



# **HIGH EFFICIENCY IC ENGINE SYMPOSIUM**

## EVENT GUIDE

April 8-9, 2018  
Westin Book Cadillac Hotel  
Detroit, MI

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# HIGH EFFICIENCY IC ENGINE SYMPOSIUM

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### EMERGENCY PROCEDURES DURING THE HIGH EFFICIENCY IC ENGINE SYMPOSIUM

During the event attendees are to follow the established emergency guidelines of the facility where the emergency occurs. **Based on the location of the incident, report emergencies to the nearest venue representative and/or security personnel if available, or report to the SAE registration area.**

Should a catastrophic event occur, attendees should follow the safety and security instructions issued by the facility at the time of the event. This includes listening for instructions provided through the public address system and following posted evacuation routes if required.

In the event of an emergency or a major disruption to the schedule of events at the event, attendees and exhibitors may call this number to receive further information about the resumption of this event. Updates will also be provided via the SAE website at [www.sae.org](http://www.sae.org).

#### SAE EMERGENCY HOTLINE

+1.724.772.4044  
+1.800.581.9295

Attendees are permitted to bring camera equipment onto the show floor. Exhibitors retain the right to restrict photography of their products or displays and such decisions are within the discretion of the exhibitor and are not controlled by SAE International.

#### Consent to use of images

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

## SAVE THE DATE High Efficiency IC Engine Symposium

April 7-8, 2019  
Detroit, Michigan

P18193451



# INFORMATION

## Operation Hours

Sunday, April 8  
9 a.m.-7:30 p.m.  
Monday, April 9  
7 a.m.-6 p.m.

## Registration and Lanyard

Sponsored by  


## Woodward Foyer 2nd Floor

Sunday, April 8  
10 a.m.-4 p.m.  
Monday, April 9  
7 a.m.-1 p.m.

## Breaks

Sponsored by  


## Notepads and Pens

Sponsored by  


## Exhibit Hours

**Woodward Ballroom**  
Sunday, April 8  
1-7:30 p.m.  
Monday, April 9  
8 a.m.-6 p.m.

## Networking Reception

**Woodward Ballroom**  
Sunday, April 8  
6:30-7:30 p.m.

## Networking Lunch

Sponsored by  


## Venetian Ballroom 4th Floor

Monday, April 9  
12:30-1:30 p.m.

## ORGANIZING COMMITTEE

Terry Alger, Southwest Research Institute  
Zoran Filipi, Clemson University  
Bengt Johansson, King Abdullah University of  
Science and Technology  
Jim Szybist, Oak Ridge National Laboratory

## EXHIBITOR PROFILE

Exhibitor Directory text is published as submitted by exhibiting companies.

### ARGONNE NATIONAL LABORATORY

Booth **6**  
9700 S. Cass Ave  
Argonne, IL 60439  
United States  
[anl.gov](http://anl.gov)

Argonne National Laboratory's transportation research program deploys experts from many disciplines to address the problems of foreign oil dependency and greenhouse gas emissions. Working with U.S. transportation industry, Argonne researchers improve processes, create transferrable technologies, and provide cost-effective solutions in support of U.S. Department of Energy goals.

### CAMBUSTION LTD

Booth **4**  
347 Cherry Hinton Road, J6 The Paddocks  
Cambridge CB1 8DH  
England  
[www.cambustion.com](http://www.cambustion.com)

Cambustion's fast-response research grade gas and particulate analyzers enable engineers worldwide to understand engine operation and meet emissions targets, including new versions for on-board use to measure the transients seen in real-world driving. Rapid mapping and transient mapping capabilities offer cost effective routes to emissions compliance.

### CONVERGENT SCIENCE INC

Booth **5**  
6400 Enterprise Ln, Ste 101  
Madison, WI 53719-1138  
United States  
[www.convergecf.com](http://www.convergecf.com)

Convergent Science is an innovative CFD company. Our flagship product, CONVERGE, is a revolutionary CFD software with autonomous meshing capabilities that eliminate the grid generation bottleneck from the simulation process. Convergent Science is headquartered in Madison, Wisconsin, and has offices in the United States, Europe, and India and distributors worldwide.

## Keynote Speaker:

Sunday, April 8  
1:15 -1:55 p.m.

**Daniel Barba, EPA**

**"Assessing the Efficiency and  
Low-Emissions Potential of Future  
Gasoline Engines"**



Dan Barba is currently the Director of the National Center for Advanced Technology, and is responsible for advanced engine & vehicle technology programs at EPA's National Vehicle and Fuel Emissions Laboratory in Ann Arbor, Michigan. For the last five years, Mr. Barba has focused on assessing the effectiveness of advanced low emission and low fuel consumption technologies for a broad range of light-duty vehicles, engines and transmissions in support of the mid-term evaluation of MY 2021-2025 light-duty greenhouse gas standards and compliance programs. Mr. Barba earned his Bachelor of Science in Mechanical Engineering from Wayne State University.



# EVENT-AT-A-GLANCE HIGH EFFICIENCY IC ENGINE SYMPOSIUM

Sunday, April 8 - Monday, April 9

## April 8 SUNDAY

### FUTURE REGULATIONS AND REGULATORY ACTIVITY

**1 p.m.**  
**Moderator Overview**  
Zoran Filipi, Clemson University

**1:15 p.m.**  
**Assessing the Efficiency and Low-Emissions Potential of Future Gasoline Engines**  
Daniel Barba, EPA

**1:55 p.m.**  
**Co-Optima Initiative's Approach to Multi-Mode Combustion Strategies**  
Jim Szybist, Oak Ridge National Lab

**2:35 p.m.**  
**What's the Role of the ICE Going Forward?**  
Greg Pannone, Novation Analytics

**3:15 p.m. Break**

### ADVANCED GASOLINE COMBUSTION STRATEGIES

**3:45 p.m.**  
**Development of High Efficiency Jet Ignition Engines for Multiple End-Use Applications**  
Mike Bunce, Mahle

**4:25 p.m.**  
**Future Internal Combustion Engines for Efficient Contribution to Environment**  
Toshihide Yamamoto, Mazda

**5:05 p.m.**  
**Prerequisites for a Successful Spark Assisted Compression ignition (SACI)**  
Andreas Kaechele, FKFS

**5:45 p.m.**  
**Introduction of World First Mass Production Variable Compression Ratio Engine "VC-TURBO"**  
Shinichi Kiga, Nissan

**6:30-7:30 p.m. Reception**

## April 9 MONDAY

### ADVANCED LIGHT-DUTY CONCEPTS

**8 a.m.**  
**High Efficiency Engine Requirements for Future Electrified Powertrain Architectures**  
Eric Curtis, Ford

**8:40 a.m.**  
**Engine and Powertrain Efficiency to Meet Standards in the US, China, and Europe from 2020 to 2030**  
Chris Thomas, GAST Strategy Consulting LLC

**9:20 a.m.**  
**Development of High Efficiency Gasoline Engine with Thermal Efficiency over 43%**  
Youngnam Kim, Hyundai

**10 a.m. Break**

### ADVANCED HEAVY-DUTY CONCEPTS

**10:30 a.m.**  
**Heavy Duty Engine Efficiency Potential and the Impact of Emissions Regulation**  
Charlie Roberts, Southwest Research Institute

**11:10 a.m.**  
**High Efficiency Engines for Long Haul Trucks**  
Arne Andersson, Volvo Trucks

**11:50 a.m.**  
**Supercritical CO<sub>2</sub>: A New Opportunity for High Performance Waste Heat Recovery**  
Tom Briggs, Southwest Research Institute

**12:30 p.m. Lunch**

### OUTLOOK, IC ENGINE AND POWERTRAIN SYSTEMS

**1:30 p.m.**  
**Potential of Advanced Combustion for Fuel Economy Reduction in the Light-duty Fleet: Current Status and Research Needs**  
Paul Miles, Sandia

**2:10 p.m.**  
**The Direction of Powertrain Development Toward the Electric Mobility Era**  
Terutoshi Tomoda, Toyota

**2:50 p.m.**  
**Honda Powertrain Strategy and Future ICE Technology**  
Tomonori Niizato, Honda

**3:20 p.m. Break**

### NEW ICE CONCEPTS

**3:50 p.m.**  
**Energy in the Air - Using V2X Information for Real-time Vehicle Powertrain Control and Optimization**  
Scott Hotz, Southwest Research Institute; Anna Stefanopoulou, University of Michigan

**4:10 p.m.**  
**Using Connectivity and Automation to Improve Heavy-Duty Truck Fuel Economy**  
Greg Shaver, Purdue University; Ed Hodzen, Cummins

**4:30 p.m.**  
**A Pragmatic Approach to Maximizing Internal Combustion Engine Efficiency**  
Russell Durrett, GM R&D

**5:10 p.m.**  
**Lubricants - Enabling Future Powertrain Technologies and Enhancing Efficiency**  
Alex Michlberger, Lubrizol

**6 p.m. Symposium Concludes**

## EVENT-AT-A-GLANCE

Sponsored by:



# AGENDA

Sunday, April 8

Woodward Ballroom

Time	Title
1:00 p.m.	<b>Moderator Overview</b> <i>Zoran Filipi, Clemson University</i>
1:15 p.m.	<b>Assessing the Efficiency and Low-Emissions Potential of Future Gasoline Engines</b> <i>Daniel Barba, U.S. Environmental Protection Agency</i>
1:55 p.m.	<b>Co-Optima Initiative's Approach to Multi-Mode Combustion Strategies</b> <i>Jim Syzbist, Oak Ridge National Lab</i>
2:35 p.m.	<b>What's the Role of the ICE Going Forward?</b> <i>Greg Pannone, Novation Analytics</i>
<b>3:15 p.m. Break</b>	
3:45 p.m.	<b>Development of High Efficiency Jet Ignition Engines for Multiple End-Use Applications</b> <i>Michael Bunce, MAHLE</i>
4:25 p.m.	<b>Future Internal Combustion Engines for Efficient Contribution to Environment</b> <i>Toshihide Yamamoto, Mazda</i>
5:05 p.m.	<b>Prerequisites for a Successful Spark Assisted Compression Ignition (SACI)</b> <i>Andreas Kaechele, FKFS</i>
5:45 p.m.	<b>Introduction of World First Mass Production Variable Compression Ratio Engine "VC-TURBO"</b> <i>Shinichi Kiga, Nissan</i>
6:30 p.m.	<b>Reception</b>

# AGENDA

Monday, April 9

Woodward Ballroom

Time	Title
8:00 a.m.	<b>High Efficiency Engine Requirements for Future Electrified Powertrain Architectures</b> <i>Eric Curtis, Ford Motor Company</i>
8:40 a.m.	<b>Engine and Powertrain Efficiency to Meet Standards in the US, China, and Europe from 2020 to 2030</b> <i>Chris Thomas, GAST Strategy Consulting, LLC</i>
9:20 a.m.	<b>Development of High Efficiency Gasoline Engine with Thermal Efficiency over 43%</b> <i>Youngnam Kim, Hyundai</i>
<b>10:00 a.m. Break</b>	
10:30 a.m.	<b>Heavy Duty Engine Efficiency Potential and the Impact of Emissions Regulation</b> <i>Charles Roberts, Southwest Research Institute</i>
11:10 a.m.	<b>High Efficiency Engines for Long Haul Trucks</b> <i>Arne Andersson, Volvo Trucks</i>
11:50 a.m.	<b>Supercritical CO2: A New Opportunity for High Performance Waste Heat Recovery</b> <i>Tom Briggs, Southwest Research Institute</i>
<b>12:30 p.m. Lunch</b>	
1:30 p.m.	<b>Potential of Advanced Combustion for Fuel Economy Reduction in the Light-Duty Fleet: Current Status and Research Needs</b> <i>Paul Miles, Sandia</i>
2:10 p.m.	<b>The Direction of Powertrain Development Toward the Electric Mobility Era</b> <i>Terutoshi Tomoda, Toyota</i>
2:50 p.m.	<b>Honda Power Train Strategy and Future ICE Technology</b> <i>Tomonori Niizato, Honda</i>
<b>3:30 p.m. Break</b>	
3:50 p.m.	<b>Energy in the Air - Using V2X Information for Real-time Vehicle Powertrain Control and Optimization</b> <i>Scott Hotz, Southwest Research Institute; Anna G. Stefanopoulou, University of Michigan</i>
4:10 p.m.	<b>Using Connectivity and Automation to Improve Heavy-Duty Truck Fuel Economy</b> <i>Gregory Matthew Shaver, Purdue Univ-West Lafayette; Edmund P. Hodzen, Cummins Inc.</i>
4:30 p.m.	<b>A Pragmatic Approach to Maximizing Internal Combustion Engine Efficiency</b> <i>Russell Durrett, GM R&amp;D</i>
5:10 p.m.	<b>Lubricants – Enabling Future Powertrain Technologies and Enhancing Efficiency</b> <i>Scott Halley and Alex Michelberger, Lubrizol</i>

## 2018

### High Efficiency IC Engine

April 8-9  
Detroit, MI

### WCX™: SAE World Congress Experience

April 10-12  
Detroit, MI

### Connect2Car™ at WCX

April 10-12  
Detroit, MI

### Waste Heat Recovery Symposium

May 24  
Haifa, Israel

### Aviation Technology Forum

June 5-6  
Shanghai, China

### SAE Automated and Connected Vehicle Systems Testing

June 20-21  
Greenville, SC

### SAE CyberAuto Challenge™

July 23-27  
Warren, MI

### Intelligent and Connected Vehicles

August 14-15  
Kunshan City, Jiangsu, China

### Connect2Car™ Executive Leadership Forum

September 5-6  
San Jose, CA

### SAE New Energy Vehicle Forum

September 11-12  
Shanghai, China

### COMVEC™

September 11-13  
Rosemont, IL

### On-Board Diagnostics

September 11-13  
Indianapolis, IN

### North American International Powertrain Conference

September 12-14  
Chicago, IL

### Noise and Vibration Forum

September 13  
Shanghai, China

### International Powertrains, Fuels & Lubricants Meeting

September 17-19  
Heidelberg, Germany

### From ADAS to Automated Driving

October 9-11  
Detroit, MI

### Transmission and Driveline Technologies

October 9-10  
Plymouth, MI

### Co-Optimization of Fuels and Engines

October 9-10  
Plymouth, MI

### Thermal Management Systems

October 9-11  
San Diego, CA

### Brake Colloquium & Exhibition

October 14-17  
Palm Desert, CA

### Heavy Duty Diesel Emissions Control

October 16-17  
Gothenburg, Sweden

### SAE/JSAE Small Engine Technology Conference

November 6-8  
Dusseldorf, Germany

### Aerospace Systems + Technology Conference

November 6-8  
London, UK

### Defense Maintenance and Logistics Exhibition

December 17-19  
Tampa, FL

### DoD Maintenance Symposium

December 17-20  
Tampa, FL

## 2019

### Connect2Car™ at CES

January 8  
Las Vegas, NV

### International Powertrains, Fuels & Lubricants Meeting

January 22-24  
San Antonio, TX

### Hybrid and Electric Vehicle Technologies

February 19-21  
Anaheim, CA

### On-Board Diagnostics

March 12-14  
Stuttgart, Germany

### Aerotech-Americas

March 26-28  
Charleston, SC

### Government/Industry Meeting

April 3-5  
Washington, DC

### High Efficiency IC Engine

April 7-8  
Detroit, MI

### WCX™: SAE World Congress Experience

April 9-11  
Detroit, MI

### Connect2Car™ at WCX

April 9-11  
Detroit, MI

### Noise and Vibration Conference & Exhibition

June 10-13  
Grand Rapids, MI

### International Conference on Icing of Aircraft, Engines, and Structures

June 17-20, 2019  
Minneapolis, MN

### COMVEC™

September 10-12  
Indianapolis, IN

### North American International Powertrain Conference

September 18-20  
Chicago, IL

### Brake Colloquium & Exhibition

September 22-25  
Orlando, FL

### AeroTech-Europe

September 24-26  
Bordeaux, France

### Thermal Management Systems

October 15-17  
Plymouth, MI