wednesday, April 9

Combustion in Compression-Ignition Engines: In-Cylinder Processes

Session Code:  PFL222
Room 411 A  Session Time:  8:00 a.m.

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 PFL110 or PFL120 modeling sessions.

Organizers -  Jose M Garcia, Universidad Politecnica de Valencia; Song-Chaung Kong; Budhadeb Mahakul, Navistar; Robert M. McDavid, Caterpillar Inc.; Paul C. Miles, Mark Musculus, Sandia National Laboratories; Raul Payri, Universitat Politecnica de Catalunya; Yongli Qi, Caterpillar Inc.; Stefan Simescu, Southwest Research Institute; Dale R. Tree, Brigham Young Univ.; Rishikesh Venugopal, Achates Power Inc.; John F. Wright, Cummins Inc.; Ming Zheng, Univ. of Windsor

Chairpersons -  W. Eagle, Univ. of Michigan-Ann Arbor; Qingluan Xue, Argonne National Laboratory

Time      Paper No. Title

8:00 a.m.  2014-01-1257 Different Percentage of Acetone-Butanol-Ethanol (ABE) and Diesel Blends at Low Temperature Condition in a Constant Volume Chamber  Nan Zhou, Jilin Univ.; Han Wu, Chang’an Univ.; Chia-Fon Lee, Univ. of Illinois; Qingnian Wang, Jilin Univ.; Ming Huo, Univ. of Illinois; Pengyu Wang, Jilin Univ.


8:40 a.m.  2014-01-1254 Investigation of Chemical Kinetics on Soot Formation Event of n-Heptane Spray Combustion  Kar Mun Pang, Technical University of Denmark; Mehdi Jangi, Xue-Song Bai, Lund Univ.; Jesper Schramm, Technical University of Denmark

Wednesday, April 9

Fuel/Additive Effects on HCCI Combustion Processes and Emissions

Session Code: PFL234

Room 411 A Session Time: 1:00 p.m.

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

Organizers - Scott Goldsborough, Argonne National Laboratory; Samveg Saxena; Zhi Wang, Tsinghua Univ.; Hongming Xu, Birmingham Univ.
Wednesday, April 9

HCCI Combustion Processes Modeling

Session Code: PFL231

Room 411 A Session Time: 3:00 p.m.

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

Organizers - Scott Goldsborough, Argonne National Laboratory; Samveg Saxena; Zhi Wang, Tsinghua Univ.; Hongming Xu, Birmingham Univ.

Time Paper No. Title

3:00 p.m. 2014-01-1267 Numerical Study of Boosting Configurations and Valve Strategies for High Load HCCI Engine in Wide Range of Engine Speed
Ivan Taritas, Darko Kozarac, Momir Sjeric, Univ. of Zagreb

3:20 p.m. 2014-01-1268 Integration of a Cool-Flame Heat Release Rate Model into a 3-Stage Ignition Model for HCCI Applications and Different Fuels
Dimitrios Angelos Mitakos, Christopher Blomberg, Yuri M. Wright, Peter Obrecht, Bruno Schneider, Konstantinos Boulouchos, Swiss Federal Institute of Technology

3:40 p.m. 2014-01-1269 Overcoming Pressure Waves to Achieve High Load HCCI Combustion
Julie Blumreiter, Chris Edwards, Stanford Univ.

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00438, and also individually.
Wednesday, April 9

**On Board Measurement and Control**

**Session Code:** PFL425  
**Room 411 B**  
**Session Time:** 8:00 a.m.

This technical session will focus on internal combustion engine emissions on board measurement and control. Papers and presentations will cover topics that discuss varying methods of emissions data collection and control during operation of vehicles and engines. Topics will also include various advanced analysis techniques to determine emissions levels and reduce emissions under in-use operations.

**Organizers** - Shouxian Ren, General Motors Co.; Hui Xu, Cummins Inc.

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<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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<tr>
<td>8:00 a.m.</td>
<td>2014-01-1549</td>
<td>In-Use Emissions Testing with Portable Emissions Measurement Systems (PEMS) in the Current and Future European Vehicle Emissions Legislation: Overview, Underlying Principles and Expected Benefits</td>
</tr>
<tr>
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<td>Theodoros G. Vlachos, Pierre Bonnel, Adolfo Perujo, Martin Weiss, Pablo Mendoza Villafuerte, Francesco Riccobono, European Commission JRC, IET</td>
</tr>
<tr>
<td>8:20 a.m.</td>
<td>2014-01-1552</td>
<td>Diesel Cold-Start Emission Control Research for 2015-2025 LEV III Emissions - Part 2</td>
</tr>
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<td>Gary D. Neely, Darius Mehta, Jayant Sarlashkar, Southwest Research Institute</td>
</tr>
<tr>
<td>8:40 a.m.</td>
<td>2014-01-1547</td>
<td>A Novel Singular Perturbation Technique for Model-Based Control of Cold Start Hydrocarbon Emission</td>
</tr>
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<td>Mohammad Reza Amini, Mahdi Shahbakhti, Michigan Technological Univ.; Ali Ghaffari, K N Toosi Univ. of Technology</td>
</tr>
<tr>
<td>9:00 a.m.</td>
<td>2014-01-1548</td>
<td>Contribution of High Accuracy Temperature Sensors Towards Fuel Economy and Robust Calibration</td>
</tr>
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<td>Stefan Schmidt, Watlow; Maurice Smeeet, Roland Bohner, FEV GmbH; Robert Aas, Christian Winkler, Watlow; Markus Schoenen, FEV GmbH; Peter Herrmann, Watlow Gordon; Julian Tan, Magdi Khair, Joern Bullert, Watlow</td>
</tr>
<tr>
<td>9:20 a.m.</td>
<td>2014-01-1550</td>
<td>Diagnostics Development for Cost-Effective Temperature Sensor based Particulate Matter OBD Method</td>
</tr>
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<td>Robert Cloudt, Bosal Emission Control Systems</td>
</tr>
<tr>
<td>9:40 a.m.</td>
<td>ORAL ONLY</td>
<td>Challenges and Trends for the Emissions Monitoring Systems (OBD) of Heavy Duty Diesel Engines in Brazil: Comparative Case Study EURO VI x PROCONVE P7 (SAE BRASIL 2013 Congress Best Paper 2013-36-0184)</td>
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<tr>
<td></td>
<td></td>
<td>Leonardo De Oliveira Costa, Rodrigo Santos, IAV do Brasil</td>
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The papers in this session are available in SAE Technical Paper Collection, SUB-TP-00010, and also individually. To purchase visit collections.sae.org

Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity

**Wednesday, April 9**

Emission Control Modeling (Part 1 of 2)
Wednesday, April 9

Emission Control Modeling (Part 2 of 2)

Session Code:  PFL430  
Room 411 B  
Session Time:  1:00 p.m.

Papers are invited for exhaust aftertreatment system models as well as their validation and application. Technologies covered 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.

Organizers - Maruthi Devarakonda, General Electric Company; Thomas McKinley, Cummins Inc.; Vincenzo Mulone, Univ. Of Roma Tor Vergata; Achuth Munnannur, Cummins Inc.; Balaji Sukumar, Johnson Matthey ECT

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<tr>
<th>Time</th>
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<tr>
<td>1:00 p.m.</td>
<td>2014-01-1563</td>
<td>Optical and Numerical Investigations on the Mechanisms of Deposit Formation in SCR Systems</td>
</tr>
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<td>Henrik Smith, Thomas Lauer, Mattias Mayer, Vienna University of Technology; Steven Pierson, Jaguar Land Rover Ltd.</td>
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<tr>
<td>1:05 p.m.</td>
<td>2014-01-1556</td>
<td>Nonuniformity and NO\textsubscript{2}/NO\textsubscript{x} Ratio Effects on the SCR Performance under Transient Engine Conditions</td>
</tr>
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<td>Xiaobo Song, Jeffrey Naber, John Johnson, Michigan Technological University</td>
</tr>
<tr>
<td>1:10 p.m.</td>
<td>2014-01-1565</td>
<td>NO/NO\textsubscript{2} Ratio based NH\textsubscript{3} Control of a SCR</td>
</tr>
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<td>Stephan Stadlbauer, Harald Waschl, Luigi del Re, Johannes Kepler University Linz</td>
</tr>
<tr>
<td>1:20 p.m.</td>
<td>2014-01-1561</td>
<td>Modeling Spatially Resolved Concentration and NH\textsubscript{3} Storage Profiles During Selective Catalytic Reduction of NO\textsubscript{x} with NH\textsubscript{3} over Commercial Cu-Zeolite Catalyst</td>
</tr>
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<td>Saurabh Yashwant Joshi, Ashok Kumar, Cummins Inc.; Josh Pihl, Oak Ridge National Laboratory; Neal Currier, Sumit Basu, Cummins Inc.; William Partridge, Oak Ridge National Laboratory; Aleksey Yezerets, Cummins Inc.</td>
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<tr>
<td>1:30 p.m.</td>
<td></td>
<td>Effect of DPF Properties on Maximum Temperature Rise following a DTI</td>
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<td>Mengting Yu, Vemuri Balakotaiah, Dan Luss, University of Houston</td>
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Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity
1:00 p.m. 2014-01-1553 Particulate Matter and Nitrogen Oxides Kinetics Based on Engine Experimental Data for a Catalyzed Diesel Particulate Filter
Kiran C. Premchand, Harsha Surenahalli, John Johnson, Michigan Technological University

1:20 p.m. 2014-01-1559 Development of a Simplified Diesel Particulate Filter Model Intended for an Engine Control Unit
Christopher Depcik, Chenaniah Langness, Jonathan Mattson, University of Kansas

1:40 p.m. 2014-01-1558 Design & Evaluation of an Exhaust Filtration Analysis (EFA) System
Sandeej Viswanathan, Stephen Sakai, David Rothamer, Univ. of Wisconsin

2:00 p.m. 2014-01-1564 Factors Affecting Three-Way Catalyst Light-Off: A Simulation Study
Timothy C. Watling, Johnson Matthey Technology Centre; Julian P. Cox, Johnson Matthey Inc.

2:20 p.m. ORAL ONLY Multiscale, Multiphysics Computational Modeling of Automotive Catalysts Based on Ultra-Accelerated Quantum Chemical Molecular Dynamics Method
Akira Miyamoto, Tohoku University

2:40 p.m. 2014-01-1560 Analysis of Packaging Impact on Emission Catalyst Design
Yi Liu, Wei Chen, Matthew Henrichsen, Arvind Harinath, Cummins Emission Solutions

3:00 p.m. 2014-01-1554 Model Based Exhaust Aftertreatment System Integration for the Development and Calibration of Ultra-Low Emission Concepts
Stephan Adelberg, Friedemann Schrade, Peter Eckert, Lutz Kraemer, IAV GmbH

3:20 p.m. 2014-01-1562 Simulations of the Fuel Economy and Emissions of Hybrid Transit Buses over Planned Local Routes
Zhiming Gao, Tim J. LaClair, C. Stuart Daw, David E. Smith, Oscar Franzese, Oak Ridge National Laboratory

3:20 p.m. 2014-01-1555 Model Based Study of the Urea Injector's Effects on SCR of an 11 Liter Diesel Engine (Written Only -- No Oral Presentation)
Wanyu Sun, Shufen Wang, Shanheng Yan, Lei Guo, Yuanjing Hou, Sinotruk Ltd.

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00405 and SUB-TP-00010, and individually. To purchase visit collections.sae.org

Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity

Wednesday, April 9

CNG/Dual-fuel CNG Engines
Session Code: PFL271
Room 411 C Session Time: 8:00 a.m.

This session covers topics related to use of natural gas in light-duty as well as heavy-duty engine applications with focus on ignition and early flame development, modelling-based geometry optimization as well as dual-fuel technologies.

Organizers - Chris Hagen, Oregon State Univ.; Patric Ouellette, Westport Innovations Inc.; Riccardo Scarcelli, Argonne National Laboratory

Time Paper No. Title
### Panel Discussion: Opportunities, Barriers and Strategies to Larger-Scale Introduction of Natural Gas for Light-Duty Applications

**Session Code:** PFL399  
**Room 411 C**  
**Session Time:** 10:20 a.m.

With a strong group of light-duty natural gas experts on the panel we are looking to address the fact that a fuel price difference exists for every market, but payback time is much longer for LD because cars travel less miles/year. Home refueling may change the whole picture but it would be most interesting to identify the main barriers to introduction of CNG in the LD market. It is a niche market and it is difficult for the OEM's to justify major investments and currently vehicle platforms are designed to offer CNG versions. With Diesel currently more expensive than gasoline, we should also discuss the Diesel market LD with the CNG market LD and then understand what needs to happen for a higher adoption rate by the consumer as there is currently not a large-scale demand.

**Organizers** - Robert W. Dibble, Univ. of California-Berkeley (retired); Zoran S. Filipi, Clemson-ICAR; Ronald L. Graves, Oak Ridge National Laboratory; Joachim G. Taiber, Clemson Univ.; Robert M. Wagner, Oak Ridge National Laboratory; Thomas Wallner, Argonne National Laboratory

**Moderators** - Robert M. Wagner, Oak Ridge National Laboratory; Thomas Wallner, Argonne National Laboratory

**Panelists** - Michael Bargende, FKFS; Dick C. Kauling, General Motors of Canada Limited; John M. Lapetz, Westport Innovations Inc.; Oliver Schmidt, Volkswagen Group of America Inc.;

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<th>Time</th>
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<tr>
<td>8:00 a.m.</td>
<td>2014-01-1331</td>
<td>Investigation of Ignition Energy with Visualization on a Spark Ignited Engine powered by CNG</td>
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<td>Nick Polcyn, DENSO International America Inc.; Ming-Chia Lai, Po-I Lee, Wayne State Univ.</td>
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<tr>
<td>8:20 a.m.</td>
<td>2014-01-1327</td>
<td>Effect of Relative Mixture Strength on Performance of Divided Chamber Avalanche Activated Combustion Ignition Technique in a Heavy Duty Natural Gas Engine</td>
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<td>Ashish Shah, Per Tunestal, Bengt Johansson, Lund Univ.</td>
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<tr>
<td>8:40 a.m.</td>
<td>2014-01-1330</td>
<td>Study of the Early Flame Development in a Spark-Ignited Lean Burn Four-Stroke Large Bore Gas Engine by Fuel Tracer PLIF</td>
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<td>Rikard Wellander, Joakim Rosell, Mattias Richter, Marcus Alden, Olivind Andersson, Bengt Johansson, Lund Univ.; Jeudi Duong, Jari Hyvonen, Wartsila Finland Oy</td>
</tr>
<tr>
<td>9:00 a.m.</td>
<td>2014-01-1326</td>
<td>Piston Design Optimization for a Two-Cylinder Lean-Burn Natural Gas Engine - 3D-CFD-Simulation and Test Bed Measurements</td>
</tr>
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<td>Sebastian Wohlgemuth, Sebastian Roesler, Georg Wachtmeister, TU Muenchen</td>
</tr>
<tr>
<td>9:20 a.m.</td>
<td>2014-01-1332</td>
<td>An Efficient Direct-Injection of Natural Gas Engine for Heavy Duty Vehicles</td>
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<td>G. McTaggart-Cowan, K. Mann, N. Wu, S. Munshi, Westport Innovations Inc.</td>
</tr>
<tr>
<td>9:40 a.m.</td>
<td>2014-01-1329</td>
<td>An experimental investigation on combustion and engine performance and emissions of a methane-gasoline dual-fuel optical engine</td>
</tr>
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<td>Silvana Di Iorio, Paolo Sementa, Bianca Maria Vaglieco, Francesco Catapano, Istituto Motori CNR</td>
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Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity

**Wednesday, April 9**
Components for Gaseous Fueled Vehicles

Session Code: PFL272  
Session Time: 1:00 p.m.  
Room 411 C  
This session covers use of syngas in comparison to hydrogen and natural gas in spark ignition engines, HCNG usage and impact of variabilities in heavy-duty engines as well as auto-ignition modeling and experiments of methane/hydrogen blends.

Organizers - Brad A. Boyer, Ford Motor Co.; Thomas Wallner, Argonne National Laboratory

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<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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</table>
| 1:00 p.m. | 2014-01-1337 | Energy Balance of a Spark Ignition Engine Running on Hydrogen, Synthesis Gas and Natural Gas  
Pedro Orbaiz, Michael Brear, Univ. of Melbourne |
| 1:20 p.m. | 2014-01-1336 | Mass Fraction Burn Investigation of Lean Burn Low BTU Gasification Gas in Direct-injection Spark-ignition Engine  
Ftwi Yohaness Hagos, Abd Rashid Abd Aziz, Universiti Teknologi Petronas |
| 1:40 p.m. | 2014-01-1338 | Effects of Compression Ratio and Valve Overlap on Feasibility of HCNG Engines for Heavy-Duty Vehicles  
Cheolwoong Park, Changgi Kim, Korea Institute of Machinery & Materials; Gihun Lim, University of Science & Technology; Sungwon Lee, Young Choi, Korea Institute of Machinery & Materials |
| 2:00 p.m. | 2014-01-1335 | Experimental and Modeling Study on Auto-Ignition of Methane/Hydrogen Blends at Elevated Pressures  
Yingjia Zhang, Xi'an Jiaotong Univ. |

Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity

Wednesday, April 9

Components for Gaseous Fueled Vehicles

Session Code: PFL273  
Session Time: 2:40 p.m.  
Room 411 C  
This session covers the impact of gaseous fuels on automotive powertrain components including catalytic converters as well as novel gas compression concepts.

Organizers - Victor Salazar, GE Company; Hailin Li, West Virginia Univ.; Thomas Wallner, Argonne National Laboratory

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<th>Time</th>
<th>Paper No.</th>
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| 2:40 p.m. | 2014-01-1341 | Design and Analysis of a Self-Refueling CNG Vehicle to Provide Home Refueling  
| 3:00 p.m. | 2014-01-1343 | Experimental Validation towards a Self-Refueling CNG Vehicle to Provide Home Refueling  
Robert C. Elgin, Shane Daly, Christopher L. Hagen, Oregon State Univ. |
Huayu Tian, Baigang Sun, Haichun Yao, Hongyang Tang, Qinghe Luo, Beijing Institute of Technology |

Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity
Fuel and Additive Effects on Engine Systems (Part 3 of 3)

Session Code: PFL310

Room 412 A  

This session includes presentations looking at the effects of blends of petroleum and non-petroleum based diesel fuel on engine performance and emissions. Presentations cover fuels derived from different non-petroleum sources. The session starts with a review of biodiesel quality within the US.

Organizers - Barbara Goodrich, John Deere Product Engineering Center; Gerald Micklow, Florida Institute of Technology; Paul Richards

Chairpersons - Gerald Micklow, Florida Institute of Technology; Barbara Goodrich, John Deere Product Engineering Center

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<th>Time</th>
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<tr>
<td>8:00 a.m.</td>
<td>2014-01-1379</td>
<td>Review of 2013 U.S. Retail Biodiesel Blends Quality Survey</td>
</tr>
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<td>Shailesh Martin Lopes, Pat Geng, General Motors Co.; Anke Konzack, SGS</td>
</tr>
<tr>
<td>8:20 a.m.</td>
<td>2014-01-1394</td>
<td>Effects of Biodiesel Feedstock on the Emissions from a Modern Light Duty Engine</td>
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<td>Dai Liu, Hongming Xu, Ramadhas Arumugam Sakunthalai, Univ. of Birmingham</td>
</tr>
<tr>
<td>9:00 a.m.</td>
<td>2014-01-1378</td>
<td>Evaluation of Emission Characteristics of Blend of Algae Oil Methyl Ester with Diesel in a Medium Capacity Diesel Engine</td>
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<td>Jitesh Singh Patel, Naveen Kumar, Amar Deep, Abhishek Sharma, Dhruv Gupta, Delhi Technological Univ.</td>
</tr>
<tr>
<td>9:20 a.m.</td>
<td>2014-01-1386</td>
<td>Experimental Investigation on Biodiesel from Microalgae as Fuel for Diesel Engines</td>
</tr>
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<td>Carlo Alberto Rinaldini, Enrico Mattarelli, Universita di Modena e Reggio Emilia; Michael Magri, Mariaelena Beraldi, Teregroup</td>
</tr>
<tr>
<td>9:40 a.m.</td>
<td>2014-01-1392</td>
<td>Utilizing FAME as a Cetane Number Improver for a Light-duty Diesel Engine</td>
</tr>
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<td>XiaoDan Cui, Peng Lu, Hiroki Nakamura, Mitsuhiro Matsunaga, Akira Kikusato, Kusaka Jir, Yasuhiro Daisho, Waseda Univ.</td>
</tr>
<tr>
<td>10:00 a.m.</td>
<td>2014-01-1396</td>
<td>Effect of Blending of Ethanol in Kusum Oil on Performance and Emission Characteristics of a Single Cylinder Diesel Engine</td>
</tr>
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<td>Harveer Singh Pali, Naveen Kumar, Delhi Technological University; Chinmaya Mishra, Galgotias University</td>
</tr>
<tr>
<td>10:20 a.m.</td>
<td>2014-01-1395</td>
<td>Comparison and Evaluation of Engine Wear, Combustion and Emissions Performance between Diesel, Karanja and Jatropha Oil Methyl Ester Biodiesel in a 780 hp Military Diesel Engine</td>
</tr>
<tr>
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<td>Anand Kumar Pandey, P. Sivakumar, Combat Vehicle R&amp;D Establishment, Chennai; Milankumar Nandgaonkar, College of Engineering, Pune; S. Suresh, Combat Vehicle R&amp;D Establishment, Chennai</td>
</tr>
<tr>
<td>10:40 a.m.</td>
<td>2014-01-1400</td>
<td>Emissions and Redox Activity of Biodiesel Blends Obtained from Different Feedstocks from a Heavy-Duty Vehicle Equipped with DPF/SCR Aftertreatment and a Heavy-Duty Vehicle without Control Aftertreatment</td>
</tr>
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<td>Nicholas Gysel, George Karavalakis, Thomas Durbin, Debra Schmitz, Arthur Cho, University of California</td>
</tr>
<tr>
<td>11:00 a.m.</td>
<td>2014-01-1381</td>
<td>Low Temperature Heat Release of Palm and Soy Biodiesel in Late Injection Low Temperature Combustion</td>
</tr>
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<td>Brandon T. Tompkins, Hoseok Song, Timothy J. Jacobs, Texas A&amp;M Univ.</td>
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</table>
Wednesday, April 9

Alternative and Advanced Fuels (Part 1 of 2)

Session Code: PFL330

Room 412 A

This session focuses on the fundamental properties of fuels and methods for measuring these properties, as well as issues related to fuel storage and transportation. Examples include diesel fuel lubricity determination, fuel effects on deposits, cold weather issues, and environmental and toxicological impacts of new fuels.

Organizers - Casey Maxwell Allen, Marquette University; George Karavalakis, Univ. of California-Riverside; Amanda Lea-Langton, Univ. of Leeds; Charles Mueller, Sandia National Laboratories; Elisa Toulson, Michigan State University

Chairpersons - George Karavalakis, Univ. of California-Riverside; Charles Mueller, Sandia National Laboratories

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<tr>
<td>1:00 p.m.</td>
<td>2014-01-1468</td>
<td>Characterization of Hydroprocessed Used Cooking Oils in Blend with Low Quality Gasoil Samples</td>
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<td>Dimitrios Karonis, Despina Chilari, Constantina Manou, National Technical University of Athens</td>
</tr>
<tr>
<td>1:20 p.m.</td>
<td>2014-01-1462</td>
<td>Compatibility Assessment of Elastomer Materials to Test Fuels Representing Gasoline Blends Containing Ethanol and Isobutanol</td>
</tr>
<tr>
<td>1:40 p.m.</td>
<td>2014-01-1465</td>
<td>Compatibility Assessment of Plastic Infrastructure Materials to Test Fuels Representing Gasoline Blends Containing Ethanol and Isobutanol</td>
</tr>
<tr>
<td>2:00 p.m.</td>
<td>2014-01-1470</td>
<td>Experimental and Modeling Study on Auto-Ignition of DME/\textit{n}-Butane Blends under Engine Relevant Pressure</td>
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<td>Xue Jiang, YingJia Zhang, Lun Pan, XingJia Man, Zuhoua Huang, Xi'an Jiaotong University</td>
</tr>
<tr>
<td>2:20 p.m.</td>
<td>2014-01-1452</td>
<td>An Experimental Investigation of the Combustion Characteristics of Acetone-Butanol-Ethanol-Diesel Blends with Different ABE Component Ratios in a Constant Volume Chamber</td>
</tr>
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<td>Han Wu, Chang'an University; Ming Hua, Univ. of Illinois; Nan Zhou, Jilin University; Karthik Nithyanandan, Chia-Fon Lee, Univ. of Illinois; Chunhua Zhang, Chang'an University; Jiang Lin, Zhejiang Univ. of Science and Technology</td>
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Planned by Fuels and Lubricants / Powertrain Fuels and Lubricants Activity
Wednesday, April 9

Fuel Injection and Sprays - Spray Modeling (Part 1 of 2)

Session Code: PFL322
Room 412 B

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.

Organizers - Tarek M. Abdel-Salam, East Carolina University; Essam El-Hannouny, Argonne National Laboratory; Jacqueline O'Connor, Sandia National Laboratories

Chairpersons - Tarek Abdel-Salam, East Carolina University; Michele Battistoni, Universita degli Studi di Perugia; Sibendu Som, Argonne National Laboratory

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<tr>
<td>8:00 a.m.</td>
<td>2014-01-1418</td>
<td>Simulation of the First Millimeters of the Diesel Spray by an Eulerian Spray Atomization Model Applied on ECN Spray A Injector</td>
</tr>
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<td>José María Desantes, Raúl Payrí, Jaime Gimeno, Pedro Martí-Aldaravi, Universitat Politècnica de València</td>
</tr>
<tr>
<td>8:20 a.m.</td>
<td>2014-01-1431</td>
<td>Non-classical Orifice Characterization</td>
</tr>
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<td>Kenth Svensson, Chad Koci, Caterpillar</td>
</tr>
<tr>
<td>8:40 a.m.</td>
<td>2014-01-1417</td>
<td>Comparison of Spray Structures of Diesel and Gasoline Using Modified Evaporation Model in Openfoam CFD Package</td>
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<td>Donghoon Kim, Kihyun Kim, Korea Advanced Inst of Science &amp; Tech</td>
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Planned by Fuels and Lubricants / Powertrain Fuels and Lubricants Activity
9:00 a.m. 2014-01-1419  
**Influence of Injector Diameter (0.2-1.2 mm range) on Diesel Spray Combustion: Measurements and CFD Simulations**  
Michele Bolla, Aleš Srna, Yuri M. Wright, Swiss Federal Institute of Technology; Beat Von Rotz, Kai Herrmann, Wärtsilä Switzerland Ltd.; Konstantinos Boulouchos, Swiss Federal Institute of Technology

9:20 a.m. 2014-01-1428  
**Influence of Cylindrical, k, and ks Diesel Nozzle Shape on the Injector Internal Flow Field and on the Emerging Spray Characteristics**  
Federico Brusiani, Gian Marco Bianchi, Stefania Falfari, University of Bologna; Angelo Onorati, Tommaso Lucchini, Politecnico di Milano; Rita Di Gioia, Magneti Marelli Powertrain SPA

9:40 a.m. 2014-01-1423  
**Numerical Simulations of Supersonic Diesel Spray Injection and the Induced Shock Waves**  
Shaoping Quan, Meizhong Dai, Eric Pomraning, P. K. Senecal, Keith Richards, Convergent Science Inc.; Sibendu Som, Argonne National Laboratory; Scott Skeen, Julien Manin, Lyle M. Pickett, Sandia National Laboratories

10:00 a.m. 2014-01-1421  
**Numerical Simulation Study of Cavitating Nozzle Flow and Spray Propagation with Respect to Liquid Compressibility Effects**  
David Greif, AVL-AST d.o.o.; Wilfried Edelbauer, AVL LIST GmbH; Jure Strucl, AVL-AST d.o.o.

10:20 a.m. 2014-01-1425  
**Eulerian CFD Modeling of Coupled Nozzle Flow and Spray with Validation Against X-Ray Radiography Data**  
Qingluan Xue, Argonne National Laboratory; Michele Battistoni, Universita degli Studi di Perugia; Sibendu Som, Argonne National Laboratory; Shaoping Quan, P. K. Senecal, Eric Pomraning, Convergent Science Inc.; David Schmidt, Univ. of Massachusetts

10:40 a.m. 2014-01-1422  
**Numerical characterization of two alternative-to-diesel fuels using a moments spray model**  
Nwabueze Emekwuru, Univ. of Wolverhampton

11:00 a.m. 2014-01-1433  
**Modelling of Liquid Fuel Spray in Non-Isothermal Environments**  
Ogheneruona E. Diemuodeke, Cranfield Univ.; Univ. of Port Harcourt; Ilai Sher, Cranfield University

11:20 a.m. 2014-01-1429  
**Effects of Real-Fluid Thermodynamics on High-Pressure Fuel Injection Processes**  
Joseph Oefelein, Guilhem Lacaze, Rainer Dahms, Anthony Ruiz, Sandia National Laboratories; Antony Misdariis, Renault SAS

11:40 a.m. 2014-01-1426  
**Effect of Off-Axis Needle Motion on Internal Nozzle and Near Exit Flow in a Multi-Hole Diesel Injector**  
Michele Battistoni, Universita degli Studi di Perugia; Qingluan Xue; Sibendu Som, Argonne National Laboratory; Eric Pomraning, Convergent Science Inc.

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Planned by Fuels and Lubricants / Powertrain Fuels and Lubricants Activity

**Wednesday, April 9**

**Fuel Injection and Sprays - Spray Modeling (Part 2 of 2)**

**Session Code:** PFL322

**Room 412 B**

**Session Time:** 1:00 p.m.
This session is devoted to experimental and computational work in the area of fuel injection systems and sprays. Topics include: spray characterization, cavitation, multi-phase jet modeling, CFD models for spray processes, wall films and impingement, hydraulic circuit analysis, and dissolved gas effects. Studies of both gasoline and diesel fuel sprays and fuel injection equipment are encouraged.

Organizers - Tarek M. Abdel-Salam, East Carolina University; Essam El-Hannouny, Argonne National Laboratory; Jacqueline O'Connor, Sandia National Laboratories

Chairpersons - Tarek Abdel-Salam, East Carolina University; Michele Battistoni, Universita degli Studi di Perugia; Sibendu Som, Argonne National Laboratory

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<tr>
<td>1:00 p.m.</td>
<td>2014-01-1430</td>
<td>Research of the Primary Breakup of a Planar Liquid Sheet Produced by an Air-Blast Atomizer</td>
</tr>
<tr>
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<td>Hua Zhou, Tsinghua University; Chia-Fon Lee, Univ. of Illinois; Shi-jin Shuai, Tsinghua University</td>
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<tr>
<td>1:20 p.m.</td>
<td>2014-01-1427</td>
<td>Influence of the Injector Geometry on Primary Breakup in Diesel Injector Systems</td>
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<td>Mathis Bode, Felix Diewald, David Oliver Broll, Jan Felix Heyse, ITV, RWTH Aachen University; Vincent Le Chenadec, École Centrale Paris; Heinz Pitsch, ITV, RWTH Aachen University</td>
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<td>1:40 p.m.</td>
<td>2014-01-1424</td>
<td>Comparison of Spray Characteristics Measured in an Optical Single Cylinder Diesel Engine with 1D Model</td>
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<td>Ezio Mancaruso, Renato Marialto, Luigi Sequino, Bianca Maria Vaglieco, Istituto Motori CNR</td>
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<tr>
<td>2:00 p.m.</td>
<td>2014-01-1434</td>
<td>GDI Nozzle Parameter Studies Using LES and Spray Imaging Methods</td>
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<td>Mark A. Shost, Ming-Chia Lai, Wayne State University; Bizhan Befrui, Peter Spiekermann, Daniel L. Varble, Delphi Automotive</td>
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Planned by Fuels and Lubricants / Powertrain Fuels and Lubricants Activity

Wednesday, April 9

Fuel Injection and Sprays - Experimental Sprays (Part 1 of 2)

Session Code: PFL321

Room 412 B  Session Time: 2:40 p.m.

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

Organizers - Tarek M. Abdel-Salam, East Carolina University; Essam El-Hannouny, Argonne National Laboratory; Jacqueline O'Connor, Sandia National Laboratories

Chairpersons - Tarek Abdel-Salam, East Carolina University; Vasudha Patri, Argonne National Laboratory

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<td>2:40 p.m.</td>
<td>2014-01-1404</td>
<td>X-ray Imaging of Cavitation in Diesel Injectors</td>
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<td>Daniel Duke, Andrew Swantek, Zak Tilocco, Alan Kastengren, Kamel Fezza, Argonne National Laboratory; Kshitij Neroorkar, Maryam Moulai, University of Massachusetts; Christopher Powell, Argonne National Laboratory; David Schmidt, University of Massachusetts</td>
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</table>
3:00 p.m.  2014-01-1406  Schlieren and Mie Scattering Visualization for Single-Hole Diesel Injector under Vaporizing Conditions with Numerical Validation  
Alessandro Montanaro, Marianna Migliaccio, Luigi Allocca, Valentina Fraioli, Istituto Motori CNR; Seong-Young Lee, Anqi Zhang, Jeffrey Naber, Michigan Technological University

3:20 p.m.  2014-01-1407  Spray Characterization for Pure Fuel and Binary Blends under Non-Reacting Conditions  
José V. Pastor, José M. Garcia-Oliver, Vicente Bermudez, Carlos Micó, CMT- Universitat Politècnica de València

3:40 p.m.  2014-01-1415  High Speed Imaging Study on the Spray Characteristics of Dieseline at Elevated Temperatures and Back Pressures  
Xiao Ma, University of Birmingham; Liang Zheng, Yanfei Li, Zhi Wang, Tsinghua University; Hongming Xu, Tsinghua University, University of Birmingham; Jian-Xin Wang, Tsinghua University

2014-01-1408  Investigation on the Spray Characteristics of DMF- Isooctane Blends using PDPA (Written Only -- No Oral Presentation)  
PoWen Tu, Changzhao Jiang, Haichun Ding, Birmingham Univ.; Cao Li, Jaguar Land Rover; Hongming Xu, Birmingham Univ.; Tsinghua Univ.; Akbar Ghafoorian, Birmingham Univ.; Shi-jin Shuai, Tsinghua Univ.

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Planned by Fuels and Lubricants / Powertrain Fuels and Lubricants Activity

Wednesday, April 9

Fuel/Additive Effects on SI Combustion Processes

Session Code:  PFL214

This session focuses on the impact of conventional and alternative fuels as well as fuel additives on the operation, performance and emissions of SI engines. Papers focus on the impact of bio-derived fuels (ethanol, butanol and others) on engine design and performance as well as gasoline properties and additives, and their impact.

Organizers -  Elana Chapman, Richard S. Davis, John O. Waldman, General Motors Co.
Chairpersons -  John O. Waldman, Elana Chapman, General Motors Co.

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<tr>
<td>8:00 a.m.</td>
<td>2014-01-1228</td>
<td>Effects of Fuel Octane Rating and Ethanol Content on Knock, Fuel Economy, and CO2 for a Turbocharged DI Engine</td>
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<td>8:20 a.m.</td>
<td>2014-01-1231</td>
<td>Intermediate Alcohol-Gasoline Blends, Fuels for Enabling Increased Engine Efficiency and Powertrain Possibilities</td>
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<td>Derek Splitter, James Szybist, Oak Ridge National Lab.</td>
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<tr>
<td>8:40 a.m.</td>
<td>2014-01-1230</td>
<td>Impact of Blending Gasoline with Isobutanol Compared to Ethanol on Efficiency, Performance and Emissions of a Recreational Marine 4-Stroke Engine</td>
</tr>
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<td>Thomas Wallner, Andrew Ickes, Argonne National Lab.; Jeff Wasil, BRP US Inc.; James Sevik, Scott Miers, Michigan Technological Univ.</td>
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Wednesday, April 9

Basic SI Combustion Processes

**Session Code:** PFL211

**Room 413 A**

**Session Time:** 10:40 a.m.

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

**Organizers** - Terrence Alger, Southwest Research Institute; Richard S. Davis, General Motors Co.; Ronald James Herrin, GM Powertrain (retired)

**Chairpersons** - Terrence Alger, Southwest Research Institute; Ronald James Herrin, GM Powertrain (retired)

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<tr>
<td>10:40 a.m.</td>
<td>2014-01-1205</td>
<td>Effect of Valve Timing and Residual Gas Dilution on Flame Characteristics in a Spark Ignition Engine</td>
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<td>Kang Xu, Hui Xie, Minggang Wan, Tao Chen, Tianjin Univ.; Hua Zhao, Brunel Univ.</td>
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<tr>
<td>11:00 a.m.</td>
<td>2014-01-1206</td>
<td>Performance Maps of Turbocharged SI Engines with Gasoline-Ethanol Blends: Torque, Efficiency, Compression Ratio, Knock Limits, and Octane</td>
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<td>Young Suk Jo, Raymond Lewis, Leslie Bromberg, John Heywood, Massachusetts Institute of Technology</td>
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<td>11:20 a.m.</td>
<td>2014-01-1207</td>
<td>The Effects of Charge Homogeneity and Repeatability on Particulates Using the PLIF Technique in an Optical DISI Engine</td>
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<td>Quan Liu, Alasdair Cairns, Hua Zhao, Mohammadreza Anbari Attar, Brunel Univ.; Luke Cruft, Hugh Blaxill, MAHLE Powertrain LLC</td>
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Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity
Wednesday, April 9

Abnormal SI Combustion (Part 1 of 2)

Session Code: PFL213

This session focuses on abnormal SI combustion processes including spark knock and 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. (Part 1 of 2)

Organizers - Terrence Alger, Southwest Research Institute; Richard S. Davis, John O. Waldman, General Motors Co.; Lurun Zhong, Chrysler Corporation LLC

Chairpersons - John O. Waldman, General Motors Co.; Terrence Alger, Southwest Research Institute

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<td>1:00 p.m.</td>
<td>2014-01-1212</td>
<td>Investigation on Pre-ignition and Super-Knock in Highly Boosted Gasoline Direct Injection Engines</td>
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<td>Zhi Wang, Hui Liu, Tao Song, Yaqi Xu, Jian-Xin Wang, Tsinghua Univ.; Dong-Sheng Li, Tao Chen, Dongfeng Motor Corp.</td>
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<td>1:20 p.m.</td>
<td>2014-01-1214</td>
<td>A Comprehensive Simulation Approach to Irregular Combustion</td>
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<td>Thomas Lauer, Michael Heiss, Nikola Bobicic, Werner Holly, Vienna University of Technology; Stefan Pritze, GM Powertrain</td>
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<td>1:40 p.m.</td>
<td>2014-01-1226</td>
<td>Fuel Octane and Volatility Effects on the Stochastic Pre-Ignition Behavior of a 2.0L Gasoline Turbocharged DI Engine</td>
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<td>Elana Chapman, Richard Davis, William Studzinski, Pat Geng, General Motors Co.</td>
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<tr>
<td>2:00 p.m.</td>
<td>2014-01-1218</td>
<td>Study of Low-Speed Pre-Ignition in Boosted Spark Ignition Engine</td>
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<td>Yoshihiro Okada, Shigeki Miyashita, Toyota Motor Corp.; Yoshihiro Izumi, Nippon Soken, Inc.; Yutaka Hayakawa, DENSO Corp.</td>
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<td>2:20 p.m.</td>
<td>2014-01-1219</td>
<td>Measuring the Impact of Engine Oils and Fuels on Low-Speed Pre-Ignition in Downsized Engines</td>
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<td>Orian Welling, University of Cambridge; James Moss, John Williams, BP International Ltd; Nick Collings, University of Cambridge</td>
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<td>2:40 p.m.</td>
<td>2014-01-1213</td>
<td>Impact of Lubricant Composition on Low-speed Pre-Ignition</td>
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<td>Orian Welling, Nick Collings, University of Cambridge; John Williams, James Moss, BP International Ltd.</td>
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<td>3:00 p.m.</td>
<td>2014-01-1222</td>
<td>Lubricant Induced Pre-Ignition in an Optical SI Engine</td>
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<td>Simon F. Dingle, Alasdair Cairns, Hua Zhao, Brunel Univ.; John Williams, Oliver Williams, Rana Ali, BP International Ltd.</td>
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<td>3:20 p.m.</td>
<td>2014-01-1224</td>
<td>The Effect of Oil Intrusion on Super Knock in Gasoline Engine</td>
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<td>Yunliang Qi, Yaqi Xu, Zhi Wang, Jianxin Wang, Tsinghua Univ.</td>
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3:40 p.m.  2014-01-1217  Analysis of Knocking Suppression Effect of Cooled EGR in Turbo-Charged Gasoline Engine
Kengo Kumano, Shiro Yamaoka, Hitachi, Ltd.

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00410 and SUB-TP-00008, ar:
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Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity

Wednesday, April 9

Particle Emissions from Combustion Sources (Part 2 of 3)

Session Code: PFL450
Room 413 B  Session Time: 8:00 a.m.

Papers in Session 2 are related to diesel PM emissions, including the effects of EGR, biodiesel fuels, duel fuel systems, and soot emissions modeling.

Organizers - Imad A. Khalek, Southwest Research Institute; Matti Maricq, Ford Motor Co.; Andrea Strzelec, Texas A&M University
Chairpersons - Andrea Strzelec, Texas A&M University; Imad Khalek, Southwest Research Institute; Matti Maricq, Ford Motor Co

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<td>8:00 a.m.</td>
<td>2014-01-1593</td>
<td>Experimental Study of Physical and Chemical Properties of Soot under Several EGR Conditions</td>
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<td>Hidehisa Iwata, Ibiden Co. Ltd.; Athanasios Konstandopoulos, CERTH/CPERI and Aristotle University; Kazuki Nakamura, Kazutake Ogyu, Kazushige Ohno, Ibiden Co. Ltd.</td>
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<td>8:20 a.m.</td>
<td>2014-01-1602</td>
<td>Effect of Diesel/RME Blend on Particle Emissions from a Diesel Engine for Quadricycle Vehicle</td>
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<td>Silvana Di Iorio, Agnese Magno, Ezio Mancaruso, Bianca Maria Vaglieco, Istituto Motori CNR</td>
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<td>8:40 a.m.</td>
<td>2014-01-1600</td>
<td>Emissions from Compression Ignition Engines with Animal-Fat-Derived Biodiesel Fuels</td>
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<td>Justin E. Ketterer, James S. Wallace, Greg J. Evans, University of Toronto</td>
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<td>9:00 a.m.</td>
<td>2014-01-1612</td>
<td>Effect of Injection Parameters and EGR on the Particle Size Distributions and Exhaust Emissions for Diesel and Biodiesel Fuels in CRDI Engine</td>
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<td>Donghui Qi, Tsinghua Univ.; Chia-Fon Lee, Univ. of Illinois; Yilu Lin, Tsinghua Univ.</td>
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<td>Gabriele Di Blasio, Mauro Viscardi, Istituto Motori CNR; Michela Alfè, Valentina Gargiulo, Anna Ciajolo, Istituto Ricerche sulla Combustione CNR; Carlo Beatrice, Istituto Motori CNR</td>
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<td>9:40 a.m.</td>
<td>2014-01-1605</td>
<td>Impact of FAME Content on the Regeneration Frequency of Diesel Particulate Filters (DPFs)</td>
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<td>Kenneth Rose, Heather Hamje, Liesbeth Jansen, Corrado Fittavolini, Richard Clark, Maria Dolores Cardenas Almena, Concawe; Dimitris Katsaounis, Christos Samaras, Savas Geivanidis, Zissis Samaras, Aristotle University of Thessaloniki</td>
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### Particle Emissions from Combustion Sources (Part 3 of 3)

**Session Code:** PFL450  
**Room 413 B**  
**Session Time:** 1:00 p.m.

Papers in Session 3 address PM emissions from gasoline engines, including GDI, ethanol effects, and modeling. Also included is PM from RCCI engines.

**Organizers:** Imad A. Khalek, Southwest Research Institute; Matti Maricq, Ford Motor Co.; Andrea Strzelec, Texas A&M University  
**Chairpersons:** Imad Khalek, Southwest Research Institute; Matti Maricq, Ford Motor Co; Andrea Strzelec, Texas A&M University

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| 1:00 p.m | 2014-01-1590     | A Sectional Soot Model for RANS Simulation of Diesel Engines  
 Damien Aubagnac-Karkar, Jean-Baptiste Michel, Olivier Colin, Ludovic Noé, IFP Energies Nouvelles; Nasser Darabiha, Ecole Centrale Paris |
| 1:20 p.m | 2014-01-1606     | Novel Characterization of GDI Engine Exhaust for Gasoline and Mid-Level Gasoline-Alcohol Blends  
 John M. Storey, Sam Lewis, James Szybist, John Thomas, Teresa Barone, Mary Eibl, Eric Nafziger, Brian Kaul, Oak Ridge National Laboratory |
| 1:40 p.m | 2014-01-1608     | Particulate Emissions from European Vehicles Featuring Direct Injection Spark Ignition Engines Tested Under Laboratory Conditions  
 Piotr Bielaczyca, Joseph Woodbum, Andrzej Szczotka, Bosmal Automotive R & D Institute |
| 2:00 p.m | 2014-01-1611     | Effects of Ethanol on Part-Load Performance and Emissions  
 Analysis of SI Combustion with EIVC and Throttled Operation and CAI Combustion  
 Mohammed Moore Ojapah, Hua Zhao, Yan Zhang, Brunel University |
| 2:20 p.m | 2014-01-1607     | Modeling of Equivalence Ratio Effects on Particulate Formation in a Spark-Ignition Engine under Premixed Conditions  
 Qi Jiao, Rolf Reitz, University of Wisconsin |
| 2:40 p.m | 2014-01-1588     | Number Concentration and Size Distributions of Nanoparticle Emissions during Low Temperature Combustion using Fuels for Advanced Combustion Engines (FACE)  
 Peter Bonsack, Ross Ryskamp, Marc Besch, Daniel Carder, Mridul Gautam, West Virginia University; John Nuszkowski, University of North Florida |
| 3:00 p.m | 2014-01-1596     | Particulate Matter Characterization of Reactivity Controlled Compression Ignition (RCCI) on a Light Duty Engine  
 Adam Dempsey, Scott Curran, John Storey, Mary Eibl, Josh Pihl, Vitaly Prikhodko, Robert Wagner, James Parks, Oak Ridge National Laboratory |

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Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity

**Wednesday, April 9**
Cold Start and Transients
Session Code: PFL290

Room 414 A/B

This session focuses on both SI and CI combustion and mixture preparation during cold start and transient engine operation. Example topics include engine performance, emissions, control strategies and calibrations for cold start and transient operation impact on NOx, PM, HC, CO, and CO2 emissions; also including the impact of variable valve timing, spark, and turbocharger controls.


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<td>8:00 a.m.</td>
<td>2014-01-1368</td>
<td>On the Nature of Particulate Emissions from DISI Engines at Cold-Fast-Idle</td>
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<td>Justin E. Ketterer, Wai K. Cheng, Massachusetts Institute of Technology</td>
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<td>8:20 a.m.</td>
<td>2014-01-1370</td>
<td>Investigation of VVT and spark timing on combustion and particle emission from a GDI Engine during transient operation</td>
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<td>Cheng Tan, Hongming Xu, He Ma, Akbar Ghafourian, Birmingham Univ.</td>
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<td>8:40 a.m.</td>
<td>2014-01-1374</td>
<td>Behaviours of a GDI Gasoline Engine during Start</td>
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<td>Huayin Tang, Richard Burke, Sam Akehurst, Chris Brace, University of Bath; Les Smith, Jaguar Land Rover Ltd.</td>
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<td>9:00 a.m.</td>
<td>2014-01-1366</td>
<td>SI Engine Control in the Cold-Fast-Idle Period for Low HC Emissions and Fast Catalyst Light Off</td>
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<td>Kevin Cedrone, Wai K. Cheng, MIT</td>
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<td>9:20 a.m.</td>
<td>2014-01-1369</td>
<td>Ethanol Flex Fuel system with Delphi Heated injector application</td>
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<td>Roberto Krenus, Marcos R. V. Passos, Thiago Ortega, Kenneth Mowery, Delphi Automotive; Young Jin Kim, Hyundai Motor Co.; Lucille G. Lavan, Delphi Automotive; Kuho Lee, C.J. Park, Hyundai Motor Co.; Kwang Han, Delphi Automotive</td>
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<td>9:40 a.m.</td>
<td>2014-01-1375</td>
<td>A Comparison of Cold-Start Behavior and its Impact on Fuel Economy for Advanced Technology Vehicles</td>
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<tr>
<td>10:00 a.m.</td>
<td>2014-01-1373</td>
<td>In-Cylinder Wall Temperature Influence on Unburned Hydrocarbon Emissions During Transitional Period in an Optical Engine Using a Laser-Induced Phosphorescence Technique</td>
</tr>
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<td>Xi Luo, Xin Yu, Kan Zha, Marcis Jansons, Wayne State Univ.; Valentin Soloiu, Georgia Southern Univ.</td>
</tr>
<tr>
<td>10:20 a.m.</td>
<td>2014-01-1367</td>
<td>Experimental Investigation of Transient Response and Turbocharger Coupling for High and Low Pressure EGR Systems</td>
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<td>David Heuwetter, William Glewen, David Foster, Roger Krieger, Michael Andrie, University of Wisconsin</td>
</tr>
<tr>
<td>10:40 a.m.</td>
<td>2014-01-1372</td>
<td>Experimental Investigation of Six Cylinder Turbocharged Di-Diesel Engine Cold Startability</td>
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<td>Dinesh Kumar B, Leelakumar Murugesan, M Nagarajan, Nitin Kakde, P Mahesh, Product Development Ashok Leyland Ltd.</td>
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</tbody>
</table>

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Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity
RCCI Combustion

Session Code: PFL262

Room 414 A/B  Session Time: 1:00 p.m.

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

Organizers - Scott Curran, Oak Ridge National Laboratory; Sage Kokjohn, University Of Wisconsin Madison; William F. Northrop, Univ. of Minnesota-Twin Cities

Chairpersons - Scott Curran, Oak Ridge National Laboratory

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<tr>
<th>Time</th>
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<th>Title</th>
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<tbody>
<tr>
<td>1:00 p.m.</td>
<td>2014-01-1320</td>
<td>High Speed Dual-Fuel RCCI Combustion for High Power Output</td>
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<td>Jae Hyung Lim, N. Ryan Walker, Sage Kokjohn, Rolf Reitz, University of Wisconsin</td>
</tr>
<tr>
<td>1:20 p.m.</td>
<td>2014-01-1325</td>
<td>Improving the Understanding of Intake and Charge Effects for Increasing RCCI Engine Efficiency</td>
</tr>
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<td>Derek Splitter, Martin Wissink, Dan DelVescovo, Rolf Reitz, University of Wisconsin</td>
</tr>
<tr>
<td>1:40 p.m.</td>
<td>2014-01-1323</td>
<td>Experimental Investigation of Engine Speed Transient Operation in a Light Duty RCCI Engine</td>
</tr>
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<td>Reed Hanson, Rolf Reitz, University of Wisconsin</td>
</tr>
<tr>
<td>2:00 p.m.</td>
<td>2014-01-1324</td>
<td>Reactivity Controlled Compression Ignition Drive Cycle Emissions and Fuel Economy Estimations Using Vehicle Systems Simulations with E30 and ULSD</td>
</tr>
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<td>Scott Curran, Zhiming Gao, Robert Wagner, Oak Ridge National Lab.</td>
</tr>
<tr>
<td>2:20 p.m.</td>
<td>2014-01-1322</td>
<td>Simultaneous Reduction of NO&lt;sub&gt;X&lt;/sub&gt; and Soot in a Diesel Engine through RCCI Operation with PFI of n-butanol and DI of Cottonseed Biodiesel</td>
</tr>
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<td>Valentin Soloiu, Alejandro Rivero-Castillo, Martin Muinos, Marvin Duggan, Spencer Harp, Wallace Peavy, Sven Wolter, Brian Vicek, Georgia Southern Univ.</td>
</tr>
<tr>
<td>2:40 p.m.</td>
<td>2014-01-1321</td>
<td>Computational Study of Reactivity Controlled Compression Ignition (RCCI) Combustion in a Heavy-Duty Diesel Engine Using Natural Gas</td>
</tr>
<tr>
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<td>Philip Zoldak, Andrzej Sobiesiak, University of Windsor; Michael Bergin, David D. Wickman, Wisconsin Engine Research Consultants</td>
</tr>
<tr>
<td>3:00 p.m.</td>
<td>2014-01-1318</td>
<td>Experimental Demonstration of RCCI in Heavy-Duty Engines using Diesel and Natural Gas</td>
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<td>Erik Doosje, Frank Willems, Rik Baert, TNO Automotive</td>
</tr>
<tr>
<td>3:20 p.m.</td>
<td>2014-01-1319</td>
<td>Dual Fuel Compression Ignition Combustion Concept for Gasoline and Diesel</td>
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<td>Christof Hepp, Markus Krenn, Josef Wasserbauer, Helmut Eichlseder, Graz University of Technology</td>
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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 Engine Combustion / Powertrain Fuels and Lubricants Activity

Wednesday, April 9

Vehicle Dynamics, Stability and Control (Part 1 of 4)
This session is focused on vehicle dynamics and controls using modeling and simulation, and experimental analysis of passenger cars, heavy trucks, and wheeled military vehicles. This session addresses active and passive safety systems to mitigate rollover, yaw instability and braking issues; driving simulators and hardware-in-the-loop systems; suspension kinematics and compliance, steering dynamics, advanced active suspension technologies; and tire force and moment mechanics.

**Organizers**

David A. Finch, Raetech Corp.; W. Riley Garrett, National Hwy Traffic Safety Admin; Paul Grygier; Mark Heitz; Gary J. Heydinger, SEA, Ltd.; Raymond Leto, TotalSim LLC; David R. Mikesell; Michael Royce; M. Kamel Salaani, Transportation Research Center Inc.; Amandeep Singh, US Army TARDEC

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<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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<tr>
<td>8:00 a.m.</td>
<td>2014-01-0099</td>
<td>Professional Driving Simulator to Design First-Time-Right Race Cars</td>
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<tr>
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<td>Andrea Toso, Alessandro Moroni, Dallara</td>
</tr>
<tr>
<td>8:20 a.m.</td>
<td>2014-01-0122</td>
<td>Simulation of Transient Maneuver Hydroplaning Events Using HVE</td>
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<td>L. Daniel Metz, Metz Engineering and Racing, LLC</td>
</tr>
<tr>
<td>8:40 a.m.</td>
<td>2014-01-0139</td>
<td>Integrated Chassis Control for Improving On-Center Handling Behavior</td>
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<tr>
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<td>Sehyun Chang, Byungrim Lee, Youngdae Park, Hyunseok Cho, Minjun Kim,</td>
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<td>Hyundai Motor Co.</td>
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<tr>
<td>9:00 a.m.</td>
<td>2014-01-0128</td>
<td>Correlation of Subjective and Objective Measures of On-Center Handling</td>
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<td>Bongchoon Jang, Andong National Univ.; Kyongsu Yi, Chanhee Jung, Seoul</td>
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<td>National Univ.; Jaeman Lee, Young Joon Cha, Andong National Univ.;</td>
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<td>Jaeyong Park, Joonhong Park, Hyundai Kia Motor Co.</td>
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<tr>
<td>9:20 a.m.</td>
<td>2014-01-0110</td>
<td>Handling Analysis of a Vehicle Fitted with Roll-Plane Hydraulically</td>
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<td>Interconnected Suspension Using Motion-Mode Energy Method</td>
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<td>Haohua Hong, Hunan University; Lifu Wang, Univ. of Technology Sydney;</td>
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<td>Minyi Zheng, Hunan University; Nong Zhang, Univ. of Technology Sydney</td>
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<tr>
<td>9:40 a.m.</td>
<td>2014-01-0086</td>
<td>Development of Hardware-In-the-Loop Simulation System for</td>
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<td>Steering Evaluation Using Multibody Kinematic Analysis</td>
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<td>Masashi Tsushima, Eiichi Kitahara, Nissan Motor Co., Ltd.; Taichi Shiiba,</td>
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<td>Takumi Motosugi, Meiji University</td>
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<tr>
<td>10:00 a.m.</td>
<td>2014-01-0118</td>
<td>A Primer on Building a Hardware in the Loop Simulation and</td>
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<td>Validation for a 6X4 Tractor Trailer Model</td>
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<td>Ryan M. Ashby, The Ohio State University; JongYun Jeong, Hyundai Motor</td>
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<td>Co.; Shreesha Y. Rao, Gary J. Heydinger, Dennis A. Guenther, The Ohio</td>
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<td>State University</td>
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<td>10:20 a.m.</td>
<td>2014-01-0135</td>
<td>Modeling and Validation of ABS and RSC Control Algorithms for a</td>
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<td>6X4 Tractor and Trailer Models using SIL Simulation</td>
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<td>Shreesha Y. Rao, The Ohio State University; JongYun Jeong, Hyundai Motor</td>
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<td>Co.; Ryan M. Ashby, Gary J. Heydinger, Dennis A. Guenther, The Ohio State University</td>
</tr>
<tr>
<td>10:40 a.m.</td>
<td>2014-01-0143</td>
<td>Dynamics Analysis of Car-Trailer Systems with Active Trailer</td>
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<td>Differential Braking Strategies</td>
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<td>Tao Sun, Yuping He, Jing Ren, Univ. of Ontario Institute of Technology</td>
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<tr>
<td>11:00 a.m.</td>
<td>2014-01-0117</td>
<td>Development of Composite Brake Pedal Stroke Simulator for Electro-</td>
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<td>Hydraulic Braking System</td>
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<td>Yang Liu, Zechang Sun, Wenbin Jl, Tongji University</td>
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</tbody>
</table>
This session is focused on vehicle dynamics and controls using modeling and simulation, and experimental analysis of passenger cars, heavy trucks, and wheeled military vehicles. This session addresses active and passive safety systems to mitigate rollover, yaw instability and braking issues; driving simulators and hardware-in-the-loop systems; suspension kinematics and compliance, steering dynamics, advanced active suspension technologies; and tire force and moment mechanics.

Organizers -
David A. Finch, Raetech Corp.; W. Riley Garrott, National Hwy Traffic Safety Admin; Paul Grygier; Mark Heitz; Gary J. Heydinger, SEA, Ltd.; Raymond Leto, TotalSim LLC; David R. Mikesell; Michael Royce; M. Kamel Salaani, Transportation Research Center Inc.; Amandeep Singh, US Army TARDEC

Wednesday, April 9

Vehicle Dynamics, Stability and Control (Part 2 of 4)

Room 415 A

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<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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<tr>
<td>11:20 a.m.</td>
<td>2014-01-0112</td>
<td>A Rough Road Ride Simulation Assessment with Flexible Vehicle Body</td>
</tr>
<tr>
<td>1:00 p.m.</td>
<td>2014-01-0076</td>
<td>Development of a Control Strategy and HIL Validation of Electronic Braking System for Commercial Vehicle (Written Only -- No Oral Presentation)</td>
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<tr>
<td>1:20 p.m.</td>
<td>2014-01-0115</td>
<td>Dynamic Characteristics of a Full Car Fitted with Torsion-Eliminating Hydraulically Interconnected Suspension (Written Only -- No Oral Presentation)</td>
</tr>
<tr>
<td>1:40 p.m.</td>
<td>2014-01-0156</td>
<td>The Rolling Quarter Car Model a Method to Incorporate Dynamic Tire Response in Grip Optimization (Written Only -- No Oral Presentation)</td>
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Planned by Vehicle Dynamics Committee / Automobile Chassis Activity; Motorsports Engineering Committee / Motor Engineering Activity
Noise and Vibration (Part 4 of 8): Vehicle Body NVH

Session Code: AC200
Room 415 B
Session Time: 8:00 a.m.

This session covers the source identification, panel vibration, torsional stiffness and other NVH subjects dealing with BIW and the trim vehicle. It also covers some solutions to BIW NVH issues and concerns to improve the vehicle comfort.

Organizers - Saeed Siavoshani, LMS A Siemens Business; Christopher Shaw, Visteon Climate Control

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<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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<tr>
<td>8:00 a.m.</td>
<td>2014-01-0005</td>
<td>Torsion Mode Achievement on BIW of Next Generation Land Rover - Freelander</td>
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<td>Atul Devidas Pol, Praveen Naganoor, Tata Technologies Ltd.</td>
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<td>8:20 a.m.</td>
<td>2014-01-0013</td>
<td>Application and Development Challenges of Dynamic Damper in Cabin Booming Noise Elimination</td>
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<td>Ravi Kiran Cheni, Chetan Prakash Jain, Revathy Muthiah, Srikanth Gomatam, Maruti Suzuki India Ltd.</td>
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<tr>
<td>8:40 a.m.</td>
<td>2014-01-0010</td>
<td>Optimization of Body Structure for Road Noise Performance</td>
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<td>Hyungtae Kim, Sehwun Oh, Ki-Chang Kim, Ju Young Lee, Jungseok Cheong, Junmoo Her, Hyundai Motor Co.</td>
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Planned by Vehicle Dynamics Committee / Automobile Chassis Activity; Motorsports Engineering Committee / Motor Engineering Activity
Wednesday, April 9

Noise and Vibration (Part 5 of 8): Components and Accessories

Session Code: AC200
Room 415 B
Session Time: 9:40 a.m.

This session will cover intake/exhaust/powertrain and chassis noise and vibration. Papers covering vehicle interior comfort, advanced methods and subjective response are also welcome

Organizers - Vikas Juneja, Chrysler Jeep Truck; Christopher Shaw, Visteon Climate Control

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<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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</table>
| 9:40 a.m.  | 2014-01-0017 | Experimental Study on Source Identification of Bus Floor’s Vibration (Written Only -- No Oral Presentation)
                      | Changxin Wang, Jilin University; Deguang Fang, Fuxiang Guo, Nanjing IVECO |
| 10:00 a.m. | 2014-01-0025 | Investigation of the Effect of Different Spot-Weld Modeling Approaches on Fundamental NVH Virtual Simulations (Written Only - No Oral Presentation) |
                      | Kambiz Jahani; Sajjad Beigmoradi; Mohsen Bayani Khaknejad, R&D Centre of SAIPA |

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Planned by Noise and Vibration Committee / Automobile Chassis Activity

Wednesday, April 9

Tire and Wheel Technology

Session Code: AC400
Room 415 B
Session Time: 1:00 p.m.

Advanced concepts and modeling of tires will be presented by industry and university researchers.
Your Personal Brand

Session Code: CONG101

Room 420 A  Session Time:  10:00 a.m.

Do you know your personal brand? Your brand, reputation and credibility are all directly linked to your business, career, and professional path. Dennis Mannion is very familiar with developing a personal brand. His unique brand comes from his vast experience in the sports and entertainment industries. Mannion holds the rare distinction of having experience in all four major league sports where he has led operations during 14 postseason runs and been part of two World Series, a Major League All-Star Game, a NHL Conference Championship, a Super Bowl and two National League Championship Series. In this career development session, Mannion will share his personal brand success story and hopefully inspire you to write yours!

Organizers - Martha Schanno, SAE International
Chairpersons - Whitney Liftig, IAV Automotive Engineering Inc.
Presenters - Dennis Mannion, Palace Sports and Entertainment and the Detroit Pistons

Navigating the Strategic Career Path

Session Code: CONG101

Room 420 A  Session Time:  11:00 a.m.

Some people believe that employers should establish their employees' career tracks. In some ways, that makes things easier, as you just follow along with what others have planned for you and hope for the best. But such a passive approach to your professional development can lead to a stagnant, unfulfilling career. If you want to be in charge of your own destiny, you need the courage and the drive to forge your own career path. During this career development session, the speakers will engage in conversation about career path, leadership and what senior leaders expect from new employees.

Organizers - Martha Schanno, SAE International
Chairpersons - Jeremy L. Kearney, General Motors Co.
Active Safety and Advanced Driver Assistance Systems (Part 1 of 2)

Session Code: AC600

Room 420 B

Active Safety & Advanced Driver Assistance Systems help prevent accidents or mitigate accident severity. Some of these safety systems provide alerts to the driver in critical situations, while others respond to threats by automatically braking and steering the vehicle to avoid crashes. Today’s ADAS systems are enabled by on-board vehicle and environmental sensors such as radars and cameras. In the future, V2X communication will be added to enhance safety functionality and performance.

Organizers - Joseph Kanianthra, Retired NHTSA; Kristofer D. Kusano, Virginia Tech.; H. Gabler, Virginia Tech

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<tr>
<td>8:00 a.m.</td>
<td>2014-01-0159</td>
<td>Automated Driving in Real Traffic: from Current Technical Approaches towards Architectural Perspectives</td>
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<td>Andree Hohm, Continental Teves AG &amp; Co. oHG; Felix Lotz, Technische Universität Darmstadt; Oliver Fochler, Stefan Lueke, Continental Teves AG &amp; Co. oHG; Hermann Winner, Technische Universität Darmstadt</td>
</tr>
<tr>
<td>8:20 a.m.</td>
<td>2014-01-0172</td>
<td>Benefit Estimation Method for Lane Departure Warning Systems in the American Traffic Environment</td>
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<td>Edgar Yoshio Morales Teraoka, Shin Tanaka, Tsutomu Mochida, Toyota Motor Corp.</td>
</tr>
<tr>
<td>8:40 a.m.</td>
<td>2014-01-0166</td>
<td>Fleetwide Safety Benefits of Production Forward Collision and Lane Departure Warning Systems</td>
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<td>Kristofer D. Kusano, H. Gabler, Thomas I. Gorman, Virginia Tech</td>
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<tr>
<td>9:00 a.m.</td>
<td>2014-01-0160</td>
<td>Clustering and Scaling of Naturalistic Forward Collision Warning Events Based on Expert Judgments</td>
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<td>Louis Tijerina, Ford Motor Co.; James Sayer, UMTRI</td>
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<td>9:20 a.m.</td>
<td>2014-01-0163</td>
<td>Method of Selecting Test Scenarios for Pedestrian Forward Looking Pre-Collision System Evaluation</td>
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<td>Stanley Chien, Qiang Yi, Indiana Univ Purdue Univ Indianapolis; David Good, Indiana University - Bloomington; Ali Gholamjafar, Yaobin Chen, Indiana Univ Purdue Univ Indianapolis; Rini Sherony, Toyota Motor Engineering &amp; Mfg NA Inc.</td>
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<tr>
<td>9:40 a.m.</td>
<td>2014-01-0158</td>
<td>Tradeoffs in the Evaluation of Light Vehicle Pre-Collision Systems</td>
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<td>David LeBlanc, Mark Gilbert, Stephen Stachowski, University of Michigan - UMTRI; Rini Sherony, Toyota Motor Engineering &amp; Mfg NA Inc.</td>
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<tr>
<td>10:00 a.m.</td>
<td>ORAL ONLY</td>
<td>Brain Wave Monitoring of Driver Fatigue</td>
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<td>Joshua R. Maxwell, Hyundai-Kia America Technical Center Inc.</td>
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Planned by Automobile Chassis Activity / EMB Land and Sea Group

Wednesday, April 9

Active Safety and Advanced Driver Assistance Systems (Part 2 of 2)
ACTIVE SAFETY & ADVANCED DRIVER ASSISTANCE SYSTEMS help prevent accidents or mitigate accident severity. Some of these safety systems provide alerts to the driver in critical situations, while others respond to threats by automatically braking and steering the vehicle to avoid crashes. Today’s ADAS systems are enabled by on-board vehicle and environmental sensors such as radars and cameras. In the future, V2X communication will be added to enhance safety functionality and performance.

Organizers - Joseph Kiananthra, Retired NHTSA; Kristofer D. Kusano, Virginia Tech.; H. Gabler, Virginia Tech

Time | Paper No. | Title
--- | --- | ---
1:00 p.m. | 2014-01-0157 | 360° Surround View System with Parking Guidance
Mengmeng Yu, Guanglin Ma, Delphi Automotive

1:20 p.m. | 2014-01-0167 | Development of Lens Condition Diagnosis for Lane Departure Warning by Using Outside Camera
Masayuki Takemura, Masato Imai, Masahiro Kiyohara, Hitachi Research Lab.; Kota Irie, Masao Sakata, Clarion; Shoji Muramatsu, Hitachi Research Lab.

1:40 p.m. | 2014-01-0170 | Adaptation of the Mean Shift Tracking Algorithm to Monochrome Vision Systems for Pedestrian Tracking Based on HoG-Features
Daniel Schugk, Anton Kummert, Univ. of Wuppertal; Christian Nunn, Delphi Automotive

2:00 p.m. | 2014-01-0162 | Evaluation of Intersection Assistance Systems Based on Vehicular Communication Systems
Marco Steger, Michael Karner, Werner Rom, Daniel Watzenig, Virtual Vehicle Research Center

2:20 p.m. | 2014-01-0161 | Lateral Control for Automated Vehicle Following System in Urban Environments
Dongwook Kim, Hakgu Kim, Seoul National University

2:40 p.m. | 2014-01-0165 | Vehicle Collision Avoidance Using Sensor Fusion
Ming Hung Li, Chih Hung Yang, Chi-Chun Yao, Automotive Research & Testing Center

ORAL ONLY | 2014-01-0164 | Multi-Modal Image Segmentation for Obstacle Detection and Masking (Written Only -- No Oral Presentation)
Cheng-Lung Lee, Hongyi Zhang, Hong Nguyen, Yu-Ting Wu, Christopher Smalley, Utayba Mohammad, Mark J. Paulik, Univ. of Detroit Mercy

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Planned by Automobile Chassis Activity / EMB Land and Sea Group
**Wednesday, April 9**

**Vehicle Aerodynamics (Part 5 of 10): Unsteady Aerodynamics**

**Session Code:** B500  
**Room 430 A  
Session Time: 10:00 a.m.**

Vehicle aerodynamic development, drag reduction and fuel economy, handling and stability, cooling flows, surface soiling and water management, vehicle internal environment, tyre aerodynamics and modelling, aeroacoustics, structural response to aerodynamic loading, simulating the on-road environment, onset flow turbulence, unsteady aerodynamics, fundamental flow structures, new test methods and facilities, new applications of computational fluid dynamics simulation, competition vehicle aerodynamics.

**Organizers -**  
David Sims-Williams, Durham Univ.; Kevin Golsch, Navistar; Arturo Guzman, Chrysler Group LLC; Taeyoung Han, Bahram Khalighi, General Motors Co.; Todd Lounsberry, Chrysler Group LLC; James T. McKillen, Thomas N. Ramsay, Honda R & D Americas Inc.; Sandeep Sovani, ANSYS Inc.; H. Robert (Bob) Welge, Robert's Engineering Development; Mesbah Uddin, UNC Charlotte Motorsports Engineering; Raymond LeTo, TotalSim LLC; Adrian P. Gaylard, Jaguar Land Rover; Edward G. Duell, Jacobs Technology Inc.; Gary M. Elfstrom, Univ. of Ontario Institute of Technology; Gregory Fadler, Navistar; Mark E. Gleason, Chrysler Group LLC

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<tr>
<td>10:00 a.m.</td>
<td>2014-01-0604</td>
<td>The Aerodynamics of a Small Car Overtaking a Truck</td>
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<td>Jeff Howell, Tata Motors European Technical Centre; Kevin Garry, Jenny</td>
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<td>Holt, Cranfield Univ.</td>
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<tr>
<td>10:20 a.m.</td>
<td>2014-01-0576</td>
<td>Effect of Unsteady Lift Force on Vehicle Dynamics in Heave and Pitch</td>
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<td>Motion</td>
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<td>Tetsuhiro Kawamura, Atsushi Ogawa, Honda R&amp;D Co., Ltd.</td>
</tr>
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</table>
Wednesday, April 9

Occupant Protection: Accident Reconstruction (Part 1 of 2)

Session Code: B400

Room 430 B

This session focuses on the latest research related to methods and techniques for reconstructing vehicular crashes involving wheeled and tracked vehicles, pedestrians, and roadside features. Emphasis is placed on experimental data and theoretical methods that will enable reconstructionists to identify, interpret and analyze physical evidence from vehicular crashes.

Organizers - Christopher D. Armstrong, KEVA Engineering; Alan F. Asay, Armstrong Forensic Engineers Inc.; Timothy Cheek, Delta V Forensic Engrg; Brian J. Everest, General Motors Co.; Geoff Germane, Germane Engineering; Jason R. Kerrigan, Univ. of Virginia; L. Daniel Metz; Nathan A. Rose, Kineticorp LLC; Heath Spivey, Delta V Forensic Engrg; John T. Sprague, General Motors Co.; John C. Steiner, KEVA Engineering; David Plant, D P Plant & Associates

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00378 and SUB-TP-00004, ar: individually. To purchase visit collections.sae.org

Planned by Vehicle Aerodynamics Committee / Automobile Body Activity

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<thead>
<tr>
<th>Time</th>
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<tr>
<td>9:00 a.m.</td>
<td>2014-01-0470</td>
<td>Pedestrian Impact on Low Friction Surface</td>
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<td>Greg A. Sullenberger, Inst. of Police Tech &amp; Mgmt, University of North Florida</td>
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<tr>
<td>9:20 a.m.</td>
<td>2014-01-0483</td>
<td>Video Analysis and Analytical Modeling of Actual Vehicle/Pedestrian Collisions</td>
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<td>Thomas Rush, Jay Przybyla, Daniel Melcher, Christian Sax, Armstrong Forensic Engineers Inc.</td>
</tr>
<tr>
<td>10:00 a.m.</td>
<td>2014-01-0464</td>
<td>Vehicle Acceleration Modeling in PC-Crash</td>
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<td>Nathan A. Rose, Neal Carter, David Pentecost, Kineticorp LLC</td>
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<tr>
<td>10:20 a.m.</td>
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<td>Networking Break</td>
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<tr>
<td>10:40 a.m.</td>
<td>2014-01-0478</td>
<td>Time and Distance Required for a Motorcycle to Turn Away from an Obstacle</td>
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<td>Wade D. Bartlett, Mechanical Forensics Engineering Srvc; Duane Meyers, Great Lakes Crash Analysis, LLC</td>
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<tr>
<td>11:00 a.m.</td>
<td>2014-01-0466</td>
<td>Lane Change Maneuver Driving a Car with Reduced Tire Pressure</td>
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<td>Jakub Zebala, Wojciech Wach, Inst. of Forensic Research</td>
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<tr>
<td>11:20 a.m.</td>
<td>2014-01-0475</td>
<td>Passenger Car Response to Interaction with Tractor-Trailer Steer Tire Lugs</td>
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<td>Joseph Cormier, Mark “Tony” Freund, Enrique Bonugli, Herbert Guzman, Biodynamic Research Corp.</td>
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</table>
2014-01-0473 Calculating Three Dimensional Stiffness Coefficients for Use in Three Dimensional Simulation Modeling for Accident Reconstruction (Written Only -- No Oral Presentation)

Anthony Dominic Cornetto, Jeffrey Suway, Ronny Wahba, Fawzi Bayan, SEA Ltd.

2014-01-0477 Further Assessment of the Uncertainty of CRASH3 $\varphi$V and Energy Loss Calculations (Written Only -- No Oral Presentation)

Nathan A. Rose, Neal Carter, Kineticorp LLC


Bryan Randles, Daniel Voss, Isaac Ikram, Christopher Furbish, Judson Welcher, Thomas Szabo, Biomechanical Research & Testing

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00393 and SUB-TP-00006, arv

individually. To purchase visit collections.sae.org

Planned by Occupant Protection Committee / Automobile Body Activity

Wednesday, April 9

Occupant Protection: Accident Reconstruction (Part 2 of 2)

Session Code: B400

Room 430 B Session Time: 1:00 p.m.

This session focuses on the latest research related to methods and techniques for reconstructing vehicular crashes involving wheeled and tracked vehicles, pedestrians, and roadside features. Emphasis is placed on experimental data and theoretical methods that will enable reconstructionists to identify, interpret and analyze physical evidence from vehicular crashes.

Organizers - Christopher D. Armstrong, KEVA Engineering; Alan F. Asay, Armstrong Forensic Engineers Inc.; Timothy Cheek, Delta V Forensic Engrg; Brian J. Everest, General Motors Co.; Geoff Germane, Germane Engineering; Jason R. Kerrigan, Univ. of Virginia; L. Daniel Metz; Nathan A. Rose, Kineticorp LLC; Heath Spivey, Delta V Forensic Engrg; John T. Sprague, General Motors Co.; John C. Steiner, KEVA Engineering; David Plant, D P Plant & Associates

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<th>Time</th>
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<tr>
<td>1:00 p.m.</td>
<td>2014-01-0469</td>
<td>Analysis of High-Speed Sideswipe Collisions Using Data from Small Overlap Tests</td>
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<td>R. Matthew Brach, Brach Engineering; Raymond M. Brach, University of Notre Dame and Brach Engineering</td>
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<tr>
<td>1:20 p.m.</td>
<td>2014-01-0472</td>
<td>Estimating the Speed Change and Relative Approach Speed of Aligned Offset Impacts using CRASH3 Techniques</td>
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<td>Ryan Fix, David King, Travis Fricker, MEA Forensic Engineers &amp; Scientists</td>
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<tr>
<td>1:40 p.m.</td>
<td>2014-01-0468</td>
<td>Prediction of Stiffness Coefficients for Frontal Impacts in Passenger Vehicles</td>
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<td>Matthew Wood, Vivek Shekhawat, Tate Kubose, Rajeev Kelkar, InSciTech Inc.</td>
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<tr>
<td>2:00 p.m.</td>
<td>2014-01-0474</td>
<td>Calculating Non-Linear Frontal Stiffness Coefficients</td>
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<td>Brian Gilbert, Ron Jadischke, Joseph McCarthy, McCarthy Engineering Inc.</td>
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<tr>
<td>2:20 p.m.</td>
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<td>Networking Break</td>
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<tr>
<td>2:40 p.m.</td>
<td>2014-01-0482</td>
<td>Characterization of Force Deflection Properties for Vehicular Bumper-to-Bumper Interactions</td>
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<td>Enrique Bonugli, Jeffrey Wirth, James Funk, Joseph Cormier, Herbert Guzman, Lisa Gwin, Mark Freund, Biodynamic Research Corp.</td>
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</tbody>
</table>
Wednesday, April 9

Keynote Address - Mobility: Future Market, or End of Growth?
Session Code: CONG301
Room AVL Technology Leadership Center/G Session Time: 9:00 a.m.
Keynote Speakers - Peter Phleps, Institute for Mobility Research

Wednesday, April 9

Consumer Driven Powertrain Innovations
Session Code: ANN102
Room AVL Technology Leadership Center/G Session Time: 9:45 a.m.
What will drive powertrain consumer purchase decisions of the future? Quality, driving experience, and performance are just a few reasons why. With so many powertrain choices, consumer preferences for powertrain rarely align with regulations. This panel will discuss pathways and 2025 powertrain solutions that set the standards for industry to meet a broad set of future real-world consumer needs.
Moderators - Uwe Dieter Grebe, Executive Vice President, Global Business Development & International Operations, AVL LIST GmbH
Panelists - Bob Fascetti, Vice President, Powertrain Engineering, Ford Motor Co.; Steven A. Kiefer, Vice President Global Powertrain, General Motors Co.; Robert (Bob) Lee, Vice President and Head of Engine Powertrain and Electrified Propulsion Systems Engineering, Chrysler Group LLC;

Wednesday, April 9

Regulatory Driven Impacts on Powertrain
Session Code: ANN103
Room AVL Technology Leadership Center/G Session Time: 1:30 p.m.
Regulations are transforming powertrain technologies by pushing the industry to innovate at a very fast pace. The industry is also faced with finding the most cost effective solutions to meet future global emissions and fuel economy standards. This panel will discuss the types of innovation that various OEMs and suppliers are bringing forward to meet significant challenges. The real question is: what, if any, silver bullets exist in the innovation pipeline?
Moderators - John M. Fuerst, President of Diesel Systems, Delphi Automotive
Panelists - Louis Bailoni, President, Scenaria Inc.; Robert J. Bienenfeld, Assistant Vice President, Environment & Energy Strategy, Product Regulatory Office, American Honda Motor Co. Inc.; Christopher Grundler,
Wednesday, April 9

Keeping the Energy in Without Sacrificing Engine Components

Session Code: ANN202
Room FEV Powertrain Innovation Forum/Gr Session Time: 9:45 a.m.

Active thermal management of powertrain system components is becoming state-of-the-art as engineers consider active control strategies and technologies, which include thermostats, water pumps, application of complete thermal modules, and high load EGR systems, heating/cooling systems and other technologies that can be actively managed. This session will feature relevant insights into the trade-offs between thermal management and component durability.

Moderators - David Lancaster, Principal Engineer, FEV Inc.
Panelists - Yohan Chi, Research Fellow, Passenger Diesel Engine, Hyundai Motor Company; David P. Kauppila, General Director, Engineering & Chief Manufacturing Engineer, Thermal Systems, Delphi Corporation; William F. Resh, Senior Manager - Powertrain Virtual Analysis, Chrysler Group LLC; Christopher P. Thomas, Vice President and Chief Technology Officer, BorgWarner Inc.; Michael Weiss, Director Thermal Management, Schaeffler Group;

The New Art of Quiet - NVH Powertrain Advancements and the Future of Quiet

Session Code: ANN203
Room FEV Powertrain Innovation Forum/Gr Session Time: 1:00 p.m.

With new trends toward highly strung engines and transmissions, start/stop operation, and electric and hybrid vehicles, the future of quiet is taking on a new shape. These technologies present myriad new possibilities and NVH engineers now face resulting challenges that require innovative and advanced solutions. In this session, industry experts will discuss this NVH renaissance and the forward-thinking technical approaches that are being used to proactively address these complex issues.

Moderators - Kiran Govindswamy, Business Unit Director, FEV Inc.
Panelists - Jeff Hemphill, Chief Technology Officer, Schaeffler Group USA Inc.; Mark L. Stickler, Powertrain NVH Manager, Ford Motor Co.; Bernie Swanson, Jr., Senior Manager, Noise Vibration and Harshness, Chrysler Group LLC;

Thursday, April 10

Advanced Analysis, Design, and Optimization of Materials, Restraints, and Structures for Enhanced Automotive Safety and Weight Reduction (Part 1 of 2)

Session Code: M103
Room 110 A/B Session Time: 8:00 a.m.

Papers with an emphasis on, but not limited to, innovative ideas to enhance automotive safety with improved material constitutive modeling, analysis method developments, simulation and pre/post processing tools, optimization techniques, crash code developments, finite element model updating, model validation and verification techniques, dummies and occupants, restraint systems, passive safety as well as lightweight material applications and designs are highly encouraged.

Organizers - William J. Altenhof, Univ. of Windsor; Guofei Chen, United States Steel Corp.; Wei Li, General Motors Co.; Sheng-Dong Liu, Generalety LLC; Jwo Pan; Tau Tyan, Ford Motor Co.

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<th>Time</th>
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Thursday, April 10

Advanced Analysis, Design, and Optimization of Materials, Restraints, and Structures for Enhanced Automotive Safety and Weight Reduction (Part 2 of 2)

Session Code: M103
Room 110 A/B

Papers with an emphasis on, but not limited to, innovative ideas to enhance automotive safety with improved material constitutive modeling, analysis method developments, simulation and pre/post processing tools, optimization techniques, crash code developments, finite element model updating, model validation and verification techniques, dummies and occupants, restraint systems, passive safety as well as lightweight material applications and designs are highly encouraged.

Organizers - William J. Altenhof, Univ. of Windsor; Guofei Chen, United States Steel Corp.; Wei Li, General Motors Co.; Sheng-Dong Liu, Generalety LLC; Jwo Pan; Tau Tyan, Ford Motor Co.

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00395, and also individually. To purchase visit collections.sae.org

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity
Reliability and Robust Design in Automotive Engineering: Reliability and Accelerated Testing

Session Code: IDM103  
Room 111 A  
Session Time: 1:00 p.m.

This session presents methods and automotive applications on how to assess reliability and robustness in product development. Topics include among others, system reliability target allocation, interval analysis in robust design and imprecise reliability assessment. It also addresses new developments and applications in the area of accelerated testing.

Organizers - Paul Lubinski, Thermo King Corp.; Zissimos Mourelatos, Oakland University; Mohamed El-Sayed, Kettering Univ

Chairpersons - Paul Lubinski, Thermo King Corp

Time  | Paper No.  | Title
--- | --- | ---
1:00 p.m. | 2014-01-0797 | Transient Liquid Phase Sintering (TLPS) Conductive Adhesives for High Temperature Automotive Applications  
Binghua Pan, Chee Keng Yeo, Delphi Automotive

1:20 p.m. | 2014-01-0812 | Effects of Constituent Properties on Performance Improvement of a Quenching and Partitioning Steel  
Kyoo Sil Choi, Xiaohua Hu, Xin Sun, Pacific Northwest National Laboratory; Mark Taylor, Emmanuel De Moor, John Speer, David Matlock, Colorado School of Mines

1:40 p.m. | 2014-01-0808 | Sandwich Panels with Corrugated Core - A Lightweighting Concept with Improved Stiffness  
Pankaj K. Mallick, Rajesh Boorle, University of Michigan

2:00 p.m. | 2014-01-0809 | Virtual Coupon Testing of Carbon Fiber Composites for Application in Structural Analysis  
Benoit Bidaine, Laurent Adam, e-Xstream engineering; Roger Assaker, e-Xstream engineering and MSC Software; Hanson Chang, MSC Software; Marc Duflot, Bender Kutub, Emmanuel Lacoste, e-Xstream engineering

2:20 p.m. | ORAL ONLY | Improvement of High Temperature Oxidation and Mechanical Behaviors of High Si-Mo Ductile Iron for Exhaust Manifolds  
Rifat Yilmaz, Emin Kondakci, Nuri Solak, Istanbul Technical Univ.

Oday Ibraheem Abdullah; Josef Schlattmann, Emir Pireci, Hamburg University of Technology

2014-01-0806 | AION A-Pillars: Enhancing Passenger Safety and Driver Visibility (Written Only -- No Oral Presentation)  
Shweta Rawat, IGDTUW; Soumya Kanta Das, VIT University

2014-01-0810 | A Proposal of Middle Speed Hybrid III 50<sup>th</sup> Dummy Chest Calibration Test (Written Only -- No Oral Presentation)  
Youmei Zhao, Chery Automobile Co.

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00395, and also individually. To purchase visit collections.sae.org

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Thursday, April 10
Thursday, April 10

Load Simulation and Vehicle Performance (Part 3 of 5): Tire and Terrain

Session Code: M107

Room 111 B

1:00 p.m. 2014-01-0725 Advances Relating to Fatigue Calculations for Combined Random and Deterministic Loads
Neil Bishop, Stuart Kerr, Paresh Murthy, CAEfatigue Ltd.; Karl Sweitzer, Booz Allen Hamilton

1:20 p.m. 2014-01-0724 A Prognostic and Data Fusion Based Approach to Validating Automotive Electronics
Derek R. Braden, Delphi Automotive; David M. Harvey, Liverpool John Moores Univ.

1:40 p.m. 2014-01-0722 How Stress Variance in the Automotive Environment will Affect a 'True' Value of the Reliability Demonstrated by Accelerated Testing
Andre Kleyner, Delphi Automotive

2:00 p.m. ORAL ONLY Stop Start Duty Cycle and Validation
Mohammad Hijawi, Dennis Craggs, Chrysler Group LLC

3:00 p.m. 2014-01-0723 EV Customer Usage Measurement Program for Durability Test Mode Development
Valerie Earlene Bumbaca, HATCI

Planned by Quality, Reliability and Robust Design Committee / Integrated Design and Manufacturing Activity

8:00 a.m. Identification of Agricultural Tyres' Handling Characteristics from Full Vehicle Experimental Tests
Edoardo Sabbioni, Federico Cheli, Matteo Riva, Politecnico di Milano; Andrea Zorzutti, Bridgestone Americas Tire Operations LLC

8:20 a.m. Development of a Modified Off-Road Rigid Ring Tire Model for Heavy Trucks
Adam C. Reid, UOIT; David Philipps, Volvo Group Trucks Technology; Fredrik Oijer, Inge Johansson, Volvo 3P; Moustafa EL-Gindy, UOIT

8:40 a.m. Investigating Vehicle Behavior on a Sloped Terrain Surface
Erdem Uzunsoy, Bursa Technical University; Emmanuel Bolarinwa, U.S. Department of Transportation; Oluremi Olatunbosun, Rui He, University of Birmingham

9:00 a.m. Tire Model Application and Parameter Identification-A Literature Review
Bin Li, Texas Tech University; Xiaobo Yang, Oshkosh Corp.; James Yang, Texas Tech University

9:20 a.m. A Road Load Data Processing Technique for Durability Optimization of Automotive Products
Hong Su, Changan US R & D
The focus of this session are the tests and test methods employed in the evaluation of the performance and durability of powertrain (engines, transmissions), driveline (4WD systems, drivshafts, axles), chassis (frame, suspensions, brakes, etc.) and body components, subsystems, and full vehicle systems.

Organizers - Mike Temkin, Chrysler Corporation LLC; Paul Spiteri, Oshkosh Defense; Darryl S. Taylor, Boeing

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<th>Time</th>
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<th>Title</th>
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| 9:40 a.m.| 2014-01-0885   | Identification of Road Surface Friction for Vehicle Safety Systems
Mustafa Ali Arat, Saied Taheri, Virginia Tech |
| 10:00 a.m.| 2014-01-0858  | Finite Element Modeling of Tire Transient Characteristics in Dynamic Maneuvers
Shahyar Taheri, Corina Sandu, Saied Taheri, Virginia Tech |
| 10:20 a.m.| 2014-01-0861  | An Advanced Flexible Realtime Tire Model and its Integration Into Fraunhofer’s Driving Simulator
Axel Gallrein, Manfred Baecker, Michael Burger, Andrey Gizatullin, Fraunhofer ITWM |

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00377, and also individually. To purchase visit collections.sae.org

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Thursday, April 10

Automotive Engineering Testing and Test Methods

Session Code: M104

Room 111 B

Session Time: 1:00 p.m.

The focus of this session are the tests and test methods employed in the evaluation of the performance and durability of powertrain (engines, transmissions), driveline (4WD systems, drivshafts, axles), chassis (frame, suspensions, brakes, etc.) and body components, subsystems, and full vehicle systems.

Organizers - Mustafa Ali Arat, Saied Taheri, Virginia Tech; Shahyar Taheri, Corina Sandu, Saied Taheri, Virginia Tech; Axel Gallrein, Manfred Baecker, Michael Burger, Andrey Gizatullin, Fraunhofer ITWM

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<tr>
<th>Time</th>
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| 1:00 p.m.| 2014-01-0818   | Response Surface Energy Modeling of an Electric Vehicle over a Reduced Composite Drive Cycle
Forrest Jehlik, Argonne National Laboratory; Tim Laclair, Oak Ridge National Laboratory |
Chenaniah Langness, Michael Mangus, Christopher Depcik, University of Kansas |
| 1:40 p.m.| 2014-01-0822   | Development of a Test Method for BSR Noise and the Full-Vehicle Testing System
Jong Ho Lee, Hyundai & Kia Corp. |
| 2:00 p.m.| 2014-01-0816   | 6-Axis Measuring Wheels for Trucks or Heavy Vehicles
Massimiliano Gobbi, Giampiero Mastinu, Giorgio Previati, Mario Pennati, Politecnico di Milano (Tech Univ) |
| 2:20 p.m.| 2014-01-0819   | Development of a Lighting System for Pedestrian Pre-Collision System Testing under Dark Conditions
Qiang Yi, Stanley Chien, Indiana Univ. Purdue Univ.; David Good, Indiana University; Yaobin Chen, Indiana Univ. Purdue Univ.; Rini Sherony, Toyota Motor Engineering & Mfg NA Inc. |
| 2:40 p.m.| ORAL ONLY      | Improved Automotive Testing through Pavement Engineering
Robert Rasmussen, Transtec Group Inc. |
| 3:00 p.m.| 2014-01-0821   | Integrated Approach for Accelerated Fatigue Testing of Resonating Structures
Sunil KV, Sunil Sheepri, Kiran Kandula, Amit Kumar, Maruti Suzuki India Ltd. |
Thursday, April 10


Session Code: HX102

Room 112 A  

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

Organizers - Ales Alajbegovic, Exa Corp.; Jason Aaron Lustbader, National Renewable Energy Laboratory; Gursaran D. Mathur, CalsonicKansei North America Inc.; Kumar Srinivasan, Chrysler Group LLC

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<tr>
<td>8:00 a.m.</td>
<td>2014-01-0645</td>
<td>CFD Simulation of a Sliding Vane Expander Operating Inside a Small Scale ORC for Low Temperature Waste Heat Recovery</td>
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<td>Gianluca Montenegro, Augusto Della Torre, Angelo Onorati, Dalia Broggi, Politecnico di Milano; Gerd Schlager, Christian Benatzky, Magna Powertrain Austria</td>
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<tr>
<td>8:20 a.m.</td>
<td>2014-01-0652</td>
<td>Temperature Control of Water with Heating, Cooling and Mixing in a Process with Recycle Loop</td>
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<td>Hai Wu, General Motors Co.; Wen Chen, Wayne State Univ.; Meng-Feng Li, General Motors Co.; Xinlei Wang, University of Illinois</td>
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<tr>
<td>9:00 a.m.</td>
<td>2014-01-0663</td>
<td>Modeling Analysis of Waste Heat Recovery via Thermo Electric Generators for Fuel Economy Improvement and CO_{2} Reduction in Small Diesel Engines</td>
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<td>Ivan Arsie, Andrea Cricchio, Vincenzo Marano, Cesare Pianese, Universita di Salerno; Matteo De Cesare, Walter Nesci, Magneti Marelli Powertrain SPA</td>
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<tr>
<td>9:20 a.m.</td>
<td>2014-01-0657</td>
<td>Modeling of a Thermal Management Platform of an Automotive DI Diesel Engine to Predict the Impact of Downsizing and Hybridization during a Cold Start</td>
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<td>Fabien Rabeau, Sebastien Magand, IFP Energies Nouvelles</td>
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<td>9:40 a.m.</td>
<td>2014-01-0655</td>
<td>Thermal Analysis of the Exhaust Line Focused on the Cool-Down Process</td>
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<td>Akihito Hosoi, Atsushi Morita, Naoto Suzuki, Toyota Motor Corp.</td>
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<td>10:00 a.m.</td>
<td>2014-01-1981</td>
<td>Investigation of Thermo-Acoustic Excitations in a Rijke Tube Geometry</td>
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<td>Devadatta Mukutmoni, Robert Powell, L.A. Raghu Mutnuri, Exa Corp.</td>
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<td>10:20 a.m.</td>
<td>2014-01-0668</td>
<td>Vehicle Thermal Management Simulation Method Integrated in the Development Process from Scratch to Prototype</td>
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<td>Armin Trauussnig, Virtual Vehicle Competence Center; Heinz Petutschnig, Andreas Ennemoser, AVL LIST GmbH; Michael Stolz, Virtual Vehicle Competence Center; Mauro Tizianel, AVL LIST GmbH</td>
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<tr>
<td>10:40 a.m.</td>
<td>2014-01-0656</td>
<td>Sensitivity and Uncertainty Analysis in Computational Thermal Models</td>
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<td>Alaa El-Sharkawy, Chrysler Group LLC</td>
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Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Gianluca Montenegro, Augusto Della Torre, Angelo Onorati, Dalia Broggi, Politecnico di Milano; Gerd Schlager, Christian Benatzky, Magna Powertrain Austria

Hai Wu, General Motors Co.; Wen Chen, Wayne State Univ.; Meng-Feng Li, General Motors Co.; Xinlei Wang, University of Illinois

Ivan Arsie, Andrea Cricchio, Vincenzo Marano, Cesare Pianese, Universita di Salerno; Matteo De Cesare, Walter Nesci, Magneti Marelli Powertrain SPA

Fabien Rabeau, Sebastien Magand, IFP Energies Nouvelles

Akihito Hosoi, Atsushi Morita, Naoto Suzuki, Toyota Motor Corp.

Devadatta Mukutmoni, Robert Powell, L.A. Raghu Mutnuri, Exa Corp.

Armin Trauussnig, Virtual Vehicle Competence Center; Heinz Petutschnig, Andreas Ennemoser, AVL LIST GmbH; Michael Stolz, Virtual Vehicle Competence Center; Mauro Tizianel, AVL LIST GmbH

Alaa El-Sharkawy, Chrysler Group LLC
Thursday, April 10

Thermal Systems Modeling and Simulation (Part 3 of 3): Powertrain Technologies & Climate Control Simulation

Session Code: HX102

Room 112 A

Session Time: 1:00 p.m.

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00383, SUB-TP-00008 and STP-00010, and also individually. To purchase visit collections.sae.org

Planned by Thermal Management Activity / EMB Land and Sea Group

Numerical Simulation of Unsteady Natural Convection in a Simplified Engine Bay Enclosure under Soak Conditions

Zun Wang, Michigan Technological University; Jaehoon Han, Devadatta Mukutmoni, Exa Corp.

Automotive Vehicle Body Temperature Prediction in a Paint Oven

Yu Hsien Wu, Sreekantan Surapaneni, Kumar Srinivasan, Paul Stibich, Chrysler Group LLC

A Numerical Investigation of Dampeing Dynamic Profiles for the Application in Transient Vehicle Thermal Management Simulations (Written Only -- No Oral Presentation)

Kristian Haehndel, Angus Pere, BMW Group - RMIT University; Torsten Frank, Frieder Christel, BMW Group; Sylvester Abanteriba, RMIT University

The Development of Exhaust Surface Temperature Models for 3D CFD Vehicle Thermal Management Simulations Part 2 - Exhaust Acoustic Silencer Configurations (Written Only -- No Oral Presentation)

Kristian Haehndel, BMW Group - RMIT University; Anthony Jeffries, Markus Schlipf, Torsten Frank, Frieder Christel, BMW Group; Sylvester Abanteriba, RMIT University


Steve De Vos, Kristian Haehndel, BMW Group - RMIT University; Torsten Frank, Frieder Christel, BMW Group; Sylvester Abanteriba, RMIT University

Theoretical Analysis of a Combined Thermoelectric Generator (TEG) and Dual-loop Organic Rankine Cycle (DORC) System Using for Engines’ Exhaust Waste Heat Recovery (Written Only -- No Oral Presentation)

Chengyu Zhang, Ge-Qun Shu, Hua Tian, Haiqiao Wei, Guopeng Yu, Youcai Liang, State Key Lab of Engines

11:00 a.m. 2014-01-0651 Numerical Simulation of Unsteady Natural Convection in a Simplified Engine Bay Enclosure under Soak Conditions

11:20 a.m. 2014-01-0644 Automotive Vehicle Body Temperature Prediction in a Paint Oven


2014-01-0670 Theoretical Analysis of a Combined Thermoelectric Generator (TEG) and Dual-loop Organic Rankine Cycle (DORC) System Using for Engines’ Exhaust Waste Heat Recovery (Written Only -- No Oral Presentation)
### Thursday, April 10

**CAD/CAM/CAE Technology**

**Session Code:** B101

**Room 112 B**

The presentations in this session focus on technologies related to modeling and analysis, quality assurance, as well as utilization for rapid prototyping, robust tolerance designs, structural crash performance of a compact car through CAE, accurate analytical solutions of resilience for high-modulus elastic-plastic material, testing, transfer path analysis, NVH, vehicle development, wheel input forces and brake design.

**Organizers** - Randy Gu, Oakland University; Yu J. Teng, Chrysler Group LLC

<table>
<thead>
<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>8:00 a.m.</td>
<td>2014-01-0379</td>
<td>Advancement in Vehicle Development Using the Auto Transfer Path Analysis</td>
</tr>
<tr>
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<td>Mallikarjuna Bennur, General Motors Co.; Jianmin Guan, Dilip Mandal, Altair Engineering Inc.</td>
</tr>
<tr>
<td>8:40 a.m.</td>
<td>2014-01-0374</td>
<td>Analytical Solutions of Resilience Based on Tri-Parameters Constitutive Model under Different Cold-Forming Cases</td>
</tr>
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<td>Lei Liu, Zhiheng Yang, Bo Song, Shanghai Aero Plane Mig Co., Ltd.; Zhengwei Fan, Jianhua Jiang, Tongji Univ.</td>
</tr>
<tr>
<td>9:00 a.m.</td>
<td>2014-01-0366</td>
<td>Integrated CAE Methods for Perceived Quality Assurance of Vehicle Outer Panels</td>
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<td>Jaehyuk Jang, General Motors Co.</td>
</tr>
<tr>
<td>9:20 a.m.</td>
<td>2014-01-0381</td>
<td>Development of Virtual Road Wheel Input Forces for Belgian Ground</td>
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<td>Juwan Kim, Hyundai Motor Co.; Munsung Kim, Dassult Systems Korea; Sang-Gun Joo, Sung Pil Heo, Youngdug Yoo, Hyundai Motor Co.</td>
</tr>
</tbody>
</table>

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00383, and also individually. To purchase visit collections.sae.org

Planned by Thermal Management Activity / EMB Land and Sea Group
CAE Analysis and Application

Session Code: M110

Room 113 C

Session Time: 8:00 a.m.

Key words: CAE, coupling, multi-discipline interaction

Papers should discuss the simulation methods for the coupled effects of various physical phenomena, including (not limited to) the following methods:

- Sequential coupling/de-coupling of multi-discipline CAE methods
- Direct/Parallel coupling/de-coupling of multi-discipline CAE methods

Organizers - Peiran Ding, ANSYS Inc.; Robert L. Geisler, General Motors Co.; Fan Li, GM; Y Charles Lu, Univ. of Kentucky

Time | Paper No. | Title
--- | --- | ---
8:00 a.m. | 2014-01-0933 | Electromagnetics, Structural Harmonics and Acoustics Coupled Simulation on the Stator of an Electric Motor
Mohamed Senousy, Paul Larsen, Peiran Ding, ANSYS Inc.

8:20 a.m. | 2014-01-0928 | Cadillac ATS ¿Loads Management Striker Cap¿ Development
Daryl R. Poirier, Ravindra Patil, Robert Geisler, Joseph Schudt, General Motors Co.

8:40 a.m. | 2014-01-0943 | A Technique to Predict Thermal Buckling in Automotive Body Panels by Coupling Heat Transfer and Structural Analysis
Paul R. Stibich, Yu Hsien Wu, Weidong Zhang, Michao Guo, Kumar Srinivasan, Srekanth Surapaneni, Chrysler Group LLC

9:00 a.m. | 2014-01-0930 | Achieving Optimum Crankshaft Design - I
Cagri Cevik, Emre Kanpolat, FEV GmbH

9:20 a.m. | 2014-01-0932 | A Study into the Compression Ring Rotation Based on Geometry
Matthew W. Dickinson, Nathalie Rennie, John Calderbank, Univ. of Central Lancashire

9:40 a.m. | 2014-01-0936 | Wading Simulation - Challenges and Solutions
Prashant Khapane, Uday Ganeshwade, Jaguar Land Rover
<table>
<thead>
<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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<tbody>
<tr>
<td>1:20 p.m.</td>
<td>ORAL ONLY</td>
<td>Comparison Study of FLC Determination Using Tactile and Non-Contact DIC Methods</td>
</tr>
<tr>
<td>1:40 p.m.</td>
<td>2014-01-0830</td>
<td>The Properties and Industry Applications of Nd: YAG Microchip Laser Feedback Interferometers</td>
</tr>
<tr>
<td>2:00 p.m.</td>
<td>2014-01-0828</td>
<td>Research on Shear Test of New Style Automotive Structural Adhesive</td>
</tr>
<tr>
<td>2:20 p.m.</td>
<td>2014-01-0824</td>
<td>Spatial Phase-Shift Digital Shearography for Out-of-Plane Deformation Measurement</td>
</tr>
<tr>
<td>2:40 p.m.</td>
<td>ORAL ONLY</td>
<td>Technical Keynote presentation</td>
</tr>
<tr>
<td>3:20 p.m.</td>
<td>2014-01-0829</td>
<td>The Research Progress of Dynamic Photo-Elastic Method</td>
</tr>
<tr>
<td>3:40 p.m.</td>
<td>2014-01-0825</td>
<td>The Digital Image Correlation Technique Applied to Hole Drilling Residual Stress Measurement</td>
</tr>
<tr>
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<td>2014-01-0826</td>
<td>Qualitative Analysis of Principal Stress on Free Boundary under Dynamic Load Based on Dynamic Photoelastic Method (Written Only -- No Oral Presentation)</td>
</tr>
<tr>
<td>Time</td>
<td>Paper No.</td>
<td>Title</td>
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<tr>
<td>8:00 a.m.</td>
<td>ORAL ONLY</td>
<td>Dynamic Stress Experimental Study on Key Part of Port under Impact Load (Written Only -- No Oral Presentation)</td>
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<td>Songgang Li, Tongji University; Guobiao Yand, Oakland University, Tongji University; Weiming Zeng, Tongji University</td>
</tr>
<tr>
<td>8:20 a.m.</td>
<td>ORAL ONLY</td>
<td>Design Approach for Online Measuring the Distance of the Gap between the Contactors of Electric Relay Switch (Written Only -- No Oral Presentation)</td>
</tr>
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<td>Ping Zhong, Kang Zhang, Donghua University; Xu Chen, Oakland University; Yunlong Shi, Donghua University; Lianxiang Yang, Oakland University</td>
</tr>
<tr>
<td>8:40 a.m.</td>
<td>2014-01-0962</td>
<td>Evaluation of Global and Local Deformation Behaviors of Similar Laser Welded Joints using Digital Image Correlation (Written Only -- No Oral Presentation)</td>
</tr>
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<td></td>
<td></td>
<td>Li Yanhua, Jianping Lin, Tongji Univ.</td>
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</table>

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00418, and also individually. To purchase visit collections.sae.org

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

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Thursday, April 10

Modeling and Simulation Technology for Composite Materials

**Session Code:** M112  
**Room 114 A**  
**Session Time:** 8:00 a.m.

This session focuses on advances and challenges in composite materials characterizations using advanced modeling and computational technologies including but not limited to: the notion of material models and their validation (especially for crash), paradigm shifts in modeling techniques (thinking out of the metallic box), composite materials design, virtual testing and parameter extraction, and the drive towards Integrated Computational Materials Engineering (ICME) concepts.

**Organizers** - Khaled Shahwan, Chrysler LLC

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<thead>
<tr>
<th>Time</th>
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<th>Title</th>
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<tbody>
<tr>
<td>8:00 a.m.</td>
<td>ORAL ONLY</td>
<td>Thermoplastic Lightweight Design Trends and Simulation Challenges in the Automotive Industry</td>
</tr>
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<td>Marios Lambi, BASF Corp.</td>
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<tr>
<td>8:20 a.m.</td>
<td>ORAL ONLY</td>
<td>The Role of Accurate Material Modeling In Automotive Light Weighting</td>
</tr>
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<td>Dominic Gallello, MSC Software Corp.</td>
</tr>
<tr>
<td>8:40 a.m.</td>
<td>2014-01-0962</td>
<td>Modeling and Simulating Progressive Failure in Composite Structures for Automotive Applications</td>
</tr>
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<td></td>
<td></td>
<td>Michael Bruyneel, Philippe Jetteur, Jean Pierre Delsemme, LMS Intl, A Siemens Business; Saeed Siavoshani, Anthony Cheruet, LMS North America, A Siemens Business</td>
</tr>
<tr>
<td>9:00 a.m.</td>
<td>ORAL ONLY</td>
<td>Use of Simulation Tools for Replacement of Aluminum by Engineering Thermoset Materials</td>
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<td>Andreas Kürten, ISK GmbH</td>
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<td>9:20 a.m.</td>
<td>ORAL ONLY</td>
<td>High Rate Axial Crushing of Filled Honeycombs</td>
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<td>Royan D'Mello, A. M. Waas, University of Michigan - Ann Arbor</td>
</tr>
</tbody>
</table>
Thursday, April 10

Advances in Plastic Components, Processes, and Technologies

Session Code: M301

This session will cover a very broad range of applications, processes and technologies as the title suggests.

Organizers - Emile Homsi, DSM Engineering Plastics; Y Charles Lu, Univ. of Kentucky; Robert Randolph Maynard, Celanese (formerly Ticona); Venkatesha N, GE India Technology Centre

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<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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<tbody>
<tr>
<td>9:40 a.m.</td>
<td>2014-01-0965</td>
<td>Simulation Based Solutions for Industrial Manufacture of Large Infusion Composite Parts</td>
</tr>
<tr>
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<td>Pierre Marquette, Arnaud Dereims, ESI Group; Michael Hugon, Guenael Esnault, Daher Aerospace; Anthony Pickett, University of Stuttgart; Dimitrios Karagiannis, Apostolos Gkinosatis, INASCO</td>
</tr>
<tr>
<td>10:00 a.m.</td>
<td>2014-01-0961</td>
<td>Multi-Scale Modeling of an Injection Over-Molded Woven Fabric Composite Beam</td>
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<td>Alan R. Wedgewood, Patrick Granowicz, Zhenyu Zhang, DuPont</td>
</tr>
</tbody>
</table>

Time Paper No. Title
8:20 a.m.  2014-01-1034 Methodology to Compare Effectiveness of Lubricating Additives in a Polymeric Matrix
Anshuman Shrivastava, Mark Scheel, Julie Strama, Delphi Automotive

8:40 a.m.  2014-01-1001 A Test Method and Simulation Study of PMMA Glazing on Motion Deviation
Yunkai Gao, Na Qiu, Jianguang Fang, Shanshan Wang, Tongji Univ.

9:00 a.m.  2014-01-1038 Post-Molding Crosslinking of Polyethylene in Automotive Connection Systems
Robert A. Smith, Delphi Automotive

9:20 a.m.  2014-01-1035 Characterization of PU Foam for High Temperature Applications in Automobiles
Shruti Mehta, Mrunal Hatwalne, Mangesh Dhule, Tata Motors Ltd.

9:40 a.m.  2014-01-1042 Next Generation in Hydrolysis Resistance Polyester (PBT) for Electrical Connectors and Components
Josh Mcilvaine, Malika Warner, DuPont Performance Polymers

10:00 a.m. 2014-01-1037 Plastic Resins for Sensors and Electronic Components to Minimize Long Term Corrosion
Josh Mcilvaine, Dupont

10:20 a.m.  ORAL ONLY Turbo Air Duct Market and Materials
Harry Siepel, DSM Engineering Plastics

10:40 a.m.  2014-01-1040 Material NVH Convergence Technology for a Plastic Intercooler Pipe
Gihwan Kim, Chi-Hoon Choi, You Sung Moon, Hyundai Motor Co.; Yong Sun (Steven) Jin, DuPont

11:00 a.m.  2014-01-1041 Design Considerations for Plastic Fuel Rail and Its Benefits
Praveensingh Jadhav, Maruti Suzuki India, Ltd.; Aditya Nanda, Manas Tripathi, Amit Kumar, Maruti Suzuki Automobiles India, Ltd.; Shriganesh Umbarkar, Maruti Udyog Ltd.
### Thursday, April 10

#### Automotive Tribology

**Session Code:** M111  
**Room 115 B**  
**Session Time:** 8:00 a.m.

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

**Organizers** - Ozgen Akalin, Istanbul Technical Univ.; Yucong Wang, General Motors Co.; Qingmin Yang, Federal-Mogul Corp.; Qian Zou

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<tr>
<th>Time</th>
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<tr>
<td>8:00 a.m.</td>
<td>2014-01-0956</td>
<td>Comparative Tribological Investigation of Mahua Oil and its Chemically Modified Derivatives</td>
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<td>Shubham Sharma, Himanshu Tyagi, Naveen Kumar, Vikrant Yadav, Delhi Technological University</td>
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<td>8:20 a.m.</td>
<td>2014-01-0955</td>
<td>Friction and Wear Reduction of Engine Bearings with Solid Lubricant Overlay</td>
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<td>Toshiyuki Chitose, Shu Kamiya, Yasunori Kabeya, Toru Desaki, Taiho Kogyo Co., Ltd.</td>
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<tr>
<td>9:20 a.m.</td>
<td>2014-01-0959</td>
<td>Tribological and Metallurgical Properties of Nitrided AISI 4340 Steel</td>
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<td>Ali H. Ashara, Qian Zou, Oakland University</td>
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<tr>
<td>9:40 a.m.</td>
<td>2014-01-0948</td>
<td>Expanding the Development of More Durable Friction Modifiers with Sustained Friction-Reduction: Extended Tribological Studies and Oil-Aging</td>
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<td>Frank DeBlase, Faith Corbo, Cyril Migdal, Chemtura Corp.</td>
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<tr>
<td>10:00 a.m.</td>
<td>2014-01-0958</td>
<td>Outside-Engine Wear Study of Ceramic Coated Cylinder Wall Tribosystem</td>
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<td>Hoda Eiliat, Xueyuan Nie, Univ. of Windsor; Jimi Tjong, Ford Motor Co.; Julio Villafuerte, Centerline (Windsor), Ltd.</td>
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<tr>
<td>10:40 a.m.</td>
<td>2014-01-0957</td>
<td>Effect of Surface Roughness and Sliding Velocity on Tribological Properties of an Oxide-Coated Aluminum Alloy</td>
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<td>Guang Wang, Xueyuan Nie, University of Windsor</td>
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</tbody>
</table>
Virtual Design and Engineering (Part 1 of 2)

Session Code:  IDM301
Room 116 A  Session Time:  8:00 a.m.

This technical session will showcase the creation and application of various tools that will allow for the design and manufacture of parts, equipment, facilities and tests that eliminate the need for physical part prototyping early in a program. The ability to model various aspects of design, test and manufacturing allows for more accurate, cost effective and faster development and product delivery to market.

Organizers -  George Smith, Magna Powertrain; Paul Zalucha, Ford Motor Co.

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<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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</table>
| 8:00 a.m.  | ORAL ONLY | Lightweighting and the Implications for Materials Data in Virtual Design and Engineering  
Dan Williams, Granta Design, Ltd. |
| 8:20 a.m.  | 2014-01-0750 | Vacuum Cleaning Vehicle Dust Subsidence System Design  
Gangfeng Tan, Ming Chen, Wuhan University of Technology; Haobo Xu, Bing Luo, Heli Special Automobile Manufacture Co., Ltd.; Jiameng Wang, Wuhan University of Technology |
| 8:40 a.m.  | 2014-01-0757 | Virtual Development in Upstream Design Phases of Automotive Electronic Products  
Yukihide Niimi, Toshinori Matsui, Naoya Tsuchiya, DENSO Corp. |
This technical session will showcase the creation and application of various tools that will allow for the design and manufacture of parts, equipment, facilities and tests that eliminate the need for physical part prototyping early in a program. The ability to model various aspects of design, test and manufacturing allows for more accurate, cost effective and faster development and product delivery to market.

George Smith, Magna Powertrain; Paul Zalucha, Ford Motor Co.

Organizers - George Smith, Magna Powertrain; Paul Zalucha, Ford Motor Co.

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<th>Time</th>
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<th>Title</th>
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<tr>
<td>1:00 p.m.</td>
<td>2014-01-0752</td>
<td>Assessment of the Accuracy of Certain Reduced Order Models used in the Prediction of Occupant Injury during Under-Body Blast Events</td>
</tr>
<tr>
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<td>Kumar B. Kulkarni, ESI US Inc; Jaisankar Ramalingam, Ravi Thyagarajan, US Army TARDEC</td>
</tr>
<tr>
<td>1:20 p.m.</td>
<td>2014-01-0758</td>
<td>Development of an Air Filtration Software</td>
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<td>Marco Barbolini, Röchling Automotive SE &amp; Co. KG</td>
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</table>
Thursday, April 10

Human Factors in Driving and Automotive Telematics (Part 1 of 2)

Session Code: B302

Room 116 B

Session Time: 8:00 a.m.

As information and entertainment to and from the vehicle (Telematics) become more prolific it is critical to increase our understanding of how the driver understands and uses Telematics functions. Equally critical is how those functions impact the driver. This session will address those issues.

Organizers - James Foley, Toyota Technical Center USA Inc.; Kristin Kolodge, Chrysler LLC; Daniel J. Selke, Mercedes-Benz USA LLC

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<th>Time</th>
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<th>Title</th>
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<tr>
<td>8:00 a.m.</td>
<td>2014-01-0443</td>
<td>The Influence of Font Type on Task Performance in a Static and Driving Simulation Environment</td>
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<td>Michael Tschirhart, Kathleen Ku, Visteon Corp.</td>
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<tr>
<td>8:20 a.m.</td>
<td>2014-01-0446</td>
<td>An Unbiased Estimate of the Relative Crash Risk of Cell Phone Conversation while Driving an Automobile</td>
</tr>
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<td>Richard Young, Wayne State Univ.</td>
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<tr>
<td>8:40 a.m.</td>
<td>2014-01-0450</td>
<td>Extracting Situations with Uneasy Driving in NDS-Data</td>
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<tr>
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<td>Tobias Karlsson, Magdalena Lindman, Jordanka Kovaceva, Bo Svanberg, Henrik Wiberg, Lotta Jakobsson, Volvo Cars</td>
</tr>
<tr>
<td>9:00 a.m.</td>
<td>2014-01-0448</td>
<td>Self-Regulation Minimizes Crash Risk from Attentional Effects of Cognitive Load during Auditory-Vocal Tasks</td>
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<td>Richard Young, Wayne State Univ.</td>
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<tr>
<td>9:20 a.m.</td>
<td></td>
<td>Networking Break</td>
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<tr>
<td>9:40 a.m.</td>
<td></td>
<td>Panel Discussion: Human Factors of Connected Vehicles (plus are connected cars necessary for self-driving cars to succeed?)</td>
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<td>Moderators - James Foley, Toyota Technical Center USA Inc.</td>
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<td></td>
<td>Panelists - Myra Blanco, Virginia Tech. Transportation Institute; John L. Campbell, Battelle Memorial Institute; Zachary Doerzaph, Virginia Tech.; Charles Green, General Motors Co.; Michael Tschirhart, Visteon Corp.;</td>
</tr>
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The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00409, and also individually. To purchase visit collections.sae.org

Planned by Quality, Reliability and Robust Design Committee / Integrated Design and Manufacturing Activity
### Human Factors in Driving and Automotive Telematics (Part 2 of 2)

**Session Code:** B302  
**Room:** 116 B  
**Session Code:** PFL730  
**Room:** 140 A

As information and entertainment to and from the vehicle (Telematics) become more prolific it is critical to increase our understanding of how the driver understands and uses Telematics functions. Equally critical is how those functions impact the driver. This session will address those issues.

**Organizers** - James Foley, Toyota Technical Center USA Inc.; Kristin Kolodge, Chrysler LLC; Daniel J. Selke, Mercedes-Benz USA LLC

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<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
<th>Authors</th>
</tr>
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<tr>
<td>1:00 p.m.</td>
<td>2014-01-0451</td>
<td>A Comparison of Three Different Approaches to Image Depth in Driver Information Clusters: 2D Computer Graphics, 3D Computer Graphics and 3D Imaging</td>
<td>Kathleen Ku, Michael Tschirhart, Visteon Corp.</td>
</tr>
<tr>
<td>1:20 p.m.</td>
<td>ORAL ONLY</td>
<td>Cluster Display Layout Differentiation for Elderly Drivers</td>
<td>Sang-Hwan Kim, Heather Harrelson, Mengyao Xu, Brian Weiss, University of Michigan; Claudia Escobar, Hyundai-Kia America Technical Center Inc.</td>
</tr>
<tr>
<td>1:40 p.m.</td>
<td>ORAL ONLY</td>
<td>Intentionality-Focused Solid State HMI Control using Pressure Sensing Surfaces</td>
<td>Gerry Seidman, Tactonic Technologies</td>
</tr>
<tr>
<td>2:00 p.m.</td>
<td>2014-01-0444</td>
<td>In-Vehicle Driver State Detection Using TIP-II</td>
<td>Yinghao Huang, Wenduo Wang, Chen Fang, Yi Murphey, University of Michigan; Dev S. Kochhar, Ford Motor Co.</td>
</tr>
<tr>
<td>2:20 p.m.</td>
<td></td>
<td>Networking Break</td>
<td></td>
</tr>
<tr>
<td>3:00 p.m.</td>
<td>2014-01-0452</td>
<td>Simulated Driving Assessment: Case Study for the Development of Drivelab, Extendable Matlab Toolbox for Data Reduction of Clinical Driving Simulator Data</td>
<td>Helen S. Loeb, Thomas Seacrist, Children Hospital of Philadelphia; Catherine McDonald, University of Pennsylvania; Flaura Winston, Children Hospital of Philadelphia</td>
</tr>
<tr>
<td>3:20 p.m.</td>
<td>2014-01-0445</td>
<td>Experience and Skill Predict Failure to Brake Errors: Further Validation of the Simulated Driving Assessment</td>
<td>Flaura Winston, Children's Hospital of Philadelphia; Catherine McDonald, University of Pennsylvania; Venk Kandadai, Children's Hospital of Philadelphia; Zachary Winston, University of Michigan; Thomas Seacrist, Children's Hospital of Philadelphia</td>
</tr>
<tr>
<td>3:20 p.m.</td>
<td>2014-01-0447</td>
<td>Steering Wheel Torque Rendering: Measure of Driver Discrimination Capabilities (Written Only -- No Oral Presentation)</td>
<td>Renaud Deborne, Skárlet Khouri Silva, Andras Kemeny, Renault</td>
</tr>
</tbody>
</table>

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00420, and also individually. To purchase visit collections.sae.org

Planned by Human Factors Committee / Automobile Body Activity

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### Advanced Battery Technologies (Part 3 of 4): Battery Safety and Battery Design

**Session Code:** PFL730  
**Room:** 140 A  
**Session Time:** 8:00 a.m.
The success of HEV's, PHEV's & EV's is highly dependent on their batteries. This session focuses on advanced battery technologies, including, but not limited to: advanced materials and cell chemistries, battery management systems and controls, modeling, testing, diagnosis and health monitoring, safety, reliability, durability, battery charging, battery economics/cost reduction, and system integration/optimization. These topics can be addressed at the cell, module, pack or vehicle levels.

**Organizers** - Wayne Cai, General Motors Co.; Yi Ding, US Army; Neil M. Johnson, Ricardo Inc.; Alvaro Masias, Ford Motor Co.; James Miller, Argonne National Laboratory; Ramesh Rebba, General Motors Co.

**Chairpersons** - Yi Ding; James Miller, Argonne National Laboratory

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<tr>
<th>Time</th>
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<tr>
<td>8:00 a.m.</td>
<td>2014-01-1857</td>
<td>Quantification of Combustion Hazards of Thermal Runaway Failures in Lithium-Ion Batteries</td>
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<td>Vijay Somandepalli, Kevin Marr, Quinn Horn, Exponent Inc.</td>
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<tr>
<td>8:20 a.m.</td>
<td>2014-01-1838</td>
<td>Cone Calorimetry as a Tool for Thermal Hazard Assessment of Li-Ion Cells</td>
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<td>Vijay Somandepalli, Hubert Biteau, Exponent Inc.</td>
</tr>
<tr>
<td>9:00 a.m.</td>
<td>2014-01-1836</td>
<td>Optimizing Lithium-Ion Batteries - Tailoring Electrodes for Microhybrid Vehicle Applications</td>
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<td>Brian Sisk, Zhenli Zhang, Johnson Controls Power Solutions</td>
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<tr>
<td>9:20 a.m.</td>
<td>2014-01-1846</td>
<td>Switched-Capacitor Cell Balancing: A Fresh Perspective</td>
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<td>Ienkaran Arasaratnam, McMaster Univ.; Jimi Tjong, Ford Motor Co.; Saeid Habibi, McMaster Univ.</td>
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<tr>
<td>9:40 a.m.</td>
<td></td>
<td>Networking Break</td>
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<tr>
<td>10:00 a.m.</td>
<td>2014-01-1853</td>
<td>Evaluation of Air Conditioning Impact on the Electric Vehicle Range and Li-ion Battery Life</td>
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<td>Ehsan Samadani, Roydon Fraser, Michael Fowler, University of Waterloo</td>
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<tr>
<td>10:20 a.m.</td>
<td>2014-01-1844</td>
<td>Improved Cyclic Performances of Li-Sulfur Batteries with Sulfone-Based Electrolyte</td>
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<td>Nary Shin, Kyoung Han Ryu, Yong-Gu Kim, Ho-Taek Lee, Hyundai Motor Co.</td>
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<td>10:40 a.m.</td>
<td>ORAL ONLY</td>
<td>How Energy Storage and Power Delivery Solutions Spur Start-Stop Growth</td>
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<td>John Miller, Maxwell Technologies</td>
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<tr>
<td>11:00 a.m.</td>
<td>ORAL ONLY</td>
<td>Meeting the Needs of Next-Generation Micro-Hybrid Systems with Nickel-Zinc Battery Technology</td>
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<td>Salil Soman, Powergenix</td>
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The papers in this session are available in SAE Technical Paper Collection, COLL-GTL-00001, COLL-TP-00384 and TP-00011, and also individually. To purchase visit collections.sae.org

Planned by Hybrid and Electric Powertrains Committee / Powertrain Fuels and Lubricants Activity

**Thursday, April 10**

**Advanced Battery Technologies (Part 4 of 4): Battery Design and Application**

**Session Code:** PFL730

**Room 140 A**

Session Time: 1:00 p.m.

The success of HEV's, PHEV's & EV's is highly dependent on their batteries. This session focuses on advanced battery technologies, including, but not limited to: advanced materials and cell chemistries, battery management systems and controls, modeling, testing, diagnosis and health monitoring, safety, reliability, durability, battery charging, battery economics/cost reduction, and system integration/optimization. These topics can be addressed at the cell, module, pack or vehicle levels.

**Organizers** - Wayne Cai, General Motors Co.; Yi Ding, US Army; Neil M. Johnson, Ricardo Inc.; Alvaro Masias,
# Embedded Supervisory Control Design & Calibration

**Session Code:** PFL132  
**Room 140 B**  
**Organizers:** Kody G. Klindt, IAV Automotive Engineering Inc.; Feilong Liu, Delphi Corp.; Denise M. Rizzo, US Army TARDEC; Matti Vint, VALEO  
**Assistant Chairpersons:** Peter J. Maloney, MathWorks Inc.

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<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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</table>
| **1:00 p.m.** | [ORAL ONLY]  | The Role of the 12V Battery in the Evolution of Stop-Start/Micro-Hybrid Systems  
Jeff Sieber, A123 Systems Inc. |
| **1:20 p.m.** | [ORAL ONLY]  | A Battery Management System Benchmark Analysis and Approaches for Standardization  
David Berels, Ricardo Inc. |
| **1:40 p.m.** | [ORAL ONLY]  | Challenges in Lithium ion Battery Pack  
Thermal Management and Energy Optimization in Electric Vehicles  
Mukund Arvind Kulkarni, R JAYAPRAKASH, GAJANAN KALE, Pratik Singh, Mahindra Reva Electric Vehicles Private |
| **2:00 p.m.** | [ORAL ONLY]  | Optimal Experimental Design and Battery Aging Studies  
Joel Forman, Ryan Spray, Kevin White, Quinn Horn, Exponent Inc. |

Planned by Hybrid and Electric Powertrains Committee / Powertrain Fuels and Lubricants Activity

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# Thursday, April 10

## Embedded Supervisory Control Design & Calibration

**Session Code:** PFL132  
**Room 140 B**  
**Session Time:** 8:00 a.m.

**Organizers:** James Miller, Argonne National Laboratory; Yi Ding  
**Chairpersons:** Peter J. Maloney, MathWorks Inc.

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<th>Time</th>
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| **8:00 a.m.** | 2014-01-1160  | Enabling Powertrain Variants through Efficient Controls Development  
Vincenzo Alfieri, General Motors; Daniel Pachner, Honeywell Automotive Software |
| **8:20 a.m.** | 2014-01-1158  | Multi-Objective Optimal Design of Parallel Plug-In Hybrid Powertrain Configurations with Respect to Fuel Consumption and Driving Performance  
Thomas Juergen Boehme, Matthias Rothschuh, Benjamin Frank, Matthias Schultalbers, IAV Automotive Engineering GmbH; Markus Schori, Torsten Jeinsch, University of Rostock |
| **8:40 a.m.** | 2014-01-1159  | Efforts to Establish Malaysian Urban Drive-Cycle for Fuel Economy Analysis  
Mohd Azman Abas, Proton Holdings Bhd; Owan Salim, Ricardo Martinez-Botas, Imperial College London; Srithar Rajoo, Universiti Teknologi Malaysia |
| **9:00 a.m.** | 2014-01-1157  | Criteria for Coasting on Highways for Passenger Cars  
Hermann Koch-Groeber, Jue Wang, Heilbronn University ASE |

Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity
### Embedded Diagnostic Algorithm Design & Calibration

**Session Code:** PFL134  
**Room 140 B**  
**Session Time:** 9:40 a.m.

**Organizers** - Feilong Liu, Delphi Corp.  
**Assistant Chairpersons** - Peter J. Maloney, MathWorks Inc.

**Time** | **Paper No.** | **Title**  
--- | --- | ---  
9:40 a.m. | 2014-01-1171 | The OBD System Development Database - a Solution for Knowledge Management and Tool Supported Control System Design and Calibration  
Aleš Kolar, Ralf Cerna, Werner Hofegger, Christoph Pichler, Markus Riener, AVL LIST GmbH; Nathan Murphy, AVL Powertrain Engineering Inc; Georg Zembacher, AVL Software and Functions GmbH  
10:00 a.m. | 2014-01-1172 | Protecting Development Engines during Controls Development and Calibration  
Jeremy Kraenzlein, Gregory T. Roth, Delphi Automotive

*Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity*

### Fundamental Advances in Heat Transfer and Thermal Sciences

**Session Code:** PFL160  
**Room 140 B**  
**Session Time:** 1:00 p.m.

**Organizers** - Tarek M. Abdel-Salam, East Carolina University; Raj Ranganathan, Showatech Inc.; Martin Tuner, Lund Univ.

**Chairpersons** - Tarek Abdel-Salam, East Carolina University; Raj Ranganathan, Automotive Supplier; Martin Tuner, Lund Univ.

**Time** | **Paper No.** | **Title**  
--- | --- | ---  
1:00 p.m. | 2014-01-1182 | Experimental Investigation of Piston Heat Transfer in a Light Duty Engine Under Conventional Diesel, Homogeneous Charge Compression Ignition, and Reactivity Controlled Compression Ignition Combustion Regimes  
Eric Gingrich, Jaal Ghandhi, Rolf Reitz, University of Wisconsin  
1:20 p.m. | 2014-01-1184 | Calibration Methodology in System Simulation to Predict Heat Transfer Along the Exhaust Line of a Diesel Engine  
Betty Belhassein, IFP Energies nouvelles; David Chalet, Pascal Chesse, Ecole Centrale De Nantes; Guillaume Alix, Romain Lebas, IFP Energies nouvelles  
1:40 p.m. | 2014-01-1181 | Heat and Mass Flow Characterization of Highly Viscous Fluid in Narrow-Channel Heat Exchanger  
Md Abdul Quaiyum, Mohammed Ismail, Amir Fartaj, Univ. of Windsor
Thursday, April 10

General Thermodynamics and Fundamentals
Session Code: PFL117
Room 140 C

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

Organizers - Kevin L. Hoag, Southwest Research Institute; Federico Millo, Politecnico di Torino; Peter Noronha, Chrysler Group LLC; Christof Schernus, FEV GmbH; Brad R. Tillock, EngSim Corporation

Time | Paper No. | Title
--- | --- | ---
8:00 a.m. | 2014-01-1100 | Comparison of Fuel Consumption and Emissions of Automotive and Large-Bore Diesel Engines
René Wolf, Peter Eilts, Technical University of Braunschweig

8:20 a.m. | 2014-01-1099 | Fundamental Analysis of Spring-Varied, Free Piston, Otto Engine Device
Matthew C. Robinson, West Virginia University; Nigel Clark, West Virginia University Foundation Inc.

8:40 a.m. | 2014-01-1102 | Development of a High-Fidelity 1D Physics-Based Engine Simulation model in MATLAB/Simulink
Bradley Thompson, Hwan-Sik Yoon, University of Alabama

9:00 a.m. | 2014-01-1103 | Engine Operating Parameter-based Heat Transfer Simulation to Predict Engine Warm-up
Sebastian Salbrechter, Markus Krenn, Graz University of Technology; Gerhard Pirker, Large Engines Competence Center; Andreas Wimmer, Graz University of Technology; Michael Nöst, Virtual Vehicle Research Center

9:20 a.m. | 2014-01-1098 | Combining Thermodynamics and Design Optimization for Finding ICE Downsizing Limits
Sergii Bogomolov, Vit Dolecek, Jan Macek, Antonin Mikulec, Oldrich Vitek, Czech Technical University

9:40 a.m. | 2014-01-1104 | Simulation Study of SI-HCCI Transition in a Two-Stroke Free Piston Engine Fuelled with Propane
Hung Nguyen Ba, Ocktaeck Lim, University of Ulsan; Norimasa Iida, Keio Univ.

10:00 a.m. | 2014-01-1101 | Modeling Internal Combustion Engine with Thermo-Chemical Recuperation of the Waste Heat by Methanol Steam Reforming
Arnon Poran, Moris Artoul, Moshe Sheintuch, Leonid Tartakovksy, Technion Israel Inst. of Technology

Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity
Thursday, April 10

Multidisciplinary Modeling Methods

Session Code: PFL118

Room 140 C  Session Time: 10:40 a.m.

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

Organizers - Kevin L. Hoag, Southwest Research Institute; Federico Millo, Politecnico di Torino; Peter Noronha, Chrysler Group LLC; Christof Schernus, FEV GmbH; Brad R. Tillock, EngSim Corporation

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<th>Time</th>
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<tr>
<td>10:40 a.m.</td>
<td>2014-01-1105</td>
<td>Comparative Analysis of Multiple Powertrain Architectures based on a Novel Optimization Framework</td>
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<td>Ganesh Mohan, Francis Assadian, Stefano Longo, Cranfield Univ.</td>
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<td>11:00 a.m.</td>
<td>2014-01-1106</td>
<td>Complex System Engineering Simulation through Co-Simulation</td>
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Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity

Thursday, April 10

Models for Mechanical and Hydro-mechanical Systems

Session Code: PFL115

Room 140 C  Session Time: 1:00 p.m.

This session focuses on mechanical and hydro-mechanical models of SI and CI engines, including system-level models for vehicle fuel economy and emission prediction.

Organizers - Diana Dascalescu, Bradford L. Lynch, Gamma Technologies Inc.; Federico Millo, Politecnico di Torino; Christof Schernus, FEV GmbH

Chairpersons - Diana Dascalescu, Ricardo Inc; Bradford Lynch, Gamma Technologies Inc

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<th>Time</th>
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<td>1:00 p.m.</td>
<td>2014-01-1082</td>
<td>Impact of Transmission Technologies on Fuel Efficiency to Support 2017-2025 CAFE Regulations</td>
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<td>Ayman Moawad, Aymeric Rousseau, Argonne National Laboratory</td>
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<tr>
<td>1:20 p.m.</td>
<td>2014-01-1084</td>
<td>Impact of Electric Drive Vehicle Technologies on Fuel Efficiency to Support 2017-2025 CAFE Regulations</td>
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<td>Ayman Moawad, Aymeric Rousseau, Argonne National Laboratory</td>
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<td>1:40 p.m.</td>
<td>2014-01-1090</td>
<td>Driveline Optimization for a Hybrid Electric City Vehicle to Minimize Fuel Consumption</td>
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<td>Massimiliana Carello, Paolo Bonansea, Politecnico di Torino - DIMEAS; Massimo D'Auria, Noesis Solutions N.V.</td>
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Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity
Thursday, April 10

Valvetrain, Including VVA

Session Code: PFL570
Room 140 E  
Session Time: 8:00 a.m.

This session includes Valve Train and Variable Valve Actuation mechanisms, devices, components and systems; and the impact and control of such systems on thermodynamics, combustion, fuel economy, emissions, and performance

Organizers -  Steven Ernest, Jacobs Vehicle Systems Inc.; Timothy Kunz, Delphi Automotive PLC; James Robert Westbrook, Chrysler Group LLC

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<th>Time</th>
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<td>8:00 a.m.</td>
<td>2014-01-1702</td>
<td>Cycle by Cycle Trapped Mass Estimation for Diagnosis and Control</td>
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<td>Carlos Guardiola, Benjamin Pla, David Blanco-Rodriguez, Pau Bares,</td>
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<td>Universitat Politècnica de València</td>
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<td>8:20 a.m.</td>
<td>2014-01-1703</td>
<td>Development of the Multi Locking Hydraulic Variable Valve Timing</td>
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<td>Control System(VTC) for Hybrid Engines</td>
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<td>Ken Shiozawa, Kenji Ariga, Tetsuro Murata, Hironori Ito, Hitoshi</td>
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<td>Takeuchi, Takahiro Anada, Nissan Motor Co. Ltd.; Masamichi Hayashi,</td>
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<td>Masaki Kobayashi, Shigeru Nakajima, Aisin Seiki Co. Ltd.</td>
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<td>8:40 a.m.</td>
<td>2014-01-1704</td>
<td>Switching Response Optimization for Cylinder Deactivation with Type</td>
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<td>II Passenger Car Applications</td>
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<td>Andrei Radulescu, Eaton Corp.; Venkateswaran Krishnasamy, Pavan</td>
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<td>Chandras, Eaton Technologies Pvt Ltd.</td>
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<td>9:20 a.m.</td>
<td>2014-01-1700</td>
<td>Extended Range Cam Phasing Effects on Engine Stop/Start Quality</td>
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<td>Xiaobing Liu, Paul Nahra, Anna Strehlau, BorgWarner Inc.</td>
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Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity
Thursday, April 10

**Small Engine Technology**

Session Code: PFL540  
Room 140 E  
Session Time: 10:00 a.m.

In this session, research and development of small engine technology will be covered. Topics include combustion, emission, control, and NVH.

**Organizers** - Robert Kee; David Masser, Ford Motor Co.

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<th>Time</th>
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| 10:00 a.m. | 2014-01-1673  | Experimental Evaluation of a 4-cc Glow-Ignition Single-Cylinder Two-Stroke Engine  
Michael D. Kass, Mark W. Noakes, Brian Kaul, Dean Edwards, Timothy Theiss, Lonnie Love, Ryan Dehoff, John Thomas, Oak Ridge National Laboratory |
| 10:20 a.m. | ORAL ONLY     | Influence of Cylinder Mounting Tilt Angle on Cylinder Cooling in an Air-Cooled Engine  
Masao Yoshida, Aichi University of Technology; Masayuki Takahashi, Kohei Nakashima, Yoshio Murakami, Meijo Univ. |
| 10:40 a.m. | 2014-01-1672  | Modeling and Experimental Investigation of a 2-Stroke GDI Engine for Range Extender Applications  
Enrico Mattarelli, Carlo Alberto Rinaldini, Universita di Modena e Reggio Emilia; Piero Baldini, Primavis S r l |

Planned by New Engines, Components, Actuators and Sensors / Powertrain Fuels and Lubricants Activity

Thursday, April 10

**Electric Motor & Power Electronics (Part 3 of 3)**

Session Code: PFL740  
Room 140 F  
Session Time: 8:40 a.m.

Power electronics and electric motors are essential for improving vehicle efficiency through drivetrain electrification. Technologies that support high efficiency, high power density, and low cost motors and power modules are required for the success of vehicle electrification.

**Organizers** - John Czubay, GM; Sergey P. Gladyshev, Michigan-Dearborn University; Laura Marlino, Oak Ridge National Laboratory; Constantine N. Raptis, GM Powertrain; Serdar Yonak, Infineon Technologies North America Corp.

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<th>Time</th>
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<th>Title</th>
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| 8:40 a.m.  | 2014-01-0417  | Thin-Film High Voltage Capacitors on Ultra-Thin Glass for Electric Drive Vehicle Inverter Applications  
M. Ray Fairchild, Ralph Taylor, Carl Berlin, Celine Wong, Delphi Automotive; Beihe Ma, U. (Balu) Balachandran, Argonne National Laboratory |
This session covers powertrain control processes related to achieving stringent market fuel economy, emissions, performance, reliability, and quality demands of hybrid and electric powertrains. Topics include the control, calibration, and diagnostics of the engine, powertrain, and supporting electromechanical subsystems related to energy management.

Organizers - Dohoy Jung, Univ. of Michigan-Dearborn; Jason McConnell, IAV Automotive Engineering Inc.; Bin Wu, Mercedes Benz R&D North America

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<th>Time</th>
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<td>8:00 a.m.</td>
<td>2014-01-1897</td>
<td>Refrigeration Load Identification of Hybrid Electric Trucks</td>
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<td>Soheil Mohagheghi fard, Amir Khajepour, Ayyoub Rezaeian, University of Waterloo; Chris J. Mendes, CrossChasm Technologies</td>
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<tr>
<td>8:20 a.m.</td>
<td>2014-01-1904</td>
<td>Optimization of the Series-HEV Control with Consideration of the Impact of Battery Cooling Auxiliary Losses</td>
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<td>Xueyu Zhang, Andrej Ivanko, Clemson-ICAR; Xinran Tao, John Wagner, Clemson Univ; Žoran Filipi, Clemson-ICAR</td>
</tr>
</tbody>
</table>
The Development of a Flexible Hybrid Vehicle Control Unit
Stephen Borman, Gordon Kennedy, Tony Cains, Jonathon Hall, Mike Bassett, MAHLE Powertrain, Ltd.

Braking Force Distribution and Coordinated Control Algorithm for Hybrid Electric Bus based on EBS
Rong He, Hongyu Zheng, Changfu Zong, Jilin Univ.

New Concepts for Drag Torque Control in the Power Electronic Control Unit
Tim Fischer, Stefan Mueller, Bosch Engineering GmbH

Implementation of an Optimal Control Like Energy Management for Hybrid Vehicles based on Driving Profiles
Thomas Juergen Boehme, Tobias Sehnke, Matthias Schultalbers, IAV Automotive Engineering GmbH; Torsten Jeinsch, Univ of Rostock

Energy Management System for Electrified Tactical Mobility Platforms
Rodrigo Felix Moreno, John Economou, Kevin Knowles, Cranfield University

Analytical Calibration of Map-Based Energy Managements of Parallel Hybrid Vehicles
Thomas Juergen Boehme, IAV Automotive Engineering GmbH; Markus Schori, Univ of Rostock; Heiko Rabba, Matthias Schultalbers, IAV Automotive Engineering GmbH

Optimal Control for Ensured Drivability of Parallel HEVs/PHEVs during Mode Transition
Guang Wu, Xing Zhang, Zuomin Dong, University of Victoria

Control Variables Optimization and Feedback Control Strategy Design for the Blended Operating Regime of an Extended Range Electric Vehicle
Branimir ¿kugor, Mihael Cipek, Jo¿ko Deur, Univ of Zagreb

The Optimization of Control Parameters for Hybrid Electric Vehicles based on Genetic Algorithm (Written Only -- No Oral Presentation)
Wang Jun, Qingnian Wang, Pengyu Wang, Biao Han, State Key Laboratory of Automotive Simulation

Development of Representative Vehicle Drive Cycles for Hybrid Applications (Written Only -- No Oral Presentation)
Sandeep Karande, Michael Olson, Bipul Saha, Eaton

Development of a SIL, HIL and Vehicle Test-Bench for Model-Based Design and Validation of Hybrid Powertrain Control Strategies (Written Only -- No Oral Presentation)
Ashish Vora, Haotian Wu, Chuang Wang, Purdue University; Yili Qian, Massachusetts Institute of Technology; Gregory Shaver, Purdue University; Vahid Motefalli; Peter Meckl, Oleg Wasynyczuk, Haiyan Zhang, Purdue University

Intelligent Energy Management Strategy for a Parallel Hybrid Vehicle (Written Only -- No Oral Presentation)
Rashad Mustafa, Mirko Schulze, Peter Eilts, Ferit Küçükay, Technical Univ. of Braunschweig

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Planned by Hybrid and Electric Powertrains Committee / Powertrain Fuels and Lubricants Activity

Thursday, April 10
Chat with the Experts: Reconstructing and Analyzing Rollovers

Session Code: BCHAT
Room 330 A/B  Session Time: 4:00 p.m.
Rollover collisions present special problems to practitioners who analyze them for the purposes of reconstructing the crash sequence, as well as, those who are examining occupant injury mechanics. As someone who has been involved in the analysis of rollover crashes for over 20 years I would enjoy discussing the complexities of rollover analysis with anyone who is interested.

Presenters - Jarrod Carter, Origin Engineering

Thursday, April 10

Chat with the Experts: HMI

Session Code: IDMCHAT
Room 330 A/B  Session Time: 4:00 p.m.
The evolution of automotive HMI continues to be influenced by consumers who expect experiences that resemble interactions with other familiar digital interfaces, particularly those in mobile devices. The modern auto interior can offer as many as 700 distinct functions, yet designs must be intuitive and safe; striking this balance is a challenge.

Studies have shown that driver distraction can be mitigated by adding non-visual confirmation in the form of audio and tactile (haptic) feedback to touch-based interfaces. While each reduces distraction, the greatest benefit is achieved when both are used. Providing confirmation by simulating the mechanical sense of physical buttons, knobs and sliders, haptics reduce glance time and minimize distraction.

Presenters - Daniel Brongiel, Immersion Corp.

Thursday, April 10

Chat with the Experts: Metallurgical Engineering, Failure Analysis and Testing in the Transportation World

Session Code: MCHAT
Room 330 A/B  Session Time: 4:00 p.m.
Determining how metals have been processed and how they will perform in automotive manufacturing environments and applications are important to successfully developing new products and solving warranty problems for current products. Metallurgical, chemical analysis, mechanical and fatigue testing are important to database development, saving weight and global material substitution initiatives. Failure analysis is important to determining what key design, material, manufacturing, and service considerations, either singularly or in combination, lead to failures and how product quality can be improved.

Presenters - John M. Tartaglia, Element Materials Technology

Thursday, April 10

Chat with the Experts: Testing Advanced Vehicle Technologies

Session Code: PFLCHAT
Room 330 A/B  Session Time: 4:00 p.m.

Presenters - Henning Lohse-Busch, Argonne National Laboratory

Thursday, April 10

Chat with the Experts: Discussing the Challenges of Distributed Control Systems Integration in the Future
The increasing use of network based control systems is evident, as many of the new developments are distributing features and functions across the traditional domains of vehicle, chassis, body and powertrain. This distributed nature of the system has enabled scalability and design flexibility while increasing integration complexity with the continued development of safety requirements and regulations. Experts discuss specifics about the challenges of merging of powertrain, vehicle engineering system and sub-systems.

**Moderators -** Stefan Koenig, IAV GmbH

**Presenters -** Robert Gruszczynski, Volkswagen of America; David E. Helton, Delphi Corp.; Patrick Leteinturier, Infineon Technologies AG; Anthony M. Phillips, Ford Motor Co.; Vinod Reddy, MathWorks

---

**Thursday, April 10**

**In-Vehicle Networks**

**Session Code:** AE305

**Room 332**

Technical papers and/or presentations offered in this session will portray the latest developments and proposals for In-Vehicle Networks. Typical subjects covered are: new protocols, gateways, vehicle control, message handling, X-by-wire, diagnostics, off-board connectivity and vehicle-to-vehicle or vehicle-to-infrastructure communications.

**Organizers -** Christopher Lupini, Delphi Corp.; Richard D. Means, Mark Zachos, DG Technologies

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<thead>
<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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<tbody>
<tr>
<td>8:00 a.m.</td>
<td>2014-01-0252</td>
<td>DSI3 Sensor to Master Decoder using Symbol Pattern Recognition</td>
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<td></td>
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<td>David Levy, Infineon Technologies AG</td>
</tr>
<tr>
<td>8:20 a.m.</td>
<td>2014-01-0253</td>
<td>Multi-Layer Organic (MLO¿) RF Components - A New Component Option for Harsh Environment RF Automotive Designs</td>
</tr>
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<td>Edgardo X. Menendez, George White, Michael Ulrich, AVX Corp.</td>
</tr>
<tr>
<td>8:40 a.m.</td>
<td>2014-01-0249</td>
<td>Technical Issues of 100Mbit/s Ethernet Transmission based on Standard Automotive Wiring Components</td>
</tr>
<tr>
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<td></td>
<td>Reinhard Felgenhauer, Michael Rucks, Delphi Automotive</td>
</tr>
<tr>
<td>9:20 a.m.</td>
<td>2014-01-0245</td>
<td>Requirements on Real-Time-Capable Automotive Ethernet Architectures</td>
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<td>Philip Axer, Daniel Thiele, Rolf Ernst, Technical Univ of Braunschweig; Jonas Diemer, Simon Schliecker, Kai R. Richter, Symtavision GmbH</td>
</tr>
<tr>
<td>9:40 a.m.</td>
<td>2014-01-0251</td>
<td>Telematics and Potential in Indian Market</td>
</tr>
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<td>Aswin Sreekumar, Anuradha Meena, Shiraz Shahabudeen, NeST</td>
</tr>
<tr>
<td>10:00 a.m.</td>
<td>ORAL ONLY</td>
<td>High Resolution Recording and Playback of Synchronized GPS-CAN-WIFI-Cellular Data</td>
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<td></td>
<td>Mark Zachos, DG Technologies</td>
</tr>
<tr>
<td>10:20 a.m.</td>
<td>2014-01-0246</td>
<td>Design of a High Efficiency In-Vehicle Network with a Single ECU for a Network (SEN)</td>
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<td></td>
<td>Jihas Khan, Tata Elxsi, Ltd.</td>
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<tr>
<td></td>
<td>2014-01-0250</td>
<td>Ethernet in Infotainment - Challenges and Solutions (Written Only -- No Oral Presentation)</td>
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<td></td>
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<td>Stefan Singer, Freescale</td>
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The papers in this session are available in SAE Technical Paper Collection, COLL-GTL-00001, and also individually. Visit collections.sae.org

Planned by Testing and Instrumentation Committee / Automobile Electronics Activity
Thursday, April 10

Electrical Wiring Systems / Harnesses

Session Code: AE301

Room 332

Session Time: 1:00 p.m.

This session deals with the electrical distribution system, increasing content/complexity, and the optimization of the systems in vehicles. The electrical distribution system is the nerve system of the vehicle and is far reaching into all areas of the architecture and requires immunity to many different environments/conditions. In detail will review the associated components and standards for the wiring systems: wiring/cables, connectors, harnesses, fuse & relay boxes, etc. Also will discuss new technologies that emerge in the wiring system arena to address mega trends (alternative materials for reduced weight, higher temperature resistance materials, new industry/governmental standards, etc).

Organizers - J. Howard Evans, Bentley Motors, Ltd.; Kirk Rasmussen, Leoni Wiring Systems Inc.; Jeremy Tibbett, Leoni Wiring Systems

Chairpersons - J Evans, Bentley Motors Ltd; Kirk Rasmussen, Leoni Wiring Systems Inc

Panelists - Sven Neeser, Leoni Wiring Systems Inc;

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<tr>
<th>Time</th>
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<tr>
<td>1:00 p.m.</td>
<td>2014-01-0224</td>
<td>Modeling of the Impact of Ultrasonic Welding of Harness on the Terminals Integrity</td>
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<td>Ould Mohamed Lemine Yahya, Houssem Eddine Miled, Delphi Automotive</td>
</tr>
<tr>
<td>1:20 p.m.</td>
<td>2014-01-0221</td>
<td>A Non Traditional Solution for High Vibration Connection Systems</td>
</tr>
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<td>John Morello, Delphi Automotive</td>
</tr>
<tr>
<td>1:40 p.m.</td>
<td>2014-01-0219</td>
<td>EMC Management in HEV/EV Applications</td>
</tr>
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<td>Rich Boyer, Delphi Automotive</td>
</tr>
<tr>
<td>2:00 p.m.</td>
<td>2014-01-0222</td>
<td>Electromagnetic Coupling for Wire Twisting Pitch Optimization for SRS Applications</td>
</tr>
<tr>
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<td></td>
<td>Jean Razafiarivelo, Youssef Bouri, Delphi Automotive</td>
</tr>
<tr>
<td>2:20 p.m.</td>
<td>ORAL ONLY</td>
<td>LEONI Shield-Interconnection</td>
</tr>
<tr>
<td>2:40 p.m.</td>
<td>ORAL ONLY</td>
<td>LEONI Y-Power Distribution</td>
</tr>
<tr>
<td>3:00 p.m.</td>
<td>2014-01-0220</td>
<td>Aluminum Solutions and Testing Methods</td>
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<td>Louis Chretien; Adrien Laurino, LEONI Wiring Systems France</td>
</tr>
<tr>
<td>3:20 p.m.</td>
<td>2014-01-0223</td>
<td>A Statistical Analysis of the Thermal Behavior of Electrical Distribution Systems</td>
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<td>Ludwig Brabetz, Mohamed Ayeb, Universitaet Kassel</td>
</tr>
<tr>
<td>3:40 p.m.</td>
<td>ORAL ONLY</td>
<td>Self-lubricating LSR - Reliable Sealing with Easy Assembly</td>
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<td>Oliver Franssen, Beatrice Grau, Momentive Performance Materials</td>
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</table>

Planned by Testing and Instrumentation Committee / Automobile Electronics Activity

Thursday, April 10

Automobile Electronics Design and Systems Reliability

Session Code: AE302

Room 333

Session Time: 8:00 a.m.

Meeting Reliability, Design, quality and safety requirements for electrical/electronic systems becomes more challenging every year as E/E content, complexity, time-to-market and globalization pressures increase. This session focuses on intelligent practices for achieving high reliability. New approaches and techniques for integrating robust design and robustness validation into the mainstream global automotive electronics product development and manufacturing processes are discussed.

Organizers - John Day, Automotive Electronics News; Mohammad Naserian, Hyundai America Technical Center

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<th>Time</th>
<th>Paper No.</th>
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Planned by Testing and Instrumentation Committee / Automobile Electronics Activity
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<tr>
<th>Time</th>
<th>Session Code</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00 a.m.</td>
<td>2014-01-0239</td>
<td>Trends of the Safety Challenges in Automotive Electronic Control Systems</td>
<td>Qi Van Eikema Hommes, Christopher Becker, Wassim Najm, Volpe Natl Transportation Systems Center</td>
</tr>
<tr>
<td>8:20 a.m.</td>
<td>2014-01-0233</td>
<td>Moving Automotive Electronics from Reliability/Durability Testing to Virtual Validation Modeling Using a Physics of Failure CAE App</td>
<td>James G. McLeish, DfR Solutions; Russell Haeberle, Magna Electronics</td>
</tr>
<tr>
<td>8:40 a.m.</td>
<td>2014-01-0227</td>
<td>A Building Blocks Method to Estimate Electronics Size and Calculate Productivity</td>
<td>Uday H. Prabhu, Robert Bosch Engg &amp; Bus Solutions Ltd.</td>
</tr>
<tr>
<td>9:20 a.m.</td>
<td>2014-01-0242</td>
<td>Hybrid Cars Setting New Challenges for Optimized Power Semiconductors</td>
<td>Marco Puerschel, Andreas Kiep, Infineon Technologies AG</td>
</tr>
<tr>
<td>9:40 a.m.</td>
<td>2014-01-0236</td>
<td>Estimation of Controllability Based on Driver Behavior - A Case of Insufficient Brake-Assist Force</td>
<td>Maki Kawakoshi, Takanobu Kaneko, Japan Automobile Research Institute; Toru Nameki, Japan Automotive Manufactures Association</td>
</tr>
<tr>
<td>10:00 a.m.</td>
<td>2014-01-0232</td>
<td>An Efficient Multi-Task Scheduling Methodology for Real-Time System Based on Normalized Slack Time</td>
<td>Tomoyoshi Funazaki, Hirofumi Yamamoto, Shinichirou Taguchi, Takesi Kondo, Denso Corp.</td>
</tr>
<tr>
<td>10:20 a.m.</td>
<td>2014-01-0228</td>
<td>Spontaneous Transistor Failures in Automotive Power Electronics</td>
<td>Andreas Kiep, Marco Puerschel, Infineon Technologies AG</td>
</tr>
<tr>
<td>10:40 a.m.</td>
<td>2014-01-0244</td>
<td>A Simple Method to Insure Bus-to-Bus Safety in Dual-Voltage Automotive Systems</td>
<td>Rupam Shrivastava, ePlanet Capital; Thomas A. Keim, Exponent Inc.</td>
</tr>
<tr>
<td>11:00 a.m.</td>
<td>2014-01-0237</td>
<td>A Unique and Novel Approach for Increasing the Life of Automotive Audio Signaling Device</td>
<td>Prasad Rao Yerraguntla, Shashi Kulkarni, Deepak Asthana, Tata Motors, Ltd.</td>
</tr>
<tr>
<td>11:20 a.m.</td>
<td>2014-01-0240</td>
<td>FPGA-Based Development for Sophisticated Automotive Embedded Safety Critical System</td>
<td>Thang Nguyen, Infineon Technologies Austria AG; Stuart Wooters, TRW Automotive</td>
</tr>
<tr>
<td>2014-01-0229</td>
<td>Improving Quality, Reliability and Profitability of Mobility Electronics Using Systemic Failure Mode Analysis (Written Only -- No Oral Presentation)</td>
<td>David E. Verbitsky</td>
<td></td>
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<tr>
<td>2014-01-0241</td>
<td>Solving Radio Frequency Interference (RFI) Issue in Designs using Isolated DC - DC Converter (Written Only -- No Oral Presentation)</td>
<td>Kausalya Bai Sonale, Automotive</td>
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</tr>
<tr>
<td>2014-01-0243</td>
<td>The Design of Electrically Controlled Steering System Hardware-In-the-Loop Test Bench (Written Only -- No Oral Presentation)</td>
<td>Lijiao Yu, Hongyu Zheng, Changfu Zong, ASCL, Jilin University</td>
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The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00397 and SUB-TP-00002, or individually. To purchase visit collections.sae.org
Thursday, April 10

**Systems Engineering**

**Session Code:** AE312

**Room 338**

Session Time: 8:00 a.m.

This session addresses automotive requirements, high level system design, cost analysis, simulation, modeling, testing, and validation. System includes components, sub assemblies, computer based controllers, hardware and software. The session focuses on intelligent and efficient approaches to analysis, design (not detailed design), modeling, measurement, document management and optimizing performance. Topics on effect of cost, and human machine interface are covered.

**Organizers** - Subramaniam Ganesan, Oakland University; Kanaparty Rao

**Chairpersons** - Subramaniam Ganesan, Oakland University

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<th>Time</th>
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<tr>
<td>8:00 a.m.</td>
<td>2014-01-0291</td>
<td>A Novel Approach for Diagnostics, End of Line and System Performance Checks for Micro Hybrid Battery Management Systems</td>
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<td>Gopal Athani, Tata Technologies Ltd.; Prasad Yerraguntla, Tata Motors Ltd.; Anand Gajaraj, Tata Technologies Ltd.; Kapil Dongare, Tata Motors Ltd.</td>
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<tr>
<td>8:20 a.m.</td>
<td>2014-01-0289</td>
<td>AUTOSAR Software Platform Adoption: Systems Engineering Strategies</td>
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<td>Sandeep Menon, General Motors Co.; Prathap Venugopal, General Motors Technical Center India</td>
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<tr>
<td>8:40 a.m.</td>
<td>2014-01-0294</td>
<td>A System for Capturing and Monitoring Machine Breakdown in Shop Floor Using Open Source Software for Improved Productivity</td>
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<td>Ramya Natarajan, Ganesan Swaminathan, Shanmugasundaram Ramanathan, Ashok Leyland, Ltd.</td>
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<tr>
<td>9:00 a.m.</td>
<td>2014-01-0286</td>
<td>Analysis of FM Multipath Distortion using Two-Stage and MUSIC Methods</td>
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<td>Satoru Komatsu, Yukihiro Serizawa, Akira Nagao, Ken Asami, Honda R&amp;D Co., Ltd.; Yoshio Karasawa, University of Electro-Communication</td>
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<tr>
<td>9:20 a.m.</td>
<td>2014-01-0290</td>
<td>Turbocharger Dynamics Influence on Optimal Control of Diesel Engine Powered Systems</td>
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<td>Vaheed Nezhadali, Martin Sivertsson, Lars Eriksson, Linköping University</td>
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<tr>
<td>9:40 a.m.</td>
<td>2014-01-0288</td>
<td>Shape Optimization of Multi-Element Airfoil Using Morphing Deformation</td>
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<td>Asya Gabbasa, Badih Jawad, Liping Liu, Selin Arslan, Andrew Gerhart, Lawrence Technological Univ.</td>
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<tr>
<td>10:00 a.m.</td>
<td>2014-01-0296</td>
<td>Aerodynamic Shape Optimization for a 3-D Multi-Element Airfoil</td>
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<td>Asya Gabbasa, Selin Arslan, Badih Jawad, Andrew Gerhart, Lawrence Technological Univ.</td>
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<tr>
<td>10:20 a.m.</td>
<td>2014-01-0297</td>
<td>CAE Process Workflow Management of an Automotive Simulation Scenario</td>
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<td>Maria Stampouli, Menelaos Pappas, Beta CAE Systems S.A.</td>
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<tr>
<td>10:40 a.m.</td>
<td>2014-01-0292</td>
<td>Hardware-in-Loop for all Types of Hybrid Vehicles using Open Modular Hardware to Meet ISO 26262 Standard</td>
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<td>Bhakti Kalghatgi, Manbir Kaur, Gaurav Singla, Ashish Ranjan, Prasanta Sarkar, Tata Technologies Ltd.</td>
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<tr>
<td>11:00 a.m.</td>
<td>2014-01-0256</td>
<td>Analysis of Software Update in Connected Vehicles</td>
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<td>Husein Dakroub, Robert Cadena, Visteon Electronics</td>
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Vehicle Diagnostics (Part 1 of 2)

Session Code: AE311

Room 353

Thursday, April 10

Vehicle diagnostics deals with the development, delivery and execution of diagnostic procedures for vehicle systems. This session will explore new technologies, processes and trends in the area of vehicle diagnostics.

Organizers - Kathleen E. Kedzior, MAHLE Test Systems

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<td>8:00 a.m.</td>
<td>2014-01-0280</td>
<td>Model-Based Fault Diagnosis of Selective Catalytic Reduction Systems for Diesel Engines</td>
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<td>Rui Chen, Xinlei Wang, Univ. of Illinois</td>
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<tr>
<td>8:20 a.m.</td>
<td>2014-01-0284</td>
<td>Guided Integrated Remote and Workshop Troubleshooting of Heavy Trucks</td>
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<td>Häkan Warnquist, Mattias Nyberg, Jonas Biteus, Scania CV AB</td>
</tr>
<tr>
<td>8:40 a.m.</td>
<td>ORAL ONLY</td>
<td>A New Tool for Reducing Translation Costs for Service Information: SAE J2892 - Graphics-Based Service Information</td>
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<td>Arnold Taube, John Deere World Headquarters</td>
</tr>
<tr>
<td>9:00 a.m.</td>
<td>2014-01-0281</td>
<td>Internationally Standardized Technology for the Diagnostic Communication of External Test Equipment with Vehicle ECUs</td>
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<td>Peter Subke, Softing Automotive Electronics Gmbh</td>
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<td>9:20 a.m.</td>
<td>ORAL ONLY</td>
<td>SAE J817 - Diagnosability Index</td>
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<td>Mark N. Pope, General Motors Co.; Arnold Taube, John Deere World Headquarters; David Dickinson, Harley Davidson Motor Co.</td>
</tr>
</tbody>
</table>
9:40 a.m. Panel

**Expert Panel Discussion: Hybrid and EV First and Second Responder Recommended Practice J2990 Presentation and Panel Discussion**

This recommended practice provides first and second responders with the ability to identify an xEV, avoid the hazards associated with the high voltage system, communicate hazard identification to other incident responders, and manage the risks in a manner consistent with the best practices utilized by first responders, second responders, and by the vehicle manufacturers and other responsible organizations.

**Organizers** - Kathleen E. Kedzior, MAHLE Test Systems; Mark N. Pope, General Motors Co.

**Moderators** - Mark Pope, General Motors Co


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Planned by Testing and Instrumentation Committee / Automobile Electronics Activity

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**Thursday, April 10**

**Vehicle Diagnostics (Part 2 of 2)**

**Session Code:** AE311

**Room 353**

Vehicle diagnostics deals with the development, delivery and execution of diagnostic procedures for vehicle systems. This session will explore new technologies, processes and trends in the area of vehicle diagnostics.

**Organizers** - Kathleen E. Kedzior, MAHLE Test Systems

**Time** | **Paper No.** | **Title**
--- | --- | ---
1:00 p.m. | ORAL ONLY | *Integrating Connected Vehicle Technology into Customer Support*
Evandro Silva, Volvo Group

1:20 p.m. | 2014-01-1978 | *Network Diagnostic Flow Chart-How to Troubleshoot Vehicle Level CAN Communication and CAN Diagnostic Issues on Nissan and Infinity Vehicles*
Timothy Robertson, Nissan Technical Center NA

1:40 p.m. | ORAL ONLY | *Building Strong Diagnostic Chains with Native ODX Systems*
Andreas Hege, RA Consulting GmbH

2014-01-0278 | *On-Board Model Based Diagnosis Based on an Off-Board Engine Simulation Model (Written Only -- No Oral Presentation)*
Olof Lindgarde, Rune Prytz, Volvo Group Trucks Technology

2014-01-0279 | *Air Leak Detection for a Turbocharged SI Engine using Robust Estimation of the Turbocharger Dynamics (Written Only -- No Oral Presentation)*
Rasoul Salehi, Aria Alasty, Gholam-Reza Vossoughi, Sharif University of Technology

2014-01-0282 | *Vibroacoustic Method of IC Engine Diagnostics (Written Only -- No Oral Presentation)*
Alex Beresnev, Max Beresnev, SFEDU
Thursday, April 10

Prognostics & Predictive Maintenance

Known as Health Vehicle Maintenance in Europe and Condition Based Maintenance in the U.S.A., Prognostics is sometimes referred to as Predictive Maintenance. The value proposition story of prognostics will be reviewed with actual case studies of how prognostics reduces costs. How to build an algorithm that captures the important values related to a system in order to produce the wanted result or "catch the anomaly". Case studies will be discussed.

Organizers - Tim A. Cavanaugh, Cavanaugh Consulting; Jim Sherman, SAE International

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<tr>
<td>2:20 p.m.</td>
<td>2014-01-0347</td>
<td>Lifetime Prediction of DC-Link Film Capacitors using a Stochastic Model Combined by Random Variable and Gamma Process</td>
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<td>Seok-san Shin, Hyeongjin Ham, Hyeongcheol Lee, Hanyang University</td>
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<tr>
<td>2:40 p.m.</td>
<td>Panel</td>
<td>Panel Discussion: Prognostics</td>
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<td>Moderators - Tim A. Cavanaugh, Cavanaugh Consulting</td>
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<tr>
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<td></td>
<td>Panelists - David V. Freeman, DOT/NHTSA; Deborah M. Freund, Federal Motor Carrier Safety; Steven W. Holland, General Motors Company; William R. Mckinney, General Electric - Aviation; Martin Mellera, SFMTA San Francisco Municipal Transportation Agency; Bernie Porter, MAHLE Powertrain LLC; Seok-san Shin, Hanyang Univ.;</td>
</tr>
</tbody>
</table>

Planned by Testing and Instrumentation Committee / Automobile Electronics Activity

Thursday, April 10

Occupant Protection: Rear and Side Impact

Papers are invited on all aspects of automotive crashworthiness and occupant protection in side impacts, including topics such as discussions of test data, CAE methods, statistical analyses, automobile designs, restraint systems and airbags, crash test methodology and development of surrogates (test dummies). Additional topics may include side impact safety considerations for hybrid and electric propulsion vehicles.

Organizers - Jarrod Carter, Origin Engineering; Jason R. Kerrigan, Univ. of Virginia; Donald Parker, Exponent Inc.; Jeffery W. Sankey, Transportation Research Center Inc.; Mukul K. Verma

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<tr>
<td>8:00 a.m.</td>
<td>2014-01-0524</td>
<td>The Effect of Rear Impact Collision Delta-V and Restraint Status on Injury Outcome</td>
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<tr>
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<td>Stacy M. Imler, Michelle F. Heller, Christine C. Raasch, Heather N. Watson, Ke Zhao, Exponent Failure Analysis</td>
</tr>
<tr>
<td>8:20 a.m.</td>
<td>2014-01-0544</td>
<td>An Improved Methodology for Calculation of the Inertial Resistance of Automotive Latching Systems</td>
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<td></td>
<td>James Nelsen, Hyundai-Kia America Technical Center Inc.; Chang Su Seo, Hyundai Motor Co.</td>
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The papers in this session are available in SAE Technical Paper Collection, SUB-TP-00007, and also individually. To purchase visit collections.sae.org

Planned by Occupant Protection Committee / Automobile Body Activity

**Occupant Protection: Rollover**
*Session Code: B406*

**Session Time:** 1:00 p.m.

Papers and presentations in this session are related to vehicular rollover. They cover various aspects of occupant safety, including vehicle design, restraint systems design, crash test analysis, CAE simulations and statistical trends analysis.

**Organizers** - Jarrod Carter, Origin Engineering; Jason R. Kerrigan, Univ. of Virginia; Donald Parker, Exponent Inc.

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<tr>
<th>Time</th>
<th>Paper No.</th>
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<tbody>
<tr>
<td>1:00 p.m.</td>
<td>2014-01-0527</td>
<td>Belted Occupant Kinematics and Head Excursion During the Airborne Phase of Vehicle Rollover: Evaluation of the Effects of Rollover-Deployed Curtain Airbags</td>
</tr>
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<td>William N. Newberry, Stacy Imler, Michael Carhart, Alan Dibb, Karen Balavich, Jeffrey Croteau, Exponent Failure Analysis; Eddie Cooper, B33 Consulting Inc.</td>
</tr>
<tr>
<td>1:20 p.m.</td>
<td>2014-01-0533</td>
<td>Effects of Headform Friction on Ejection Mitigation Testing</td>
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<td>Mindy Heading, Douglas Stein, Autoliv ASP, Inc.; Jeff Dix, Nissan North America Inc.</td>
</tr>
<tr>
<td>1:40 p.m.</td>
<td>2014-01-0528</td>
<td>Results from Calculating the Acceleration at an ELR in a Steer Induced Rollover Crash Test</td>
</tr>
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<td>Mark William Arndt, Transportation Safety Tech. Inc.; John Wiechel, The Ohio State Univ.</td>
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</tbody>
</table>
Thursday, April 10

Transmission and Driveline (Part 6 of 7): Driveline Modeling

Session Code: PFL680

Room 357  
Session Time:  8:00 a.m.

This session covers transmission and driveline modeling, including topics related to transmission hardware, software, and system integration.

Organizers -  Rakan Chabaan, Gang Chen, John C. Collins, Chrysler Group LLC; Patrick Robert Darmstadt, Boeing Helicopters; Hussein Dourra, Chrysler Group LLC; Fabio Ferreira, Schaeffler Brasil, Ltd.; Michael E. Fingerman, John A. Frait, Chrysler Group LLC; Joel Gunderson, James Hendrickson, Chunhao Lee, Dongxu Li, General Motors Co.; Berthold Martin, Chrysler Group LLC; Thomas Martin, General Motors Co.; David Popejoy, Craig Renneker, Ford Motor Co.; Farzad Samie, General Motors Co.; Brian Carl Schneidewind, Toyota Technical Center USA Inc.; Tejinder Singh, General Motors Co.; Robert A. Smithson, Dana Holding Corporation; Erich L. Wilfinger, Jatco USA Inc.

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<tr>
<th>Time</th>
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<tbody>
<tr>
<td>8:00 a.m.</td>
<td>2014-01-1773</td>
<td>Experimental Characterization and Modeling of Dry Dual Clutch Wear</td>
</tr>
<tr>
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<td>Matija Hoic, Nenad Kranjcevic, Zvonko Herold, Josko Deur, Univ. of Zagreb; Vladimir Ivanovic, Ford Motor Co.</td>
</tr>
<tr>
<td>8:20 a.m.</td>
<td>2014-01-1782</td>
<td>A Two Degree of Freedom, Lumped Inertia Model for Automatic Transmission Clutch-to-Clutch Shift Dynamics</td>
</tr>
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<td>Darrell Robinette, General Motors Co.</td>
</tr>
<tr>
<td>8:40 a.m.</td>
<td>2014-01-1774</td>
<td>A DFSS Approach to Determine Automatic Transmission Gearing Content for Powertrain-Vehicle System Integration</td>
</tr>
<tr>
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<td>Darrell Robinette, General Motors Co.</td>
</tr>
<tr>
<td>9:00 a.m.</td>
<td>2014-01-1778</td>
<td>Advanced Automatic Transmission Model Validation Using Dynamometer Test Data</td>
</tr>
<tr>
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<td>Namdoo Kim, Aymeric Rousseau, Henning Lohse-Busch, Argonne National Laboratory</td>
</tr>
<tr>
<td>9:20 a.m.</td>
<td>2014-01-1772</td>
<td>CFD Analysis of Lubricant Fluid Flow in Automotive Transmission</td>
</tr>
<tr>
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<td></td>
<td>Daiki Saegusa, Shinji Kawai, Honda R&amp;D Co., Ltd.</td>
</tr>
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</table>
Transmission and Driveline (Part 7 of 7): Driveline Controls

Session Code: PFL640

Room 357

This session covers transmission and driveline controls. Session will cover topics related to controls hardware, controls software, and controls integration.

Organizers -

Rakan Chabaan, Gang Chen, John C. Collins, Chrysler Group LLC; Patrick Robert Darmstadt, Boeing Helicopters; Hussein Dourra, Chrysler Group LLC; Fabio Ferreira, Schaeffler Brasil, Ltd.; Michael E. Fingerman, John A. Frait, Chrysler Group LLC; Joel Gunderson, James Hendrickson, Chunhao Lee, Dongxu Li, General Motors Co.; Berthold Martin, Chrysler Group LLC; Thomas Martin, General Motors Co.; David Popejoy, Craig Renneker, Ford Motor Co.; Farzad Samie, General Motors Co.; Brian Carl Schneidewind, Toyota Technical Center USA Inc.; Tejinder Singh, General Motors Co.; Robert A. Smithson, Dana Holding Corporation; Erich L. Wilfinger, Jatco USA Inc.

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Thursday, April 10

Transmission and Driveline (Part 7 of 7): Driveline Controls

Time: 10:20 a.m.

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<th>Time</th>
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</table>

Sreenath K. Reghunath, Deepak Sharma, Ashwini S. Athreya, Mercedes Benz
Thursday, April 10

Advances in NOx Reduction Technology (Part 2 of 3)

Session Code: PFL424

Room 410 A

Session Time: 8:00 a.m.

Organizers - Brad Adelman, Navistar Inc.; Danan Dou, John Deere Product Engineering Center; Magdi Khair, Watlow; Jong Lee, Daimler Trucks North America LLC; Rahul Mital, General Motors Co.; Shyam Santhanam, Navistar Inc.

Time 

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<th>Paper No.</th>
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<tr>
<td>8:00 a.m.</td>
<td>2014-01-1526</td>
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<tr>
<td>8:20 a.m.</td>
<td>2014-01-1544</td>
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The papers in this session are available in SAE Technical Paper Collection, COLL-GTL-00001 and SUB-TP-00003, and also individually. To purchase visit collections.sae.org

Planned by Transmission and Driveline Committee / Powertrain Fuels and Lubricants Activity

An Optimal Regenerative Braking Energy Recovery System for Two-Speed Dual Clutch Transmission-Based Electric Vehicles

Jiageng Ruan, Paul Walker, Univ of Technology Syndey

Development of Stop/Start Engine Combustion and Restart Control for Gasoline Direct Injection Automatic Transmission Application

Alex O. Gibson, Brad VanDerWege, Steven Wooldridge, Peter C. Moilanen, Seunghoon Lee, Ford Motor Co.

Learning Slip Control of an Engine Clutch in a Parallel Hybrid Electric Vehicle for Linear Vehicle Launch

Seongwook Moon, Hyundai Motor Co.


Shaohua Sun, Shunbo Li, Yao Fu, Cheng Yang, State Key Lab of Automotive Simulation Control, Jilin Univ

HIL Driveline Dyno

Tom Mockeridge, General Motors Co.; Hans-Peter Dohman, AVL Deutschland GmbH; David Philips, GM Milford Proving Ground

Research on Shift Control Strategy in Braking Conditions of Automatic Transmission Vehicles based on Fuzzy Inference (Written Only -- No Oral Presentation)

Yao Fu, Yulong Lei, Ke Liu, Yuanxia Zhang, Huabing Zeng, State Key Lab. of ASC, Jilin University

Shift Quality Improvement through Integrated Control of Dual Clutches Pressure and Engine Speed for DCT (Written Only -- No Oral Presentation)

Xiaofeng Yin, State Key Lab of Automotive Simulation & Control; Xihua Univ; Yuan Zhong, Xiaohua Wu, Han Lu, Xihua Univ
### Advances in NOx Reduction Technology (Part 3 of 3)

**Session Code:** PFL424  
**Room 410 A**

#### Session Time: 1:00 p.m.

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<th>Time</th>
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<tr>
<td>8:40 a.m.</td>
<td>2014-01-1529</td>
<td>Study on Optimization for LNT+SCR System of Diesel Vehicle to Comply with the LEV3 Regulations</td>
</tr>
<tr>
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<td>Jongik Jeon, Hyongman Seo, Kangwon Lee, Soonhyung Kwon, Kisong Bae, Hyundai Motor Co.</td>
</tr>
<tr>
<td>9:00 a.m.</td>
<td>2014-01-1537</td>
<td>Development and Demonstration of LNT+SCR System for Passenger Car Diesel Applications</td>
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<tr>
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<td>Thomas Wittka, RWTH Aachen University; Bastian Holderbaum, FEV GmbH; Teuvo Maunula, Dinex Ecocat; Michael Weissner, Volkswagen AG</td>
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<td>Krishna Kamasamudram, Ashok Kumar, Jinyong Luo, Neal Currier, Aleksey Yezerets, Cummins Inc.; Thomas Watkins, Larry Allard, Oak Ridge National Laboratory</td>
</tr>
<tr>
<td>9:40 a.m.</td>
<td>2014-01-1521</td>
<td>Development of SCR on High Porosity Substrates for Heavy Duty and Off-Road Applications</td>
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<td>Jason D. Pless, Johnson Matthey ECT; Mojghan Naseri, Johnson Matthey Inc.; Wassim Klink, Johnson Matthey ECT; Glen Spreitzer, Johnson Matthey Inc.; Sougato Chatterjee, Johnson Matthey ECT; Penelope Markatou, Johnson Matthey Inc.</td>
</tr>
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<td>10:00 a.m.</td>
<td>2014-01-1528</td>
<td>Development of High Porosity Cordierite Honeycomb Substrate for SCR Application to Realize High NOx Conversion Efficiency and System Compactness</td>
</tr>
<tr>
<td>10:20 a.m.</td>
<td>2014-01-1522</td>
<td>Control of a Combined SCR on Filter and Under-Floor SCR System for Low Emission Passenger Cars</td>
</tr>
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<td>Jean Ballard, Michael Parmentier, Julien Schmitt, Delphi Automotive</td>
</tr>
<tr>
<td>10:40 a.m.</td>
<td>2014-01-1523</td>
<td>Integration of Vanadium and Zeolite Type SCR Functionality into DPF in Exhaust Aftertreatment Systems - Advantages and Challenges</td>
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<tr>
<td></td>
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<td>Keld Johansen, Henrik Bentzer, Arkady Kustov, Kenneth Larsen, Ton V.W. Janssens, Rasmus G. Barfod, Haldor Topsoe A/S</td>
</tr>
<tr>
<td>11:00 a.m.</td>
<td>2014-01-1536</td>
<td>Impact of Hydrocarbons on the Dual (Oxidation and SCR) Functions of Ammonia Oxidation Catalysts</td>
</tr>
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<td>Nathan Ottinger, Brandon Foley, Yuanzhou Xi, Z. Gerald Liu, Cummins Emission Solutions</td>
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Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity

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**Thursday, April 10**

**Session Code:** PFL424  
**Location:** Room 410 A

**Organizers:** Brad Adelman, Navistar Inc.; Danan Dou, John Deere Product Engineering Center; Magdi Khair, Watlow; Jong Lee, Daimler Trucks North America LLC; Rahul Mital, General Motors Co.; Shyam Santhanam, Navistar Inc.
The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00385 and SUB-TP-00010, and also individually. To purchase visit collections.sae.org

Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity

Thursday, April 10

Embedded Control and Calibration of Subsystems, Sensors, and Actuators

Session Code: PFL133

Room 410 B

Session Time: 8:00 a.m.

Organizers - Xuefei Chen, Chrysler LLC; Feilong Liu, Delphi Corp.; Matti Vint, VALEO

Assistant Chairpersons - Peter J. Maloney, MathWorks Inc.

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<th>Time</th>
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<tr>
<td>8:00 a.m.</td>
<td>2014-01-1168 The Development of an Electronic Control Unit for a High Pressure Common Rail Diesel/Natural Gas Dual-Fuel Engine</td>
<td></td>
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<td>Bo Yang, Xing Wei, Ke Zeng, Xi¿an Jiaotong Univ.; Ming-Chia Lai, Wayne State Univ.</td>
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<tr>
<td>8:20 a.m.</td>
<td>2014-01-1161 Dynamic Injection Adaptation by Input Shaping for Low NO&lt;sub&gt;x&lt;/sub&gt; Emissions during Transients</td>
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<td>Donald Selmanaj, Politecnico di Milano; Harald Waschl, Johannes Kepler Univ. Linz; Michael Schinnerl, BMW Motoren GmbH; Sergio Savaresi, Politecnico di Milano; Luigi del Re, Johannes Kepler Univ. Linz</td>
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<tr>
<td>8:40 a.m.</td>
<td>2014-01-1167 Individual Cylinder Fuel Control for a Turbocharged Engine</td>
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<td>James F. Burkhard, Delphi Automotive</td>
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<tr>
<td>9:00 a.m.</td>
<td>2014-01-1162 Investigation on the Highly Precise Air Fuel Ratio Adaptive Control in Transient States under Changes in the Intake Valve Opening Timing</td>
<td></td>
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<td>Takeshi Takiyama, Osaka City Univ.</td>
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</tbody>
</table>
### HCCI Combustion Processes Experiments

**Session Code:** PFL232  
**Room 411 A**  
**Session Time:** 8:00 a.m.

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

**Organizers:** Scott Goldsborough, Argonne National Laboratory; Samveg Saxena; Zhi Wang, Tsinghua Univ.; Hongming Xu, Birmingham Univ.

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<tr>
<td>8:00 a.m.</td>
<td>2014-01-1270</td>
<td>Effects of Mixture Stratification on Ignition and Combustion in a GCAI Engine</td>
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<td></td>
<td>2014-01-1277</td>
<td>Boosted HCCI - Experimental Observations in a Single Cylinder Engine</td>
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The papers in this session are available in SAE Technical Paper Collection, SUB-TP-00008 and SUB-TP-00010, and also individually. To purchase visit collections.sae.org

Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity

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Thursday, April 10

**SCR Systems Pump Control Taking into Consideration the Motor Command Saturation and the Controller Substitution**

Jean-Claude Habumuremyi, Inergy Automotive Systems Research SA

**Model-Based Exhaust Pressure Control with Dynamic Feedforward for Engine Protection**

Yue-Yun Wang, Yongjie Zhu, Ibrahim Haskara, General Motors Co.

**Investigation of Cylinder Deactivation and Variable Valve Actuation on Gasoline Engine Performance**

Chavithra Kuruppu, Apostolos Pesiridis, Brunel Univ.; Srithar Rajoo, Universiti Teknologi Malaysia

**Model Predictive Control of DOC Temperature during DPF Regeneration**

Yong-Wha Kim, Michiel Van Nieuwstadt, Ford Motor Co.; Greg Stewart, Honeywell Intl Inc.; Jaroslav Pekar, Honeywell Automotive Software

**Shift Quality Evaluation of DCT Based on TOPSIS Model (Written Only -- No Oral Presentation)**

Yao Fu, Yulong Lei, Sun Shaohua, Huabing Zeng, Ke Liu, Yuanxia Zhang, State Key Lab of Automotive Simulation Control, Jilin Univ.
9:00 a.m. 2014-01-1275 Probing Species Formed by Pilot Injection During Re-Compression in a Controlled Auto-Ignition Engine by H\textsubscript{2}CO LIF and Chemiluminescence Imaging

Thomas Huelser, Christian Schulz, Thorsten Brands, Gerd Grunefeld, Hans-Jürgen Koss, Bastian Morcinkowski, Stefan Pischinger, RWTH Aachen Univ.; Philipp Adomeit, FEV Inc.

9:20 a.m. 2014-01-1272 Investigation of the Sources of Combustion Noise in HCCI Engines

Jeremie Dernotte, John Dec, Chunsheng Ji, Sandia National Labs.

9:40 a.m. 2014-01-1273 Analysis of Gasoline Negative-Valve-Overlap Fueling via Dump Sampling


10:00 a.m. 2014-01-1276 Refinement and Validation of the Thermal Stratification Analysis: A post-processing methodology for determining temperature distributions in an experimental HCCI engine

Benjamin Lawler, Joshua Lacey, University of Michigan; Nicolas Dronniou, IFP Energies Nouvelles; Jeremie Dernotte, John Dec, Sandia National Labs.; Orgun Guralp, Paul Najt, General Motors Co.; Zoran Filipi, Clemson-ICAR

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Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity

Thursday, April 10

HCCI Control and Mode Change

Session Code: PFL233

Room 411 A Session Time: 11:00 a.m.

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

Organizers - Scott Goldsborough, Argonne National Laboratory; Samveg Saxena; Zhi Wang, Tsinghua Univ.; Hongming Xu, Birmingham Univ.

Time Paper No. Title

11:00 a.m. 2014-01-1279 Investigation of Robustness Control for Practical Use of Gasoline HCCI Engine- An Investigation of a Detecting Technology of Conditions of HCCI Using an Ion Current Sensor - Kenichiro Ogata, Hitachi, Ltd.

Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity

Thursday, April 10

Advances in Oxidation and Particulate Filter Systems

Session Code: PFL423

Room 411 B Session Time: 8:00 a.m.

This session covers the complete particulate filter system. There are papers covering the DOC aging as well as the effect of high sulfur fuel on the DOC. A couple of paper study the effect of ash accumulation and two papers cover a novel new asymmetric cell design and modeling of this new design. Finally we have a paper on gasoline particulate filters.
An Investigative Study of Sudden Pressure Increase Phenomenon Across the DPF
Kihong Kim, GM Korea Co.; Rahul Mital, General Motors Co.; Takehiro Higuchi, IBIDEN; Seomoon Chan, GM Korea Co.; Chang Hwan Kim, General Motors Co.

Theoretical and Experimental Analysis of Ash Accumulation and Mobility in Ceramic Exhaust Particulate Filters and Potential for Improved Ash Management
Alexander Sappok, Yujun Wang, Ruo-Qian Wang, Carl Kamp, Victor Wong, Massachusetts Institute of Technology

New Asymmetric Plugging Layout of Diesel Particulate Filters for the Pressure Drop Reduction
Kazuki Nakamura, Ibiden Co., Ltd.; Athanasios Konstandopoulos, Margaritis Kostoglou, CERTH/CPERI and Aristotle University; Toshiaki Shibata, Yuki Hashizume, Ibiden Co., Ltd.

Analysis of Asymmetric and Variable Cell Geometry Wall-Flow Particulate Filters
Athanassios G. Konstandopoulos, Margaritis Kostoglou, CERTH/CPERI and Aristotle University

Regeneration investigation in Cordierite-Particulate-Filter with Hexagonal Cell Structure for Robustness Performance Enhancement
Kentaro Iwasaki, Sumika Ceramics Poland Sp. z o.o.

Ash-accumulation Study on Ceramic Particulate Filter Substrates with Asymmetric Cell Design for High Durability Performance
Kentaro Iwasaki, Sumika Ceramics Poland Sp. z o.o.

Cause and Effect of Reversible Deactivation of Diesel Oxidation Catalysts
Homayoun Ahari, Michael Zammit, Luis Cattani, Chrysler Group LLC; Jason Jacques, Thomas Pauly, Umicore Autocat USA Inc

Applicable Diesel Oxidation Catalyst for Multi-Diesel Exhaust System
Yosuke Goto, Umicore Shokubai Japan Co., Ltd.; Naohiro Kato, Umicore AG & Co. KG; Shota Kawashima, Yoshiyuki Hayashi, Hideki Goto, Masao Hori, Umicore Shokubai Japan Co., Ltd.

DOC Development Targeting Emerging High S Area Market
Lifeng Wang, Takeshi Kadono, Satoshi Sumiya, Johnson Matthey Japan GK

Comprehensive Gasoline Exhaust Gas Aftertreatment, an Effective Measure to Minimize the Contribution of Modern Direct Injection Engines to Fine Dust and Soot Emissions?
Bernhard Kern, Umicore Autocat Luxembourg; Stephanie Spiess, Joerg Michael Richter, Umicore AG & Co. KG

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Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity

Thursday, April 10
System Integration and Durability

Session Code: PFL421

Room 411 B  Session Time: 1:00 p.m.

This session will cover various aspects of system durability and system integration pertaining to Diesel Exhaust Emissions Control. It includes publications contributing to the understanding of durability of exhaust catalysts and particulate filters, mechanisms of their performance degradation and possible mitigation strategies, data from the field tests, analysis of the aged catalysts, laboratory and accelerated on-engine aging studies, along with relevant experimental tools and methodology.

Organizers - Eric Corrigan, Corning Inc.; Pradeep Prasad, Aleksey Yezerets, Cummins Inc.

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<th>Time</th>
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| 1:00 p.m. | 2014-01-1494 | Secondary Fuel Injection Characterization of a Diesel Vaporizer for Active DPF Regeneration  
Eric Hein, Adam Kotrba, Tobias Inclan, Andrew Bright, Tenneco |
| 1:20 p.m. | 2014-01-1493 | Test Method Development for Material Selection of Diesel Exhaust Line  
Claudine Miraval, Pierre-Olivier Santacreu, Saghi Saedlou, Antoine Acher, Aperam |
| 1:40 p.m. | 2014-01-1499 | Comparative Study on Performance and Emission Characteristics of Fish Oil Biodiesel and Mahua Oil Biodiesel Blend with Diesel and Diesel Fuel in a Medium Capacity Compression Ignition Employing Urea-SCR with Cu-ZSM5  
Shubham Sharma, B.Tech., Delhi Technological University; Sahil Gupta, Naveen Kumar, Delhi Technological University; Sidhant Kumar, B.Tech., Delhi Technological University |
| 2:00 p.m. | 2014-01-1500 | Effect of Accelerated Aging Rate on the Capture of Fuel-Borne Metal Impurities by Emissions Control Devices  
Aaron Williams, Robert McCormick, National Renewable Energy Laboratory; Michael Lance, Chao Xie, Todd Toops, Oak Ridge National Laboratory; Rasto Brezny, Manufacturers of Emission Controls Assoc |
| 2:20 p.m. | 2014-01-1498 | Analysis of the Aftertreatment Sizing for Pre-Turbo DPF and DOC Exhaust Line Configurations  
José Ramón Serrano, Carlos Guardiola, Pedro Piqueras, Emanuele Angiolini, Universitat Politècnica de València |
| 2:40 p.m. | 2014-01-1501 | Emission Characteristics from After-Treatment System of Medium and Light Duty Engines  
Keiichi Hayashizaki, Mitsuru Hosoya, Hiroshi Urushibara, Hiroshi Hirabayashi, Hideki Honda, Yoichiro Nakamura, Hino Motors, Ltd. |
| 3:00 p.m. | 2014-01-1496 | Experimental Study of Catalyzed Diesel Particulate Filter with Exhaust Fuel Injection System for Heavy-Duty Diesel Engines  
Tao Tang, Dongxiao Cao, Jun Zhang, Yan-guang Zhao, Shi-jin Shuai, Tsinghua University |

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00439 and SUB-TP-00010, or individually. To purchase visit collections.sae.org

Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity

Thursday, April 10

Combustion Control and Optimization (Part 1 of 2)

Session Code: PFL280

Room 411 C  Session Time: 8:00 a.m.
This session covers engine combustion control and optimization techniques. Topics include engine combustion diagnostics as specialized for control, control methodologies and algorithms, optimization, related combustion sensing, etc.

**Organizers** - John R. Bucknell; Michael Prucka, Chrysler Group LLC; Robert Gary Prucka, Clemson Univ.

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<th>Time</th>
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<tr>
<td>8:00 a.m.</td>
<td>2014-01-1355</td>
<td>Control and Constraint of NOx Emissions during Transient Manoeuvres, Based on an Engine Combustion Model</td>
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<td>Peter Fussey, Oxford University and Ricardo UK; David Limebeer, Oxford University</td>
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<td>8:20 a.m.</td>
<td>2014-01-1356</td>
<td>Fuel Economy Optimization of Euro 6 Compliant Light Commercial Vehicles Equipped with SCR</td>
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<td>Matteo De Cesare, Federico Stola, Cosimo Senni, Alfredo Di Monte, Stefano Sgatti, Magneti Marelli SpA Powertrain Division</td>
</tr>
<tr>
<td>8:40 a.m.</td>
<td>2014-01-1357</td>
<td>Multivariable Control of Dual Loop EGR Diesel Engine with a Variable Geometry Turbo</td>
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<td>Nassim Khaled, Michael Cunningham, Cummins Inc.; Jaroslav Pekar, Adrian Fuxman, Ondrej Santin, Honeywell Automotive Software</td>
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<tr>
<td>9:00 a.m.</td>
<td>2014-01-1345</td>
<td>On-Board Fuel Identification using Artificial Neural Networks</td>
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<td>Florin Mocanu, Wayne State Univ.</td>
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<tr>
<td>9:20 a.m.</td>
<td>2014-01-1351</td>
<td>Optimal Catalytic Converter Heating in Hybrid Vehicles</td>
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<td>Markus Schori, Univ. of Rostock; Thomas Boehme, IAV Automotive Engineering; Torsten Jeinsch, Univ. of Rostock; Matthias Schultalbers, IAV Automotive Engineering</td>
</tr>
<tr>
<td>9:40 a.m.</td>
<td>2014-01-1358</td>
<td>Stochastic Knock Detection, Control, Software Integration, and Evaluation on a V6 Spark-Ignition Engine under Steady-State Operation</td>
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<td>Wei Luo, Bo Chen, Jeffrey Naber, Michigan Technological Univ.; Chris Glugla, Ford Motor Co.</td>
</tr>
<tr>
<td>10:00 a.m.</td>
<td>2014-01-1349</td>
<td>Recent Advances in Knock Analysis, Simulation, and Control</td>
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<td>Jill M. Spelina, James C. Peyton Jones, Jesse Frey, Villanova Univ.</td>
</tr>
<tr>
<td>10:20 a.m.</td>
<td>2014-01-1352</td>
<td>A Study of Combustion Control Parameter Optimization in a Diesel Engine Using Cylinder Pressure</td>
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<td>Buomsik Shin, Insoo Jung, Soonchan Pyo, Yohan Chi, Hyundai Motor Co.</td>
</tr>
<tr>
<td>10:40 a.m.</td>
<td>2014-01-1362</td>
<td>Closed-loop Control of Low Temperature Combustion Employing Ion Current Detecting Technology</td>
</tr>
<tr>
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<td>Zhiqiang Zhang, Tongji Univ.; Fuquan Zhao, Tsinghua Univ.; Liguang Li, Zhijun Wu, Jun Deng, Zongjie Hu, Tongji Univ.</td>
</tr>
<tr>
<td>11:00 a.m.</td>
<td>2014-01-1346</td>
<td>Automatic Combustion Control for Calibration Purposes in a GDI Turbocharged Engine</td>
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<td>Enrico Corti, Claudio Forte, Nicolo Cavina, Giorgio Mancini, Vittorio Ravaglioli, University of Bologna</td>
</tr>
<tr>
<td>11:20 a.m.</td>
<td>2014-01-1350</td>
<td>Combustion Model Based Explanation of the ( P_{\text{max}} ) and IMEP Coupling Phenomenon in Diesel Engine</td>
</tr>
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The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00396, SUB-TP-00008 and STL-TP-00009, and also individually. To purchase visit collections.sae.org

Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity
### Combustion Control and Optimization (Part 2 of 2)

**Session Code:** PFL280  
**Room:** Room 411 C  
**Session Time:** 1:00 p.m.

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

**Organizers:** John R. Bucknell; Michael Prucka, Chrysler Group LLC; Robert Gary Prucka, Clemson Univ.

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<th>Time</th>
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<tr>
<td>1:00 p.m.</td>
<td>2014-01-1360</td>
<td>Combustion Ionization for Resonance Detection and Mitigation Using Pilot Injection in a Diesel Engine</td>
</tr>
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<td>Tamer Badawy, Naeim Henein, Wayne State Univ.</td>
</tr>
<tr>
<td>1:20 p.m.</td>
<td>2014-01-1347</td>
<td>Individual Cylinder IMEP Estimation using a Single Cylinder Pressure Sensor for Light-duty Diesel Engines</td>
</tr>
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<td>Kyunghan Min, Jaesung Chung, Eunhwan Kang, Myoungho Sunwoo, Hanyang Univ.</td>
</tr>
<tr>
<td>1:40 p.m.</td>
<td>2014-01-1364</td>
<td>Analysis of the Relationship between Noise Emission and In-Cylinder Pressure in a Small Displacement Diesel Engine</td>
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<td>Ornella Chiavola, Giancarlo Chiatti, Erasmo Recco, ROMA TRE Univ.</td>
</tr>
<tr>
<td>2:00 p.m.</td>
<td>2014-01-1344</td>
<td>A Predictive Model of $P_{\text{max}}$ and IMEP for Intra-Cycle Control</td>
</tr>
<tr>
<td>2:20 p.m.</td>
<td>2014-01-1348</td>
<td>Enhancement of a Software-Based Sensing Approach, which Instantaneously Determines the Mixture Fraction of Bio-Diesel Present in a Crude Oil Based Classic Diesel Fuel by Use of an Alternative Set of Integral Key-Parameters</td>
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<td>Michael Pontoppidan, Numidis Sarli; Gino Montanari, Magneti Marelli Sistemas Automotivos</td>
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The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00396 and SUB-TP-00009, ar: individually. To purchase visit collections.sae.org

**Planned by** Engine Combustion / Powertrain Fuels and Lubricants Activity

### Alternative and Advanced Fuels (Part 2 of 2)

**Session Code:** PFL330  
**Room:** Room 412 A  
**Session Time:** 8:00 a.m.

This session focuses on the fundamental properties of fuels and methods for measuring these properties, as well as issues related to fuel storage and transportation. Examples include diesel fuel lubricity determination, fuel effects on deposits, cold weather issues, and environmental and toxicological impacts of new fuels.

**Organizers:** Casey Maxwell Allen, Marquette University; George Karavalakis, Univ. of California-Riverside; Amanda Lea-Langton, Univ. of Leeds; Elisa Toulson, Michigan State University

**Chairpersons:** Charles Mueller, Sandia National Laboratories; George Karavalakis, Univ. of California-Riverside

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<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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<tr>
<td>8:00 a.m.</td>
<td>2014-01-1475</td>
<td>Experimental Studies on Butanol/Gasoline Fuel Blends in a Four Stroke Engine Powered Motorcycle</td>
</tr>
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<td>M. Muralidharan, Neeraj Kumar, Mrinmoy Kalita, M. Sithananthan, Ved Singh, Indian Oil Corp. Ltd.</td>
</tr>
</tbody>
</table>
Thursday, April 10

Fuel Injection and Sprays - Experimental Sprays (Part 2 of 2)

Session Code: PFL321

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.

Organizers - Tarek M. Abdel-Salam, East Carolina University; Essam El-Hannouny, Argonne National Laboratory; Jacqueline O’Connor, Sandia National Laboratories

Chairpersons - Vasudha Patri, Argonne National Laboratory

8:00 a.m. 2014-01-1453 Performance Analysis of 18% HCNG fuel on Heavy Duty Engine
M. Subramanian, Indian Oil Corp., Ltd.

8:20 a.m. 2014-01-1463 The Impact of Fuel Ethanol Content on Particulate Emissions from Light-Duty Vehicles Featuring Spark Ignition Engines
Piotr Bielaczyc, Andrzej Szczotka, Joseph Woodburn, Bosmal Automotive R & D Institute

8:40 a.m. 2014-01-1451 Regulated Emissions, Air Toxics, and Particle Emissions from SI-DI Light-Duty Vehicles Operating on Different Iso-Butanol and Ethanol Blends
George Karavalakis, Daniel Short, Diep Vu, Mark Villela, Robert Russell, Heejung Jung, Akua Asa-Awuku, Thomas Durbin, University of California

9:00 a.m. 2014-01-1471 Combustion Modeling of Landfill Gas Fueled Spark Ignition Engine Performance
Daniel Swain, S O Bade Shrestha, Western Michigan Univ.

9:20 a.m. 2014-01-1459 A Preliminary Investigation of the Performance and Emissions of a Port-Fuel Injected SI Engine Fueled with Acetone-Butanol-Ethanol (ABE) and Gasoline
Karthik Nithyanandan, Univ. of Illinois; Han Wu, Chang’an University; Ming Huo, Chia-Fon Lee, Univ. of Illinois

9:40 a.m. 2014-01-1467 Comparison of Regulated Emissions and Particulate Matter of Gasoline/CNG Dual-Fuel Taxi Over New European Driving Cycle
Xin Wang, Yunshan Ge, Beijing Institute of Technology

10:00 a.m. 2014-01-1452 Performance Analysis of 18% HCNG fuel on Heavy Duty Engine
M. Subramanian, Indian Oil Corp., Ltd.

Navin Kumar, Abyarth Behera, Dulari Hansdah, Murugan Sivalingam, NIT Rourkela

10:40 a.m. 2014-01-1472 Direct Sugar to Hydrocarbon (DSH) Fuel Performance Evaluation in Multiple Diesel Engines

11:00 a.m. 2014-01-1469 Research on Ethylene Glycol Monoethyl Ether Palm Oil Monoester as a Novel Biodiesel-Like Fuel and Its Effect on Diesel Engine Performance
Xiao Chen, Xi’an Jiaotong University; Hejun Guo, Xi’an Research Institute of High Tech; Liqiang Zhang, Xi’an Jiaotong University

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00391, SUB-TP-00009 and SI TP-00010, and also individually. To purchase visit collections.sae.org

Planned by Fuels and Lubricants / Powertrain Fuels and Lubricants Activity
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.

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00404, SUB-TP-00008 and SUB-TP-00009, and also individually. To purchase visit collections.sae.org

Planned by Fuels and Lubricants / Powertrain Fuels and Lubricants Activity

Thursday, April 10

Fuel Injection and Sprays - Hardware and Testing (Part 1 of 2)

Session Code: PFL323

Room 412 B

Session Time: 10:40 a.m.
This session is devoted to experimental and computational work in the area of fuel injection systems and sprays. Topics include: spray characterization, cavitation, multi-phase jet modeling, CFD models for spray processes, wall films and impingement, hydraulic circuit analysis, and dissolved gas effects. Studies of both gasoline and diesel fuel sprays and fuel injection equipment are encouraged.

Organizers - Tarek M. Abdel-Salam, East Carolina University; Essam El-Hannouny, Argonne National Laboratory; Jacqueline O’Connor, Sandia National Laboratories

Chairpersons - Jacqueline O’Connor, Pennsylvania State University; Wei Zeng, Sandia National Laboratories

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<tr>
<th>Time</th>
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<th>Title</th>
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<tr>
<td>10:40 a.m.</td>
<td>2014-01-1447</td>
<td>Experimental Investigation of Fuel Impingement and Spray-Cooling on the Piston of a GDI Engine via Instantaneous Surface Temperature Measurements</td>
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<td>Fabian Köpple, Dimitri Seboldt, Paul Jochmann, Alexander Hettinger, Andreas Kufferath, Robert Bosch GmbH; Michael Bargende, IVK, University of Stuttgart</td>
</tr>
<tr>
<td>11:00 a.m.</td>
<td>2014-01-1446</td>
<td>Gasoline Wall Films and Spray/Wall Interaction Analyzed by Infrared Thermography</td>
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<td>Florian Schulz, Jürgen Schmidt, Otto-von-Guericke-University Magdeburg; Andreas Kufferath, Wolfgang Samenfink, Robert Bosch GmbH</td>
</tr>
<tr>
<td>11:20 a.m.</td>
<td>2014-01-1438</td>
<td>The Effects of GDi Fuel Pressure on Fuel Economy</td>
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<td>Harry Husted, Timothy D. Spegar, Joseph Spakowski, Delphi Automotive</td>
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<td></td>
<td>2014-01-1439</td>
<td>Experimental Study on Injector Spray Pattern Optimization for a Turbocharged GDI Engine Combustion System (Written Only -- No Oral Presentation)</td>
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<td>Xiangang Wang, Zhangsong Zhan, Xun Yu, Tiegang Hu, Yanjun Qiao, Yuming Zhu, Shuhui Jiang, Changan Automobile Company</td>
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The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00411 and SUB-TP-00008, or individually. To purchase visit collections.sae.org

Planned by Fuels and Lubricants / Powertrain Fuels and Lubricants Activity
Abnormal SI Combustion (Part 2 of 2)

Session Code: PFL213

This session focuses on abnormal SI combustion processes including spark knock and 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. (Part 2 of 2)

Organizers - Terrence Alger, Southwest Research Institute; Richard S. Davis, John O. Waldman, General Motors Co.; Lurun Zhong, Chrysler Corporation LLC

Chairpersons - Lurun Zhong, Chrysler Corporation LLC; Terrence Alger, Southwest Research Institute

Time | Paper No. | Title |
-----|------------|-------|
8:00 a.m. | 2014-01-1216 | The Effects of Octane, Sensitivity and <italic>K</italic> on the Performance and Fuel Economy of a Direct Injection Spark Ignition Vehicle |
| | | Caroline Nicola Orlebar, Shell Global Solutions (UK); Arndt Joedicke, Shell Global Solutions (Deutschland) GmbH; William Studzinski, GM |
8:20 a.m. | 2014-01-1220 | Engine Knock in an SI Engine with Hydrogen Supplementation under Stoichiometric and Lean Conditions |
| | | Yu Chen, Robert Raine, University of Auckland |
8:40 a.m. | 2014-01-1221 | Modeling Investigation of Auto-ignition and Engine Knock by \text{HO}_2<sub>2</sub> |
| | | Jiankun Shao, Christopher Rutland, University of Wisconsin |
Thursday, April 10

SI Direct Injection Technology

Session Code: PFL212

Focuses on SI combustion technologies that employ direct, in-cylinder fuel injection. Topics of particular interest include in-cylinder fuel injection and spray studies, flow/spray interaction and in-cylinder mixture formation studies, and combustion chamber shape optimization. Focus includes "stratified" operation or other modes enabled by DI hardware, DI-specific emissions issues such as particulates and smoke, and technologies enabled by DISI (such as downsizing).

Organizers - Sudhakar Das, SwRI; Richard S. Davis, General Motors Co.; James W G Turner, Jaguar Land Rover; Jianwen Yi, Ford Motor Co.

Chairpersons - James W G Turner, Jaguar Land Rover; Jianwen Yi, Ford Motor Co.

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<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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<tbody>
<tr>
<td>10:00 a.m.</td>
<td>2014-01-1209</td>
<td>Fuel System Pressure Increase for Enhanced Performance of GDI Multi-Hole Injection Systems</td>
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<td>Guy Hoffmann, Bizhan Befrui, Axel Berndorfer, Walter F. Piock, Daniel L. Varble, Delphi Automotive</td>
</tr>
<tr>
<td>10:20 a.m.</td>
<td>2014-01-1210</td>
<td>New Combustion Concept for Turbocharged Gasoline Direct-Injection Engines</td>
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<td>Shinichi Mitani, Susumu Hashimoto, Hiroshi Nomura, Rio Shimizu, Mutsumi Kanda, Toyota Motor Corp.</td>
</tr>
<tr>
<td>10:40 a.m.</td>
<td>2014-01-1211</td>
<td>Injection Quantity Range Enhancement by Using Current Waveform Control Technique for DI Gasoline Injector</td>
</tr>
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<td>Ryo Kusakabe, Motoyuki Abe, Hitachi, Ltd.; Hideharu Ebara, Tohru Ishikawa, Takuya Mayuzumi, Takao Miyake, Hitachi Automotive Systems, Ltd.</td>
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The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00410 and SUB-TP-00008, and also individually. To purchase visit collections.sae.org

Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity

Thursday, April 10

Spark Assisted Compression Ignition, SACI

Session Code: PFL240

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 Engine Combustion / Powertrain Fuels and Lubricants Activity
Mixed mode combustion with both flame propagation and controlled auto ignition (distinct from damage inducing, uncontrolled SI knock). The scope of topics includes fuel/additive effects and SACI mode change. Papers describing experimental or applied simulation results are invited and will be placed in appropriate sub-sessions. Papers with an emphasis on the modeling aspects of combustion are encouraged to be submitted into PFL110 or PFL120 modeling sessions.

**Organizers** - Janardhan Kodavasal; Sotirios Mamalis, MAHLE Powertrain LLC; Laura Manofsky

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<tr>
<td>10:40 a.m.</td>
<td>2014-01-1289</td>
<td>Characterization of SACI Combustion for Use in Model Based Controls</td>
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<td>Veli Kivanc Temel, Jeff Sterniak, Robert Bosch LLC</td>
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<td>11:00 a.m.</td>
<td>2014-01-1288</td>
<td>Combustion Mode Switch by Integrating Stoichiometric ASSCI Mode in a Four-cylinder Gasoline SI/HCCI Engine</td>
</tr>
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<td>Dongsheng Li, Zhi Wang, Hui Liu, Jian-Xin Wang, Tsinghua Univ.</td>
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Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity

**Thursday, April 10**

**Emissions Measurement and Testing (Part 1 of 2)**

**Session Code:** PFL440

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

**Organizers** - Allen B. Duncan, Environmental Protection; Leslie Hill, Horiba, Ltd.; Phil Price, Ford Motor Co.

**Chairpersons** - Kamalkishore Chhaganlal Vora, A R A I

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<th>Time</th>
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<td>8:00 a.m.</td>
<td>2014-01-1580</td>
<td>Development of a High Sensitivity and High Response Portable Smoke Meter</td>
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<td>Tomohiro Minagawa, Tsukasa Sokken Co., Ltd.; Daji Nagaoka, Hiroyuki Yuza, Teruo Nakada, Isuzu Motors Ltd.; Takeyuki Kamimoto</td>
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<tr>
<td>8:20 a.m.</td>
<td>2014-01-1584</td>
<td>Uncertainties in Measurements of Emissions in Chassis Dynamometer Tests</td>
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<td>Lokanath Mohanta, Suresh Iyer, Partha Mishra, David Klinikowski, Pennsylvania State University</td>
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<tr>
<td>8:40 a.m.</td>
<td>2014-01-1576</td>
<td>Comparative Influences of Air and Nitrogen as Dilution Gases in Measurement of Diesel Engine Particle Number Concentrations</td>
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<td>Nehemiah Sabinus Alozie, David Peirce, Lionel Ganippa, Brunel University London</td>
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<tr>
<td>9:00 a.m.</td>
<td>2014-01-1568</td>
<td>Influence of Dilution Conditions on Diesel Exhaust Particle Measurement Using a Mixing Tube Diluter</td>
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<td>Nehemiah Sabinus Alozie, David Peirce, Brunel University London; Andreas Lindner, Wolfgang Winklmayr, Tapcon &amp; Analysesysteme; Lionel Ganippa, Brunel University London</td>
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Thursday, April 10

Emissions Measurement and Testing (Part 2 of 2)

**Session Code:** PFL440
**Room 413 B**
**Session Time:** 1:00 p.m.

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

**Organizers** - Allen B. Duncan, Environmental Protection; Leslie Hill, Horiba, Ltd.; Phil Price, Ford Motor Co.

**Time** | **Paper No.** | **Title**
--- | --- | ---
1:00 p.m. | 2014-01-1579 | *VERTdePN Quality Test Procedures of DPF+SCR Systems*  
Jan Czerwinski, Univ. of Applied Sciences Biel-Bienne; Yan Zimmerli, Univ. of Applied Sciences; Andreas Mayer, TTM; Norbert Heeb, EMPA; Jacques Lemaire, AEEDA; Giovanni D’Urbano, BAFU

1:20 p.m. | 2014-01-1569 | *Testing of SCR-Systems on HD-Vehicles TeVeNO*  
Jan Czerwinski, Univ. of Applied Sciences Biel-Bienne; Yan Zimmerli, Univ. of Applied Sciences; Andreas Mayer, TTM; Norbert Heeb, EMPA; Heinz Berger, ASTRA; Giovanni D’Urbano, BAFU

1:40 p.m. | 2014-01-1586 | *NH*  
John Hoard, Nandagopalan Venkataramanan, University of Michigan; Barbara Marshik, William Murphy, MKS Instruments Inc.
2:00 p.m. 2014-01-1572 Determination of the R Factor for Fuel Economy Calculations Using Ethanol-Blended Fuels over Two Test Cycles  
C. Scott Sluder, Brian H. West, Oak Ridge National Laboratory; Aron D. Butler, Arvon L. Mitcham, US Environmental Protection Agency; William J. Ruona, Ford Motor Co.

2:20 p.m. 2014-01-1570 Comparison of Measurement Strategies for Light Absorbing Aerosols from Modern Diesel Engines  
Michael Robinson, Z. Gerald Liu, Cummins Emission Solutions; Michael Olson, James Schauer, Univ. of Wisconsin

2:40 p.m. 2014-01-1574 Vehicle Evaporative Emissions Characterization by Chromatographic Techniques Applied to Different Gasoline-Ethanol Blends  
Susanna Paz, Rosa Delgado, David Riba, Applus Idiada

3:00 p.m. ORAL ONLY Navigating the Maze of Automotive Cabin VOC Emission Test Methods  
Joe Franklin, Intertek

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00382 and SUB-TP-00010, or individually. To purchase visit collections.sae.org

Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity

Thursday, April 10

PPC Combustion Processes Experiments  
Session Code: PFL252  
Room 414 A/B  
Session Time: 8:00 a.m.

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 PFL110 or PFL120 modeling sessions.

Organizers - Bengt Johansson, Lund University

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<td>8:00 a.m.</td>
<td>2014-01-1302</td>
<td>Extension of the Lower Load Limit of Gasoline Compression Ignition with 87 AKI Gasoline by Injection Timing and Pressure</td>
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<td>Christopher P. Kolodziej, Stephen Ciatti, Argonne National Lab.; David Vuilleumier, Univ. of California; Bishwadipa Das Adhikary, Rolf Reitz, Univ. of Wisconsin</td>
</tr>
<tr>
<td>8:20 a.m.</td>
<td>2014-01-1299</td>
<td>Experimental and Computational Assessment of Inlet Swirl Effects on a Gasoline Compression Ignition (GCI) Light-Duty Diesel Engine</td>
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<td>Paul Loeper, Youngchul Ra, David Foster, Jaal Ghandhi, Univ. of Wisconsin</td>
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<td>8:40 a.m.</td>
<td>2014-01-1294</td>
<td>The Impact of Intake Dilution and Combustion Phasing on the Combustion Stability of a Diesel Engine</td>
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<td>Prasad Divekar, Xiaoye Han, Shui Yu, Xiang Chen, Ming Zheng, University of Windsor</td>
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<td>Bishwadipa Das Adhikary, Rolf Reitz, Univ. of Wisconsin; Stephen Ciatti, Christopher Kolodziej, Argonne National Lab.</td>
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The papers in this session are available in SAE Technical Paper Collection, SUB-TP-00009, and also individually. To purchase visit collections.sae.org
Thursday, April 10

Fuel/Additive Effects on PPC Combustion Processes and Emissions

Session Code: PFL254
Room 414 A/B
Session Time: 9:40 a.m.

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 PFL110 or PFL120 modeling sessions.

Organizers - Bengt Johansson, Lund University

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<th>Time</th>
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<tr>
<td>9:40 a.m.</td>
<td>2014-01-1304</td>
<td>Characterization of Low Load PPC Operation using RON70 Fuels</td>
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<td>P.C. Bakker, Eindhoven University of Technology; J.E. De Abreu Goes,</td>
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<td>Politecnico di Torino; L.M.T. Somers, B.H. Johansson, Eindhoven University</td>
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<td>of Technology</td>
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<tr>
<td>10:00 a.m.</td>
<td>2014-01-1292</td>
<td>Combustion and Emission Characteristics in a DME Premixed Charge</td>
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<td>Compression Ignition Diesel Engine</td>
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<td>Yuwei Zhao, Ying Wang, Shenghua Liu, Xi'an Jiaotong Univ.</td>
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<tr>
<td>10:20 a.m.</td>
<td>2014-01-1301</td>
<td>Compression Ratio and Derived Cetane Number Effects on Gasoline</td>
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<td>Compression Ignition Engine Running with Naphtha Fuels</td>
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<td>Yoann Viollet, Junseok Chang, Gautam Kalghatgi, Saudi Aramco</td>
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<td>10:40 a.m.</td>
<td>2014-01-1303</td>
<td>Using Oxygenated Gasoline Surrogate Compositions to Map RON and MON</td>
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<td>Hadeel Solaka Aronsson, Martin Tuner, Bengt Johansson, Lund Univ.</td>
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<tr>
<td>11:00 a.m.</td>
<td>2014-01-1298</td>
<td>Clean Combustion in a Diesel Engine Using Direct Injection of Neat n-Butanol</td>
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<td>Tadanori Yanai, Xiaoye Han, Meiping Wang, Graham T. Reader, Ming Zheng, University of Windsor; Jimi Tjong, Ford Motor Co.</td>
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</table>

Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity

Thursday, April 10

PPC Combustion Processes Modeling

Session Code: PFL251
Room 414 A/B
Session Time: 1:00 p.m.

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 PFL110 or PFL120 modeling sessions.

Organizers - Bengt Johansson, Lund University

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<tr>
<th>Time</th>
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<tbody>
<tr>
<td>1:00 p.m.</td>
<td>2014-01-1295</td>
<td>The Nature of Heat Release in Gasoline PPCI Engines</td>
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<td>Wenwen Sang, Wai K. Cheng, MIT; Amir Maria, Chevron</td>
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</tbody>
</table>
Thursday, April 10

Vehicle Dynamics, Stability and Control (Part 3 of 4)

Session Code: AC500
Room 415 A
Session Time:  8:00 a.m.

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

Organizers - David A. Finch, Raetech Corp.; W. Riley Garrott, National Hwy Traffic Safety Admin; Paul Grygier; Mark Heitz; Gary J. Heydinger, SEA, Ltd.; Raymond Leto, TotalSim LLC; David R. Mikesell; Michael Royce; M. Kamel Salaani, Transportation Research Center Inc.; Amandeep Singh, US Army TARDEC

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<tr>
<th>Time</th>
<th>Paper No.</th>
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<tr>
<td>8:00 a.m.</td>
<td>2014-01-0149</td>
<td>Implementation of Real-Time Vehicle Rollover Prevention System</td>
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<td>Chi-Chun Yao, Jin-Yan Hsu, Yu-Sheng Liao, Ming Hung Li, Automotive</td>
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<td>Research &amp; Testing Center</td>
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<tr>
<td>8:20 a.m.</td>
<td>2014-01-0090</td>
<td>Inertia Tensor and Other Mass Properties Measurement for Automotive</td>
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<td>Applications</td>
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<td></td>
<td>Massimiliano Gobbi, Giampiero Mastinu, Giorgio Previati, Politecnico</td>
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<td>di Milano (Tech. Univ.)</td>
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</tbody>
</table>
Methods in Vehicle Mass and Road Grade Estimation
Narayanan Kidambi, R. L. Harne, University of Michigan; Yuji Fujii, Gregory M. Pietron, Ford Motor Co.; K. W. Wang, University of Michigan

Estimation of the Real Vehicle Velocity Based on UKF and PSO
Guirong Zhuo, Fengbo Zhang, Tongji University

Design Challenges in the Development of a Large Vehicle Inertial Measurement System
Joshua L. Every, The Ohio State University; Gary J. Heydinger, SEA Ltd.; Dennis A. Guenther, The Ohio State University; Anmol S. Sidhu, Dale A. Andreatta, Ronald A. Bixel, SEA Ltd.

Vehicle Sideslip Angle EKF Estimator based on Nonlinear Vehicle Dynamics Model and Stochastic Tire Forces Modeling
Mario Hrgetic, Josko Deur, Univ. of Zagreb; Vladimir Ivanovic, Eric Tseng, Ford Motor Co.

Effective Vehicle Sideslip Angle Estimation using DVS Technology
Mario Milanesi, Ilario Gerlero, Modelway srl; Carlo Novara, Politecnico di Torino

A Novel Method for Side Slip Angle Estimation of Omni-Directional Vehicles
Boyuan Li, Haiping Du, Weihua Li, University of Wollongong

Longitudinal Slip Ratio Control of Electric Powertrains Using a Controller Output Observer for Disturbance Rejection
Scott Varnhagen, Donald Margolis, Univ. of California

Vehicle Modeling and Performance Evaluation Using Active Torque Distribution
Rizwan Latif, Raja Amer Azim, National University of Sciences & Tech.; Aamer Ahmed Baqai, Abasyn Univ.; Imran Shafi, National University of Sciences & Tech.

Modeling and Simulation of Intelligent Driving with Trajectory Planning and Tracking
Mengxun Wu, Weiwen Deng, Sumin Zhang, Hao Sun, State Key Lab of Automotive Simulation & Control, Jilin Univ; Bin Liu, Bingxu Shang, Shaobo Qiu, R&D Center, China FAW Group

A Dynamic Model for Tire/Road Friction Estimation under Combined Longitudinal/Lateral Slip Situation (Written Only -- No Oral Presentation)
Mingyuan Bian, Long Chen, Yugong Luo, Keqiang Li, Tsinghua University

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00376, and also individually. To purchase visit collections.sae.org

Planned by Vehicle Dynamics Committee / Automobile Chassis Activity; Motorsports Engineering Committee / Motor Engineering Activity

Thursday, April 10

Vehicle Dynamics, Stability and Control (Part 4 of 4)
Session Code: AC500
Room 415 A Session Time: 1:00 p.m.

This session is focused on vehicle dynamics and controls using modeling and simulation, and experimental analysis of passenger cars, heavy trucks, and wheeled military vehicles. This session addresses active and passive safety systems to mitigate rollover, yaw instability and braking issues; driving simulators and hardware-in-the-loop systems; suspension kinematics and compliance, steering dynamics, advanced active suspension technologies; and tire force and moment mechanics.
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<th>Time</th>
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<tr>
<td>1:00 p.m.</td>
<td>2014-01-0121</td>
<td>Location-Aware Adaptive Vehicle Dynamics System: Concept Development</td>
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<tr>
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<td>Rebecca Anne Bandy, Sukhwan Cho, Cullen Matthews, John Celli, Robert</td>
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<td>Binns, John Ferris, Virginia Tech; Joerg Schlinkheider, Marc Wimmershoff,</td>
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<td>Volkswagen Group of America, Inc.</td>
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<td>1:20 p.m.</td>
<td>2014-01-0105</td>
<td>Location-Aware Adaptive Vehicle Dynamics System: Throttle Modulation</td>
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<td>Sukhwan Cho, Rebecca Anne Bandy, John Ferris, Virginia Tech; Joerg</td>
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<td>Schlinkheider, Marc Wimmershoff, Volkswagen Group of America, Inc.</td>
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<td>1:40 p.m.</td>
<td>2014-01-0079</td>
<td>Location-Aware Adaptive Vehicle Dynamics System: Brake Modulation</td>
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<td>Sukhwan Cho, Rebecca Anne Bandy, John Ferris, Virginia Tech; Joerg</td>
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<td>Schlinkheider, Marc Wimmershoff, Volkswagen Group of America, Inc.</td>
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<td>2:00 p.m.</td>
<td>2014-01-0137</td>
<td>Optimal Design of On-Center Steering Force Characteristic Based on</td>
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<td>Correlations between Subjective and Objective Evaluations</td>
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<td>Jianmin Dang, Hui Chen, Bolin Gao, Qi Li, Minhaol Li, Tongji University;</td>
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<td>Takeshi Watanabe, Ryouhei Hayama, Liming Lou, Shirou Nakanoto, JTEKT</td>
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<td>Corp.</td>
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<td>2:40 p.m.</td>
<td>2014-01-0138</td>
<td>Design Optimisation of Adaptive Scooter to Ensure Optimal Vehicle</td>
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<td>Handling and Safety</td>
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<td>Shiwalik Ghosh, Baskan Anthony Samy, Hero MotoCorp Ltd.</td>
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<td>3:00 p.m.</td>
<td>2014-01-0078</td>
<td>Two Wheeled Vehicle Ride Comfort Evaluation and Optimization</td>
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<td>Using Bump Test Rig in Virtual Simulation and Validation Through</td>
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<td>Actual Testing</td>
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<td>Rama Subbu, Baskan Anthony Samy, Piyush mani Sharma, Hero MOTOCORP Ltd.</td>
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<td>3:20 p.m.</td>
<td>2014-01-0126</td>
<td>The Influence of Motorcycle Usage Pattern on its Stability and</td>
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<td>Response in Dynamic Condition</td>
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<td>Shiwalik Ghosh, Baskan Anthony Samy, Hero MotoCorp Ltd.</td>
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<td>2014-01-0082</td>
<td>Minimization of Sweep Width of Tractor Semi-Trailers at Low Speeds</td>
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<td>via Active Trailer Steering (Written Only -- No Oral Presentation)</td>
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<td>Yang Qi; Nenggen Ding; Feng Gao; Guoyan Xu</td>
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<td></td>
<td>2014-01-0083</td>
<td>A New Control Strategy for Electric Power Steering on Low Friction</td>
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<td>Roads (Written Only -- No Oral Presentation)</td>
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<td>Lu Fan, Bing Zhou, Hunan University; Harry Zheng, University of Waterloo</td>
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<td>2014-01-0093</td>
<td>High Speed Optimal Yaw Stability of Tractor-Semitrailers with Active</td>
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<td>Trailer Steering (Written Only -- No Oral Presentation)</td>
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<td>Xiaomin Lin, Nenggen Ding, Guoyan Xu, Feng Gao, Beihang University</td>
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<td>2014-01-0109</td>
<td>Steer Assistance Control for Improved Vehicle Response (Written</td>
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<td>Only -- No Oral Presentation)</td>
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<td>Prashanth KR. Vaddi, Sandeep Vinjamuri, Kumar Cheruvu, Indian Institute</td>
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<td>of Technology</td>
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<td>2014-01-0136</td>
<td>The Three Suspension Roll Centers and their Application to Vehicle</td>
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<td>Dynamics (Written Only -- No Oral Presentation)</td>
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<td>Ibrahim A. Badiru, General Motors Co.</td>
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Thursday, April 10

Noise and Vibration (Part 6 of 8): Vehicle Interior NVH and Source Identification

Session Code: AC200
Room 415 B  Session Time: 8:00 a.m.

This session will cover intake/exhaust/powertrain and chassis noise and vibration. Papers covering vehicle interior comfort, advanced methods and subjective response are also welcome.

Organizers - Christopher Shaw, Visteon Climate Control; Barry Robert Wyerman, Janesville Acoustics

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<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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<tr>
<td>8:20 a.m.</td>
<td>2014-01-0038</td>
<td>Evaluation System for Simulating and Reducing Interior Noise Caused by Wind</td>
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<td>Jin-Seok Hong, Hyundai Motor Co.; Hyung-Seok Kook, Kookmin University; Kang-Duck Ih, Hyoong-Gun Kim, Hyundai Motor Co.</td>
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<tr>
<td>8:40 a.m.</td>
<td>2014-01-0032</td>
<td>Study of Vehicle Seat Vibration Characteristics through Sensitivity Analysis</td>
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<td>Sung Young Shin, Korea Automotive Technology Institute; Sang Dong Lee, Bong Chul Go, Dae Won San Up Co. Ltd.</td>
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<td></td>
<td>2014-01-0004</td>
<td>Vehicular Cabin Noise Source Identification and Optimization Using Beamforming and Acoustical Holography (Written Only -- No Oral Presentation)</td>
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<td>Ajo John Thomas, Avnish Gosain, Prashanth Balachandran, Maruti Suzuki India Ltd.</td>
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</table>

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00376 and SUB-TP-00006, ar. individually. To purchase visit collections.sae.org

Planned by Vehicle Dynamics Committee / Automobile Chassis Activity; Motorsports Engineering Committee / Motor Engineering Activity

Thursday, April 10

Noise and Vibration (Part 7 of 8): Advanced Methodologies

Session Code: AC200
Room 415 B  Session Time: 1:00 p.m.

This session will cover intake/exhaust/powertrain and chassis noise and vibration. Papers covering vehicle interior comfort, advanced methods and subjective response are also welcome.

Organizers - Robert Powell, Exa Corporation; Christopher Shaw, Visteon Climate Control

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<th>Time</th>
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<tr>
<td>1:00 p.m.</td>
<td>2014-01-0031</td>
<td>Identification of Vibro-Acoustic Coupled Modes for Vehicle</td>
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<td>Takahito Watanabe, Takuya Yoshimura, Tokyo Metropolitan Univ.</td>
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</table>
Thursday, April 10

Noise and Vibration (Part 8 of 8): Target Setting

Session Code: AC200
Room 415 B
Session Time: 2:20 p.m.

This session will cover intake/exhaust/powertrain and chassis noise and vibration. Papers covering vehicle interior comfort, advanced methods and subjective response are also welcome.

Organizers - Christopher Morgan, Autoliv ASP; Christopher Shaw, Visteon Climate Control

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<th>Time</th>
<th>Paper No.</th>
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<tbody>
<tr>
<td>2:20 p.m.</td>
<td>2014-01-0035</td>
<td><strong>A Study of Coupling Behavior of Acoustic Cavity Modes to Improve Booming Noise in Passenger Vehicles</strong></td>
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<td>Gaurav Gupta, Rituraj Gautam, Chetan Prakash Jain, Maruti Suzuki India, Ltd.</td>
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<tr>
<td>2:40 p.m.</td>
<td>2014-01-0023</td>
<td><strong>Measurement Technique for Quantifying Structure Borne and Air Borne Noise Levels in Utility Vehicle (Written Only -- No Oral Presentation)</strong></td>
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<td>Manchi Venkateswara Rao, Mahindra &amp; Mahindra, Ltd.; Jos Frank, NVH Technologies; Prasath Raghavendran, Automotive OEM</td>
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Planned by Noise and Vibration Committee / Automobile Chassis Activity

Thursday, April 10

Vehicle Aerodynamics (Part 6 of 10): Test Facilities

Session Code: B500
Room 430 A
Session Time: 8:00 a.m.

Vehicle aerodynamic development, drag reduction and fuel economy, handling and stability, cooling flows, surface soiling and water management, vehicle internal environment, tyre aerodynamics and modelling, aeroacoustics, structural response to aerodynamic loading, simulating the on-road environment, onset flow turbulence, unsteady aerodynamics, fundamental flow structures, new test methods and facilities, new applications of computational fluid dynamics simulation, competition vehicle aerodynamics.

Organizers - Edward G. Duell, Jacobs Technology Inc.; Bahram Khalighi, General Motors Co.; Raymond Leto; Todd Lounsberry, Chrysler Group LLC; James T. McKillen, Thomas N. Ramsay, Honda R & D Americas Inc.; David Sims-Williams, Durham Univ.; Sandeep Sovani, ANSYS Inc.; Mesbah Uddin,

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<th>Time</th>
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<tr>
<td>8:00 a.m.</td>
<td>2014-01-1976</td>
<td><strong>Vehicle Interior Sound Quality Analysis by Using Grey Relational Analysis</strong></td>
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<td>Shuming Chen, Dengfeng Wang, Jilin University</td>
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Planned by Noise and Vibration Committee / Automobile Chassis Activity
Thursday, April 10

Vehicle Aerodynamics (Part 7 of 10): Surface Contamination

Session Code: B500

Room 430 A

Session Time: 10:40 a.m.

Vehicle aerodynamic development, drag reduction and fuel economy, handling and stability, cooling flows, surface soiling and water management, vehicle internal environment, tyre aerodynamics and modelling, aeroacoustics, structural response to aerodynamic loading, simulating the on-road environment, onset flow turbulence, unsteady aerodynamics, fundamental flow structures, new test methods and facilities, new applications of computational fluid dynamics simulation, competition vehicle aerodynamics.

Organizers - Bahram Khalighi, General Motors Co.; Arturo Guzman, Chrysler Group LLC; Taeyoung Han, General Motors Co.; Raymond Leto; Todd Lounsberry, Chrysler Group LLC; James T. McKillen, Honda R & D Americas Inc.; David Sims-Williams, Durham Univ.; Sandeep Sovani, ANSYS Inc.; Mesbah Uddin, UNC Charlotte Motorsports Engineering; H. Robert (Bob) Welge, Robert’s Engineering Development; Thomas N. Ramsay, Honda R & D Americas Inc.; Adrian P. Gaylard, Jaguar Land Rover; Kurt Zielinski, Honda R & D Americas Inc.; Edward G. Duell, Jacobs Technology Inc.; Gary M. Elfstrom, Univ. of Ontario Institute of Technology; Gregory Fadler, Navistar; Mark E. Gleason, Chrysler Group LLC; Kevin Golsch, Navistar

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00378 and SUB-TP-00004, and individually. To purchase visit collections.sae.org

Planned by Vehicle Aerodynamics Committee / Automobile Body Activity
Thursday, April 10

Vehicle Aerodynamics (Part 8 of 10): CFD Methods Development

Session Code: B500
Room 430 A
Session Time: 1:00 p.m.

Vehicle aerodynamic development, drag reduction and fuel economy, handling and stability, cooling flows, surface soiling and water management, vehicle internal environment, tyre aerodynamics and modelling, aeroacoustics, structural response to aerodynamic loading, simulating the on-road environment, onset flow turbulence, unsteady aerodynamics, fundamental flow structures, new test methods and facilities, new applications of computational fluid dynamics simulation, competition vehicle aerodynamics.

Organizers - Kurt Zielinski, Honda R & D Americas Inc.; Taeyoung Han, Bahram Khalighi, General Motors Co.; Raymond Leto; Todd Lounsberry, Chrysler Group LLC; James T. McKillen, Thomas N. Ramsay, Honda R & D Americas Inc.; David Sims-Williams, Durham Univ.; Mesbah Uddin, UNC Charlotte Motorsports Engineering; H. Robert (Bob) Welge, Robert’s Engineering Development; Sandeep Sovani, ANSYS Inc.; Adrian P. Gaylard, Jaguar Land Rover; Edward G. Duell, Jacobs Technology Inc.; Gary M. Elfstrom, Univ. of Ontario Institute of Technology; Gregory Fadler, Navistar; Mark E. Gleason, Chrysler Group LLC; Kevin Golsch, Navistar; Arturo Guzman, Chrysler Group LLC

Time | Paper No. | Title |
--- | --- | --- |
1:00 p.m. | 2014-01-0599 | Alternative Simulation Methods for Assessing Aerodynamic Drag in Realistic Crosswind  
Andrew D’Hooge, Robert Palin, Luke Rebbeck, Tesla Motors; Joaquin Gargoloff, Bradley Duncan, Exa Corp. |
1:20 p.m. | 2014-01-0594 | Computational Study of the Aerodynamics of a Realistic Car Model by Means of RANS and Hybrid RANS/LES Approaches  
Suad Jakirlic, Lukas Kutej, Technische Universitaet, Darmstadt; Branislav Basara, AVL List GmbH; Cameron Tropea, Technische Universitaet, Darmstadt |
Thursday, April 10

Vehicle Aerodynamics (Part 9 of 10): Motorsports

Session Code: B500
Room 430 A
Session Time: 3:00 p.m.

Vehicle aerodynamic development, drag reduction and fuel economy, handling and stability, cooling flows, surface soiling and water management, vehicle internal environment, tyre aerodynamics and modelling, aeroacoustics, structural response to aerodynamic loading, simulating the on-road environment, onset flow turbulence, unsteady aerodynamics, fundamental flow structures, new test methods and facilities, new applications of computational fluid dynamics simulation, competition vehicle aerodynamics.

Organizers - H. Robert (Bob) Welge, Robert's Engineering Development; Kevin Golsch, Navistar; Arturo Guzman, Chrysler Group LLC; Taeyoung Han, Bahram Khalighi, General Motors Co.; Todd Lounsberry, Chrysler Group LLC; James T. McKillen, Honda R & D Americas Inc.; David Sims-Williams, Durham Univ.; Sandeep Sovani, ANSYS Inc.; Mesbah Uddin, UNC Charlotte Motorsports Engineering; Raymond Leto, TotalSim LLC; Thomas N. Ramsay, Honda R & D Americas Inc.; Adrian P. Gaylard, Jaguar Land Rover; Kurt Zielinski, Honda R & D Americas Inc.; Edward G. Duell, Jacobs Technology Inc.; Gary M. Elfstrom, Univ. of Ontario Institute of Technology; Gregory Fadler, Navistar; Mark E. Gleason, Chrysler Group LLC

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<th>Time</th>
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<th>Title</th>
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<tr>
<td>3:00 p.m.</td>
<td>2014-01-0596</td>
<td>Methodology for the Design of an Aerodynamic Package for a Formula SAE Vehicle</td>
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<td>Christopher Craig, Martin A. Passmore, Loughborough Univ.</td>
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<tr>
<td>3:20 p.m.</td>
<td>2014-01-0600</td>
<td>Aerodynamic Structure and Development of Formula 1 Racing Car Wakes</td>
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<td>Matthew Watts, Simon Watkins, RMIT Univ.</td>
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<tr>
<td>3:40 p.m.</td>
<td>ORAL ONLY</td>
<td>Design Exploration of Formula One Airfoils using Data Mining Techniques</td>
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<td>Matthew Watts, Simon Watkins, RMIT Univ.</td>
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Planned by Vehicle Aerodynamics Committee / Automobile Body Activity

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Thursday, April 10

Vehicle Aerodynamics (Part 10 of 10): Commercial Vehicles

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Planned by Vehicle Aerodynamics Committee / Motorsports Engineering Activity
Vehicle aerodynamic development, drag reduction and fuel economy, handling and stability, cooling flows, surface soiling and water management, vehicle internal environment, tyre aerodynamics and modelling, aeroacoustics, structural response to aerodynamic loading, simulating the on-road environment, onset flow turbulence, unsteady aerodynamics, fundamental flow structures, new test methods and facilities, new applications of computational fluid dynamics simulation, competition vehicle aerodynamics.

Organizers - Kevin Golsch, Navistar; Bahram Khalighi, General Motors Co.; Raymond Leto; Todd Lounsberry, Chrysler Group LLC; James T. McKillen, Thomas N. Ramsay, Honda R & D Americas Inc.; David Sims-Williams, Durham Univ.; Sandeep Sovani, ANSYS Inc.; Mesbah Uddin, UNC Charlotte Motorsports Engineering; H. Robert (Bob) Welge, Robert’s Engineering Development; Gregory Fadler, Navistar; Adrian P. Gaylard, Jaguar Land Rover; Kurt Zielinski, Honda R & D Americas Inc.; Edward G. Duell, Jacobs Technology Inc.; Gary M. Elfstrom, Univ. of Ontario Institute of Technology; Mark E. Gleason, Arturo Guzman, Chrysler Group LLC; Taeyoung Han, General Motors Co.

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00378, and also individually. To purchase visit collections.sae.org

Planned by Vehicle Aerodynamics Committee / Automobile Body Activity

Thursday, April 10

Occupant Protection: Event Data Recorders (EDR)

Session Code: B500

Session Time: 4:00 p.m.

Room 430 A

Vehicle aerodynamic development, drag reduction and fuel economy, handling and stability, cooling flows, surface soiling and water management, vehicle internal environment, tyre aerodynamics and modelling, aeroacoustics, structural response to aerodynamic loading, simulating the on-road environment, onset flow turbulence, unsteady aerodynamics, fundamental flow structures, new test methods and facilities, new applications of computational fluid dynamics simulation, competition vehicle aerodynamics.

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Planned by Vehicle Aerodynamics Committee / Automobile Body Activity

Thursday, April 10

Occupant Protection: Event Data Recorders (EDR)

Session Code: B402

Session Time: 8:00 a.m.

Room 430 B

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

Organizers - Christopher D. Armstrong, KEVA Engineering; Timothy Cheek, Delta V Forensic Engrr; Geoff Germaine, Germaine Engineering; Jason R. Kerrigan, Univ. of Virginia; L. Daniel Metz; David Plant, D P Plant & Associates; Heath Spivey, Delta V Forensic Engrr; John T. Sprague, General Motors Co.; John C. Steiner, KEVA Engineering; Craig Wilkinson, MEA Forensic Engineers & Scientists

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Planned by Vehicle Aerodynamics Committee / Automobile Body Activity

Thursday, April 10
Chat with the Experts: Advances in Diesel Engine Combustion - A Chat with Industry Leaders

Keynote Address: What is Driving the Next Generation?

We will discuss the state-of-the-art of the diesel engine and advances in combustion as they relate to both light-duty and heavy-duty applications. The discussion leaders will facilitate the discussion and coordinate questions and answers during the chat.

Examples of topics to be explored include: (1) How does the trade-off between fuel-consumption, emissions and noise fit with low-temperature combustion and other advances? (2) How will new emissions and fuel consumption standards impact the diesel engine, and what technologies exist to further advance diesel engine performance to meet these? (3) What potential remains for increasing fuel injection control and injection pressure? (4) How can better integration of combustion control and emissions control improve system performance?

Organizers - Paul C. Miles, Sandia National Laboratories; Jeffrey Naber, Michigan Technological Univ.

Moderators - Paul C. Miles, Sandia National Laboratories; Jeffrey Naber, Michigan Technological Univ.


Thursday, April 10

Keynote Address: What is Driving the Next Generation?
Thursday, April 10

Connected Car and Cyber Security

**Session Code:** CONG302  
**Room AVL Technology Leadership Center/G**  
**Session Time:** 9:00 a.m.

We are connected, but are we safe? As vehicles become more connected to the Internet, wireless networks and each other, consumers are at greater risk of becoming victims of hacking. Possible threats to interconnected systems and cyber security are front and center for every manufacturer and supplier. This session looks at the ways in which manufacturers are addressing cyber security and the proactive steps they are taking to stay current and thwart potential threats.

**Moderators** - Michael C. Dudzik, CEO, Environmental Research Institute of Michigan  
**Panelists** - Glen W. De Vos, Vice President - Engineering, Electronics & Safety, Delphi Corporation; Andreas Mai, Director Product Management, Smart Connected Vehicles, Cisco Systems Inc.; David A. McNamara, President, MTS LLC; Andre Weimerskirch, Research Scientist, University of Michigan Transportation Research Institute (UMTRI), Transportation Cyber-Security & Privacy;

Thursday, April 10

Good Things Come in Small Packages

**Session Code:** ANN104  
**Room AVL Technology Leadership Center/G**  
**Session Time:** 9:45 a.m.

Today’s powertrain engineers are in the midst of a revolution in engine technology as virtually every OEM readjusts its powertrain mix to get the most out of increasingly efficient engines. This session will examine recent developments and new trends that include various boosting technology strategies, advanced combustion systems and fuel injection technologies, and advanced emission controls with modern DI concepts where particulate size and count mitigation are increasingly becoming compliance relevant factors for CAFE, LEVIII and particulate emissions.

**Moderators** - Dean Tomazic, Executive Vice President and Chief Technical Officer, FEV Inc.  
**Panelists** - Richard Balsley II, Assistant Chief Engineer, Global Powertrain Large Four Cylinder Turbocharged Engines, General Motors Co.; John W. Juriga, Director, Powertrain, Hyundai America Technical Center, Inc.; Tom McCarthy, Chief Engineer, Engine Research & Advanced Engineering, Ford Motor Co.; Walter Riedl, Vice President of Powertrain Systems, Business Customers, BMW AG;