"A time-honored front runner among all the national-level development zones in terms of comprehensive performance" — MOFCOM

The Most Reputable Industrial Zone in China — Fortune Magazine
One of the Six Most Dynamic Cities and Regions in China — UNIDO

Important Auto Industrial Base in northern China. One of the important Production Base of FAW-VW, FAW-Toyota, and Great Wall Motor.

One of the earliest State-level Economic Zones in China, with 35 years’ experience to support investors around the world.

91 Fortune 500 companies have invested 282 projects in TEDA.

Close to Tianjin Port, one of the largest Ports in China.

Over 5000 expats from more than 80 countries work and live in TEDA.

Convenient transportation and complete infrastructure, one hour by rail to Beijing.

Website: WWW.TEDA.GOV.CN
Tel: +86-22-25202790  +86-15822375589
E-mail: wangj@teda.net  weizl@teda.net
THANK YOU TO THE FOLLOWING COMPANIES FOR THEIR GENEROUS SUPPORT.
EMERGENCY PROCEDURES DURING WCX

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 sae.org.

SAE EMERGENCY HOTLINE
+1.800.581.9295
Customer Service
+1.877.606.7323

FIRST AID SERVICES
C1
Tuesday, April 9
7:00 a.m.–5:00 p.m.
Wednesday, April 10
7:00 a.m.–5:00 p.m.
Thursday, April 11
7:00 a.m.–8:00 p.m.

SECURITY / LOST AND FOUND
A-3, Front Hall A
Security is of continued importance. Your patience and understanding is appreciated as we do everything possible to secure the event. Please report any emergencies to Cobo security and staff or SAE personnel.

Bag Checks
Your safety during WCX is of the highest importance. To maintain a safe atmosphere, WCX official security officers will be conducting random bag checks throughout the Event.

CAMERA POLICY
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.

No one under the age of 18 is permitted at the event or on exhibition floor unless part of an SAE/AWIM sponsored school tour planned and pre-arranged by SAE.

No photographs or recording of remarks, discussion or presentations may be made without permission.

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.
LEARNING LAB SESSIONS

Session: Functional Safety Influencing Autonomous Vehicle Engineering
Tuesday, 10:30 AM

Session: Innovations in Risk Management Connecting Global Mobility Engineering
Wednesday, 1:30 PM

From Requirement Management to DFMEA, PFMEA, Control Plans and other areas of Quality Risk Management, PLATO solutions integrate and link all risk information together taking your company Beyond Compliance to a new level of risk management and quality control required to meet accelerating automotive technology.

Visit PLATO at booth #1419.
EVENT INFORMATION

**Registration Hours**
Main Concourse, Cobo
- Monday, April 8
  11:00 a.m.–5:00 p.m.
- Tuesday, April 9
  7:00 a.m.–5:00 p.m.
- Wednesday, April 10
  7:00 a.m.–5:00 p.m.
- Thursday, April 11
  7:30 a.m.–3:00 p.m.

**Exhibit Hours**
Hall C/D
- Tuesday, April 9
  8:45 a.m.–5:30 p.m.
- Wednesday, April 10
  8:45 a.m.–5:30 p.m.
- Thursday, April 11
  8:45 a.m.–4:00 p.m.

**Networking Receptions**
Exhibit Hall C
- Tuesday, April 9
  4:30–5:30 p.m.
- Wednesday, April 10
  4:30–5:30 p.m.

**WCX Gala**
Cobo Atrium
- Thursday, April 11
  5:00–7:00 p.m.

**SAE Member Lounge**
Exhibit Hall C
- Tuesday, April 9
  8:45 a.m.–5:30 p.m.
- Wednesday, April 10
  8:45 a.m.–5:30 p.m.
- Thursday, April 11
  8:45 a.m.–2:00 p.m.

**SAE Operations Office**
Pre-function area of Exhibit Hall C Entrance
- Tuesday, April 9
  8:00 a.m.–4:00 p.m.
- Wednesday, April 10
  8:00 a.m.–4:00 p.m.
- Thursday, April 11
  8:45 a.m.–4:00 p.m.

**SAE Sales Office**
Exhibit, Booth 2327
- Tuesday, April 9
  8:45 a.m.–5:30 p.m.
- Wednesday, April 10
  8:45 a.m.–5:30 p.m.
- Thursday, April 11
  9:00 a.m.–4:00 p.m.

**Media Center**
Exhibit, Hall D
- Tuesday, April 9
  8:00 a.m.–6:00 p.m.
- Wednesday, April 10
  8:00 a.m.–6:00 p.m.
- Thursday, April 11
  8:00 a.m.–4:00 p.m.

**Participant Lounge**
Room 330 A/B
- Tuesday, April 9
  8:30 a.m.–5:30 p.m.
- Wednesday, April 10
  8:30 a.m.–5:30 p.m.
- Thursday, April 11
  7:30 a.m.–4:30 p.m.

**Coat/Luggage Check**
Hall B Lobby/Level 2
- Tuesday, April 9
  7:00 a.m.–7:00 p.m.
- Wednesday, April 10
  7:00 a.m.–6:30 p.m.
- Thursday, April 11
  7:00 a.m.–8:00 p.m.
ACCORDING TO RESEARCH:

- Electronic systems will account for **50%** of car costs by **2030**. (Freescale/NXP)
- The automotive electronics market will reach **~$280 billion** by the year **2020**. (Grandview Research)

WITH THE INCREASED DEMAND FOR SAFETY, CONNECTIVITY AND INFOtainment,

IPC HAS THE AUTOMOTIVE INDUSTRY COVERED ...

... BY DRIVING INTELLIGENT SOLUTIONS AND STANDARDS

Top IPC Standards for the Automotive Market

- **IPC-6012DA-WAM1**, *Automotive Applications Addendum to IPC-6012D, Qualification and Performance Specification for Rigid Printed Boards*
- **Automotive addendums under development:**
  - IPC-A-610, *Acceptability of Electronic Assemblies*
  - IPC J-STD-001, *Requirements for Soldered Electrical and Electronic Assemblies*
  - IPC/WHMA-A-620, *Requirements and Acceptance for Cable and Wire Harness Assemblies*
- **Documents to support**
  - Thermal Cycles
  - Test Methods
  - Solder Fatigue
  - Press Fit

Visit IPC at **Booth 1642**! For more information on IPC and IPC’s standards development activities, visit [www.ipc.org/automotive](http://www.ipc.org/automotive).
EVENT INFORMATION

Concessions
Exhibit, Back of Hall D
Tuesday, April 9
10:00 a.m.–2:00 p.m.
Wednesday, April 10
10:00 a.m.–2:00 p.m.
Thursday, April 11
10:00 a.m.–2:00 p.m.

Security/Lost and Found
A3 - Front Hall A

Hotel Shuttle Schedule
Cobo Atrium, Atwater Drive
The shuttle will run a continuous loop at ten-minute intervals from the Motor Lobby of the Marriott Renaissance Center to Cobo Center.
Tuesday, April 9
7:00 a.m.–8:30 p.m.
Wednesday, April 10
7:00 a.m.–6:30 p.m.
Thursday, April 11
6:30 a.m.–8:00 p.m.

Wi-Fi Access at Cobo Center
Cobo Center has free, ultra-high speed Wi-Fi service available throughout the facility. Search for “cobofree” to access the Wi-Fi. Accept the terms and conditions.

WCX Ask Alexa
Pre-function of Exhibit Hall C Entrance
For additional details see page 14.

GET THE LATEST EVENT INFO

Download the WCX™ mobile app

- **LEARN** event features, programs and sessions
- **SCHEDULE** your time and don’t miss out
- **CONNECT** with speakers, exhibitors and attendees

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HONDA
AUTOMOTIVE INNOVATION
Call for Papers

The first top English academic journal of China’s Automotive Industry

- Global distribution
- Reflecting the top-level research and technical advance of automotive engineering
- The platform for demonstrating, promoting and exchanging innovative technologies

Reasons for Submission

- Opportunities to spread your research or opinions all over the world
- Opportunities to discuss the research with peers
- Opportunities to lead the development directions of technologies
- Publishing the paper in an international journal free of charge

Topics

Covering the principles, methodologies, designs, theoretical background, and cutting-edge technologies in connection with vehicles, the main topics include but are not limited to:

- Energy-saving and green vehicles
- Electric vehicles
- Intelligent and connected vehicles
- Automotive safety technologies
- Automotive manufacturing technologies
- Automotive industry system engineering

Contacts

Sponsored by

Cooperated with

Global Submission and Free download online
11th Annual Global Automotive & Mobility Innovation Challenge (GAMIC™)

Learning Lab, Hall C
Tuesday, April 9
Noon–5:00 p.m.

GAMIC will again have its finals at WCX on April 9 at COBO Center in Detroit. Twelve finalists will be judged by OEM and Tier 1 executives as well as seasoned entrepreneurial experts. The GAMIC keynote address will be given by Ken Washington, Chief Technical Officer of Ford Motor Company. The 12 competitors will be shooting for more than $350,000 in prizes (mostly in-kind prizes to speed their North American business time-to-market). They will compete in four categories:

• Energy and Advanced Mobility
• Sensors, Actuators, Manufacturing, and Materials
• New Business Models and Cybersecurity
• New, High-Value Technology Innovations

Career Corner
Front of Exhibit Hall C
Tuesday, April 9
8:45 a.m.–5:30 p.m.
Wednesday, April 10
8:45 a.m.–5:30 p.m.

“If you want a glimpse of how the future is being engineered, there is no better book than Burns’ Autonomy.”

—JEFFREY D. SACHS,
University Professor at Columbia University and Senior UN Advisor on Sustainable Development

“An authoritative preview of the autonomous age.”

—JOHN CASESA,
Former Group Vice President, Global Strategy, Ford Motor Company
**Technology Pavilions**  
Exhibit Hall C  
Tuesday, April 9 and Wednesday, April 10  
8:45 a.m.–5:30 p.m.  
Thursday, April 11  
8:45 a.m.–4:00 p.m.  
**Connect2Car Pavilion**  
Explore the products and technology shaping the future of autonomous vehicles, connectivity and cybersecurity.  
**Lightweighting - Materials - Efficiency Pavilion**  
Investigate the latest in material development and application and research and development organizations.  
**Korean Pavilion**  
Visit this dedicated area where 16 exhibitors—from startups to well-established mobility players—will showcase the latest technology and innovations from South Korea.

**Micromobility Pavilion featuring Spin**  
Hall D (enter through Hall C)  
Tuesday, April 9 and Wednesday, April 10  
8:45 a.m.–5:30 p.m.  
Thursday, April 11  
8:45 a.m.–4:00 p.m.  
Spin is a first- and last-mile micromobility company providing shared electric scooters in almost 30 cities and college campuses nationwide. All kinds of people use Spin to get around in a sustainable way, whether touring their city, getting to and from work, or heading back from a weekend errand. As a company we are committed to ensuring safety both in our operational practices and in our hardware and technology. We’re excited to be at SAE educating people on the best ways to ride scooters, with the goal of cutting down on car rides for short trips and giving people another enjoyable, efficient way to get around.

**Start-up Pavilion**  
Discover emerging innovations in this new area dedicated to start-ups. See page 59 for additional details.

**SPECIAL EVENTS**

“The drama, ambition and genius characterizing the race to develop self-driving cars zoom into sharper focus in *Autonomy*.”

—USA TODAY

“Anyone interested in learning about how we got to where we are today should definitely grab a copy.”

—FORBES
SPECIAL EVENTS

SAE Annual Business Meeting and Service Recognitions
Meeting Room 260
Tuesday April 9
3:30 – 4:30 p.m.

During the meeting, SAE President Paul Mascarenas will announce the 2019 Board of Directors, discuss his presidential activities, and present the following SAE International Service Recognitions:

• Excellence in Engineering Education Award
• Forest R. McFarland Award
• Lloyd L. Withrow Distinguished Speaker Award
• SAE Emeritus Recognition
• SAE Outstanding Faculty Advisors Program

Additionally, David L. Schutt, SAE Chief Executive Officer, will share a 2018 year-end report.

SAE International Awards Ceremony with Presenting Sponsor J.D. Power
Sponsored by

J.D. POWER

Meeting Room 260
Tuesday, April 9
5:30 – 7:30 p.m.
See page 26 for details.

WOMEN’S BREAKFAST AND ROUNDTABLE DISCUSSION

Thursday, April 11
The Exchange, Hall C, COBO Center

7:30 a.m. – BREAKFAST
8:00-9:15 a.m. – ROUNDTABLE
New Mobility: Women Leading Disruptive Innovation
The global landscape of the automotive industry is changing rapidly, and leadership in automotive is also changing dramatically. Hear thought leaders discuss challenges and opportunities they face in making the cultural transformation necessary for organizations to successfully handle complexity, uncertainty and volatility in the industry today.

Moderator: Denise Gray, LG Chem Michigan Inc. Tech Center
Panelists: Alisyn Malek, May Mobility Inc.
Greta Cutulenco, Acerta Analytics Solutions
Stacey Miller, Toyota Motor North America Digital Transformation & Mobility Group
Minyang Jiang (MJ), GoRide Health LLC

Admission to breakfast and panel presentation is included with WCX registration.

REGISTER for the Expo Only Three-Day pass to attend this and other WCX events: sae.org/wcx

Sponsored by: TOYOTA
The History of the Future: Powering the Cars of Tomorrow

From steam to fuel cells our dreams about what would power the future of mobility have changed substantially over the years. Take a journey through this history with the SAE Mobility History Committee’s vehicle display and presentation featuring over a century of innovation history.

Mobility History
Booth #2301 – Exhibit Hall C

Vehicles include:
• Stanley Steamer 3
• Detroit Electric
• Model T Ford
• Chrysler Turbine
• Toyota Prius
• Tesla Model S
• and more

This year’s Mobility History presentation will also feature talks in the Learning Lab on:
• McLaren Engines
• Ford Specials of the 50’s & 60’s
• Vehicle Designer Alex Tremulis
• Powering the Cars of the Future

Presentations will be held 10:00 a.m.–12:00 p.m. on Thursday, April 11 in the Learning Lab, Exhibit Hall C.

For more information on the Learning Lab presentations see page 23.
SAE Autonomous Demo Days
Exhibit, Hall B (enter through Hall C)
Tuesday, April 9
9:30 a.m.–4:00 p.m.
Wednesday, April 10
9:30 a.m.–4:00 p.m.
Thursday, April 11
9:30 a.m.–3:00 p.m.

In partnership with

SAE Autonomous Demo Days is a public facing event created to give people hands on experience with automated vehicles and reinforce engineering advancements designed to enable safety and show the differences between ADAS and automated functions.

SAE, in partnership with PAVE [Partners for Automated Vehicle Education] and Dataspeed, Inc., will give WCX attendees a chance to test ride the future.

SAE J3300 Driving Skills Certification Ride and Drive
Exhibit, Hall B (enter through Hall C)
Tuesday, April 9
8:45 a.m.–4:30 p.m.
Wednesday, April 10
8:45 a.m.–4:30 p.m.
Thursday, April 11
12:00–3:00 p.m.

Sponsored by

The Driving Skills Standards Committee (J3300) is establishing consistent, globally-recognizable driving skill certification standards. The Committee has over 60 participants representing 30 OEMs, suppliers, other automotive-related organizations.

This completely new, global, multi-level driving skill certification process spans the spectrum from very basic to extremely advanced levels, as well as for specialty applications such as trailer towing, winter driving, and operators of automated vehicles.

The standards can apply to basically anyone who drives or operates a vehicle, whether it be for test driving on proving grounds, operating fleet vehicles on public roads, or teen drivers.

Attendees at the WCX 2019 will be able to see and participate in two of the driving certification tests. One course will be set up for DL1 certification which focuses on basic driving and maneuvering skills. The other course will be set up for TT1 certification which focuses on basic trailer towing of small to mid-size trailers.

13TH ANNUAL AWIM INTERNATIONAL JETTOY COMPETITION
APRIL 10, 2019

Sponsored by

Adient
KIA
ZF

Hall A
9:00 a.m. – 2:00 p.m.

500+ Elementary age students (in Engineering Design Teams of 4) compete in distance, accuracy, and timed events. SAE International will host this competition through the gracious sponsorship of Adient, KIA and ZF.
SPECIAL EVENTS

WCX Connected Vehicle Challenge Face-Off
Learning Lab, Exhibit Hall C

Thursday, April 11
12:00–3:00 p.m.

Sponsored by

ORGANIZED BY

SAE Vehicle Internet of Things Program Committee.

This year’s entries in the Connected Vehicle Challenge were more technology driven than ever. Out of the box thinking by our universities and start-ups set the tone for innovation. Come see the finalists compete in our own SAE “Shark Tank” with Celebrity Judges.

Competition Finalists

CPD - Child Presence Detection
Konstantin Berezin, CAARESYSs

Connected Two Wheelers, Safe Two Wheelers
Rutooj Deshpande, Team: GoVidYouth Mobility

Embry-Riddle Aeronautical University Project Proposal
Andrew Ferree, Charles Reinholtz, Embry-Riddle Aeronautical University

Duality Proposal
Apurva Shah, Duality Robotics

Digi Plates
Ali Simeto, Ulozi motors

HazARD: Hazard Autonomous Reporting and Detection
Sam Stone and Layne Gustafson, Binghamton University

Connected Vehicle Accident Predictor for Pedestrian Safety
Lisheng Yang, Virginia Tech

Celebrity Judges
Mitch Dornich, Vice President of Product at Sirius XM Connected Vehicle
Michael G. Carpenter, Vehicle Performance Owner – Active Safety, General Motors Company
Oliver Spies, Director Product Strategy, ZF
Joe Barkai, Consultant, Speaker, Author and Blogger

Get tickets now:
iottechconnect.com/events/iot-tech-connect-2019
SPECIAL EVENTS

Women’s Program
New Mobility: Women Leading Disruptive Innovation Panel

Sponsored by TOYOTA

The Exchange, Exhibit Hall C
Thursday, April 11
Breakfast: 7:30–8:00 a.m.
Panel: 8:00–9:15 a.m.

The breakfast panel is open to all WCX registrants.
See ad on page 10.

MEET YOUR ON-SITE WCX CONCIERGE: ALEXA.

Got a burning question while you’re here at WCX? Alexa has the answer.

- What are the exhibit hours for today?
- How can I get Wi-Fi?
- When is Tuesday’s general session?

Alexa, where are you located?
I am near the entrance to Exhibit Hall C.
SPECIAL EVENTS

WCX Gala
Atrium, Cobo Center
Thursday, April 11
5:00–7:00 p.m.

We have reimagined the Annual Banquet and you won’t want to miss out on this special event. Join us for an evening of fun and celebration as the industry gathers to recognize industry leaders and celebrate WCX!

The evening will provide the opportunity to gather in a relaxed environment designed to maximize networking opportunities. The gala dinner will feature action food stations and lively entertainment, as guests stroll through the atrium, catch up with colleagues, meet new industry players and recognize industry leaders who will be part of the 2019 Honored Guests.

Jack Hammons
Illusionist
America’s Got Talent Contestant

WCX Gala Tickets
Tickets can be purchased onsite in the Registration Area.
Single ticket $75

SAE Boards and Committees
Meeting list available via WCX Mobile App

SAE Professional Development Seminars
Seminar schedule available via WCX Mobile App
<table>
<thead>
<tr>
<th>Time</th>
<th>Tuesday, April 9</th>
<th>Wednesday, April 10</th>
<th>Thursday, April 11</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00-8:45 a.m.</td>
<td>Exhibit Hall, The Exchange Keynote Speaker</td>
<td>8:00-8:45 a.m.</td>
<td>Exhibit Hall, The Exchange Keynote Speaker</td>
</tr>
<tr>
<td>8:45-9:45 a.m.</td>
<td>Exhibit Hall Continental Breakfast</td>
<td>8:45-9:45 a.m.</td>
<td>Exhibit Hall Continental Breakfast</td>
</tr>
<tr>
<td>8:45 a.m.-5:30 p.m.</td>
<td>Exhibit Hall Exhibits &amp; Career Corner</td>
<td>8:45 a.m.-5:30 p.m.</td>
<td>Exhibit Hall Exhibits &amp; Career Corner</td>
</tr>
<tr>
<td>8:45 a.m.-4:30 p.m.</td>
<td>Half B SAE J3300 Driving Skills Certification Ride and Drive Sponsored by Technical Professionals Group</td>
<td>8:45 a.m.-4:30 p.m.</td>
<td>Half B SAE J3300 Driving Skills Certification Ride and Drive Sponsored by Technical Professionals Group</td>
</tr>
<tr>
<td>9:30 a.m.-12:30 p.m.</td>
<td>Exhibit Hall, The Exchange Leadership Summit</td>
<td>9:00 a.m.-2:00 p.m.</td>
<td>Exhibit Hall SAE AWIM - International Jet Toy Competition (13th Annual)</td>
</tr>
<tr>
<td>9:30 a.m.-4:00 p.m.</td>
<td>Half B SAE Demo Day In partnership with PAVE and Dataspeed, Inc.</td>
<td>9:30 a.m.-12:30 p.m.</td>
<td>Exhibit Hall, The Exchange Leadership Summit</td>
</tr>
<tr>
<td>10:00-11:30 a.m.</td>
<td>Meeting Rooms Technical Sessions</td>
<td>9:30 a.m.-4:00 p.m.</td>
<td>Hall B SAE Demo Day In partnership with PAVE and Dataspeed, Inc.</td>
</tr>
<tr>
<td>10:00 a.m.-5:30 p.m.</td>
<td>Exhibit Hall Learning Lab Sponsored by Honda</td>
<td>9:45 a.m.-5:30 p.m.</td>
<td>Exhibit Hall Learning Lab Sponsored by Honda</td>
</tr>
<tr>
<td>1:00-4:45 p.m.</td>
<td>Exhibit Hall Knowledge Bar Sponsored by Delphi Technologies</td>
<td>10:00-11:30 a.m.</td>
<td>Meeting Rooms Technical Sessions</td>
</tr>
<tr>
<td>1:30-4:45 p.m.</td>
<td>Meeting Rooms Technical Sessions</td>
<td>1:00-4:45 p.m.</td>
<td>Exhibit Hall Knowledge Bar Sponsored by Delphi Technologies</td>
</tr>
<tr>
<td>1:40-4:40 p.m.</td>
<td>Exhibit Hall, The Exchange Leadership Summit</td>
<td>1:30-4:45 p.m.</td>
<td>Meeting Rooms Technical Sessions</td>
</tr>
<tr>
<td>2:30-3:15 p.m.</td>
<td>Exhibit Hall Networking Break</td>
<td>1:40-4:40 p.m.</td>
<td>Exhibit Hall, The Exchange Leadership Summit</td>
</tr>
<tr>
<td>3:30-4:30 p.m.</td>
<td>Room 260 SAE Annual Business Meeting and Service Recognitions</td>
<td>2:30-3:15 p.m.</td>
<td>Exhibit Hall Networking Break Sponsored by Carpenter Technology Corp.</td>
</tr>
<tr>
<td>4:30-5:30 p.m.</td>
<td>Exhibit Hall Networking Reception Sponsored by DSM Engineering Plastics</td>
<td>4:30-5:30 p.m.</td>
<td>Exhibit Hall Networking Reception Sponsored by IBM Watson IoT</td>
</tr>
<tr>
<td>5:30-7:30 p.m.</td>
<td>Room 260 SAE International Awards Ceremony with Presenting Sponsor, J.D. Power</td>
<td></td>
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</tbody>
</table>
THANK YOU FOR YOUR SUPPORT!

SAE INTERNATIONAL acknowledges and thanks the following organizations that have funded the SAE standards program this past year. SAE standards increase the safety and quality of vehicle components and systems, reduce purchasing costs and make engineering work easier.

Association of Equipment Manufacturers  General Motors LLC
BMW of North America LLC  Honda Motor Co LTD
DENSO International America, Inc  Magna Intl, Inc
FCA US LLC  Nissan
Ford Motor Company  Toyota Motor Corporation
TARDEC

SAE standards – they make your engineering work easier
Contact lou.donato@sae.org if you would like to join this distinguished group.
OPENING KEYNOTE PRESENTATION AND INTERVIEW
8–8:45 a.m.
The Exchange - Exhibit Floor

Welcome and Introduction by

David L. Schutt
Chief Executive Officer
SAE International

Featured Keynote Speaker

Charles Payne
Host of “Making Money” on Fox Business, Chief Executive Officer and principal financial analyst of Wall Street Strategies

The Great Race: Finally Reaching Magic Motorways
In this insightful keynote Mr. Payne provides a comprehensive analysis of wall street’s perspective on the new mobility ecosystem. He will discuss how investors look at the impacts of regulation, insurance, customer acceptance on technology development and deployment. He will share a brief evaluation of the mobility industry as seen by Wall Street along with new economic opportunities and investments such as new IPOs in the Mobility as a Service (MaaS) industry. Mr. Payne will conclude with thoughts on the challenges and opportunities that will impact future investments.

Executive Interview with

Paul Mascarenas
2019 SAE President
KEYNOTE PRESENTATION AND INTERVIEW
8–8:45 a.m.
The Exchange - Exhibit Floor

Welcome and Introduction by

David L. Schutt
Chief Executive Officer
SAE International

Keynote Speaker

Erez Dagan
Executive Vice President Products and Strategy, Mobileye
Vice President, Intel Corporation

Safety, ADAS to AD
The field of active driver assistance, L0 - L2, may be viewed as a blend of systems responding to emergencies under human driving as well as systems conducting the vehicle relying on the driver’s emergency response.

What does the upcoming leap to higher levels of autonomy entail in terms of safety expectations and delivery? In his talk, Mr. Dagan will traverse this continuum of human-to-automated safety and explore the roles of technology suppliers. He’ll examine the roles of the public and regulation bodies in the critical articulation and alignment of safety-expectations and the technology required to cater to these expectations, while introducing a safety framework that bridges the two.

Executive Interview with

Ken Washington
2019 SAE Vice President, Automotive
SPECIAL EVENTS

WCX LEADERSHIP SUMMIT

EXHIBIT HALL, THE EXCHANGE

Experts discuss the links between business and technology in this unique venue. In specialized roundtable discussions, you’ll gain key insights from executives on the critical business issues driving quality, performance, safety, design, development and cost optimization of mobility.

Here, you’ll hear from thought leaders who will address critical business issues surrounding technology development that affect vehicle design and deployment strategies.

<table>
<thead>
<tr>
<th>TIME</th>
<th>TUESDAY, APRIL 9</th>
<th>WEDNESDAY, APRIL 10</th>
<th>THURSDAY, APRIL 11</th>
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</thead>
<tbody>
<tr>
<td>8:00 a.m.</td>
<td>Opening Keynote and Executive Interview</td>
<td>Opening Keynote and Executive Interview Erez Dagan, Sr. VP and GM, Strategy, Research &amp; Development, Mobileye, An Intel Co.</td>
<td>New Mobility: Women Leading Disruptive Innovation</td>
</tr>
<tr>
<td></td>
<td>Charles Payne, Chief Executive Officer and Principle Analyst of Wall Street Strategies, Inc.</td>
<td></td>
<td>Executives address challenges and opportunities in making the transformation needed for organizations to handle complexity, uncertainty and volatility in the mobility ecosystem.</td>
</tr>
<tr>
<td>9:30 a.m.</td>
<td>TechTalk: Intelligent Motorsport - the Most Extreme Proving Ground for Self-driving Cars?</td>
<td>TechTalk: The Future of Mobility – Moving People, Data and Freight</td>
<td>TechTalk: Mobility 2030 – The Effects of Oil Pricing and Electric Infrastructure on EV Deployment</td>
</tr>
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<td>Roborace looks at what the the next 110 years look like, in the new era of Artificial Intelligence, robotics and self-driving cars?</td>
<td>The 21st century, is about moving people, data and freight – and how technology and innovation are creating a safer, greener and smarter world.</td>
<td>An examination on how technology in both hydrocarbon and alternative energy markets will continue to shape energy markets and transportation demand.</td>
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<td>Automated Driving Systems present many potential benefits to society. Experts will address the regulatory aspects of promising new technologies including international implications.</td>
<td>Come hear executives discuss the social and economic impact that AI will have on the automotive industry and customer acceptance of future state technology.</td>
<td>We have multiple choices for propulsion today and tomorrow –Traditional ICE, Hybrid, Hybrid-Electric, and Electric but what about the future?</td>
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<td>Sponsored by AVL</td>
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<tr>
<td>11:20 a.m.</td>
<td>C2C Roundtable: CyberSecurity, Do We Feel Good Enough to be Just A Little Paranoid?</td>
<td>C2C Roundtable: Privacy and Customer Acceptance of Data Monetization</td>
<td>Roundtable: Still Not Dead -Developments in ICE</td>
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<td>As we move towards further vehicle connectivity and automation, many security challenges remain unclear. Come hear executives discuss the long-term cybersecurity approaches needed.</td>
<td>Industry executives and research experts discuss what is that ideal state of collecting consumer data, and how to prevent exceeding that tipping point of customer acceptance.</td>
<td>With the continued opportunities for efficiencies in ICE development, where can we go and how is this impacted by regulation, customer acceptance and OEM platform strategies?</td>
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<tr>
<td>1:40 p.m.</td>
<td>TechTalk: Artificial Intelligence: The Winter of our Discontent or Mild Spring Frost?</td>
<td>TechTalk: Trust In Tech</td>
<td>TechTalk: Key Trends That are Shaping the Market/the Future</td>
</tr>
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<td>A talk on what is practical with today’s AI technology to successfully leveraging AI in automotive and insight on the challenges ahead that need to be solved.</td>
<td>An examination by BlackBerry of technology and why we should trust in tech.</td>
<td>What are converging trends impacting the auto industry with the potential of changing it dramatically?</td>
</tr>
<tr>
<td>2:10 p.m.</td>
<td>C2C Roundtable: Does Deploying Safe AV’s Require Rethinking Validation?</td>
<td>C2C Roundtable: Technology Transition: Cloud and Car Enabled Digital Services</td>
<td>Roundtable: As Executives, Where are We Spending our Resources</td>
</tr>
<tr>
<td></td>
<td>Executives and experts convene to address new approaches to AI/AV validation so that we build confidence that our AV’s are safe for the road.</td>
<td>5G? V2X? EDGE Computing? Executives address business drivers and technology challenges for enabled digital services and connectivity to meet customer expectations.</td>
<td>Executives discuss allocation for development of future mobility technology while continuing to utilize resources in advancing current technologies.</td>
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<td>Sponsored by 5G Automotive Association</td>
</tr>
<tr>
<td>3:30 p.m.</td>
<td>C2C Roundtable: The Business Challenges on System Engineering for Automated Driving Technologies</td>
<td>C2C Roundtable: What is the Future Vision of a Vehicle’s Interior and the Technology to Deliver Upon this Digital Environment?</td>
<td></td>
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<td></td>
<td>Come hear industry executives from OEMs and suppliers explore opportunities to more fully leverage systems practices and expertise.</td>
<td>Industry executives discuss the current and near future state of these technologies and the business decisions occurring to meet customer’s expectations for HMI Interface and configuration.</td>
<td></td>
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</table>
## SPECIAL EVENTS

### WCX LEARNING LAB

Get unprecedented interaction and go one-on-one with new technology from exhibitors in the Learning Lab. You’ll discuss the latest innovations in mobility products with engineers and suppliers in an intimate theater venue, as well as have the opportunity to ask questions and experience hands-on demonstrations.

<table>
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<tr>
<th>TIME</th>
<th>TUESDAY, APRIL 9</th>
<th>WEDNESDAY, APRIL 10</th>
<th>THURSDAY, APRIL 11</th>
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<tr>
<td>9:45 a.m.</td>
<td></td>
<td>Expanding the Conversation: PAVE and The Need to Inform the Public About Automated Vehicles</td>
<td>The Ford &quot;Special&quot; of the 50s and 60s: A Peculiarly British Phenomenon (Presentation of SAE Paper 2019-01-1255) J. Howard Evans, Colletronics, Ltd.</td>
</tr>
</tbody>
</table>
| 10:00 am.    | Honda Mobility Collaboration Garage  
CJ Saigusa, Honda R&D Americas, Inc.                                                                                                                 | IAMTS Overview  
John Tintinalli, SAE International                                                                 | McLaren Engineering Race Engines  
Roger Schaible Meiners, RPMarketGroup LLC                                                                 |
| 10:30 am.    | Functional Safety Influencing Autonomous Vehicle Engineering  
Mark Chambers, PLATO NA                                                                                                                             | IAMTS Overview  
John Tintinalli, SAE International                                                                 | McLaren Engineering Race Engines  
Roger Schaible Meiners, RPMarketGroup LLC                                                                 |
| 11:00 am.    | Trends in Battery System Testing  
Joel Stanley, Honda                                                                                                                                     | Generating Real World Emissions Testing in the Laboratory  
Leo Breton, Honda                                                                                                                                         | Spotlight on Alex Tremulis  
William S. Tremulis                                                                                                                                           |
| 11:30 am.    | Tailoring Autonomous Tech to Fit the Business (Not the Other Way Around)  
Gil Hellmann, Wind River                                                                                                                             | Software Quality for the Future of Connected Vehicles and IoT  
Devon Bleibtreu, ESG                                                                                                                                       | The History of the Future: Powering the Cars of Tomorrow  
Erika M. Anden, SAE Mobility History Committee                                                                                                             |
| 12:00 p.m.   | GAGIC Competition  
Finalists:  
Bedestrian  
Bmmpr  
Energsoft  
Environ Clean Diesel  
GBatteries  
Joyride Technologies  
Orbitless Drives  
SafeMode Tech  
VectorZero  
Voxel51  
WaveSense                                                                                                                                             | SAE ITC: Industry Consortia Driving Implementation of New Technologies  
Laurie Strom, SAE ITC                                                                                                                                       | Connected Vehicle Challenge Face-off                                                                                                                       |
| 12:30 p.m.   | See page 8 for more information                                                                                                                   | Understanding Your Product’s Competitive Position Through Benchmark Testing  
Paul Heffernan, Clark Testing                                                                                                                                  |                                                                                                                                                    |
| 1:00 p.m.    | Environ Clean Diesel  
GBatteries  
Joyride Technologies  
Orbitless Drives  
SafeMode Tech  
VectorZero  
Voxel51  
WaveSense                                                                                                                                             | See how a Square Ball will Steer You Right  
John Sweetwood, CCTY Bearing                                                                                                                                     |                                                                                                                                                    |
| 1:30 p.m.    | Innovations in Risk Management Connecting Global Mobility Engineering  
Mark Chambers, PLATO NA                                                                                                                             |                                                                                                                                                    |                                                                                                                                                    |
| 2:00 p.m.    | Automotive SPICE: How to Ensure ASPIE Success  
Ed Neubecker, Amit Talwar, IBM; Anthony Tsler, A123 Systems, Joe Meagher, 321 Gang; Brett Hillhouse, IBM                                                                 |                                                                                                                                                    |                                                                                                                                                    |
| 2:30 p.m.    | C-V2X use on The Road for Safety and Efficiency  
Jovan Zagajac, Ford (5GAA Member)                                                                                                                    |                                                                                                                                                    |                                                                                                                                                    |
| 3:00 p.m.    | C-V2X Momentum and Commercial Readiness  
Christopher Armstrong, Panasonic (5GAA Member)                                                                                                         |                                                                                                                                                    |                                                                                                                                                    |
| 3:30 p.m.    | Using Desktop Methodologies to Accelerate Automotive Software Quality  
Ross Dickson, ASTC Design                                                                                                                               |                                                                                                                                                    |                                                                                                                                                    |
| 4:00 p.m.    | If you can’t stand the heat, get out of the engine: Engineering solutions for rising powertrain temperatures and pressures  
Danielle Rickert, Carpenter Technology Corp.                                                                                                              |                                                                                                                                                    |                                                                                                                                                    |
| 4:30 p.m.    | Announcement of the 4 GAGIC Winners                                                                                                                   |                                                                                                                                                    |                                                                                                                                                    |
| 5:00 p.m.    |                                                                                                                                                    |                                                                                                                                                    |                                                                                                                                                    |
| 5:15 p.m.    |                                                                                                                                                    |                                                                                                                                                    |                                                                                                                                                    |
| 5:30 p.m.    |                                                                                                                                                    |                                                                                                                                                    |                                                                                                                                                    |
### WCX KNOWLEDGE BAR

EXHIBIT HALL, BOOTH 1400

Subject-matter experts will lead 40-minute discussions on the critical technology listed below that will advance the design, deployment and development of future vehicles. The goal of the knowledge bar is to get your questions addressed and to help problem solve issues you are having in a casual environment. Come prepared with your questions on the given subject matter or learn how this technology will shape the future of mobility.

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| 1:00 p.m. | **High Voltage Vehicle Wireless Charging**  
Gene Saltzberg, General Motors LLC, Retired  
Chao Yu, PATAc Pan Asia Technical Automotive Center | **Battery Validation**  
Vince Socci, National Instrument | **CGI Injector Technology**  
Mark Sellnau, Aramco Research Center - Detroit |
| 1:45 p.m. | **Prognostics for Condition Based on Maintenance Plus (CBM+)**  
David Dansizewski, US Army CCDC Ground Vehicle Systems Center | **Cockpit HMI Software Architecture**  
Scott Rush, General Motors LLC | **GCI Emissions Control Challenges**  
James Park II, Oak Ridge National Laboratory (ORNL) |
| 2:30 p.m. | **Cybersecurity for Autonomous Vehicle Systems**  
Dariusz Mikulski, Ph.D., US Army CCDC Ground Vehicle Systems Center | **Biomimicry**  
Dr. Emily Kennedy & Stephen Howe, University of Akron | **GCI in Opposed Piston Engines**  
Fabien Redon, Achates Power |
| 3:15 p.m. | **What V2X Connected Vehicle Standards Mean to You**  
Sua Bai, Honda | **Automatic Emergency Braking**  
Oleg Kirovskii, ZF Group | |
| 4:00 p.m. | **Metal Additive Manufacturing**  
David A. Pierson, MAGNET | **Advanced Imaging Technologies for Autonomous Drive**  
Jeff Morin, On-Semiconductor | |

Sponsored by

[Delphi Technologies]
ATTENTION SAE MEMBERS
DON’T FORGET TO STOP BY THE EXCLUSIVE MEMBERSHIP LOUNGE

Activities Include:

• Meet the SAE Membership Team and network with fellow members
• Attend a presentation: “Things You Never Heard In Engineering Class: Leveraging SAE Involvement for Career Advancement” on Tuesday at 2:30 p.m. with SAE Member Dean Case, Consultant, Motivo Engineering/Grassroots Motorsports
• Enjoy complimentary coffee daily from 8:45 a.m. - 2:00 p.m.
• Discover volunteer opportunities through SAE Propel
• Learn about Member Connection (members-only online community)
• Sign up to become a mentor or mentee
• Wear an SAE Member ribbon for a chance to win a prize

Located on the exhibit floor, lounge hours are as follows:
Tuesday, April 9, 8:45 a.m. - 5:30 p.m.
Wednesday, April 10, 8:45 a.m. - 5:30 p.m.
Thursday, April 11, 8:45 a.m. - 2:00 p.m.

YOU BELONG HERE.
Review all of the member career tools and benefits available to you at sae.org/membership/benefits
Stop by the member lounge to join, or visit sae.org/join today.
**AWARDS & RECOGNITIONS**

Awards and Recognitions presented at WCX19

---

**SAE MEDAL OF HONOR**
Mohamed E. M. El-Sayed, P.E.
Professor and Preceding Director, School of Engineering Technology, Eastern Michigan University

---

**ARCH T. COLWELL COOPERATIVE ENGINEERING MEDAL**
Robert L Galyen, Jr.

---

**ARCH T. COLWELL MERIT AWARD**
Hassene Jammoussi
Robert Jentz
Wesley Kerstens
Michael Kluzner
Dewitt Lampman
Imad H. Makki
Mukesh Rustagi
Jason Skeen
Michael Ulizio
Chester Walawender

---

**ARNOLD W. SIEGEL INTERNATIONAL TRANSPORTATION SAFETY AWARD**
Dainius Dalmotas

---

**EDWARD N. COLE AWARD FOR AUTOMOTIVE ENGINEERING INNOVATION**
Charles E. Freese V.

---

**SAE ENVIRONMENTAL EXCELLENCE IN TRANSPORTATION (E2T) AWARD**
Rajan Ahuja
John Bocksnick
Josh Brown
Paul Davidsaver
David Geiger
Dave Knight
Josie Landers
Bryce Metcalf
Todd VanTilburg

---

**HENRY FORD II DISTINGUISHED AWARD FOR EXCELLENCE IN AUTOMOTIVE ENGINEERING**
Stephen Poulos

---

**HENRY O. FUCHS STUDENT AWARD**
Johnathan Pegeus

---

**INTERNATIONAL LEADERSHIP CITATION**
Raymond Champagne

---

**LLOYD L. WITHROW DISTINGUISHED SPEAKER AWARD**
Michael Douba
John Heywood
Timothy Johnson
Imad Khalek
Philip Koopman
Blaine Leonard
John Meyer
Paul Miles

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**SAE OUTSTANDING FACULTY ADVISORS PROGRAM**
John M. Mativo

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**SAE OUTSTANDING FACULTY ADVISORS PROGRAM**
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**MYERS AWARD FOR OUTSTANDING STUDENT PAPER AWARD**
Stefano d’Ambrosio
Enrico Oliva
Nicolo Salamone
Roberto Vitolo

---

**RALPH TEETOR**
Tanvīr Farouk
Xiao Hu
Diane Peters
Xinjie Zhang

---

**RODICA BARANESCU AWARD FOR TECHNICAL & LEADERSHIP EXCELLENCE**
Laura Hitchcock
Denise M. Rizzo

---

**J. CORDELL BREED AWARD FOR WOMEN LEADERS**
Ewa Bardasz

---

**HARRY L. HORNING MEMORIAL AWARD**
Koji Kitano
Susumu Nagano
Koichi Nakata
Nozomi Yokoo

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**EDWARD N. COLE AWARD FOR AUTOMOTIVE ENGINEERING INNOVATION**
Charles E. Freese V.
AWARDS & RECOGNITIONS

RUMBAUGH OUTSTANDING STUDENT LEADER AWARD
Greg Sawvelle

RUSSELL S. SPRINGER AWARD
Paul Dekraker
Mark Stuhldreher
Youngki Kim

SAE EMERITUS AWARD
Richard Greaves
Charles Westbrook

SAE FELLOW GRADE OF MEMBERSHIP
Christopher Atkinson
Yi Ding
Yan Fu
Robert (Bob) L. Galyen
Ing. habil. Valentin Ivanov
Ken (Xiaodi) Kang
Fangwu (Mike) Ma
Kyoungdoug Min
Patrick J. Philips
Peter Kelly Senecal
John F. VanGilder
Michael Wang

SAE DELCO ELECTRONICS INTELLIGENT TRANSPORTATION SYSTEMS AWARD
Jayendra Parikh

SAE JOHN JOHNSON INDIVIDUAL AWARD FOR OUTSTANDING RESEARCH IN DIESEL ENGINES
Aleksey Yezerets

SAE JOHN JOHNSON AWARD FOR OUTSTANDING RESEARCH IN DIESEL ENGINES-PAPER AWARD
Cody Allen
Lisa Farrell
Dheeraj Gosala
Mrunal Joshi
Edward D. Koebelbne
James McCarthy Jr.
Aswin Ramesh
Gregory Shaver
Sirish Srinivasan
Alexander Taylor
Matthew VanVoorhis
Kalen Vos

SAE JOHN MELVIN MOTORSPORT SAFETY AWARD
Steve Peterson (Posthumously)

SAE/SAE JOHN JOHNSON MELBOURNE AWARD FOR EXCELLENCE IN THE ADVANCEMENT OF AUTOMOTIVE SHEET STEEL
Atsushi Hanyu
Shingo Hayashi
Takuya Hirade
Kentarou Ishiuchi
Hideki Masuo
Tsuyoshi Yoshida

SAE/TIMKEN-HOWARD SIMPSON AUTOMOTIVE TRANSMISSION AND DRIVELINE INNOVATION AWARD
Hussein Dourra

SUBIR CHOWDHURY MEDAL OF QUALITY LEADERSHIP
Kush K. Shah

**Additional Awards & Recognitions information which may not be listed here can be found at wcx19.org. Any omissions from this page are unintentional and may be due to information that was unconfirmed at the time of print.

TREVOR O. JONES OUTSTANDING PAPER AWARD
Yu Seung Kim
Huaxin Li
Di Ma
Brahim Medjahed
Pramita Mitra

VINCENT BENDIX AUTOMOTIVE ELECTRONICS ENGINEERING AWARD
Wesley Kerstens

J.D. POWER ENGINEERING AWARD FOR HIGHEST-RATED ALL-NEW VEHICLE
Award Recipient(s) to be Announced

J.D. POWER ENGINEERING AWARD FOR HIGHEST-RATED VEHICLE REDesign
Award Recipient(s) to be Announced

AWARDS AND RECOGNITIONS CEREMONIES
Tuesday, April 9, 2019
Room 260 (Portside ballroom)
Cobo Center

Recognitions Ceremony 3:30 p.m.
Awards Ceremony 5:30 p.m.
Awards & Recognitions Reception 7 p.m.
CALL FOR PAPERS AND PRESENTATIONS

WCX SAE World Congress Experience
April 21-23, 2020 | Cobo Center, Detroit

sae.org/wcx

WCX is the future of mobility, focusing on technologies and their application to solve critical problems that move the automotive industry forward. In addition to electronics, safety, powertrain, materials, emissions, and propulsion, WCX is seeking experts to address the latest in Autonomous Driving Systems, IoT, semiconductors, ADAS, Smart Manufacturing, Artificial Intelligence and Smart Transportation.

We are asking you to share your time and talent by offering to give a presentation or presentation with technical paper on the critical issues and technology that are shaping the future of mobility.

Deadline to submit abstract: September 17, 2019

Benefits of Authorship and Presenting
• Expand your professional experience and influence as well as your organization’s leadership by demonstrating subject matter knowledge and expertise to mobility professionals from around the world.
• Connect with subject matter experts in the mobility industry to expand business opportunities.
• Be a conduit for discussion on further advancements in mobility in the areas of Automotive Electronics, Safety, Powertrain/Propulsion, Materials, Emissions, Vehicle Automation, and Micromobility.
• Discuss successes and problems encountered during research with your peers who may have similar experiences and lessons learned to share.
• Your technical paper could be selected for Advances and Current Practices in Mobility: SAE International Conference Proceedings — collecting our best technical papers in online issues throughout the year, increasing eligibility of inclusion into scientific indexes. (Written Only papers are not eligible for this Journal)
• Authors receive a discount on event registration.

Call For Reviewers
SAE International is also seeking help from experts willing to volunteer their time and technical acumen to review technical manuscripts for the Technical Sessions.

Benefits of Being a Manuscript Reviewer*
• Expand your technical knowledge by reviewing manuscripts and achieving prior awareness of the latest technologies and practices coming to the mobility industry.
• Demonstrate your subject matter expertise to the organizers developing technical sessions.
• Become a bigger part of the technical community by contributing to the mobility industry’s body of technical knowledge.
• Connect with other subject matter experts in the mobility industry to expand business opportunities
• Reviewer receive a discount on event registration
• Reviewer Resources: Reviewer, guidance and judgement information is provided here sae.org/participate/volunteer/reviewer-resources
**Authorship and Presenting**

Benefits of Authorship and Presenting include the following:

- **Authors receive a discount on event registration.**
- **Discuss successes and problems encountered during research with other experts.**
- **Be a conduit for discussion on further advancements in mobility in the areas of Automotive Electronics, Safety, Powertrain/Propulsion, and more.**
- **Connect with subject matter experts in the mobility industry to expand business opportunities.**

**Call For Reviewers**

SAE International is also seeking help from experts willing to volunteer to review manuscripts and provide feedback. Reviewers will be given a speaking slot.

**Topics Under Consideration**

With over 225 sessions offered at WCX below is a sampling of topics we are looking to see abstract submissions for this Conference.

**Automotive Electronics/Connectivity/IoT/Smart City**
- Active Safety
- ADAS
- Advanced Electronics Functions
- Artificial Intelligence
- Augmented and Virtual Reality (AR/VR)
- Automated Driving Systems
- Cybersecurity
- Electronics and Electrical Systems
- Electronics in the Interior
- Electronics in Transportation
- Electronics in Powertrain
- Electromagnetics and Antennas, EMI/EMC
- Harnesses and Wiring
- Integrated Cloud Technology
- IoT
- On-demand/shared Mobility
- Simulation and Model Based Architecture
- Systems Engineering
- V2V/V2I/V2X

**Environment/Emissions/Sustainability/Thermal Management**
- Alternative Fuels and Power Sources
- Emissions
- Lightweighting and Energy Reduction
- Noise Reduction and Abatement
- Sustainable Systems
- Thermal Systems

**Materials and Lightweighting**
- Bearings, Lubricant Systems & Tribology
- Biomaterials
- Composites
- Ferrous
- Interiors
- Seating
- Materials Modeling & Testing
- Non-Ferrous
- Plastic Components, Process and Techniques
- Polymers & Coatings

**Important Information**

- Please note that speakers will be charged a nominal fee to attend this conference.
- Approval of final manuscript does not guarantee that the author will be given a speaking slot.
- Presentations will be assigned based upon topic applicability and the number of available speaking slots.
- If your Manuscript is selected for Podium Time and you do not attend, your manuscript may not be eligible for publication.

**Design and Smart Manufacturing**

- Additive Manufacturing
- Body Design and Engineering
- CAD, CAM, CAE, and Optimization
- Design for Manufacturing
- Integrated Computational Materials Engineering (ICME)
- Modeling, Simulation, and Testing for Automotive and Military Applications
- Robotics and Manufacturing Automation
- Robust, Reliability, and Deterministic Design in Automotive Engineering
- Smart Manufacturing/Industry 4.0

**Advanced Propulsion/Powertrain**

- Advances in Thermal & Fluid Sciences
- Compression and Spark Ignition Engines
- Control and Optimization
- Engine Boosting
- Engine Components and Subsystems
- Engine Flows and Combustion Diagnostics
- Fuel and Additives
- Fuel Cells, Electric Vehicles, and Hybrids
- High Efficiency and Reduced CO2/km
- In-Cylinder Velocity Measurements
- Lubricants
- Multi-Dimensional Modeling
- Systems Analysis & Modeling
- Transmissions & Drivelines

**Body/Chassis/Occupant and Pedestrian Safety/Structure**

- Aerodynamics
- Body Structures
- Design Optimization: Methods & Applications
- Ergonomics
- Fire Safety
- Functional/Passive Safety
- Human Factors
- Lighting Technology
- Motorsports
- Occupant Protection
- Steering, Chassis & Suspension
- Tires & Wheels
- Vehicle Dynamics and Simulation

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3. Name of the author and co-authors and all contact information
4. Selection of the most appropriate technical session
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   - Abstract submission period: June 1 through September 17, 2019
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**For questions contact:**
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SAE International
+1.248.273.2465
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## TECHNICAL SESSIONS

### EMISSIONS/ENVIRONMENT/SUSTAINABILITY

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38 Floor Plan
40 Exhibitor List
41 Exhibitor Profiles
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A&D Technology delivers integrated test & lab management solutions to the transportation & energy markets for a wide range of applications, from durability to vehicle simulation. With over 30 years of experience and more than 1000 installations worldwide, A&D has the proven technology to help you implement the most advanced and cost-effective solution for your testing challenge.

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Shandong 251500
China
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United States
applusidiada.com/en

With over 25 years of history and 2,500 engineers, Applus IDIADA is an engineering company providing design, testing and engineering services to the automotive industry worldwide. Headquartered in Europe, the company is also located in Michigan and in California.
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Lemont, IL  60439
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anl.gov
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asminternational.org
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<td>esteco.com</td>
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<td><strong>FCA US LLC</strong></td>
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<td>800 Chrysler Dr Auburn Hills, MI 48326</td>
<td>fcanorthamerica.com</td>
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<td><strong>FORD MOTOR COMPANY</strong></td>
<td>1709</td>
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<td>corporate.ford.com</td>
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<td>fram.com</td>
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Jeollabuk-do 55927  
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United States  
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Booth 2200

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Princeton, NJ 08540  
United States  
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Japan  
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Booth 2317

1000 Westgate Dr Ste 252  
Saint Paul, MN 55114  
United States  
intmag.org

IMA’s mission is to promote the use and light-weight benefits of the metal Magnesium in material selection and encourage innovative applications. IMA offers education, facilitates networking, and a comprehensive buyers guide on primary producers, recyclers, foundries, fabricators, end-users and suppliers. IMA is the global voice of the magnesium industry. Learn more at our website.

INTREPID CONTROL SYSTEMS INC  
Booth 1407

31601 Research Park Dr  
Madison Heights, MI 48071  
United States  
intrepidics.com

Intrepid provides innovative tools for engineers in vehicle, test, & embedded engineering. Widely recognized for its neoVI and ValueCAN series tools, Intrepid has also developed RAD-Galaxy and RAD-Star devices to interface with 100BASE-T1. Intrepid supports the latest networks and protocols including AUTOSAR, CAN, CAN FD, LIN, FlexRay, Automotive Ethernet, Keyword, UART, J1939, ISO 14229

IPC  
Booth 1642

3000 Lakeside Dr Ste 105N  
Bannockburn, IL 60015  
United States  
sanjayhuprikar@ipc.org

IPC is a global industry association dedicated to the success of its 5,000 member-company sites which represent all facets of the electronics industry. As a leading source for industry standards, training, market research and advocacy, IPC supports programs to meet the needs of an estimated $2 trillion global electronics industry.

I-PEX CONNECTORS  
Booth 2214

41700 Gardenbrook Rd Ste 117  
Novi, MI 48375  
United States  
i-pex.com

I-PEX uses our precision manufacturing process to go from product design to mass production. Our high precision molds and molding machines are designed and manufactured in-house, which means we have control over the entire process from start-to-finish. We offer build-to-print options, as well as off-the-shelf connectors specifically for the automotive industry.
EXHIBITOR PROFILES

**JING-JIN ELECTRIC**  
Booth 2141  
24301 Catherine Industrial Dr Ste 124  
Novi, MI 48375  
United States  
jjecn.com  

Jing-Jin Electric (JJE) is China’s leading supplier of traction motors and electric drive assembly for EV, HEV and PHEV. JJE provides competitive drive motors featuring high power intensity and high reliability. JJE main products include motors, motor controllers, transmissions, reducers, control software, electric drive assembly and its core parts and components.

**JOBSOHIO**  
Booth 1632  
41 S High St  
Columbus, OH 43215  
United States  
JobsOhio.com  

JobsOhio is the state’s economic development organization charged with driving job creation and capital investment in Ohio through business attraction, retention and expansion efforts. Our team of industry experts understands the needs of growing businesses and supports them with the resources necessary to succeed. Visit our website.

**KAMAX**  
Booth 2212  
1606 Star Batt Dr  
Rochester Hills, MI 48309  
United States  
kamax.com/en/  

KAMAX is a global manufacturer of high strength Automotive fasteners and complex cold formed parts. We serve our customers through manufacturing locations in Europe, North America and Asia. KAMAX employs 3,500 employees worldwide and generate 750 Million euros in turnover serving Automotive OEMs and Tiers.

**KWANG DONG**  
Booth 1401  
5141 Highmount Dr  
Troy, MI 48098  
United States  
kwang-dong.kr  

Plastic box and container manufacture and sales in Michigan for auto parts.

**LAVISION INC**  
Booth 2206  
211 W Michigan Ave Ste 100  
Ypsilanti, MI 48197  
United States  
lavision.com  

LaVision provides integrated measurement systems for experimental fluid dynamics including combusting and multiphase flows, material characterization, and in cylinder / combustion chamber measurement for the automotive and aerospace markets. Established over 25 years ago LaVision is the market leader in image based measurement systems playing a pioneering role in the development of tech.

**LIQUIDMETAL TECHNOLOGIES INC**  
Booth 1608  
20321 Valencia Cir  
Lake Forest, CA 92630  
United States  
liquidmetal.com  

Liquidmetal provides advanced molding solutions for complex and high performance metal parts. It’s amorphous metal technology imparts uncompromising precision, strength and corrosion resistance for applications in a broad range of markets. The company’s metal injection molding (MIM) operations provide an alternative manufacturing option to ensure complete customer satisfaction.

**MELECS EWS GMBH**  
Booth 1637  
GZO- Technologiestrasse 1  
Siegendorf 7011  
Austria  
melecs.com  

Melecs EWS is - with a turnover of 262 million euros and about 1300 employees - the largest EMS provider with Austrian roots and has more than 25 years of experience. Melecs offers everything from a single source: from development, engineering and project management through industrialization and production to logistics.

**MICHIGAN TECHNOLOGICAL UNIV**  
Booth 1541  
1400 Townsend Dr  
Houghton, MI 49931  
United States  
mtu.edu  

SAE of Michigan Tech is a combined group of five hardworking enterprise teams. BAJA, Formula, Clean Snowmobile, Auto Drive, and Supermileage all compete on a national level against top colleges with the same goals, to design the best products which put them higher in the results.
MPP
150 Ford Rd
Saint Marys, PA  15857
United States
metalpowderproducts.com

MPP is a global company with operating facilities in the US and China. MPP has 60+ years of experience in custom-engineered powdered metal and MIM parts from a variety of materials, and is the world's leading producer of parts from aluminum powder.

MSC SOFTWARE CORP
4675 Macarthur Ct Ste 900
Newport Beach, CA  92660
United States
mscsoftware.com

MSC Software is a global leader in helping product manufacturers to advance their engineering methods with simulation software and services. Academic institutions, researchers, and students employ MSC's technology to expand individual knowledge as well as expand the horizon of simulation. MSC Software employs 1,300 professionals in 20 countries. Visit mscsoftware.com

NASA TECHNOLOGY TRANSFER PROGRAM
ST22 NASA/MSFC
Huntsville, AL  35812
United States
technology.nasa.gov

Whether putting rovers on Mars or sustaining life in extreme conditions, NASA develops technologies to solve some of the most difficult challenges ever faced. Through our Technology Transfer Program, we are bringing these same technologies down to Earth so that they can be applied to solving real-life problems and improve the quality of everyday life.

NIFCO AMERICA CORP
8015 Dove Pkwy
Canal Winchester, OH  43110
United States
nifcousa.com

Nifco America Corporation designs, manufactures, and supplies custom injection molded plastic components and assemblies globally. The company started off specializing in fasteners, but has since then branched out to all areas of the vehicle including interior, exterior, kinematic, and fuel products.

NOF AMERICA CORP
1 N Broadway Ste 912
White Plains, NY  10601
United States
nofamerica.com

NOF Corporation is a leading specialty polymer manufacturer supplying diverse industries, especially focus on the automotive industry. Our unique technologies are proven to be beneficial for automotive products and materials. Our special polymers named as MODIPERR A Series’, NOFR-ALLOY KA Series’ and NOFR-ALLOY TZ Series’ are used for increase in comfort of drivers and parts weight.

NUMECA USA
1044 Larkin St
San Francisco, CA  94109
United States
numeca.com

Founded on the principle of offering the best possible CFD, meshing, and optimization solutions, NUMECA has become the vendor of choice of the world’s most demanding engineers and scientists. Our solutions range from: external aerodynamics to transmissions, turbochargers, drivetrains, gearboxes, clutches, and bearings.

OPTIMIZED THERMAL SYSTEMS INC.
7040 Virginia Manor Rd
Beltsville, MD  20705
United States
optimizedthermalsystems.com

Optimized Thermal Systems (OTS), Inc. was founded by Dr. Reinhard Radermacher in 2002 in response to a recognized need for specialized consulting and software development in heat transfer and energy conversion. Teaming with colleagues, Dr. Radermacher established a workforce committed to solving unique thermal challenges brought forth by various industries, including HVAC and automotive.

PHILLIPS TUBE GROUP
5578 State Route 61
Shelby, OH  44875
United States
phillipstube.com

An industry leader in welded steel tube, Phillips Tube Group operates three tubing heavyweights: Shelby Welded Tube, Middletown Tube Works and Phillips Tube Group of Alabama. With an unbending commitment to quality, durability and reliability, it’s no wonder Phillips Tube Group is the #1 fuel filler manufacturer, and the preferred tube supplier for automotive, HVAC and other major industries.
PLATO NORTH AMERICA INC  Booth 1419
3200 Greenfield Rd Ste 300
Dearborn, MI  48120
United States
plato-inc.com

PLATO is providing companies with solutions for Quality Risk Management and Functional Safety. From Requirements to DFMEA, PFMEA, Control Plans and any other Risk Management Documentation, PLATO solutions provide an easy to use solution to take your company beyond simple compliance to a whole new level of risk management and quality control. Stop by our booth for a demo.

POPELMANN PLASTICS  Booth 1513
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Claremont, NC  28610
United States
poeppelmann.com

PROTO MANUFACTURING INC  Booth 1427
12350 Universal Dr
Taylor, MI  48180
United States
protoxrd.com

PROTO is a leading manufacturer of x-ray diffraction (XRD) systems. Our product line includes residual stress measurement systems, powder diffraction, Laue single crystal orientation, custom XRD systems, electropolishers, and custom X-ray tubes. Our LXRD and iXRD diffraction systems provide a fast and efficient way to perform Residual Stress measurements quantitatively.

QUICKLABEL  Booth 1615
600 E Greenwich Ave
West Warwick, RI  02893
United States
quicklabel.com/

QuickLabel is the leading manufacturer of production-capacity, full-color digital label printers, barcode printers, media and labeling software that allow businesses to print their own labels on-demand. QuickLabel introduced the first tabletop digital color label printer and continues to innovate labeling solutions specifically for manufacturers and processors who want to print product.

QUINTUS TECHNOLOGIES  Booth 1509
8270 Green Meadows Dr N
Lewis Center, OH  43035
United States
quintustechnologies.com

Quintus Technologies has designed, built and installed more than 150 Flexform™ hydroforming presses for major manufacturers worldwide, including Ford, Boeing, BMW, and Airbus, along with a growing number of component suppliers to the automotive industry, as well as the aerospace industry.

RADTECH - THE ASSOCIATION FOR UV+EB TECH  Booth 2243
6935 Wisconsin Ave Ste 207
Shevy Chase, MD  20815
United States
radtech.org

RadTech is the non-profit trade association dedicated to ultraviolet and electron beam processes (UV+EB). Work in the area of light cure materials supports innovations in 3D printing, dirt resistant coatings, adhesives, electronic applications and much more. Visit us and download our info graphic on UV+EB automotive applications at our website.

RAPID+ TCT  Booth 1640
1000 Town Ctr Ste 1910
Southfield, MI  48075
United States
rapid3devent.com

RAPID + TCT is known worldwide as North America’s most important additive manufacturing event. It’s where you will witness groundbreaking product announcements, experience 375+ hands-on exhibits, learn real-world solutions from industry experts, and network with thousands of peers. The 2019 event will be held May 20-23 in Detroit, MI.

SAATI AMERICAS CORP  Booth 2233
201 Fairview Street EXT
Fountain Inn, SC  29644
United States
saati.com

SAATI is a manufacturer of precision woven synthetic media for various automotive applications. SAATImotion mesh is used in the separation of solid particles from air or fluids and can also be engineered to separate liquids from other liquids. (Water from fuel, for example). SAATI Acoustex mesh is also a premier choice for car audio systems.
EXHIBITOR PROFILES

SAE EVENT SALES  Booth 2327
400 Commonwealth Dr
Warrendale, PA  15086
United States
sae.org/attend
Meet the SAE Sales Team and discover the 20+ events SAE manages annually. New product, or collaborating on a project with fellow industry players? SAE Events provide forums to showcase your advancements among targeted technical and executive attendees. We can customize participation packages to meet your objectives for exposure, networking, recruiting and more.

SAE INTERNATIONAL  Booth 1627
400 Commonwealth Dr
Warrendale, PA  15086
United States
sae.org
SAE International is committed to advancing mobility knowledge and solutions for the benefit of humanity. Stop by the SAE booth (#1627) to learn about how SAE is leading mobility through innovation, including the entire CASE ecosystem. In addition, learn more about our professional knowledge and learning solutions for engineers.

SAE INTERNATIONAL  Booth 2127
400 Commonwealth Dr
Warrendale, PA  15086
United States
sae.org
SAE International takes pride in leading the way for tomorrow's engineer with programs structured to provide real-world knowledge on mobility engineering. Stop by the SAE booth (#2127) and learn more about SAE solutions for K-8 STEM education - A World In Motion (AWIM) – and the Collegiate Design Series.

SAE ITC  Booth 2239
400 Commonwealth Dr
Warrendale, PA  15086
United States
sae-itc.org
SAE ITC® provides resources and services for public and private organizations to collaborate in a neutral forum to drive innovative solutions to industry challenges. We provide the legal framework for pre-competitive collaboration along with a suite of strategic and operational services to help programs or consortia quickly impact their industry.

SAE MOBILUS  Booth 2242
400 Commonwealth Dr
Warrendale, PA  15086
United States
saemobilus.sae.org
SAE MOBILUS® recently launched the Automated & Connected Knowledge Hub and we would like to get your feedback on it. We also are working on several new initiatives that we hope would be beneficial to you and would like you to help us make sure we are on the right track.

SAE MOBILITY HISTORY COMMITTEE  Booth 2301
1427 Ravineview Ct
Bloomfield Hills, MI  48304
United States
sae.org
The Mobility History Committee will host at two displays 11 vehicles. On Apr 11, in Learning Lab, Exhibit Hall C, there will be 4 historical vehicle talks.

SANDVIK MATERIALS TECHNOLOGY  Booth 2009
982 Griffin Pond Rd
Scranton, PA  18411
United States
materials.sandvik
Serving the automotive industry for more than 70 years, Sandvik is a high technology engineering and advanced materials group. With a strong focus on R&D, we have more than 2,000 specialists developing advanced material solutions to meet the future needs of customers, including Mercedes, Ford, BMW, GM and Toyota.

SEOUL INDUSTRY ENGINEERING CO  Booth 1526
186 Gosanro Namyangju-si Gyeonggi-do
Seoul  472-ORO
South Korea
SeoulCorea.com
Seoul Industry Engineering (SIE) of South Korea offers a heavy-duty turbocharger test system, EGR test system and state-of-the-art portable air flowmeter. SIE is well equipped to fulfill your testing requirement with its own technology. It has been exporting its equipment to Germany, China, India, and Thailand as well as to many foreign affiliated companies in South Korea since 1996.
Leading the field of high-quality, sealing and flow control technology, SFC KOENIG® develops and manufactures a wide range of products and highly reliable solutions, both standard and customized, for an unrivalled means of delivering precise components easily installed in as-drilled fluid passages. Delivering solutions for uncompromising automotive applications for over 20 years.

SHANGHAI AUZONE
No 348 Yuanqu Rd Antikng Twn Jiading
Shanghai 201805
China
auzone.com

Shanghai Auzone specializes in engineering, developing and manufacturing throttle bodies, our main market is OEM, it takes 70% market shares, at the same time, we have about 30% high lever aftermarket business.

SHENZHEN POWER MOTOR IND CO LTD
No 275 Dalian Rd Beitun
Shenzhen Guangdong 350001
China
power-motor.com

Shenzhen Power Motor Industrial Co., Ltd is a professional manufacturer of AC/DC universal motors, located in Shenzhen. We have more than 1,800 employees and over 100 among them concentrate on R&D, who are highly educated and experienced. Since established in year 2001, Shenzhen Power Motor is devoting itself in R&D high quality motors, our products widely used in home appliances.

SHIN-ETSU MICROSI
10028 S 51st St
Phoenix, AZ 85044
United States
microsi.com

Shin-Etsu is a leader in developing advanced, semiconductor packaging materials for encapsulating all types of semiconductor devices. This broad line of products is made of silicone molding compounds and epoxy molding compounds that offer low stress, very low warpage, and high thermal conductivity.

SHOWA CORPORATION
707 W Cherry St
Sunbury, OH 43074
United States
amshowa.com

SHOWA Corporation, a manufacturer of the key components that affect driving and riding comfort is globally positioned at 29 locations throughout the world. A manufacturer of automotive and motorcycle products include; vehicle shock absorbers, power steering systems, propeller shafts, differential gears, gas springs, CVT pumps, motorcycle front forks, rear cushions and other products.

SIMERICS INC
1750 112th Ave NE Ste C250
Bellevue, WA 98004
United States
simerics.com

Highly efficient and accurate CFD software from Simerics Inc requiring significantly lower problem setup and run times. Vehicle applications include front end flow, external drag, underhood/underbody thermal, cabin comfort, windshield deicing, water fording, fuel tank etc. Powertrain applications include cooling, lubrication, fuel, exhaust, turbocharging, torque converters etc.

SMALLEY
555 Oakwood Rd
Lake Zurich, IL 60047
United States
smalley.com

We are the exclusive manufacturer of the industry-leading Spirolox® Retaining Rings, an innovative design that features a no gap, 360° retaining surface without protruding ears to interfere with mating components. We are also the originator of Crest to Crest® Wave Springs which save up to 50% of space compared to conventional coil springs.

SPAL USA
1731 SE Oralabor Rd
Ankeny, IA 50021
United States
spalusa.com

SPAL designs and manufacturers sealed (IP68 and IP6K9K) DC brush and brushless motor electric cooling fans and centrifugal blowers for use in a vast array of cooling applications including radiators, oil and transmission coolers, condensers, evaporators, heaters, CACs, batteries (hybrid and EV applications), and for ventilation.
EXHIBITOR PROFILES

SPIN

450 Mission St
San Francisco, CA
United States
spin.pm

Spin profile is missing: My Fault it must not have copied over! Spin is a first- and last-mile micromobility company providing shared electric scooters in almost 30 cities and college campuses nationwide. All kinds of people use Spin to get around in a sustainable way, whether touring their city, getting to and from work, or heading back from a weekend errand. As a company we are committed to ensuring safety both in our operational practices and in our hardware and technology. We’re excited to be at SAE educating people on the best ways to ride scooters, with the goal of cutting down on car rides for short trips and giving people another enjoyable, efficient way to get around.

STANADYNE CORPORATION

92 Deerfield Rd
Windsor, CT 06095
United States
stanadyne.com

Stanadyne is a global technology leader in engine-based fuel management solutions, specializing in the design, development and manufacture of diesel and gasoline fuel pumps and injectors for original engine manufacturers. Stanadyne produces innovative and customized solutions that allow its customers to differentiate their market offerings through superior quality and technology.

STERLING TECHNOLOGIES INC

28024 Center Oaks Ct
Wixom, MI 48393
United States
sterlingtech.org

Sterling Technologies is an OEM partner to automotive and on-highway industries, specializing in production, service and recall campaign support. Capabilities include integrated electrical and mechanical assemblies which are highly scalable and flexible to the customer requirements.

SYNERGEERING GROUP LLC

25335 Interchange Ct
Farmington Hills, MI 48335
United States
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Synergeering Group is a direct service bureau for their exclusive RapidNylon®; large, fully-functional rapid prototype parts, delivered in just days. Using modified Laser Sintering technology & GF-Nylon material, parts have the highest level of accuracy & durability. Parts are air tight, insoluble to chemicals & heat tolerant up to 140°C.

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United States
syn-techlube.com

Syn-Tech Ltd. is a global leader in the formulation and manufacturing of problem solving lubricants. We provide component analysis to establish lubricant requirements, lubricant formulation, manufacturing and testing of electrical, mechanical and pneumatic lubricants. Areas of expertise include: aerospace, automotive, food grade, medical, military, industrial and recreational lubricants.

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United States
tasking.com

Altium TASKING products are the tools of choice for embedded software development across a diverse range of industries including Tier-1 automotive suppliers and industry-leading car manufacturers. We create complete development environments that allow engineers to create reliable, safe, and high-performance applications. Over 30,000 engineers around the globe rely on TASKING compilers.

TEXAS A&M UNIVERSITY

Mechanical Engineering
MS 3123
College Station, TX 77843
United States
mengr.tamu.edu

Texas A&M has a robust SAE program which promotes real engineering learning coupled with industry applications. The program supports Baja, FSAE, and Champ car. FSAE at A&M is a one year project integrated with senior design. Each year a new car is designed and build by new students from scratch this is to remain in line with the original intent of FSAE. At A&M we do not focus on building race cars, we focus on building engineers that can build race cars or wind turbines or hospital beds.

THE LEE COMPANY

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Westbrook, CT 26498
United States
leeimh.com

The Lee Company designs and manufactures a complete range of miniature, precision fluid control products for use in automotive and off-highway vehicle hydraulic and fuel systems. Products on display include miniature check valves, pressure relief valves, shuttle valves, precision orifices, safety screens, flow controls, air bleeds and expansion plugs.
EXHIBITOR PROFILES

THE OHIO STATE UNIVERSITY  Booth 1632
2036 Neil Ave
Columbus, OH 43210
United States
engineering.osu.edu

The Center for Automotive Research (CAR) is an interdisciplinary research center aimed at improving sustainable mobility. Current research includes connected and autonomous vehicles; electrified powertrains and electric and hybrid vehicle systems and energy management; energy storage-from materials to systems; clean and efficient combustion engines; and innovative mobility solutions.

TORAY INDUSTRIES  Booth 1327
2800 Livermore Rd Bldg D
Troy, MI 48083
United States
toray.com/automotive

Toray provides advanced materials for weight reduction, powertrain, safety, and comfort. Our belief is “Cars evolve through Materials”.

TOYOTA MOTOR NA R&D  Booth 2017
SPONSOR
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Saline, MI 48176
United States
toyota.com

Toyota (NYSE:TM) has been a part of the cultural fabric in the U.S. and North America for 60 years, and is committed to advancing sustainable, next-generation mobility through our Toyota and Lexus brands. Toyota has created a tremendous value chain as our teams have contributed to world-class design, engineering, and assembly of more than 33 million cars and trucks in North America.

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10820 State Route 347
East Liberty, OH 43319
United States
trcpg.com

Transportation Research Center Inc. (TRC) is the leading independent automotive testing facility & proving grounds in the U.S., specializing in research & vehicle testing. TRC operates 24/7, offering numerous facilities including a 7.5 mile high speed test track, a 50 acre vehicle dynamic area, a 9000 ft skid pad, performance & durability testing areas as well as numerous labs.

TTM TECHNOLOGIES  Booth 2234
8150 Sheppard Ave E
Scarborough, Ontario M1B 5K2
Canada
ttm.com

TTM Technologies, Inc. is a leading global printed circuit board manufacturer, focusing on quick-turn and volume production of technologically advanced PCBs, backplane assemblies and electro-mechanical solutions as well as a global designer and manufacturer of high-frequency radio frequency (RF) and microwave components and assemblies.

VELODYNE LIDAR  Booth 1420
5521 Hellyer Ave
San Jose, CA 95138
United States
velodynelidar.com

Velodyne Lidar, recognized worldwide as the leader in lidar technology, provides the smartest, most powerful lidar solutions for autonomy and driver assistance. Velodyne's high-performance product line includes the cost-effective Puck™, versatile Ultra Puck™, perfect for L4-L5 autonomy Alpha Puck™, ADAS-optimized Velarray™, and the groundbreaking software for driver assistance, Vella™.

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Elverson, PA 19520
United States
whitfordww.com

Whitford Worldwide is a global manufacturer of the world's largest, most complete line of fluoropolymer coatings for industrial and consumer industries. Whitford's Xylan provides benefits including excellent adhesion and resistance to wear, abrasion and chipping along with water- or solvent-borne options. For use on applications like steering systems, fasteners, pistons and more.

WOMEN IN CYBERSECURITY (WICYS)  Booth 2241
370 S Lowe Ave Ste A-244
Cookeville, TN 38501
United States
wicys.org

Women in CyberSecurity (WiCyS) is a 4,000 member non-profit organization dedicated to recruiting, retaining, mentoring and advancing women in the cybersecurity workforce. WiCyS works with strategic partners to move the needle from 11% women in cybersecurity to a 50% goal. Contact WiCyS at info@wicys.org or visit wicys.org for details.
**EXHIBITOR PROFILES**

**YINLUN TDI LLC**
Booth 2135
33533 W 12 Mile Rd
Farmington Hills, MI 48331
United States
yinluntdi.com

**321 GANG INC**
Booth 1308
14362 N Flw Blvd Ste 1000
Scottsdale, AZ 85260
United States
321gang.com
321 Gang helps organizations improve their ability to design and develop high-quality systems & software. We are an IBM Platinum Business Partner, winner of IBM’s 2018 Top Industrial Partner of the Year award and Scaled Agile Gold Training Partner (SAFe). Our consultants average 20 years of Systems & Software expertise.

**ASTC**
Booth 1306
Level 5
76 Waymouth Street
Adelaide, South Australia 5000
Australia
astc-design.com
ASTC is the design partner to the global embedded electronics supply chain, from semiconductors, IP and software companies, through to OEM and systems companies. ASTC is changing the way companies develop new embedded electronic products. With ASTC expert product engineering, innovative new methodologies, and advanced design software, customers can design better products.

**C2A SECURITY**
Booth 1303
Hebron Rd 24
Jerusalem 9354212
Israel
c2a-sec.com
C2A Security offers a comprehensive suite of cyber security solutions for the automotive industry, providing in-vehicle end-to-end protection. C2A products are based on a deep knowledge of the automotive industry’s pains and requirements, and have been engineered from the ground-up with automotive manufacturers’ needs in mind: cost, time-to-market and integration complexity.

**VECTOR**
Booth 1302
39500 Orchard Hill Pl Ste 400
Novi, MI 48375
United States
vector.com
For 30-years Vector has been integral in the development of automobile electronics. With 24 locations worldwide and over 2,000 employees dedicated to support the automotive industry with a professional platform of tools, software components and services for developing embedded systems. Vector is driven to help customers master the complex issues and simplify them.

**WIND RIVER SYSTEMS**
Booth 1304
500 Wind River Way
Alameda, CA 94501
United States
windriver.com
Wind River is a leader in software for safe, secure, and reliable intelligent systems, including those for the internet of things (IoT). Around since 1981, our technology is in more than 2 billion products, including more than a 100 million automobiles. For the auto market, we offer a software framework for the next generation of connected car.

**AUTOLIV**
Booth 1301
1320 Pacific Dr
Auburn Hills, MI 48326
United States
autoliv.com
Autoliv is worldwide leader in automotive safety systems, developing and manufacturing automotive safety systems for all major automotive manufacturers in the world. We are working side by side with our customers to solve the forthcoming automotive safety challenges of electric and autonomous vehicles with Autoliv pyrotechnical safety switches.

**KOREAN PAVILION**

**AIN GLOBAL FOUNDATION**
Booth 1331
247 Gongdan 1-daero 3rd Fl
Sihung-si Gyeonggi-do 15079
South Korea
ainglobal.org
We were established in 2000 as a non-profit entity under the Ministry of Trade, Industry and Energy to assist small and medium sized Korean enterprises in automotive industries. We annually organize Korea Automotive Industry Exhibition(KOAASHOW), the largest exhibition in Korean automotive industry. You can see more details at the show website (koaashow.com).
EXHIBITOR PROFILES

HYUNJIN FB  
Booth 1331
7 Seongseogong-danro Dalseo-gu
Daegu
South Korea
hyunjinfb.com

HyunJinFB Corporation supports the Total-Solution from product development to mass production such as Fine Blanking, PRO&Compound Mold & JIG Design, Making, Production, Processing, Delivery and PROTO prototype, SPARE, SOP Production. Especially, we have 1000, 325, 250 tons FB Machines. So, have a lot of experience and technology for Fine Blanking (F/B) Mold Making, Repair.

ILSHIN PLASTIC CO LTD  
Booth 1331
80 Gukkasandanbuk-ro Gugi-myeon Dalseong
Daegu-si 43011
South Korea
ilshin-plastic.co.kr

As the results from our ceaseless R&D activities and efforts for manufacturing many safe & robust interior/exterior plastic components of automobile and industrial reinforced plastic products since our company was founded in 1971, our company has dominated the market as a world-class competitive company after having exceeded the domestic top company in the plastic component industry.

KUNHWA ENGINEERING CO LTD  
Booth 1331
91, Grongdan 8-Yo, Jinhyang-Eup
Kyunjisan-St
Suoth Korea
kunhwa-eng.com

Kunhwa-EnG has been producing high quality AL die casting parts with well-equipped facilities and abundant manufacturing experience. We are having overseas business with Renault France and Daimler truck Germany and Detroit Diesel Corporation in USA. Therefore we would like to expand a new business with also global automotive companies.

SAMJIN JEONGGONG CO LTD  
Booth 1331
68 Daheunggil Seongnam-myeon
Chungnam-Do 31247
South Korea
samjinnut.co.kr


SAMYANG METAL CO LTD  
Booth 1331
973-2 Kalsan-dong
Dalse-gu Taegu 704-900
South Korea
samyangmetal.com

Samyang Metal Company was founded in 1985 and producing automotive compressor shaft & rotor assembly, shaft for starter motor, and shaft for alternator. It recorded about $30millions in sales in 2018. For 35 years since Samyang was founded, it has become the world’s best company in shaft manufacturing.

SHILLA INDUSTRIAL CO LTD  
Booth 1331
14 Jaingongolan 1-ro Jain Myeon Kyungsan
Gyeongsangbuk-do 38550
South Korea
shillaind.co.kr

Shilla Industrial Co., LTD. is a manufacturer of coil assembly and plastic/cutting processing products that are used in actuators, and it has accumulated know-how in production for preparing the rapid demand increase of the electric vehicle market. In particular, we are providing reliable and qualified parts of Stator application, Alternator and Motor with reasonable price.

SHIN CHANG PRECISION IND CO LTD  
Booth 1331
8 Seongseogdanbuk-ro 4-gil Dalsea-gu
Doegu 42711
South Korea
rubbersc.com

We can produce various kind of rubber products with accumulated technology for 41 years of manufacturing machinery and mold, and it is possible to reduce production cost by know-how of improving production efficiency. Especially, it is possible to produce oil & water leakage related products such as Oil Seal, Gasket, O-ring, X-ring, Dust Cover, Gromet, Diaphragm.

SHINHAN PRECISION IND CO LTD  
Booth 1331
93 Seongseo-ro
Dalse-gu 42719
South Korea
shinhankorea.com

Shinhan Precision is a global leader in fine-blanking press technology and is offering high quality products to GM global plants and several TierI customers in the field of Auto Transmission, Dual Clutch Transmission, Transfer Case, Seat Parts, and A/C Compressor Parts.
We have worked to utilize the various advantages of sponges such as shock resistance, oil resistance, elasticity, resilience, sound absorption, and insulation, and developed sponge-based products that offer various functions such as soundproofing, dustproofing, shock resistance, neck protection, and comfort through our sponge-related research and technologies.

SINDO CO LTD

114 Gukgosandan-daero
Daegu 43011
South Korea
sindokorea.com

Highly efficient and accurate CFD software from Simerics Inc requiring significantly lower problem setup and run times. Vehicle applications include front end flow, external drag, underhood / underbody thermal, cabin comfort, windshield deicing, water fording, fuel tank etc. Powertrain applications include cooling, lubrication, fuel, exhaust, turbocharging, torque converters etc.

TPC CO LTD

574 Iryeou-ro Jiuyang Eup
Gyeongsa-city
South Korea
tc21.co.kr

Our company was established in 1998. Our main products are DOM(Drawn Over Mandrel) Tubing, As-Welded Tubing, Fuel Filler Neck A'assy and Water Pipe. We introduced vertical production systems from As-Welded Tube to DOM Tubing that allows quality-consistency and price competitiveness. We are ready to provide you with our best service.

ALUMAG AUTOMOTIVE LLC

Kirchplatz 1a Alte Apotheke
Menden 58706
Germany
alumag.com

AluMag® co-organizes the WCX 2019 Lightweighting – Materials – Efficiency pavilion. AluMag® is a market development company that has extensive knowledge and worldwide contacts within the automotive & aluminum-, magnesium- and composite industry. We access new markets and open doors for your business – regardless of application, material, process or product.
EXHIBITOR PROFILES

LIGHTWEIGHTING MATERIALS  Booth 2215
Kirchplatz 1A Alte Apotheke
Menden 58706
Germany
alumag.com
Lightweighting - Materials - Efficiency Pavilion, organized by AluMag®. This pavilion will showcase technologies that help suppliers to: Decrease weight and improving powertrain efficiency to reducing emissions; Function integration and structural lightweighting: Design, develop, and manufacture new materials and processes; Pursue green powertrains, ICE emission reduction, and battery.

NIKKEI MC ALUMINUM AMERICA INC  Booth 2314
6875 Inwood Dr
Columbus, IN 47201
United States
nmaluminum.net
NIKKEI MC is an aluminum casting alloy producer that has produced a variety of casting alloys which mainly transform into automotive components. New this year is Castaduct®-42 (AlMg4Fe2). This alloy brings the highest ductility and strength to large and thin-wall structural casts without heat treatment and related processes.

RHEINFELDEN ALLOYS GMBH & CO KG  Booth 2312
Friedrichster 80
Rheinfelden D-79618
Germany
rheinfelden-alloys.eu
RHEINFELDEN ALLOYS specializes in developing, customizing, producing and selling hi-tech aluminum casting alloys. The following alloys are used by Premium European OEMs: Silafon-36, Castama-35, Magsima-59, Magsima-plus, Castasi-37 and the brand new Castaduc-42. To meet demands of electrical power modules with high thermal conductivity, Castasi-21 was recently launched.

WHB INTERNATIONAL INC  Booth 2219
101 W Ohio St Ste 810
Indianapolis, IN 46204
United States
whbinternational.com
WHB Automotive is a family-owned 2nd generation company located in Curitiba, Brazil produces cast iron (DISA & KW), steel forgings, aluminum gravity & HPDC's (up to 3000T) for our OEM’s, Tier 1 and Tier 2 global customers. Product segments include propulsion, drive-line, braking, chassis, transmission for LV, MD, HD, Agriculture and Industrial customers. All plants are IATF certified.

START-UP PAVILION

BRB TECHNOLOGIES LLC  Booth SUP12
3504 Larchwood Dr
Minnetonka, MN 55245
United States
icyroads.net
BRB Technologies is an R&D firm holding key patents on a unique active safety technology that addresses vehicle dynamics in crash avoidance situations.

COLAB SOFTWARE INC  Booth SUP2
5 Hallett Crescent
St. John's, Newfoundland Labrador A1B 4C4
Canada
colabsoftware.com
CoLab Software helps engineering teams streamline their design review process and resolve issues faster. Their product, Gradient, leverages cutting edge viewing technology to give all project stakeholders access to CAD files in the web. Built-in model analysis and issue tracking tools allow reviewers to provide feedback in real-time, without needing an expensive CAD license.

ENVIRO CLEAN DIESEL  Booth SUP9
5552 Vista Creek Ln
Saint Louis, MI 63128
United States
We take the soot out of diesel. Backed by 6 patents, our technology uses a probe inserted into a diesel exhaust system which creates a plasma stream. Powered by a unique pulsing power supply, the plasma converts particulate matter into harmless gaseous byproducts. We are currently in the early stage of fundraising to create more prototypes.

MIRABILIS DESIGN INC  Booth SUP1
1159 Sonora Ct #116
Sunnyvale, CA 94086
United States
mirabilisdesign.com
Mirabilis Design provides virtual prototyping software for vehicle systems, sub-systems and components. This virtual prototype provides early and comprehensive visibility into the timing, throughput, energy consumption and scheduling of the design. Design teams validate requirements, explore the architecture, optimize the specification and identify system bottlenecks using this model.
EXHIBITOR PROFILES

NOVAC SUPERCAP  Booth SUP8
Via Vivarelli 10
Modena, MO
Italy
novacsupercap.com

NovaCentrix offers industry leading photonic curing tools, conductive inks, material and expertise enabling development and production of next generation printed electronic devices – some already on the market. PulseForge® tools utilize photonic curing, a technology for processing functional inks in milliseconds on low-temperature, flexible substrates such as paper or plastic.

ORBITLESS DRIVES INC  Booth SUP7
3250 W29th Ave
Vancouver, British Columbia  V6L 1Y6
Canada
orbitless.com

ORBITLESS is a patented, revolutionary new high efficiency, low noise gearbox platform. Applications include electric vehicle powertrains, actuator, robotics, medical devices, or any other application where electric gear motors are used. It has been validated with two leading Precision gear motor manufacturers showing 50% losses and 30% the noise traditional planetary gears.

PERPETUA INC  Booth SUP13
906 W 2nd Ave Ste 600
Spokane, WA  99201
United States

Perpetua’s Flexfan technology is a welcomed alternative to the current forced-air cooling solutions in hot harsh environments. We will help you solve the thermal management challenges that were previously unthinkable with conventional rotary fans. Perpetua can work with you from design to product testing to mass production.

TESSEACT STRUCTURAL INNOVATIONS  Booth SUP3
535 W Research Center Blvd Ste 135
Fayetteville, AR  72701
United States
tesseractinnovations.com

Tesseract Structural Innovations is developing new solutions for vehicle safety. Its flagship product, the Uniform Deceleration Unit or UDU, is a unique structure that has the ability to absorb an enormous amount of energy during a vehicle crash. During a small overlap front crash, UDU absorbs significant amounts of the kinetic energy and reduces the crash forces on the vehicle.

VECTORZERO  Booth SUP10
5650 El Camino Real Ste 250
Carlsbad, CA  92008
United States
vectorzero.io

Vector Zero builds interactive road modeling, traffic and scenario tools, primarily targeted towards autonomous and ADAS vehicle testing. GIS and vector data can be imported to help model real-world locations and synthetic test cases can be created on the fly. Road Runner’s ability to model both the geometry and semantics of the most complicated urban intersections quickly is unique.

VISUALTHREAT  Booth SUP5
2055 Junction Ave Ste 110
San Jose, CA  95131
United States
visualthreat.com

VisualThreat is a leading connected-car data analytics vendor based in California. The company offers the on-the-fly visual analytics platform for automotive big data to provide real-time query and interactive analytics on streaming data. Also VisualThreat help dealerships by generating the Car Health Report for used cars for the inspection and evaluation purposes.

VOXEL51  Booth SUP11
410 North 4th Ave 3rd Fl
Ann Arbor, MI  48104
United States
voxel51.com

Voxel51 is an Ann Arbor based seed stage startup that has a team of 15 scientists, researchers, and engineers solving the thorniest problems in video processing and data management. Based on decades of academic research and the application of latest AI frameworks, Voxel51 has built a computer vision platform to solve the infrastructure challenges of working with massive volumes of video.

WAVENSENSE  Booth SUP6
444 Somerville Ave
Somerville, MA  02143
United States
wavesense.io

WaveSense enables the safest and most reliable navigation for self-driving vehicles by creating and tracking against subterranean maps of roadways using ground-penetrating radar. Already in pilots with large OEMs and Military use. Self-driving vehicles using WaveSense can navigate in snow, rain, fog, poor/no lane markings and other common but challenging conditions created by surface dynamics.
EXHIBITOR PROFILES

ZOMIO INC  Booth SUP4
Urb Hacienda Florida 837 Calle Magnolia
Yauco, PR  00698
United States
zomio.io

ZOMIO is an innovative startup that’s driving innovation, research and the development of new consumer products. As a new wave of technology arrives and the future automotive landscape changes, ZOMIO will be at the forefront creating and developing new consumer products that focus on safety and make everyday tasks easier.

CAREER CORNER

APTIV  Booth CC7
100 Northern Ave
Boston, MA  02210
United States
aptiv.com

FCA US LLC  Booth CC5
800 Chrysler Dr
Auburn Hills, MI  48326
United States
fcanorthamerica.com

FORD MOTOR CO  Booth CC2
2101 Village Rd
Dearborn, MI  48124
United States
corporate.ford.com

HONDA R&D AMERICAS INC  Booth CC3
21001 State Route 739
Raymond, OH  43067
United States
hondaresearch.com

MITSUBISHI MOTORS R&D OF AMERICA INC  Booth CC1
3735 Varsity Dr
Ann Arbor, MI  48108
United States
mitsubishicars.com

SATYAM VENTURE ENGINEERING SERVICES PVT LTD  Booth CC6
850 Stephenson Hwy Ste 512
Troy, MI  48083
United States
satyamventure.com

UNIV OF MICHIGAN-DEARBORN  Booth CC4
4901 Evergreen Rd
Dearborn, MI  48128
United States
umdearborn.edu/cecs

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## SAE INTERNATIONAL EVENTS

### 2019

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<tr>
<td><strong>Government/Industry Meeting</strong></td>
<td>April 3-5</td>
<td>Washington, DC</td>
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<tr>
<td><strong>High Efficiency IC Engine Symposium</strong></td>
<td>April 7-8</td>
<td>Detroit, MI</td>
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<tr>
<td><strong>WCX SAE World Congress Experience</strong></td>
<td>April 9-11</td>
<td>Detroit, MI</td>
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<tr>
<td><strong>Connect2Car™ at WCX</strong></td>
<td>April 9-11</td>
<td>Detroit, MI</td>
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<tr>
<td><strong>New Energy &amp; Intelligent Connected Vehicle Technology Conference</strong></td>
<td>May 21-22</td>
<td>Shanghai, China</td>
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<tr>
<td><strong>Aviation Technology Forum</strong></td>
<td>June 4-5</td>
<td>Shanghai, China</td>
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<tr>
<td><strong>Noise and Vibration Conference &amp; Exhibition</strong></td>
<td>June 10-13</td>
<td>Grand Rapids, MI</td>
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<td><strong>escar USA</strong></td>
<td>June 12-13</td>
<td>Ypsilaniti, MI</td>
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<tr>
<td><strong>International Conference on Icing of Aircraft, Engines, and Structures</strong></td>
<td>June 17-21</td>
<td>Minneapolis, MN</td>
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<tr>
<td><strong>SAE CyberAuto Challenge™</strong></td>
<td>July 21-26</td>
<td>Warren, MI</td>
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<tr>
<td><strong>JSAE/SAE International Powertrains, Fuels &amp; Lubricants Meeting</strong></td>
<td>August 25 – 29</td>
<td>Kyoto, Japan</td>
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<tr>
<td><strong>COMVEC™</strong></td>
<td>September 9-11</td>
<td>Indianapolis, IN</td>
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<td><strong>Connect2Car Executive Leadership Forum</strong></td>
<td>September 17-18</td>
<td>Chicago, IL</td>
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<td><strong>On-Board Diagnostics</strong></td>
<td>September 17-19</td>
<td>Garden Grove, CA</td>
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<td><strong>North American International Powertrain Conference</strong></td>
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<td><strong>Brake Colloquium &amp; Exhibition</strong></td>
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<td>Orlando, FL</td>
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<td><strong>AeroTech Europe</strong></td>
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<td>Bordeaux, France</td>
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<td><strong>Thermal Management Systems</strong></td>
<td>October 15-17</td>
<td>Plymouth, MI</td>
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<td><strong>Innovations in Mobility</strong></td>
<td>October 29-31</td>
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<td><strong>Small Engine Technology Conference &amp; Exposition</strong></td>
<td>November 19-21</td>
<td>Hiroshima, Japan</td>
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<tr>
<td><strong>DoD Maintenance Symposium</strong></td>
<td>December 9-12</td>
<td>Spokane, WA</td>
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<td><strong>Government/Industry Meeting</strong></td>
<td>January 22-24</td>
<td>Washington, DC</td>
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<td><strong>Hybrid and Electric Vehicle Technologies</strong></td>
<td>January 28-30</td>
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<tr>
<td><strong>AeroTech Americas</strong></td>
<td>March 17-19</td>
<td>Pasadena, CA</td>
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<tr>
<td><strong>WCX SAE World Congress Experience</strong></td>
<td>April 21-23</td>
<td>Detroit, MI</td>
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<tr>
<td><strong>COMVEC™</strong></td>
<td>September 15-17</td>
<td>Rosemont, IL</td>
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<tr>
<td><strong>North American International Powertrain Conference</strong></td>
<td>September 16-18</td>
<td>Chicago, IL</td>
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<tr>
<td><strong>International Powertrains, Fuels &amp; Lubricants Meeting</strong></td>
<td>September 22-24</td>
<td>Krakow, Poland</td>
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<td><strong>Thermal Management Systems</strong></td>
<td>October 6-8</td>
<td>Mesa, AZ</td>
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<td><strong>Brake Colloquium &amp; Exhibition</strong></td>
<td>October 11-14</td>
<td>San Antonio, TX</td>
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<tr>
<td><strong>Heavy-Duty Diesel Emissions Control Symposium</strong></td>
<td>October 13-14</td>
<td>Gothenburg, Sweden</td>
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For an updated listing of events, dates and locations, please refer to sae.org/events/