Tuesday, September 29

Thermal Systems Modeling & Simulations (Part 1 of 2)

Session Code: TMSS700  
Room Mediterranean  
Session Time: 11:00 a.m.

There is clear recognition that optimization of thermal systems (powertrain cooling, HVAC systems) has significant implications to Fuel economy of automobiles. The Thermal Simulation/Analysis/Modeling session will focus on application of simulation technologies to development and evaluation of new thermal systems. Presentations will focus on both 1D and 3D simulation tools as applied to steady and transient phenomenon.

Organizers - Bashar AbdulNour, General Dynamics Land Systems; Wilko Jansen, Jaguar & Land Rover; Kumar Srinivasan, FCA US LLC; Sudhi Uppuluri, Computational Sciences Experts Group

Time | Paper No. | Title
--- | --- | ---
11:00 a.m. | ORAL ONLY | Improving Warm-Up Fuel Efficiency of a Gasoline Engine Using a Multi-Domain Physical Model  
Josko Balic, AVL LIST GmbH

11:30 a.m. | ORAL ONLY | Cold-ambient Warm-up Predictions and Improvements Using a 1D Computational Model  
Sudhi Uppuluri, Hemant R Khalane, Ajay Naiknaware, Computational Sciences Experts Group; Yogesh Umbarkar, Ricardo

12:00 p.m. | ORAL ONLY | Model Predictive Control of an Advanced Thermal Management System in a Laboratory Environment  
Phillip Bonkoski, Ford Motor Company; Adrian Fuxman, Honeywell Automotive Software; Colby Buckman, Jason Powers, Amey Karnik, Ford Motor Company; Jaroslav Pekar, Honeywell Automotive Software

Tuesday, September 29

Alternative Refrigerants (Part 2 of 2)

Session Code: TMSS400  
Room Mediterranean  
Session Time: 2:00 p.m.

Legislation, Service Cost, Thermal Performance, Safe Vehicle Operation and Vehicle Fuel Economy are but several of the areas where the mobile air conditioning refrigerant selection impacts the customer experience. Topics of interest in this session include design guidance, valves to control flow, and refrigerant blends.

Organizers - Jeffrey Bozeman, General Motors Co.; Gursaran D. Mathur, CalsonicKansei North America Inc.; Tao Zhan, California Air Resources Board

Time | Paper No. | Title
--- | --- | ---
2:00 p.m. | ORAL ONLY | History and Importance of SAE Cooperative Research to Advance Mobile Air Conditioning Systems  
Gary Pollak, SAE International; Stephen Andersen, Inst.for Gov. & Sust. Development

2:30 p.m. | ORAL ONLY | Energy-efficient Heating of Electric-vehicles  
Gregor Homann, Volkswagen Aktiengesellschaft; Juergen Koehler, Univ Of Braunschweig
Waste Heat Recovery (Part 1 of 2)

Session Code: TMSS900

Room Mediterranean

Session Time: 4:00 p.m.

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

Organizers - Ronald Semel, Ford Motor Company; Gursaran D. Mathur, CalsonicKansei North America Inc.; Edward Gerges, Dana-Long Manufacturing; Kevin Laboe, FCA US LLC

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<tr>
<th>Time</th>
<th>Paper No.</th>
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<tbody>
<tr>
<td>4:00 p.m.</td>
<td>ORAL ONLY</td>
<td>Thermal Management Approaches from Quick Warm-up to Waste Heat Recovery</td>
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<td>Katsuya Minami, Honda R&amp;D Co., Ltd.</td>
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<tr>
<td>4:30 p.m.</td>
<td>ORAL ONLY</td>
<td>Latent Heat Storage - Advanced System for Fuel Economy Optimization of Internal Combustion Engines in Conventional and Hybrid Vehicles</td>
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<td>Guillaume HEBERT, Halla Visteon Climate Control Corp.</td>
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<tr>
<td>5:00 p.m.</td>
<td>ORAL ONLY</td>
<td>Performance Analysis of Organic Rankine Cycle (ORC) for Recovering Waste Heat from a Heavy Duty Diesel Engine</td>
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<td>Kartik Kulkari, Loughborough University; Ayush Sood, IFP School(Institut Francais du Petrole)</td>
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Keynote Speaker: Chris Cowland, FCA USA LLC

Session Code: TMSSK1

Room Salon EFGH

Session Time: 8:30 a.m.

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<tr>
<th>Time</th>
<th>Paper No.</th>
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<tr>
<td>ORAL ONLY</td>
<td></td>
<td>Learn More About This Keynote Speaker</td>
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<tr>
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<td>Chris Cowland, FCA US LLC</td>
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Regulatory Topics

Session Code: TMSS600

Room Salon EFGH

Session Time: 9:30 a.m.

The purpose of this session is to provide an update on global regulations on vehicle thermal management and HVAC systems.

Organizers - Ales Alajbegovic, Exa Corporation; John Rugh, National Renewable Energy Laboratory; Tao Zhan, California Air Resources Board

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Tuesday, September 29

Alternative Refrigerants (Part 1 of 2)

Session Code: TMSS400

Room Salon EFGH

Session Time: 11:00 a.m.

Legislation, Service Cost, Thermal Performance, Safe Vehicle Operation and Vehicle Fuel Economy are but several of the areas where the mobile air conditioning refrigerant selection impacts the customer experience. Topics of interest in this session include design guidance, valves to control flow, and refrigerant blends.

Organizers - Jeffrey Bozeman, General Motors Co.; Gursaran D. Mathur, CalsonicKansei North America Inc.; Tao Zhan, California Air Resources Board

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<th>Time</th>
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<tbody>
<tr>
<td>11:00 a.m.</td>
<td>ORAL ONLY</td>
<td>Secondary-Loop Motor Vehicle Air Conditioning Optimized for Cost-Effective Low-Carbon Footprint</td>
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<td>Stephen Andersen, Inst. for Gov. &amp; Sust. Development; Sangeet Kapoor, Tata Motors, Ltd.; Timothy Craig, MAHLE Behr; Prasanna Nagarhali, Tata Motors, Ltd.; Mark Zima, Delphi Automotive Systems</td>
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<tr>
<td>11:30 a.m.</td>
<td>ORAL ONLY</td>
<td>Using Scientific Evidence to Explain the Importance to Climate Protection of Improved MACs</td>
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<td>Nancy J. Sherman, Inst. for Gov. &amp; Sust. Development</td>
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<tr>
<td>12:00 p.m.</td>
<td>ORAL ONLY</td>
<td>Experimental Cooling and Energy Performance of Motor Vehicle AC using HFC-152a</td>
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<td>Yunho Hwang, Univ. of Maryland</td>
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Tuesday, September 29

Vehicle Climate Control

Session Code: TMSS200

Room Salon EFGH

Session Time: 2:00 p.m.

Climate control is a defining vehicle attribute often associated with brand image. Thermal performance and quality of climate control are both critical to customer satisfaction. While the primary objective of a climate control system is to deliver thermal comfort and occupant safety with low energy consumption, there are strong design interactions with other vehicle systems. Localized comfort, secondary fluids, air quality, controls, system sizing and HVAC consumer interface are just a few of the recent advances in this rapidly developing topic area.

Organizers - Jeffrey Bozeman, General Motors Co.; Hector Cano, Bergstrom Inc.; Jason Aaron Lustbader, National Renewable Energy Laboratory; Gursaran D. Mathur, CalsonicKansei North America Inc.

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<th>Time</th>
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<tr>
<td>2:00 p.m.</td>
<td>ORAL ONLY</td>
<td>Where Does All the Heating and Cooling Power Go?</td>
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<td>Filip Nielsen, Volvo Car Corporation</td>
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<tr>
<td>2:30 p.m.</td>
<td>ORAL ONLY</td>
<td>Climate Control Load Reduction Strategies for Electric Drive Vehicles in Cold Weather</td>
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<td>Larry Chaney, Matthew A. Jeffers, John Rugh, National Renewable Energy Laboratory</td>
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</table>
Waste Heat Recovery (Part 2 of 2)

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

Organizers - Ronald Semel, Ford Motor Company; Gursaran D. Mathur, CalsonicKansei North America Inc.; Edward Gerges, Dana-Long Manufacturing; Kevin Laboe, FCA US LLC

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<tbody>
<tr>
<td>9:30 a.m.</td>
<td>ORAL ONLY</td>
<td>Development of the Compact Adsorption Cooling System for Passenger Vehicle</td>
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<td>Manabu Orihashi, Masaki Morita, Toyota Motor Corporation; Yasuki Hirota, Ryuichi Iwata, Toyota Central R&amp;D Labs., Inc.</td>
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<tr>
<td>10:00 a.m.</td>
<td>ORAL ONLY</td>
<td>Model Based Experimental Investigation of a Compression-Couple Based Thermoelectric Generator</td>
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<td>Nariman Mansouri, Edward Timm, Michigan State University; Dipankar Sahoo, Adam Kotrba, Tenneco Inc; Harold Schock, Michigan State University</td>
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Wednesday, September 30

Thermal Systems Modeling & Simulations (Part 2 of 2)

There is clear recognition that optimization of thermal systems (powertrain cooling, HVAC systems) has significant implications to Fuel economy of automobiles. The Thermal Simulation/Analysis/Modeling session will focus on application of simulation technologies to development and evaluation of new thermal systems. Presentations will focus on both 1D and 3D simulation tools as applied to steady and transient phenomenon.

Organizers - Bashar AbdulNour, General Dynamics Land Systems; Wilko Jansen, Jaguar & Land Rover; Kumar Srinivasan, FCA US LLC; Sudhi Uppuluri, Computational
### Wednesday, September 30

#### Thermal Systems and Components

**Session Code:** TMSS300  
**Room Mediterranean**  
**Session Time:** 2:00 p.m.

Thermal Management represents one of the key aspects of the vehicle development. It ensures that the temperatures in the underhood and underbody areas are in desired ranges, that thermal systems operate as designed, and that no component operation is at risk due to excessive temperatures. This session covers the design of thermal components and systems and their vehicle integration.

**Organizers** - Ronald Semel, Ford Motor Company; Ales Alajbegovic, Exa Corporation; Alaa El-Sharkawy, FCA US LLC; Andrew Sutherland, BorgWarner Inc.

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<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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| 2:00 p.m.  | ORAL ONLY  | **Improved Vehicle Transient Response Via Charge Air Sub-Cooling**  
Hugh Blaxill, MAHLE Powertrain LLC |
| 2:30 p.m.  | ORAL ONLY  | **Electrical 48V Main Coolant Pump to Meet New Thermal Management Requirements**  
Michael Krappel, Alfred Elsaesser, Thomas Schmidt, Simon Streng, Mahle International GmbH |
| 3:00 p.m.  | ORAL ONLY  | **iFit -- A Novel Vehicular AC Condenser that Achieves the AC Fuel Reduction by 8.7%**  
Kelvin Zhai, Changan Automobile Global R&D Center |
| 3:30 p.m.  |            | **BREAK**                                                  |
| 4:00 p.m.  | ORAL ONLY  | **Benefits of Electronic Expansion Valve for Automotive Air Conditioner with Internal Heat Exchanger (IHX)**  
Rongrong Zhang, Edwin John Stanke, Sanhua Group |
| 4:30 p.m.  | ORAL ONLY  | **Thermal Management Concepts for Fuel Cell Electric Vehicles Based on Thermochemical Heat Storages**  
Mounir Nasri, Michael Schier, Institute Of Vehicle Concepts; Marc Philipp Linder, Institute of Engineering Thermodynamics; Horst Friedrich, Institute Of Vehicle Concepts |
| 5:00 p.m.  | ORAL ONLY  | **Ultrasonically-Assisted Heat Exchanger**  
Kamel Azzouz, Valeo Thermal Systems; Julien Tissot, Amrid mammeri, VALEO THERMAL SYSTEM |
**Wednesday, September 30**

**Keynote Speaker: Brady Ericson, BorgWarner**

**Session Code:** TMSSK2

**Room Salon EFGH**

**Session Time:** 8:30 a.m.

**Organizers -** Alexander Lee, SAE International

**Time** | **Paper No.** | **Title**
--- | --- | ---
ORAL ONLY | Learn More About This Keynote Speaker
Brady D. Ericson, BorgWarner Inc.

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**Wednesday, September 30**

**Thermal Systems for Hybrid and Electric Vehicles**

**Session Code:** TMSS100

**Room Salon EFGH**

**Session Time:** ALL DAY

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

**Organizers -** Bashar AbdulNour, General Dynamics Land Systems; Ales Alajbegovic, Exa Corporation; Christophe Petitjean, Valeo Thermal Systems; John Rugh, National Renewable Energy Laboratory

**Time** | **Paper No.** | **Title**
--- | --- | ---
9:30 a.m. | ORAL ONLY | A Design Process for Battery Pack Thermal Systems
Edward Tate, Exa Corporation; Wilko Jansen, Jaguar & Land Rover; Jaehoon Han, Exa Corporation; Ian Hughes, Jaguar Land Rover; Aditya Velivelli, Zhongzhou Yang, Chinwei Chang, Exa Corporation

10:00 a.m. | ORAL ONLY | Thermal Management of the High Voltage Battery
Tobias Glossmann, Mercedes Benz R&D North America

10:30 a.m. | BREAK |

11:00 a.m. | ORAL ONLY | Battery Thermal Management Architectures and Components
Markus Wawzyniak, Marcus Weinbrenner, Achim Wiebelt, MAHLE

11:30 a.m. | ORAL ONLY | Subcooled Boiling Heat Transfer for Thermal Control of Power Electronics in Hybrid Electric Vehicles
Weihuan Zhao, Wenhua Yu, Argonne National Laboratory; David France, Univ of Illinois at Chicago; Dileep Singh, Roger Smith Jr, Argonne National Laboratory

12:00 p.m. | ORAL ONLY | New Methods of Heating Hybrid and Electric Vehicles - Webasto Heat Layer Technology
Alejandro S. Regueiro, Webasto Thermo & Comfort NA Inc.

12:30 p.m. | Networking Lunch |

2:00 p.m. | ORAL ONLY | The Impact of the Ambient Temperature on Energy Efficiency of Electrified Vehicles
Namwook Kim, Aymeric Rousseau, Eric Rask, Namdoo Kim, Neeraj Shidore, Argonne National Laboratory
Thursday, October 1

Keynote Speaker: Steven Strepek, Navistar

Session Code: TMSSK3
Room Salon EFGH
Session Time: 8:30 a.m.

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<td>Learn More About This Keynote Speaker</td>
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<td>Steve Strepek, Navistar</td>
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Thursday, October 1

Thermal Systems for Commercial & Off-Highway Vehicles

Session Code: TMSS800
Room Salon EFGH
Session Time: 9:30 a.m.

Heavy-duty on- and off-highway vehicles face unique thermal management challenges which can be very different from the thermal challenges in other transportation sectors. This session focuses on topics and technologies specific to thermal management for these vehicles.

Organizers - Jason Aaron Lustbader, National Renewable Energy Laboratory; Andrew Sutherland, BorgWarner Inc.

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<tr>
<td>9:30 a.m.</td>
<td>ORAL ONLY</td>
<td>Targeted Vehicle Thermal Management for Agriculture Tractors</td>
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<td>Adam Shuttleworth, John Deere &amp; Co.</td>
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<td>10:00 a.m.</td>
<td>BREAK</td>
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<td>10:30 a.m.</td>
<td>ORAL ONLY</td>
<td>Complete Cab Thermal Load Reduction Package for Long-Haul Truck Rest Period Idling</td>
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<td>Jason A. Lustbader, Bidzina Kekelia, National Renewable Energy Laboratory</td>
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11:00 a.m.   ORAL ONLY   Thermal System Simulations for the Powertrain of an Electric City Bus
Antti Lajunen, Aalto University