

37TH ANNUAL
**BRAKE
COLLOQUIUM
& EXHIBITION**

SEPTEMBER 22-25, 2019
JW MARRIOTT GRANDE LAKES | ORLANDO, FL

sae.org/brake

DOWNLOAD THE
MOBILE APP





MENETA

North America

Jackson, TN
Farm. Hills, MI

Europe

Denmark
Germany

China

Shanghai
Dalian

India

Kundli, Delhi
Sonipath, Delhi



- **ANTI-NOISE SHIMS:** with more than 20,000 material combinations, we offer a solution for any noise issue.
- **SHIM SIMULATION:** the Meneta Black Box™ will save development time and cost, and reduce your time to market.
- **DYNO TESTING:** our unique dynamometers are designed, built and programmed in house, giving us the flexibility to perform tests based on any need.

www.meneta.com



EVENT-AT-A-GLANCE

September 22
SUNDAY

7:00 a.m.-2:30 p.m. Golf Outing Ritz Carlton Golf Club
3:00 p.m.-6:00 p.m. Technical Sessions & Tutorials Hardware/ Software in the Loop Tutorial Vehicular Propulsion Electric Battery System Tutorial

September 23
MONDAY

7:30 a.m.-8:30 a.m. Morning Mixer Foyer Co-Sponsor: Fibrox
8:30 a.m.-9:40 a.m. Opening Keynote & Award Presentations Keynote: Michael Robinet, IHS Markit
9:40 a.m.-10:20 a.m. Networking Break Exhibit Hall
10:20 a.m.-11:40 a.m. Technical Sessions
11:40 a.m.-1:00 p.m. Lunch/ Exhibitor Spotlight Presentations Exhibit Hall
1:00 p.m.-3:00 p.m. Technical Sessions
3:00 p.m.-3:40 p.m. Networking Break Exhibit Hall
3:40 p.m.-5:20 p.m. Technical Sessions
4:30 p.m.-6:00 p.m. Networking Reception Exhibit Hall

September 24
TUESDAY

7:30 a.m.-8:20 a.m. Morning Mixer Foyer
8:20 a.m.-9:40 a.m. Technical Sessions
9:40 a.m.-10:20 a.m. Networking Break Exhibit Hall
10:20 a.m.-11:40 a.m. Technical Sessions
11:40 a.m.-1:00 p.m. Lunch/ Exhibitor Spotlight Presentations Exhibit Hall
1:00 p.m.-2:40 p.m. Technical Sessions
2:40 p.m.-3:20 p.m. Networking Break Exhibit Hall
3:20 p.m.-5:40 p.m. Technical Sessions
6:00 p.m.-7:30 p.m. Networking Reception Valencia Lawn

September 25
WEDNESDAY

7:30 a.m.-8:00 a.m. Morning Mixer Foyer
8:00 a.m.-9:40 a.m. Technical Sessions
10:00 a.m.-10:20 a.m. Networking Break Foyer
10:20 a.m.-11:40 a.m. Technical Sessions
11:40 a.m.-12:40 p.m. Lunch Mediterranean 5
12:40 p.m.-3:00 p.m. Technical Sessions
Event Concludes

TECHNICAL SESSION

NETWORKING OPPORTUNITY

EXHIBIT HOURS

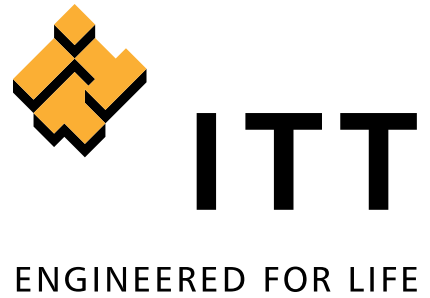
Monday 9:30 a.m.-6:00 p.m.
 Tuesday 9:30 a.m.-4:00 p.m.

REGISTRATION HOURS

Sunday 12:00 p.m.-5:00 p.m.
 Monday 7:00 a.m.-4:00 p.m.
 Tuesday 7:30 a.m.- 4:00 p.m.
 Wednesday 7:30 a.m.- 10:00 a.m.

SPONSORS

GOLD



SILVER



BRONZE



SPONSORS

CONFERENCE SUPPORTER



GOLF OUTING SPONSORS



MENETA



37TH ANNUAL BRAKE COLLOQUIUM & EXHIBITION

CONTENTS

Event-At-A-Glance	1
Sponsors	2-3
Floor Plan	5
Information	7
Special Events	8
Technical Sessions	14-23
Participants Index	24
Exhibitor Directory	27-35
Ad Index	35

EMERGENCY PROCEDURES DURING THE BRAKE COLLOQUIUM

During the Brake Colloquium & Exhibition 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

+1.724.772.4044
+1.800.581.9295

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

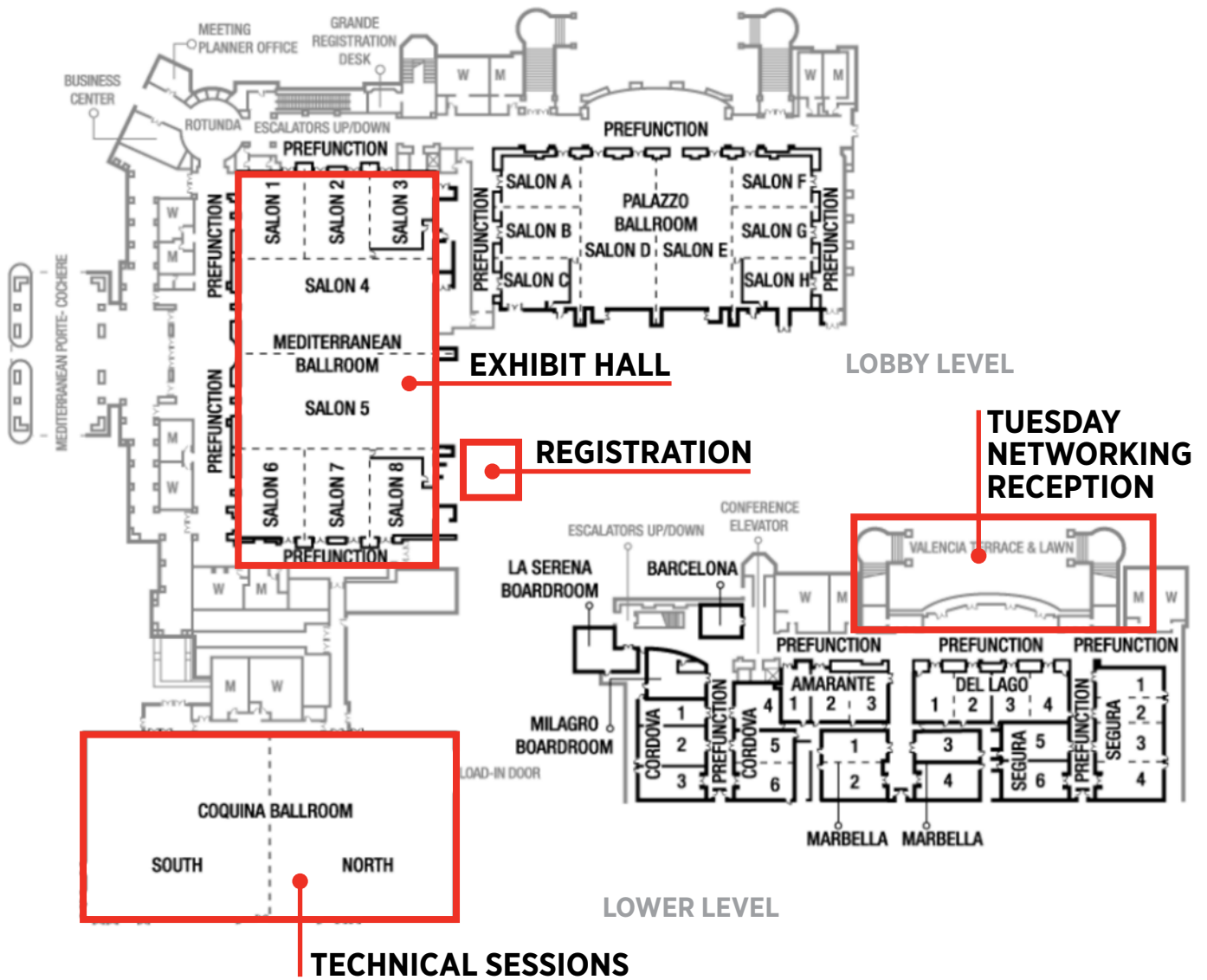
CONSENT TO USE OF IMAGES

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

P19336951



FACILITY FLOOR PLAN



SAE BRAKE EXECUTIVE BOARD



Roy Link

Chairman & CEO

Link Engineering



Paul Smith

Chief Engineer - Jeep Cherokee

FCA US LLC



Richard Kaatz

General Manager, North
America Operations

KBAutosys



Gregory Vyletel

Executive Director, Engineering
-AM Braking

DRiV Incorporated



Chris McCormick

Engineering Director,
Foundation Brake Engineering

ZF



James Webster

Global Technical Manager -
Brake Systems

General Motors LLC



Seong Rhee

President
SKR Consulting LLC



Marvin Weintraub

MHW, Ltd & Emeritus General
Chair



Daniel Sandberg

President & CEO

Brembo North America

EVENT INFORMATION

Registration
Sponsored by:



Registration Mediterranean Ballroom Foyer

Sunday, September 22
12:00 p.m.–5:00 p.m.
Monday, September 23
7:00 a.m.–4:00 p.m.
Tuesday, September 24
7:30 a.m.–4:00 p.m.
Wednesday, September 25
7:30 a.m.–10:00 a.m.

Exhibit Hours Exhibit Hall

Monday, September 23
9:30 a.m.–6:00 p.m.
Tuesday, September 24
9:30 a.m.–4:00 p.m.

Networking Lunches Exhibit Hall

Monday, September 23
11:40 a.m.–1:00 p.m.
Tuesday, September 24
11:40 a.m.–1:00 p.m.

Mediterranean 5
Wednesday, September 25
11:40 a.m.–12:40 p.m.

Networking Reception Exhibit Hall

Monday, September 23
4:30 p.m.–6:00 p.m.

Valencia Lawn
Tuesday, September 24
6:00 p.m.–7:30 p.m.

Wifi Informaton

SSID: JWMarriott_
CONFERENCE
Password: Brake2019

Meet & Greet with the OEMs During the Networking Reception

Exhibit Hall
Monday, September 23
5:00 – 6:00 pm

The following OEM's will
be available throughout
the exhibit hall on Monday.

FCA
General Motors
Hyundai
Suzuki
Toyota

SAE BRAKE TECHNICAL PROGRAM ADVISORY GROUP



Carlos Agudelo
Link Engineering



Seong Rhee
SKR Consulting LLC



Dave Antanaitis
General Motors



Gregory Vyletel
DRiV Incorporated



Richard Kaatz
KBAutosys

OPENING KEYNOTE & AWARD PRESENTATIONS

Coquina Ballroom North

8:30 a.m. -9:40 a.m.

Welcome & Awards Presentations



Roy Link
Link Engineering

Keynote Moderator



Greg Vyletel
DRiV Incorporation

Keynote



Michael Robinet
IHS Markit

AWARDS PRESENTED AT THE BRAKE COLLOQUIUM

ALLAN M. LANG AWARD

Sponsored by **TMD FRICTION**
ANISHINIBO GROUP COMPANY

This award recognizes the “Best Presentation” given during the SAE Annual Break Colloquium & Exhibition events. This is a memorial to Allan Michael Lang. Mr. Lang was killed in an avalanche while hiking in Scotland. He was Research Manager at Mintex Don, Ltd., a BBA Group Company. His Ph.D. was in Mechanical Engineering from Loughborough University in England and his thesis was entitled “An Investigation into Heavy Vehicle Drum Brakes Squeal.”



2019 Recipient:

Carlos Agudelo

Thermal Regimes During Proving Ground Measurements Using the WLTP-Brake Cycle

BEST PAPER AWARD

Sponsored by **COMPACT BRAKES**

This award is given to the best paper from the SAE 2018 Brake Colloquium.

Recipients:

Brake System Design for Dedicated BEV Architectures - 2018-01-1870



Michael Shengberger



David Antanaitis

BEST NEW PRESENTER AWARD

Sponsored by **KBautosys**

This award will be given to the best new presenter. To be considered, the recipient should have presented less than three presentations at the SAE Brake Colloquium.



2019 Recipient:

Jerome Gregeois

SAE FOREST R. MCFARLAND AWARD

This award recognizes individuals for their outstanding contributions toward the work of the SAE Engineering Meetings Board (EMB) in the planning, development, and dissemination of technical information through technical meetings, conferences, and professional development programs or outstanding contributions to the EMB operations in facilitating or enhancing the interchanges of technical information.



2019 Recipient:

Carlos Agudelo

DAN MAHANNAH AWARD

Sponsored by **LINK**

This award is a memorial to Dan Mahannah. The Dan Mahannah Achievement Award is presented to a distinguished Member of our industry. It recognizes an individual who makes unselfish contributions toward the betterment of the industry and its members; through technological advancements, educational or promotional endeavors.

SAE BRAKE ADVISORY BOARD



Harald Abendroth
Consultant



John Fieldhouse
JDF Consulting



Yuichiro Akita
Honda R&D Americas Inc.



Peter Filip
Southern Illinois University
Carbondale



Jayashree Bijwe
Indian Institute of Technology



Kasem Issaraphithakkul
Compact International
(1994) Co. Ltd.



Bart Cann
BWI Group



Ho Jang
Korea University



Gilberto Crosa
Crosa Consulting



Se-II Kim
Hyundai Mobis



ShinWan Kim
KB AutoSys



Yukihiro Shiomi
Toyota Motor Corp.



Georg Ostermeyer
TU Braunschweig



S. Viji
Brakes India Pvt. Ltd.



Kurt Person
Innovation and Management
Services LLC



Robert Waninger
Audi AG



Mike Petrovski
Ford Motor Company



Marvin Weintraub
MHW Ltd.



Kuldip Singh Rathee
Ask Automotive Pvt. Ltd.



Wang Yao
China Friction & Sealing Material
Association



Eric Roszman
Akebono Brake Corp.

TECH SESSIONS WEEK AT A GLANCE

	SUN		MON		TUES		WED		Room No.	Page No.
	AM	PM	AM	PM	AM	PM	AM	PM		
Additional Testing/Validation Considerations with Re-gen Braking Panel Discussion (BC127)	-	-	-	-	✓	-	-	-	Coquina Ballroom North	18
Advances in Brake Component Design Panel Discussion (BC105)	-	-	-	-	-	✓	-	-	Coquina Ballroom North	20
Advances in Brake Component Design Technical Presentations (BC105)	-	-	-	-	-	✓	-	-	Coquina Ballroom North	20
Brake Emissions - What Opportunities and Challenges Do We Have to Reduce Them? Panel Discussion (BC132)	-	-	-	-	-	-	-	✓	Coquina Ballroom North	23
Brake Emissions Technical Presentations, Part 1 & 2 (BC122)	-	-	-	-	-	-	✓	✓	Coquina Ballroom North	22, 23
Brake System Control Products and Methodologies (BC131)	-	-	-	✓	-	-	-	-	Coquina Ballroom South	15
Braking for Electric and Hybrid Vehicles Technical Presentations (BC108)	-	-	-	-	-	✓	-	-	Coquina Ballroom North	19
CAE Technical Presentations (BC104)	-	-	-	✓	-	-	-	-	Coquina Ballroom South	16
Commercial Vehicles Technical Presentations (BC125)	-	-	-	-	✓	-	-	-	Coquina Ballroom South	18
Friction/ Raw Materials, Part 1 & 2 (BC100)	-	-	-	✓	-	-	-	-	Coquina Ballroom North	15, 16
Fundamental Mechanisms of Friction and Vibration Technical Presentations (BC110)	-	✓	-	-	-	-	-	-	Coquina Ballroom South	14
How Can High Performance Development Profit from Racing Development Panel Discussion (BC102)	-	-	-	-	✓	-	-	-	Coquina Ballroom South	17
Opening Keynote: Five Forces- Michael Robinet (BCK1)	-	-	✓	-	-	-	-	-	Coquina Ballroom North	15
NVH Technical Presentations (BC101)	-	-	-	-	-	-	✓	-	Coquina Ballroom North	21
SAE Standards Update Technical Presentations with Panel Discussion (BC124)	-	-	-	-	✓	-	-	-	Coquina Ballroom North	17
Testing and Measurement Technical Presentations, Part 1 & 2 (BC103)	-	-	-	-	-	✓	-	-	Coquina Ballroom South	19, 20
Tutorial: Hardware in the Loop (BCK3)	-	✓	-	-	-	-	-	-	Coquina Ballroom North	14
Tutorial: Lithium Battery and its Behavior on Brakes (BCK2)	-	✓	-	-	-	-	-	-	Coquina Ballroom North	14
Voice of the OEM Panel Discussion (BC123)	-	-	✓	-	-	-	-	-	Coquina Ballroom North	15
Wheel Bearings and Seals Panel Discussion (BC120)	-	-	-	-	-	-	-	✓	Coquina Ballroom South	23
Wheel Bearings and Seals Technical Presentations, Part 1 & 2 (BC120)	-	-	-	-	-	-	✓	-	Coquina Ballroom South	21, 22
Wind Turbines Technical Presentations (BC128)	-	✓	-	-	-	-	-	-	Coquina Ballroom South	14

Notepads and Pens

Sponsored by



SAVE THE DATE!

SAE Brake Colloquium & Exhibition - 38th Annual

October 11-14, 2020
San Antonio, Texas, USA

SAE Brake Colloquium & Exhibition - 39th Annual

October 17-20, 2021
Orlando, Florida, USA

SAE Brake Colloquium & Exhibition - 40th Annual

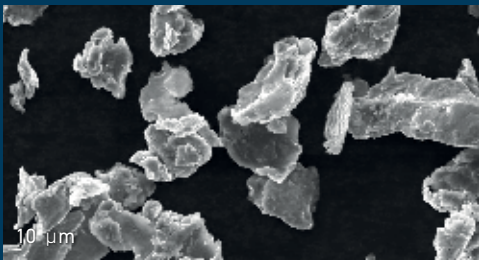
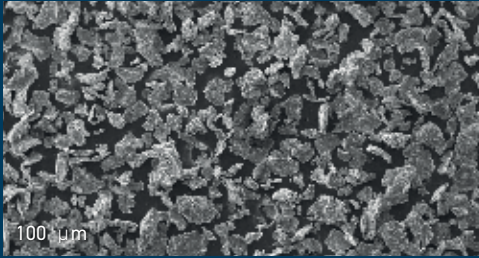
September 25-28, 2022
Grand Rapids, Michigan, USA



For complete session descriptions and speakers visit

PRODUCTS

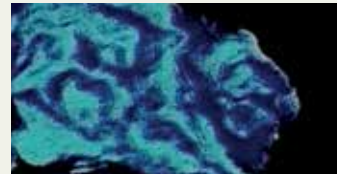
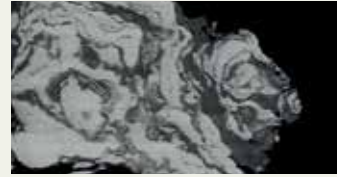
SCANNING ELECTRON MICROSCOPY



MECHANOMADE®

Mechanomade® FA25 is a metal powder manufactured by means of a mechano-chemical process known as High Energy Ball Milling (HEBM). The result of this process is the creation of specifically functionalized products with unique properties where the integration and homogeneous distribution of the phases result in superior performance.

- » Good thermal conductivity due to metallic nature and particular flake morphology
- » Constant friction even at high load, low fade and good recovery
- » Low disc wear contributing to the formation of a constant and uniform third layer
- » Good corrosion resistance



■ iron distribution
■ aluminum distribution



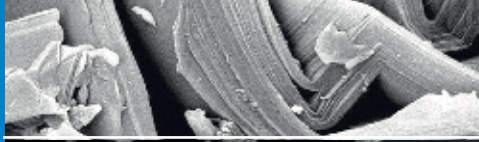
SICACELL

Improves the physical and tribological characteristics of brake pads



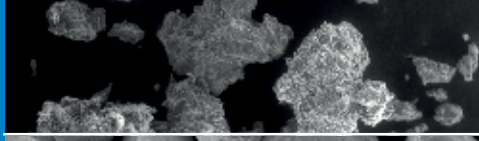
STILOX

The right key to improve the friction level reducing wear and noise



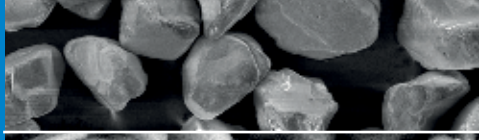
ULTIMATE SERIES

New approaches to lubrication in friction material free of antimony trisulphide: from alternative compounds to adaptive lubricants



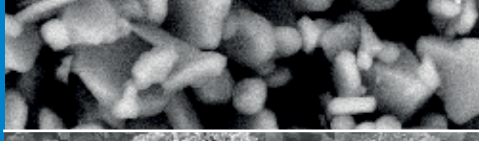
PROCHIM GP

A noise process solution in friction material



PROCHIM D SERIES

The most cheaper alternative of abrasive modifier



AL-X SERIES

Calcined aluminium oxides with different particle size and α -Al₂O₃ content



POTASSIUM TITANATE

Functional filler available in several morphologies

Tutorial: Hardware in the Loop (BCK3)

3:00 p.m. - 4:20 p.m.

Room - Coquina Ballroom North

As products continue to get more complex and integrated, and as the pressure to reduce product development cycle time and cost remains unrelenting, the need to direct more engineering development and validation efforts toward math-based models continues to increase. As many math models are insufficient to accurately or sufficiently predict the complex behavior of these systems alone, the need to blend both the physical and math-based realms offers the best of both worlds. Hardware in the Loop testing helps provide the continuity of the hardware and software integration that is necessary to deliver quality products in timely fashion.

Presenters:

Peter C. Manning, dSPACE Inc.; Marco Zessinger, Link Engineering Company

Wind Turbines Technical Presentations (BC128)

3:00 p.m.

Room - Coquina Ballroom South

Brake systems are needed to control the rotor speed and provide emergency stops for the wind turbines. Although the fundamentals of energy dissipation and heat generation are the same as in the automotive braking, there are differences in the designs and material selections. In this first special session, the wind turbine brake experts provide insights on this advancing field and both industries will benefit from the exchange of ideas.

3:00 p.m.

Hydraulic Rotor Brake System for Wind Power Industry

Francois Ouellet, Hydrep

3:20 p.m.

Wind Turbine Brake Pads

Pierre-Yves Tremblay, Kuma Brake Pads

Fundamental Mechanisms of Friction and Vibration Technical Presentations (BC110)

4:20 p.m.

Room - Coquina Ballroom South

The session focuses on the fundamentals of the interaction on the sliding surface and associated friction induced vibrations. From nanoscale interactions of the contacts on the sliding interface to macroscopic methodology to diminish friction induced vibrations, this session comprises new findings and discussion toward a step forward to full understanding of the friction and brake induced vibration.

Organizers:

Ho Jang, Korea Univ.; Harald Abendroth

4:20 p.m.

The Effect of the Friction Characteristics and Compressibility of the Brake Pads on Brake Judder

Byung Soo Joo, Korea Univ.; Jaeyoung Lee, MinGyun Chung, Hyundai Motor Company; Ho Jang, Korea Univ

4:40 p.m.

(2019-01-2130)

The Influence of Differential Pad Wear on Low-Frequency and High-Frequency Brake Squeal

Johannes Otto, Georg-Peter Ostermeyer, Technische Universitat Braunschweig; Seong K. Rhee, SKR Consulting Inc.

5:00 p.m.

Orientation of Contact Plateaus on the Sliding Surface and Friction Excitation

Sanghee Shin, Korea Univ.; Jeongkyu Kim, HMC; Wansu Song, Ho Jang, Korea Univ.

5:20 p.m.

(2019-01-2132)

The Analysis of Brake Squeal Noise Related to the Friction Properties of Brake Friction Materials

Sang-mok Lee, Jung Hoon Woo, Hyundai Motor Company; Younggu Cho, Hyundai Motor Company & KIA Motors Corporation; Dong Won Kim, Hyundai Motor Company

5:40 p.m.

(2019-01-2131)

The Normal-Load and Sliding-Speed Dependence of the Coefficient of Friction, and Wear Particle Generation Contributing to Friction: High-Copper and Copper-Free Formulations

Seong K. Rhee, SKR Consulting Inc.; Meechai Sriwiboon, Nipon Tiempun, Kritsana Kaewlob, Compact International (1994) Co., Ltd.

Tutorial: Lithium Battery and its Behavior on Brakes (BCK2)

4:40 p.m. - 6:00 p.m.

Room - Coquina Ballroom North

The battery tutorial will give a high level overview of the operation of automotive lithium-ion batteries and supporting systems, with emphasis on behaviors such as charge acceptance and power output that can have direct impact on braking systems. Topics such as types of batteries and module construction, effects of heating, aging, and cold temperatures on charge acceptance and power flow, and how battery behaviors can affect regenerative braking and vehicle performance will be addressed.

Presenter:

Michael J. Shenberger, General Motors



For complete session descriptions and speakers visit

Monday Keynote: Five Forces- Michael Robinet (BCK1)

8:30 a.m.

Room - Coquina Ballroom North

Michael will address the five forces impacting the future of the global automotive industry and how these apply to innovation and evolution of braking for the future. Five critical forces are driving change within the global automotive industry. These include the impact of China, Electrified Propulsion, Autonomous Technology, Formation of New OEM Entities and Value Change within the Automotive Ecosystem. Virtually every vehicle system (including braking) will require new strategies to harness these changes.

Welcome:

Roy Link, Link Engineering

Moderator:

Gregory Vyletel, DRIV Incorporated

Keynote Speaker:

Michael E. Robinet, IHS Automotive

Voice of the OEM Panel Discussion (BC123)

10:20 a.m.

Room - Coquina Ballroom North

Organizers:

Richard Kaatz, KBautosys Co. Ltd.; Chris McCormick, ZF

Moderators:

Richard Kaatz, KBautosys Co. Ltd.; Chris McCormick, ZF Group

Panelists:

David Antanaitis, General Motors
James Fash, Zox Inc.
Florian Guckeisen, Volkswagen AG
Ryutarō Misumi, Toyota Motor Corp.
Charles Evans, Ford Motor Company

Brake System Control Products and Methodologies (BC131)

1:00 p.m.

Room - Coquina Ballroom South

This new session is seeking abstracts on brake system control methodologies, brake controls products, model based software development, and strategic presentations with trends for EV and ADAS.

Organizers:

David B. Antanaitis, General Motors; Joachim Noack, ZF Friedrichshafen AG

1:00 p.m.

Safety-Critical Brake Control Development using a Model Based Software Development Approach shown on a Aircraft Brake System.

Pierre VINCENT, ANSYS France SAS

1:20 p.m.

Modeling and Simulation Methods for Fault-Tolerant Brake Control Algorithms

Steve Miller, MathWorks

1:40 p.m.

A Joint Virtual Engineering Process -Proposals and Requirements for a Seamless Integration

Thomas Puetz, ZF Active Safety GmbH; Richard E. Dzikilinski, TRW Automotive

2:00 p.m.

Virtual Testing Approach of Electronic Brake Systems for Autonomous

Andre Hildebrandt, Michael Peperhowe, dSPACE GmbH

2:20 p.m.

Use of Brake Controls to Enhance Loss of Assist Braking Performance

John Pennala, General Motors

2:40 p.m.

The Improvement Brakes Qualities of Vehicle by Developing the Method of the Choosing Frictional Pairs of the Brakes Mechanisms

Mikhail Podrigalo, Dmytro Klets, Mykhailo Kholodov, Viktor Bogomolov, Anatolii Turenko, Andrii Molodan, Kharkov National Auto and Highway University; Volodymyr Rudzinskyi, Zhytomyr State Technological University; Yurii Tarasov, Aloksa Mykolai, Vasyl Hatsko, Kharkov National Auto and Highway University

Friction/ Raw Materials, Part 1 of 2 (BC100)

1:00 p.m.

Room - Coquina Ballroom North

This session will present recent discoveries and innovations in friction materials development. Papers address paradigm shift expected in (close) future due to increased number of electric/hybrid/autonomous vehicles and related changes in performance of friction brakes and their interaction with regenerative braking based on different principles. Several papers address the environmentally friendly formulations, as well as valid intrinsic physical property measurement.

Organizers:

Eros Sales, ITT Friction Technologies; Peter Filip, Southern Illinois Univ. at Carbondale; Fernao Person, Lapinus

1:00 p.m.

Fabricated Brake Pads using Non-firing Ceramics

Masato FURUTA, ADVICS Co., Ltd.; Yukio Nishizawa, Masaru Yagihashi, ADVICS Co Ltd; Masayoshi Fuji, Nagoya Institute of Technology

1:20 p.m.

Ceramic Bound Materials: A Suitable Solution for Light Brakes

Roberto C. Dante, Edoardo Cotilli, Michael Conforti, Mario Cotilli, Quartz S.r.l.s.u.; José Carlos Serrano-Posada, Chilches Materials S.A.; Tobias Schramm, Georg-Peter Ostermeyer, Tu Braunschweig; Marco Dastrù, 2Dto3D S.r.l.s.

1:40 p.m.

Contact Plateaus on the Heat Affected Friction Material Surface and Propensity of Corrosion Stiction

Jaehyun Gweon, Korea Univ.; Doo Yeon KIM, Wan Gyu Lee, Keeyang Lee, Hyundai Mobis; Jongsung Park, Ho Jang, Korea Univ.

2:00 p.m.

Aging Effect on Disc Pad Properties

Meechai Sriwiboon, Compact International (1994) Co., Ltd.; Seong K. Rhee, SKR Consulting Inc.; Kritsana Kaewlob, Nipon Tiempan, Compact International (1994) Co., Ltd.

2:20 p.m.

Divergence of Thickness Loss vs. Weight Loss, Friction and Wear Behavior of Heavy Truck Brake Blocks: Development of a New Test Procedure for the Chase Tester

Aman Rathee, Devendra Kumar Sharma, Shivraj Singh, Ask Automotive Pvt, Ltd.; Seong Kwan Rhee, SKR Consulting LLC



For complete session descriptions and speakers visit

CAE Technical Presentations (BC104)

3:40 p.m.

Room - Coquina Ballroom South

The CAE has been extensively used to reduce the product development time as well as prevent the field issues such as the brake noise and vibration. This session presents the latest in the computer-aided engineering technologies in the various areas including but not limited to NVH, CFD, thermal, structural, and wear analysis.

Organizers:

Heewook Lee, General Motors; Li Lee, Akebono Brake Corp.; Joachim Noack, ZF Active Safety GmbH; K. Mike Lee, Kyung Chang Industrial Co

3:40 p.m. (2019-01-2119)

Development of Dynamics Analysis Methodology for Front Loading Design Process of Motor on Caliper

Jinsuk Song, Mando Brake

4:00 p.m. (2019-01-2120)

Research on Integrated Performance Design for the Braking System

Wookhyun Han, Kee-Young Yang, Hyundai & Kia Corporation

4:20 p.m.

Transient Brake Cooling and Racetrack Brake Thermal Analysis

Heewook Lee, General Motors

4:40 p.m.

Improved Material Damping for Squeal Prediction by Simulation (CEA)

Michael Klein, Intes GmbH; Bertold Kirchgäßner, INTES GmbH

5:00 p.m.

Moisture Induced Backplate Bow Analysis

Weiming Liu, Federal-Mogul Motorparts

Friction/ Raw Materials, Part 2 of 2 (BC100)

3:40 p.m.

Room - Coquina Ballroom North

This session will present recent discoveries and innovations in friction materials development. Papers address paradigm shift expected in (close) future due to increased number of electric/hybrid/autonomous vehicles and related changes in performance of friction brakes and their interaction with regenerative braking based on different principles. Several papers address the environmentally friendly formulations, as well as valid intrinsic physical property measurement.

Organizers:

Eros Sales, ITT Friction Technologies; Peter Filip, Southern Illinois Univ. at Carbondale; Fernao Persoon, Lapinus

3:40 p.m.

Initial Study on Graphite Grades Contribution to the Next Generation of Brake Pads

Raffaele Gilardi, Luigi Alzati, Imerys Graphite & Carbon; Jayashree Bijwe, Ashish Darpe, Indian Institute of Technology Delhi

4:00 p.m.

(2019-01-2105)

Influence of Amount of Phenolic Resin on the Tribological Performance of Environment-Friendly Friction Materials

Navnath Kalel, Jayashree Bijwe, Ashish Darpe, Indian Institute of Technology Delhi

4:20 p.m.

Influence of Pad Wear on DTV Change due to the Corrosion of Automobile Brake Disc

Wan Gyu Lee, Kangkuk Lee, Hyundai Mobis; Inho LEE, Hyundai Motor Group; Bowon Hyun, KB AutoSys; Seongjoo Lee, KBautosys Co. Ltd.



For complete session descriptions and speakers visit



How Can High Performance Development Profit from Racing Development Panel Discussion (BC102)

8:20 a.m.

Room - Coquina Ballroom South

This session focuses on OEM and aftermarket brake systems for high performance sports cars and sedans. It includes new trends in brake system technology applied to these type of vehicles, how they differentiate from standard brake systems, and the specific development challenges on component and system levels. It also deals with the question of how the focus on performance and safety can be combined with comfort and life time requirements.

Organizers:

Michael Schorn, Link Europe; Axel Stenkamp, TMD Performance GmbH

Panelists:

Eric Brown, TMD Friction Inc.
David Mohr, PFC Brakes
Andrew Smith, Alcon Components
Richard Joyce, APRacing

SAE Standards Update Technical Presentations with Panel Discussion (BC124)

(BC124)

8:20 a.m.

Room - Coquina Ballroom North

The panel discussion will provide a series of brief presentations updates on the most critical brake related standards work being developed via Committee in the areas of NVH, Linings, Hydraulics, fluids, steering and dynamometer. Following these talks will be the opportunity for the audience to engage in a Q& A period to address those issues around standards development that is of utmost criticality to discuss.

Organizers:

Tim Duncan, Link Engineering Company

Panelists:

Carlos Agudelo, Link Engineering Co.
David Antanaitis, General Motors
Eric Denys, Meneta Advanced Shim Technology A/S
Chuck Greening, Greening Inc.
Richard Kaatz, KBautosys Co. Ltd.
Mark Riefe, Matthew Robere, General Motors



For complete session descriptions and speakers visit

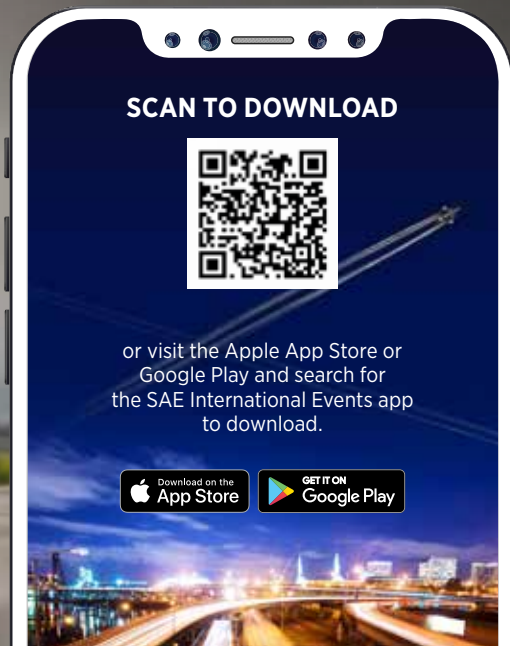


GET THE LATEST EVENT INFO

Download the Brake Colloquium & Exhibition mobile app

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

SPONSORED BY:



Additional Testing/ Validation Considerations with Re-gen Braking Panel Discussion (BC127)

10:20 a.m.

Room - Coquina Ballroom North

This panel will have a broad discussion surrounding the electrification, system differential with re-gen braking, and help the brake system/components suppliers to align testing spec with market needs, and identify the technical area to focus on. Each panelist will share their vision with the industry, and provide with insight of some technical challenges to focus on.

Organizers:

HT Chang, Brake Parts Inc.; Carlos Agudelo, Link Engineering Co

Panelists:

Carlos Agudelo, Link Engineering Co.
Daniel S. Berletchick, Rayloc Inc.
Saikiran Divakaruni, ZF Friedrichshafen AG
Pietro Durando, ITT Friction Technologies
Ryutaro Misumi, Toyota Motor Corp.
Matthew Robere, General Motors

Commercial Vehicles Technical Presentations

(BC125)

10:20 a.m.

Room - Coquina Ballroom South

This session will feature international experts addressing critical braking issues related to the performance and safety of commercial vehicles. Topics include transitioning from drums to air brakes, roll stability, global regulatory and standards review, and braking strategies for hill descent.

Organizers:

Roy Link, Link Engineering Company; Gregory Vyletel, DRiV Incorporated; John David Fieldhouse, JDF Consulting

10:20 a.m. (2019-01-2140)

Brake Pedal Feeling Comfort Analysis for Trucks with Pneumatic Brake System

Wesley Bolognesi Prado, Silvia Faria Iombriller, Marco Andre Silva, Lázaro Renato Oliveira, Ford Motor Company

10:40 a.m.

New Formulation Strategy on Development of Copper-free Commercial Brake Pads

Ricardo Lamb, Natalia Lorandi, Francisco Jardim, Fras-Le SA

11:00 a.m.

Importance of Friction Couple for North American Commercial Vehicle Air Disc Brakes

Dhawal Dharaiya, Hendrickson International

11:20 a.m. (2019-01-2141)

Comparative Analysis between American and European Requirements for Electronic Stability Control (ESC) Focusing on Commercial Vehicles

Silvia Faria Iombriller, Wesley Bolognesi Prado, Marco Andre Silva, Ford Motor Company

Braking for Electric and Hybrid Vehicles Technical Presentations (BC108)

1:00 p.m.

Room - Coquina Ballroom North

Evolving demands on brake systems driven by hybrid and electric vehicle architectures are providing opportunity for new component and brake system configurations and a demand for greater integration of the brake control system with overall vehicle controls. This session offers new concepts and ideas for electrically powered and controlled brakes, improvements in control strategies and system safety considerations.

Organizers:

Jaeseung Cheon, MOBIS; James Fash, Zoex Inc.; Yasushi Suganuma, Link Engineering Company

1:00 p.m. (2019-01-2125)

Development of Regenerative Brake Control Strategy to Remove Brake

Sora Jang, Gwichul Kim, Hyundai & Kia Corp

1:20 p.m. (2019-01-2127)

Braking Requirements for Optimizing Autonomous Emergency Braking Performance

Álvaro Esquer Molina, Jordi Bargallo, Applus IDIADA

1:40 p.m.

Objectives and Feasible Study for Complete Vehicle Stop by Motor Control

Hidetoshi Shimizu, Link Engineering Co.; Shoichi Sasaki, Keio University; Yukio Inaguma, Fumiaki Osawa, Daido University

2:00 p.m.

Future Brake System in the Context of Future Mobility Demand

Paul Linhoff, Continental Teves AG & Co. oHG

Testing and Measurement Technical Presentations, Part 1 of 2 (BC103)

1:00 p.m.

Room - Coquina Ballroom South

This session focuses on new laboratory and vehicle testing methods and systems for new braking technologies. Topics include: electrification of braking systems, powertrain electrification and its interaction with the foundation brakes, physical validation of simulation models, and hardware-in-the-loop testing. This session is aimed at providing a platform for the industry to showcase, discuss, and charter the path forward on testing activities, measurement methodologies, challenges, and needs.

Organizers:

Cara Learman, General Motors; Adam Link, Link Engineering Company; Ryan Vicary, ITT Friction Technologies

1:00 p.m. (2019-01-2116)

Braking with a Trailer and Mountain Pass Descent

David B. Antanaitis, Brent Lowe, General Motors LLC

1:20 p.m.

Developing of the Scaled Down Braking Procedure Based on Real World Driving Data

Pavlina Peikertova, VSB Technical University of Ostrava

1:40 p.m.

Challenges with Vibration Based Brake Testing From Concept to Production

Gregg Palombo, Polytec Inc; Vikrant Palan, Polytec Inc.

2:00 p.m.

PMP Interlaboratory Accuracy Study for WLTP-Brake (novel) Inertia Dynamometer Duty Cycle

Carlos Agudelo, Link Engineering Co.; Theodoros Grigoratos, Joint Research Centre; Jaroslaw Grochowicz, Ford Werke GmbH

2:20 p.m. (2019-01-2113)

Objective Method for Crack Detection in Brake Friction Material

Saikiran Divakaruni, ZF Friedrichshafen AG; Donald Yuhas, Carol Vorres, Industrial Measurement Systems Inc.; Richard Kaatz, KBAutoSys America



For complete session descriptions and speakers visit

Advances in Brake Component Design Technical Presentations

(BC105)

3:20 p.m.

Room - Coquina Ballroom North

The session focuses on innovations with foundation brake and apply system components (calipers, rotors, drums, bearings, manual and electric park brakes, and actuation). It addresses integration at all levels (pad to caliper, caliper to corner, corner and actuation to vehicle). Examples include but are not limited to: component design, performance enhancements, system sizing/configuration, drag reduction, pedal feel, mass reduction, and thermal management by new designs/innovative materials.

Organizers:

Saikiran Divakaruni, ZF Friedrichshafen AG; Chris McCormick, ZF; Jeff Pontius, Mando America Corporation; Mark Riefe, General Motors

3:20 p.m.

Optimized Cleaning Process for Brake Calipers and other Cast Iron to Achieve Highest Corrosion Resistance

Matthias Hoch, Atotech Deutschland GmbH

3:40 p.m.

(2019-01-2123)

Benefits and Application Bandwidth of Phenolic Piston Material in Opposed Piston Calipers

David B. Antanaitis, General Motors LLC; Chris Ciechoski, SBHPP; Mark Riefe, General Motors LLC

4:00 p.m.

(2019-01-2121)

A Study on the Optimum Reduction of Required Brake Fluid Level for Improvement of the High Speed Continuous Brake Distance

Junggyu Kim, Kwang Yun Kim, Eue-sub So, Hyundai Motor Company

4:20 p.m.

Brake Corner Output Optimization with Ferritic Nitro-Carburized Brake Rotors

Mark Riefe, Cara Learman, Matthew Robere, General Motors

Testing and Measurement Technical Presentations, Part 2 of 2

(BC103)

3:20 p.m.

Room - Coquina Ballroom South

This session focuses on new laboratory and vehicle testing methods and systems for new braking technologies. Topics include: electrification of braking systems, powertrain electrification and its interaction with the foundation brakes, physical validation of simulation models, and hardware-in-the-loop testing. This session is aimed at providing a platform for the industry to showcase, discuss, and charter the path forward on testing activities, measurement methodologies, challenges, and needs.

Organizers:

Cara Learman, General Motors; Adam Link, Link Engineering Company; Ryan Vicary, ITT Friction Technologies

3:20 p.m.

(2019-01-2112)

A Study of the Disc Scoring Generation Principle and Reduction(II)

ByeongUk Jeong, Hyoung Tae Ryu, Hyundai Motor Company; Kwang Ki Jung, Sangsin Brake Company; Chang Jin Kim, Myunghwa Ind Co., Ltd.; Hyunkyung Lee, Sangsin Brake Company

3:40 p.m.

(2019-01-2117)

Frequency Inspection of Brake System Components

Robert Cagle, Signalysis Inc.

4:00 p.m.

(2019-01-2115)

Brake Rotor Corrosion and Friction Cleaning Effect on Vehicle Judder Performance

Narcis Molina Montasell, Bernat Ferrer, Applus IDIADA

4:20 p.m.

Improved Low-Cost Sensor for Direct Measurement of Brake Wear and Wear Surface Temperature

Valentin Korman, K Sciences

4:40 p.m.

New Procedures and Analysis Methods for Creep Groan Evaluation at Dyno Level

Cristian Malmassari, Brembo Spa

Advances in Brake Component Design Panel Discussion

(BC105)

4:40 p.m.

Room - Coquina Ballroom North

The session focuses on innovations with foundation brake and apply system components (calipers, rotors, drums, bearings, manual and electric park brakes, and actuation). It addresses integration at all levels (pad to caliper, caliper to corner, corner and actuation to vehicle). Examples include but are not limited to: component design, performance enhancements, system sizing/configuration, drag reduction, pedal feel, mass reduction, and thermal management by new designs/innovative materials.

Organizers:

Saikiran Divakaruni, ZF Friedrichshafen AG; Chris McCormick, ZF; Jeff Pontius, Mando America Corporation; Mark Riefe, General Motors

4:00 p.m.

Brake Component Improvements Supporting Recent and Future Trends in the Automobile Industry

Panelists:

Stefan Anger, Federal-Mogul Friction Products
Josh Frieden- Continental AG
Eric Jennings- Trelleborg
Ryutaro Misumi- Toyota Motor Corp.
James Webster- General Motors



For complete session descriptions and speakers visit

NVH Technical Presentations (BC101)

8:00 a.m.

Room - Coquina Ballroom North

This session focuses on innovations for improving brake NVH (Noise, Vibration and Harshness) performance. Papers and presentations involving new methods, theories, techniques, and application examples are welcome.

Organizers:

Eric Denys, Meneta Advanced Shim Technology A/S; Weiming Liu, Federal-Mogul Motorparts; Brent Lowe, General Motors

8:00 a.m.

Creep Groan Noise- A Laboratory Testing Method and Data Analysis Technique

Brent Lowe, General Motors

8:20 a.m.

Friction ICS - An Innovative and Integrated System for End-of-Line Pad Quality Control

Cristian Malmassari, Brembo Spa

8:40 a.m.

(2019-01-2111)

Squeal Noise Improvement by High Damping & High Stiffness under Layer Material

Masato Nishioka, Leanne Johnson, Sean Rosalez, ADVICS North America, Inc.; Shusuke Suzuki, ADVICS Co., Ltd.

9:00 a.m.

NVH Study of Friction Brake Pads using Scaled-Down SAE J2521 Test

Rohit Jogineedi, Shanthan Reddy Mandadi, Sai Krishna Kancharla, Peter Filip, Southern Illinois University at Carbondale; Steve Shaffer, Bruker Corporation

9:20 a.m.

Influence of the Regeneration Strategy on the NVH Optimization with Some Hints for a Novel Approach to Re-Size the Braking System

Andrea Cerutti, Brembo Spa

9:40 a.m.

(2019-01-2110)

Disc Thickness Variation (DTV) Operational Measurement and Influence on the Overall Vehicle Roughness

Bernat Ferrer, Applus IDIADA

Wheel Bearings and Seals Technical Presentations, Part 1 of 2 (BC120)

8:00 a.m.

Room - Coquina Ballroom South

This session will focus on innovations in wheel bearings and their integration to the vehicle. Individuals will address topics such as mass optimization, drag reduction, enterprise cost, warranty reduction, Brinelling, sealing, corner splash protection, lateral stiffness, lubrication, validation, coatings and new technology. Additionally it is a great place to meet people in the wheel bearing industry and have an open dialog about the multiple challenges facing our industry.

Organizers:

Kelly Grubaugh, ILJIN USA Corporation; Robert Sutherlin, ILJIN USA; Richard Haehn, ILJIN USA Corporation

8:00 a.m.

(2019-01-2133)

Orbital Forming of Automotive Wheel Bearings

Jake Sponsler, Orbitform

8:20 a.m.

(2019-01-2135)

Development of a Low Friction High Performance Wheel Bearing Seal

Yongwon Kim, Chae Yeong Cha, Seonggyu Jin, Iljin Global; Reinhold Mahr, Iljin Bearing GmbH; Seungpyo Lee, ILJIN USA Corporation

8:40 a.m.

Seal Labyrinth Structure Resolving the Tradeoffs of High Sealing Performance

Koki Ishida, Uchiyama Mfg Corp.; Jun Hwi Cho, Kevin Pittel, Uchiyama Mrkting & Devmt America LLC

9:00 a.m.

Best Practices in Manufacturing of Wheel Studs and Wheel Bolts

Tushar Mulherkar, KAMAX INC.

9:20 a.m.

(2019-01-2134)

Lightweight Wheel Bearing with Dissimilar Materials for Vehicle

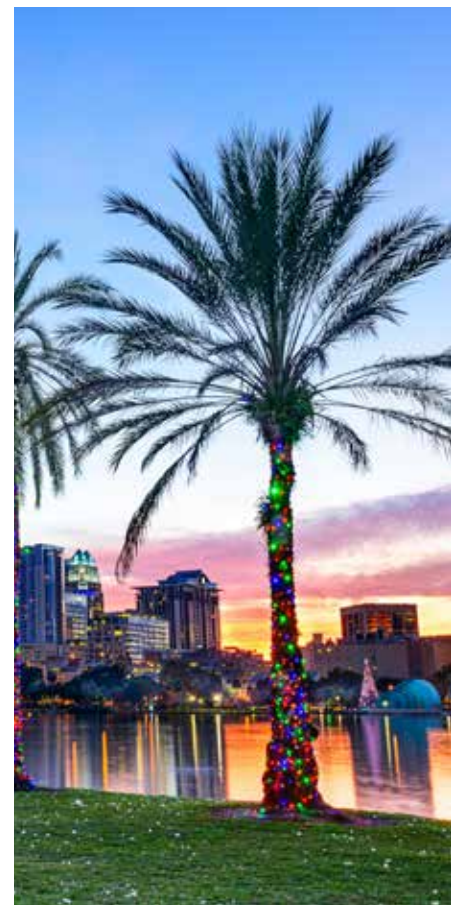
Inha Lee, Seonho Lee, Heechan Shim, Iljin Global; Jaehee Lee, Hyundai Motor Group; Sung-Tae Hong, University of Ulsan; Jungyang Park, Iljin Global

9:40 a.m.

(2019-01-2137)

Bearing Life Optimization for Automotive Wheel Bearings

Seungpyo Lee, ILJIN USA Corporation



Brake Emissions Technical Presentations, Part 1 of 2 (BC122)

10:20 a.m.

Room - Coquina Ballroom North

Braking emissions are becoming more and more the focus of the public. In addition to fundamental questions of the quantitative detection of brake dust and its distribution in the environment, health questions are also essential. This session addresses measurement technology, theory and simulation for brake emission and ways to minimize the environmental impact.

Organizers:

Carlos Agudelo, Link Engineering Co.; Georg Ostermeyer, Tu Braunschweig; Matthew Robere, General Motors

10:20 a.m.

Comparison of Brake Wear Emissions from Dynamometer and On-Road Testing

Marcel Mathissen, Ford Research and Innovation Center; Theodoros Grigoratos, Joint Research Centre; Jaroslaw Grochowicz, Rainer Vogt, Ford Motor Company

10:40 a.m.

(2019-01-2138)

Real Driving Emissions Measurement of Brake Dust Particles

David Hesse, Klaus Augsburg, Technische Universitat Ilmenau

11:00 a.m.

At Source Brake Dust Collection System

Loic Adamczak, Tallano Technologie

11:20 a.m.

Exploratory Brake Emissions Benchmarking A Design of Experiments

Matthew Robere, General Motors

Wheel Bearings and Seals Technical Presentations, Part 2 of 2 (BC120)

10:20 a.m.

Room - Coquina Ballroom South

This session will focus on innovations in wheel bearings and their integration to the vehicle. Individuals will address topics such as mass optimization, drag reduction, enterprise cost, warranty reduction, Brinelling, sealing, corner splash protection, lateral stiffness, lubrication, validation, coatings and new technology. Additionally it is a great place to meet people in the wheel bearing industry and have an open dialog about the multiple challenges facing our industry.

Organizers:

Kelly Grubaugh, ILJIN USA Corporation; Robert Sutherlin, ILJIN USA; Richard Haehn, ILJIN USA Corporation

10:20 a.m.

The Importance of Grease and Grease Component Selection for Wheel Bearing Lubrication

Anuj MISTRY, Matthias Ostertag, Fuchs Lubricants Co.

10:40 a.m.

New Lubricant Developments for Lowering Drag and Friction in Wheel Bearings

Gary Weber, DuPont

11:00 a.m.

Grease Testing for Professional Stock Car Racing Wheel Bearings

Ben Thomas Pearch, Timken Bearing Business

11:20 a.m.

(2019-01-2136)

Study on Application Methods to Mitigate Galvanic Corrosion between Wheel Bearing and Aluminum Knuckle

Sewoong Kim, Seonho Lee, Hyounsoo Park, Iljin Global



For complete session descriptions and speakers visit

Brake Emissions Technical Presentations, Part 2 of 2 (BC122)

12:40 p.m.

Room - Coquina Ballroom North

Braking emissions are becoming more and more the focus of the public. In addition to fundamental questions of the quantitative detection of brake dust and its distribution in the environment, health questions are also essential. This session addresses measurement technology, theory and simulation for brake emission and ways to minimize the environmental impact.

Organizers:

Carlos Agudelo, Link Engineering Co.; Georg Ostermeyer, Tu Braunschweig; Matthew Robere, General Motors

12:40 p.m.

The Effect of Disc Materials on the Particulate Matter (PM) Emission from the Brake System.

Hyungjo Seo, Yeongbin KIM, Korea Univ.; Yoon Cheol Kim, Hyundai Motor Co; Ho Jang, Korea Univ.

1:00 p.m.

(2019-01-2139)

Design of Experiments for Effects and Interactions during Brake Emissions Testing Using High-Fidelity Computational Fluid Dynamics

Carlos Agudelo, Ravi Teja Vedula, Link Engineering Company; Jesse Capecehatro, Qingquan Wang, University of Michigan

Wheel Bearings and Seals Panel Discussion (BC120)

12:40 p.m.

Room - Coquina Ballroom South

This session will focus on innovations in wheel bearings and their integration to the vehicle. Individuals will address topics such as mass optimization, drag reduction, enterprise cost, warranty reduction, Brinelling, sealing, corner splash protection, lateral stiffness, lubrication, validation, coatings and new technology. Additionally it is a great place to meet people in the wheel bearing industry and have an open dialog about the multiple challenges facing our industry.

Organizers:

Kelly Grubaugh, ILJIN USA Corporation; Robert Sutherlin, ILJIN USA; Richard Haehn, ILJIN USA Corporation

Panelists:

Kelly Grubaugh, ILJIN USA
Jennifer Hypes, Timken
Shakeel Shaikh, Schaeffler Group USA Inc.
Keith Sharp, Koyo Bearings of North America
Cengiz R. Shevket, SKF

Brake Emissions - What Opportunities and Challenges Do We Have to Reduce Them? Panel Discussion (BC132)

1:40 p.m.

Room - Coquina Ballroom North

The news cycles, with almost weekly headlines regarding emissions and particulate matter, and recent studies from around the world have brought brake emissions into the spotlight. This panel aims at addressing three key areas: (a) perspectives of the OEMs regarding the impact on vehicle system design, specifications, and potential compliance to PM limits; (b) perspectives from government entities with resources to monitor or mandate limits for brake emissions, and (c) perspectives from research bodies with the ability to understand the toxicology, dosimetry, and effects of particulate matter and constituents on human health.

Organizers:

Carlos Agudelo, Link Engineering Co.; Georg Ostermeyer, Tu Braunschweig; Matthew Robere, General Motors

Panelists:

Theodoros Grigoratos, Joint Research Centre
Marcel Mathissen, Ford Research and Innovation Center
Chris McCormick, ZF Group
Matthew Robere, General Motors
Agusti Sin, ITT Friction Technologies



For complete session descriptions and speakers visit



PARTICIPANTS INDEX

A

Abendroth,Harald	14
Adamczak,Loic	22
Agudelo,Carlos	17, 18, 19, 22, 23
Alzati,Luigi	16
Anger,Stefan	20
Antanaitis,David B.	15, 17, 19, 20
Augsburg,Klaus	22

B

Bargallo,Jordi	19
Berletchick,Daniel S.	18
Bijwe,Jayashree	16
Bogomolov,Viktor	15
Brown,Eric	17

C

Cagle,Robert	20
Capecelatro,Jesse	23
Cerutti,Andrea	21
Cha,Chae Yeong	21
Chang,HT	18
Cheon,Jaeseung	19
Cho,Jun Hwi	21
Cho,Younggu	14
Chung,MinGyun	14
Ciechoski,Chris	20
Conforti,Michael	15
Cotilli,Edoardo	15
Cotilli,Marlo	15

D

Dante,Roberto C.	15
Darpe,Ashish	16
Dastrù,Marco	15
Denys,Eric	17, 21
Dharaiya,Dhawal	18
Divakaruni,Saikiran	18, 19, 20
Duncan,Tim	17
Durando,Pietro	18
Dziklinski, Richard E.	15

E

Evans,Charles	15
---------------	----

F

Fash,James	15, 19
Ferrer,Bernat	20, 21
Fieldhouse,John David	18
Filip,Peter	15, 16, 21
Frieden,Josh	20
Fuji,Masayoshi	15
Furuta,Masato	15

G

Gilardi,Raffaele	16
Gramstat,Sebastian	23
Greening,Chuck	17
Grigoratos,Theodoros	19, 22, 23
Grochowicz,Jaroslav	19, 22
Grubaugh,Kelly	21, 22, 23
Guckeisen,Florian	15
Gweon,Jaehyun	15

H

Haehn,Richard	21, 22, 23
Han,Wookhyun	16
Hatsko,Vasyl	15
Hesse,David	22
Hildebrandt,Andre	15
Hoch,Matthias	20
Hong,Sung-Tae	21
Hyun,Bowon	16

I

Inaguma,Yukio	19
Iombriller,Silvia Faria	18
Ishida,Koki	21

J

Jang,Ho	14, 15, 23
Jang,Sora	19
Jardim,Francisco	18
Jennings,Eric	20
Jeong,ByeongUk	20
Jin,Seonggyu	21
Jogineedi,Rohit	21
Johnson,Leanne	21
Joo,Byung Soo	14
Jung,Kwang Ki	20

K

Kaatz,Richard	15, 17, 19
Kaewlob,Kritsana	14, 15
Kalel,Navnath	16
Kancharla,Sai Krishna	21
Kholodov,Mykhailo	15
Kim,Chang Jin	20
Kim,Dong Won	14
KIM,Doo Yeon	15
Kim,Gwichul	19
Kim,Jeongkyu	14
Kim,Junggyu	20
Kim,Kwang Yun	20
Kim,Sewoong	22
KIM,Yeongbin	23
Kim,Yongwon	21
Kim,Yoon Cheol	23
Kirchgäßner,Bertold	16
Klein,Michael	16
Klets,Dmytro	15
Korman,Valentin	20

L

Lamb,Ricardo	18
Learman,Cara	19, 20
Lee,Heewook	16
Lee,Hyunkyung	20
Lee,Inha	21
Lee,Inho	16
Lee,Jaehee	21
Lee,Jaeyoung	14
Lee,Kangkuk	16
Lee,Keeyang	15
Lee,K. Mike	16
Lee,Li	16
Lee,Sang-mok	14
Lee,Seongjoo	16
Lee,Seonho	21, 22
Lee,Seungpyo	21

Lee,Wan Gyu	15, 16
Linhoff,Paul	19
Link,Adam	19, 20
Link,Roy	18
Liu,Weiming	16, 21
Lorandi,Natalia	18
Lowe,Brent	19, 21
Lugovyy,Dmytro	23

M

Mahr,Reinhold	21
Malmassari,Cristian	20, 21
Mandadi,Shanthan Reddy	21
Manning,Peter C.	14
Mathissen,Marcel	22, 23
McCormick,Chris	15, 20, 23
Miller,Steve	15
Mistry,Anuj	22
Misumi,Ryutaro	15, 18, 20
Mohr,David	17
Molina,Álvaro Esquer	19
Molodan,Andrii	15
Montasell,Narcís Molina	20
Mulherkar,Tushar	21
Mykolai,Aloksa	15
Nishioka,Masato	21
Nishizawa,Yukio	15
Noack,Joachim	15, 16

O

Oliveira,Lázaro Renato	18
Osawa,Fumiaki	19
Ostermeyer,Georg	22, 23
Ostermeyer,Georg-Peter	14, 15
Ostertag,Matthias	22
Otto,Johannes	14
Ouellet,Francois	14

P

Palan,Vikrant	19
Palombo,Gregg	19
Park,Hyounsu	22
Park,Jongsung	15
Park,Jungyong	21
Pearch,Ben Thomas	22
Peikertova,Pavlina	19
Pennala,John	15
Peperhowe,Michael	15
Persoon,Fernao	15, 16
Pittel,Kevin	21
Podrigalo,Mikhail	15
Pontius,Jeff	20
Prado,Wesley Bolognesi	18
Puetz,Thomas	15

R

Rathee,Aman	15
Rhee,Seong K.	14, 15
Rhee,Seong Kwan	15
Riefe,Mark	17, 20
Robere,Matthew	17, 18, 20, 22, 23
Robinet,Michael E.	15
Rosalez,Sean	21
Rudzinskyi,Volodymyr	15
Ryu,Hyoung Tae	20

S

Sales,Eros	15, 16
Sasaki,Shoichi	19
Schorn,Michael	17
Schramm,Tobias	15
Schroeder,Matthias	23
Seo,Hyoungjo	23
Serrano-Posada,José Carlos	15
Shaffer,Steve	21
Sharma,Devendra Kumar	15
Shenberger,Michael J.	14
Shim,Heechan	21
Shimizu,Hidetoshi	19
Shin,Sanghee	14
Silva,Marco Andre	18
Sin,Agusti	23
Singh,Shivraj	15
Smith,Andrew	17
So,Eue-sub	20
Song,Jinsuk	16
Song,Wansu	14
Sponsler,Jake	21
Sriwiboon,Meechai	14, 15
Stenkamp,Axel	17
Suganuma,Yasushi	19
Sutherland,Robert	21, 22, 23
Suzuki,Shusuke	21

T

Tarasov,Yurii	15
Tiempan,Nipon	14, 15
Tremblay,Pierre-Yves	14
Turenko,Anatoliy	15

V

Vedula,Ravi Teja	23
Vicary,Ryan	19, 20
Vincent,Pierre	15
Vogt,Rainer	22
Vorres,Carol	19
Vyletel,Gregory	18

W

Wang,Qingquan	23
Waninger,Robert	23
Weber,Gary	22
Webster,James	20
Woo,Jung Hoon	14

Y

Yagihashi,Masaru	15
Yang,Kee-Young	16
Yuhas,Donald	19

Z

Zessinger,Marco	14
-----------------	----

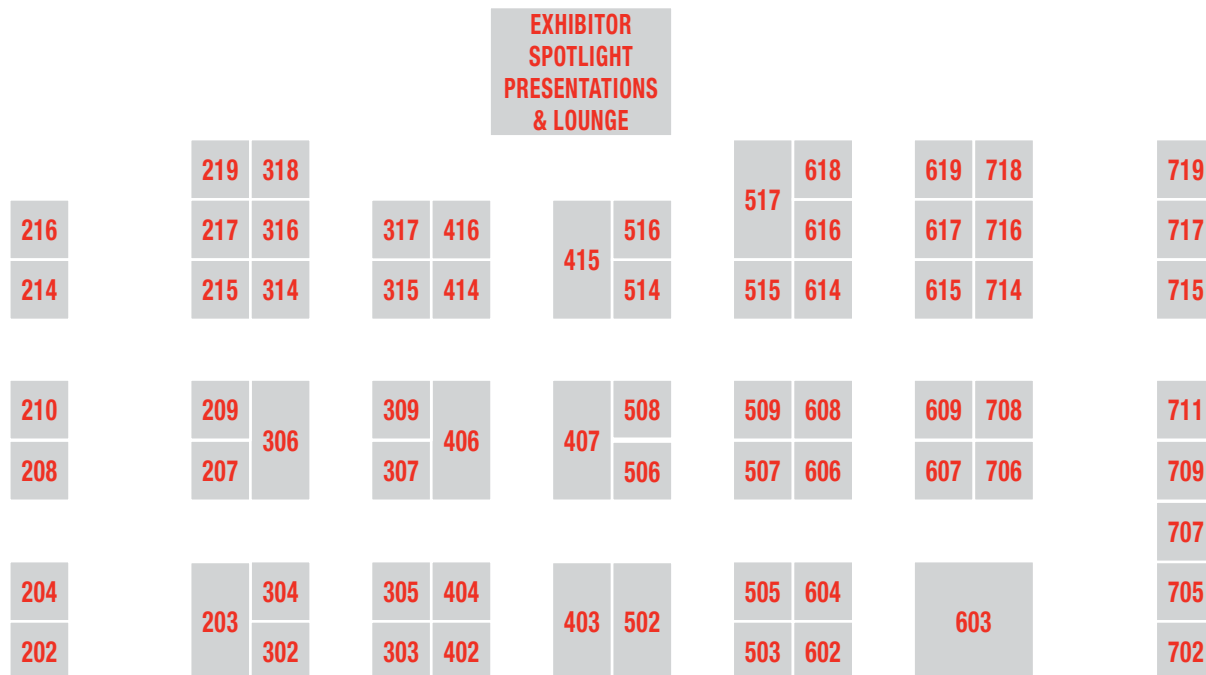
EXHIBITOR DIRECTORY



CONTENTS

Floor Plan	26
Exhibitor List	26
Exhibitor Profiles	27

EXHIBIT FLOOR PLAN



EXHIBITOR LIST

Company	Booth	Company	Booth	Company	Booth
A					
Allied Nippon Ltd	719	H.B. Fuller / Cilbond	617	Palmer International Inc	316
Alroko Inc	309	HEF USA	607	Parker Trutech Inc	716
American GCI Resitop	616	Hexion Inc	517	Polytec Inc	516
American Metal Fibers Inc	506	Hi-Pad Brake Technology	508	Preferred Automotive Components	509
Anhui Guida Auto Parts Co Ltd	711	Horiba Instruments Inc	703	Procotex Corporation sa	609
Anqing Hualan Technology Co Ltd	715	I			
Applus IDIADA	714	ILJIN USA Corporation	306	Rimsa Metal Technology SA	215
Asbury Carbons	302	IMERYS	203	S	
Atotech USA LLC	207	Industrial Measurement Systems Inc	315	Sadeca Automotive SLU	314
B					
Bruker	317	International Brake Industries Inc	305	Shamokin Carbons	202
BSS TEC International Corp	217	Itapochim Srl	204	Showa Denko Carbon Inc	507
C					
Cardolite Corporation	210	K			
Climatic Testing Systems Inc	303	KAMAX	216	Specialty Lubricants Corp	602
COMEC Grinding Machines & Presses	404	L			
D					
Daico Automotive Products SpA	606	Lapinus	209	Sterling Fibers	514
Daiichi Kigenso Kagaku Kogyo Co Ltd	608	Link Engineering Company	403	Superior Graphite	402
Daishin Kako Company Ltd	515	Loedige Process Technology	708	T	
E					
Entech Inc	619	M			
Erdrich USA Inc	717	MaGyc Srl	208	TAM Ceramics Inc	214
Erlmann	414	Meneta Group	603	Taprath Elastomers LLP	304
Excalibar Minerals Inc	604	Midwest Elastomers	318	Tianjin Kimwan Carbon Technology	503
G					
Greening Inc	416	Morgan Advanced Materials	614	Trelleborg Sealing Solutions	407
Grindoson BVBA	615	Morimura Brothers	618	U	
H					
		Niagara Brake International	718	UTIL Group	502
I					
		Novitek Fine Blanking	406	W	
J					
		O			
K					
		Otsuka Chemical America	307	Waldraff Technologies	416
L					
		P			
		Xinlida Auto Parts LLC	219	WanDa Machines	707
M					
		Q			
		R			
		S			
		T			
		V			
		Y			
		Zeon Chemicals LP			
		505			

EXHIBITOR PROFILE

Exhibitor Directory text is published as submitted by exhibiting companies.

ALLIED NIPPON LTD

BOOTH 719

12 Site V Sahibabad Indl. Area
Ghaziabad, Uttar Pradesh 201010
India
alliednippon.com

Allied Nippon Limited (ANL) is the largest Manufacturer, Exporter and OE Supplier at Tier I & Tier II level, for friction material products. The company is ISO 14001:2015 & OHSAS-18001:2007 certified and products are manufactured as per the IATF 16949:2016 quality standards. The product range includes Disc Brake Pads, Brake Shoes, Brake Linings for various Japanese, Korean, Russian, European/ German and American vehicles. With the distinction of having more than 1700 active part numbers with ECE R90 certification.

ALROKO INC.

BOOTH 309

19 Clinton Street
Pleasantville, NY 10570
United States
alroko.com

For more than 30 years Alroko is the exclusive sales representative for many important producers of raw materials and machine manufacturers around the world. We supply technically advanced products of constantly high quality, always emanating from the same established sources. Further we supply machines for producing and testing friction materials.

AMERICAN GCI RESITOP INC

BOOTH 616

1111 N Plaza Dr Ste 646
Schaumburg, IL 60173
United States

AMERICAN METAL FIBERS INC

BOOTH 506

GOLF SPONSOR

13420 Rockland Rd
Lake Bluff, IL 60044
United States
amfi-usa.com

American Metal Fibers, Inc. experience with metal fibers and other high temperature fibers, combined with manufacturing and technical development personnel, offers a range of skills and technology from around the world.

ANHUI GUIDA AUTO PARTS CO LTD

Booth 711

No.2368 Nanci 1st Road
Wuhu Anhui Province 241100
China

gdbrakes.com

Guida specializes in the production of back plate, brake steel shoe. Less consumable, low scrap, good flatness is very popular to our target customer. Please contact us if you have any requirements for Back plate & brake shoe.

ANQING HUALAN TECHNOLOGY CO LTD

Booth 715

No 8 Xiangzhang Rd Daguan District
Anqing City 246002
China

hs-hl.com

Anqing Hualan, a professional manufacturer of NBR powder.

APPLUS IDIADA APPLUS IDIADA USA

Booth 714

100 W Big Beaver Rd Ste 200, Office 28
Troy, MI 48084
United States
applusidiada.com

With 25 years of history and 2,600 engineers, IDIADA is an engineering company providing design, testing and engineering services to the automotive industry. A leader in brake development services in Europe and Asia, the company is also located in Michigan and recently in California in order to be closer to its US clients.

ASBURY CARBONS

BOOTH 302

405 Old Main St
Asbury, NJ 08802
United States
asbury.com

Established in 1895, Asbury Carbons is a family owned and operated company dedicated to developing high-performance products and Engineered Solutions that meet the demands of traditional and emerging friction applications. As the world's largest independent processor of carbon and graphite, and an ISO certified company, Asbury offers the largest selection of both high-quality carbon and non-carbon products.

EXHIBITOR PROFILE

ATOTECH USA LLC

BOOTH 207

1750 Overview Dr
Rock Hill, SC 29730
United States
atotech.com

Atotech is a global leader in surface-finishing solutions. Through a comprehensive systems and solutions approach, the company delivers chemistry, equipment, and service to support diverse industries such as consumer electronics, especially mobile devices and computers; global automotive; communication infrastructure; and many other industrial end-markets.

BRUKER

BOOTH 317

61 Daggett Dr
San Jose, CA 95134
United States
bruker.com/TMT

As the worldwide leader in measurement solutions, Bruker will be presenting the UMT TriboLab mechanical testing system at Booth 317. The TriboLab is the only benchtop friction material tester available that offers friction and thermal results in line with large-scale dynos, while paving the way in particulate matter collection.

BSS TEC INTERNATIONAL CORPORATION

Booth 217

no 5 Yongkehuan Rd Yongkang Dist
Tainan City 71041
Taiwan
bsstec.com.tw

BSS TEC is a professional braking components manufacturer which originally focused on fine backing plates. We developed our own stamping, BSS Stamping. In 2017, we expanded our scale and acquired a shoe core company which has more than 40 years of experience and the widest range in Taiwan.

CARDOLITE CORPORATION

BOOTH 210

140 Wharton Rd
Bristol, PA 19007
United States
cardolite.com

As world leader in Cashew Nutshell Liquid Technology, Cardolite offers a range of high-end CNSL derivatives that will bring top performance to your friction materials.

CLIMATIC TESTING SYSTEMS INC

Booth 303

2367 N Penn Rd Ste 100
Hatfield, PA 19440
United States
climatictesting.com

Climatic Testing Systems, Inc. (CTS) is a leading single-source supplier of Environmental Conditioning Units (ECUs) and Test Chambers for the Brake Testing Industry. CTS utilizes its expertise in refrigeration and air conditioning systems and controls to provide our customers with comprehensive services for the design, supply, installation and maintenance of environmental test facilities.

COMEC GRINDING MACHINES & PRESSES

Booth 404

viale Commercio 40
Piacenza 29122
Italy
comec-grinders.com

Founded in 1963, COMEC specializes in the design and manufacturing of grinding machines for special applications. In the last 40 years, COMEC focused especially on developing Grinding & Pressing Technologies for the Friction Material Industry.

DAICO AUTOMOTIVE PRODUCTS SPA

Booth 606

Via Goretta 84/B
Mappano Torino 10072 (TO)
Italy
daicospa.com

Daico Automotive Products S.p.A. is the European leading Company, manufacturer and distributor of brake hardware for Automotive industries and brake industries, since 1987. Products: components and accessories for disc and drum brake systems and for brake calipers. Application: Passenger Cars, L.C.V. and C.V.

DAIICHI KIGENSO KAGAKU KOGYO CO LTD

Booth 608

4-4-7 Imabashi 4 Chome Chuo-ku
Osaka 541-0042
Japan
dkkk.co.jp

We, Daiichi Kigenso Kagaku (DKK) are leading manufacturer of Zirconium compounds and we have supplied zirconium materials for brake pads for over 45 years. DKK can supply various type of materials such as particle size and impurity level for customer needs.

EXHIBITOR PROFILE

DAISHIN KAKO COMPANY LTD BOOTH 515

2-5-8 Shibadaimon Minato-ku
Tokyo 105-0012
Japan
daishinkako.com

Daishin Kako Company Ltd is based in Tokyo and has been studying the use of greases and other lubricating materials used for the prevention of brake noise and squeal for four decades. DAIKALUB 528D is the latest development and is approved by numerous automobile manufacturers and component suppliers located worldwide.

ENTECH INC BOOTH 619

10440 County Road 2
Middlebury, IN 46540
United States
4entech.com

Entech is a leading producer of micronized rubber powders (MRP). MRP has been in use in the brake industry for over sixty years. Our MRP is of the highest quality and provides such benefits as low density, thermal insulation, noise reduction, and is cost competitive.

ERDRICH USA INC BOOTH 717

112 Willie Paulk Pkwy
Dublin, GA 31021
United States
erdrich.de/en

ERDRICH is with 2,000 employees a development partner in the automotive supply chain and a world's leading manufacturer of brake pistons, producing in Germany, Czech Republic, Georgia/USA and China >30 Mio/a pistons. All pistons are optimized to minimum weight at maximum strength using our enhanced deep drawing technology on completely interlinked production lines replacing Cr-coatings with more sophisticated gas-nitro-carbureting.

ERLMANN MULTISPINDLE DRILLING AND GRINDING MACHINES Booth 414

Hohewardstrasse 350
Herten 45699
Germany
erlmann.de

We are the leading manufacturer of manual and fully automatic operating Multispindle Drilling and Grinding Machines for Brake linings and Clutch facings.

EXCALIBAR MINERALS INC BOOTH 604

21920 Merchants Way
Katy, TX 77449
United States
excalibar.com

Excalibar Minerals LLC is a quality processor and supplier of barytes. Our services include sourcing, processing, packaging and the distribution of high quality barytes used for: fillers/ extenders in friction products. Our main advantage over competitors is our ability to offer direct import capabilities to the key geographic regions of the Midwestern and Southeastern United States. Given that we source raw ore from both foreign and domestic suppliers, we are able to efficiently utilize the extensive transportation networks the Gulf Ports offer to deliver finished products with timely precision and cost savings to our customers.

GREENING INC BOOTH 416

19465 Mount Elliott St
Detroit, MI 48234
United States
greeninginc.com

GREENING's test equipment and testing service offerings span a wide range of vehicle and industrial brake system and driveline component applications • Brake Dynamometers • "Chase", Compressibility (GMW15334 capable), FAST, Shear • SAE No. 2 Machine 'wet friction' • In-Vehicle Data Systems • ISO/IEC 17025 and GM "TIP" Accredited •ECE R90.

GRINDOSONIC BVBA BOOTH 615

Esperantolaan 4
Leuven 3001
Belgium
GrindoSonic.com

Detecting cracks in brake pads using impulse excitation. A well-established method for brake pad characterisation, is now turning its hand to detecting cracks in the friction material of the brake pads.

H.B. FULLER / CILBOND BOOTH 617

1200 Willow Lake Blvd
Vadnais Heights, MN 55110
United States

hbfuller.com/en/north-america/products-and-technologies/brands/cilbond

H.B. Fuller, a leading global adhesives provider, offers CILBOND® water-based bonding agents for the friction industry. CILBOND one-coat, water-based solutions are an eco-conscious and high-performance alternative to solvent-based adhesives. With market-leading technology, CILBOND brake pad bonding agents provide key benefits for your process and end-product.

EXHIBITOR PROFILE

HEF USA BOOTH 607

2015 Progress Drive
Springfield, OH 45505
United States
hefusa.net/

HEF Group is a global provider of surface treatments and coatings for automotive components used in the engine, drivetrains, fuel injection systems etc. Our Liquid Nitriding treatments are utilized for several brake system applications such as brake rotors, brake-pad backing plates and brake pistons for WEAR, FRICTION & CORROSION reduction.

HEXION INC. BOOTH 517

1800 Meidinger Tower
Louisville, KY 40202
United States
hexion.com

Hexion is a leading supplier of high-performance phenolic resins to the global Friction market. With over 100 years of experience, our Bakelite® phenolic resins are well recognized throughout the Friction industry. Hexion's diverse resin portfolio provides solutions to the tough braking challenges experienced in passenger transportation and industrial equipment.

HI-PAD BRAKE TECHNOLOGY BOOTH 508

No 27 Yingfu Rd Fushan Area
Yantai 265500
China
hi-pad.com

Hi-Pad is a disc brake pad manufacture since 2005. With 100% positive molding process, we produce pads for Passenger car, Modified vehicle and Commercial vehicle. As an OEM supplier of SGMW,FAW,FAW-VW,Chery,etc, products of Copper-free NAO,<5% copper NAO and Low-Met are widely used in market.

HORIBA INSTRUMENTS INC BOOTH 703

GOLF SPONSOR
2890 John R Rd
Troy, MI 48083
United States

horiba.com

HORIBA Automotive Test Systems has global leadership in emissions test systems and provides the industry with battery, fuel cell, driveline, engine and brake test systems, wind tunnel balances, data management solutions, test facility automation and turnkey test facilities. Serving the automotive, heavy-duty, off-road, consumer goods, marine, aerospace and locomotive industries.

ILJIN USA CORPORATION BOOTH 306

28055 Haggerty Rd
Novi, MI 48377
United States
iljin.com

ILJIN is a global manufacturer of wheel hub bearings, chassis components, and driveline tapered roller bearings with R&D centers in Seoul Korea, Schweinfurt, Germany, and Novi Michigan.

IMERYS BOOTH 203

1732 N 1st St Ste 450
San Jose, CA 95112
United States
imerys.com

IMERYS minerals will display its solutions for Friction Materials. We address main industry requirements by offering tailored solutions: IMERYS offer Zirconias, Graphite, Coke, Mica and Wollastonite to control Fade and NVH, Carbon grades for electrostatic painting in Cu-free formulations, Mica and Wollastonite to reduce cracking, Zirconia for transfer film enhancement.

INDUSTRIAL MEASUREMENT SYSTEMS INC Booth 315

2760 Beverly Dr Ste 4
Aurora, IL 60502
United States
imsysinc.com

IMS, Inc. manufactures ultrasonic-based instrumentation for brake pad development and quality assurance. Our ETEK 3000 is designed to measure elastic properties of anisotropic friction materials (SAE J2725). The iETEK instrument is non-destructive; measures dynamic modulus and uniformity of as-manufactured pads. Our RiETEK module adapts the iETEK for production line environment.

INTERNATIONAL BRAKE INDUSTRIES INC Booth 305

1840 McCullough St
Lima, OH 45801
United States
internationalbrakeindustries.com

Located in Lima, Ohio, International Brake Industries (IBI) specializes in the engineering, manufacturing and production of aftermarket brake system hardware components and repair kits worldwide. IBI's products, such as disc and drum brake hardware kits, are sold under the Carlson Quality Brake Parts brand name and through a variety of private label programs. IBI has been a leader in the aftermarket auto industry for more than 50 years. For additional information, visit our website.

EXHIBITOR PROFILE

ITAPROCHIM SRL

BOOTH 204

GOLD SPONSOR

Via Carlo Bianconi 8/A
Milano 20139
Italy
itaprochim.it

Since 30 years, Itaprochim is a leader in the friction industry both as a distributor and as a producer of high quality raw materials and technology. The wide range of products has allowed the company to be present not only in friction sector, which represents its core business, but also in other markets such as ceramics, abrasives, lubricants, plastic and rubber. Our main goal is to provide customers with reliable and innovative products and to provide them with qualified technical support.

KAMAX

BOOTH 216

1606 Star Batt Drive
Rochester Hills, MI 48309
United States
kamax.com

KAMAX is world's leading producer of externally threaded fasteners for the Automotive and Heavy Duty Truck since 1935. Headquartered in Homberg-Ohm - Germany, KAMAX has multiple manufacturing outfits in NA, EU and Asia. We set standards in the areas of innovation, quality, and manufacturing by collaborating with our customers.

LAPINUS

BOOTH 209

BRONZE SPONSOR

Delfstoffenweg 2
Roermond 6045 JH
Netherlands
lapinus.com

At Lapinus, we offer premium quality mineral fibres and strong technical support for the friction industry. Rooted in sustainability, our highly biosoluble products contribute to shaping a better world for today and tomorrow.

LINK ENGINEERING COMPANY

BOOTH 403

BRONZE SPONSOR

43855 Plymouth Oaks Blvd
Plymouth, MI 48170
United States
linkeng.com

Link Engineering Company is the premier designer and manufacturer of customized, precision test systems, as well as the premier provider of comprehensive vehicle and laboratory test services for the brake and friction industry. Established in Detroit, MI (US) in 1935, Link now operates facilities around the world, offering test solutions to the global brake and friction industry.

LOEDIGE PROCESS TECHNOLOGY

Booth 708

Elsener Strasse 7-9
Paderborn 33102
Germany
loedige.de

Lödige is a global leading supplier of mixers, coating systems, granulators, dryers and reactors. As the inventor of the Ploughshare Mixers, Lödige has decades of experience in the process technology. The Lödige machines and process systems are at home in the building materials industry, environment, minerals and ores and others.

MAGYC SRL

BOOTH 208

Via Dante 41
Cocquio Trevisago
Italy
magyc.it

MaGyc srl develops high precision test and measurement systems for industrial quality control. Thanks to its know-how, today MaGyc is a leader of Problem Solving in industrial sector by NDT applications. MaGyc Systems have application in Mechanical, Automotive, Ceramics, Electronics, Aerospace sectors.

MENETA GROUP

BOOTH 603

GOLD SPONSOR

39300 Country Club Dr
Farmington Hills, MI 48331
United States
meneta.com

Meneta Group is a global supplier of high-quality braking components for the automotive industry. With over 2,000 employees in Europe, Asia and North America, we research, design, test and produce millions of brake shims, backplates, and brake components each year. From our division in North America, we offer local support, testing and production.

MIDWEST ELASTOMERS

BOOTH 318

PO Box 412
Wapakoneta, OH 45895
United States
midwestelastomers.com

Suppliers of rubber and plastic powder materials. Toll grinding and generic materials available.

EXHIBITOR PROFILE

MORGAN ADVANCED MATERIALS

Booth **614**

2102 Old Savannah Rd
Augusta, GA 30906
United States

morganplc.com

Thermal Ceramics, a business of Morgan Advanced Materials design and manufacture high performance fibers in operating environments from 500°C to 1600°C. Morgan's fibers blended into friction formulations produce stable friction without noise, no brake dust, and improved pad and rotor life over a wide range of temperature, pressure, and speed.

MORIMURA BROTHERS

BOOTH **618**

400 Kelby St Fl 16
Fort Lee, NJ 07024
United States

morimura.co.jp/english/

TOHO MATERIAL CO.,LTD. joined SAE Brake Colloquium since 2012 with Potassium Titanate "TOFIX" for automotive friction material. With our unique and effective production process, "TOFIX" series accomplished stable quality, high friction performance and cost reduction. As a result, we have great relationship with numerous friction material manufacturers globally.

NIAGARA BRAKE INTERNATIONAL

Booth **718**

4708 Ontario Street
Beamsville, Ontario L0R 1B4
Canada

niagarabrake.com

Niagara Brake International is a leading global producer of OEM disc brake caliper pistons. Founded in the NAFTA region, over the past 30 years we've grown our footprint globally and now serve a diverse, worldwide customer base. We're proud to stand alone in the industry as the only manufacturer to specialize in both steel and phenolic products as well as our ability to completely form, machine, grind and plate our pistons under one roof.

NOVITEK FINE BLANKING

BOOTH **406**

GOLF SPONSOR

5850 Mercury Dr
Dearborn, MI 48126
United States

Novitek Fine Blanking is a leading supplier of premium backplates for braking systems in passenger cars, vans and truck applications throughout America, Asia and Europe. They provide solutions that meet and exceed standards for safety, reliability and performance. They push the limits of technology, disrupting the norms with innovative solutions and tailored processes.

OTSUKA CHEMICAL CO LTD

BOOTH **307**

100 The Lakes Pkwy
Griffin, GA 30224
United States

otsukachemicalamerica.com

Otsuka Chemical has developed a plate-like titanate using shape control as a key technology, the first in the world in 2000. Titanate continues to grow in green materials for brake pads.

PALMER INTERNATIONAL INC

BOOTH **316**

PO Box 315
Skippack, PA 19474
United States

palmerint.com

Palmer International has been developing and manufacturing innovative products based on Cashew Nutshell Liquid (CNSL) for the global automotive friction material industry for over fifty years. Our liquid and solid particle CNSL products are found in formulations from motorcycles to locomotives and everything in between. Palmer...Innovation in a Nutshell!!!

PARKER TRUTEC INC

BOOTH **716**

GOLF SPONSOR

4700 Gateway Blvd
Springfield, OH 45502
United States

parkertrutec.com

Parker Trutec is the North American subsidiary of Nihon Parkerizing (Japan), the world leader in metal surface improvement. The ISONITE® process improves wear, corrosion & adhesion properties on 72 million brake pad backing plates annually. Addition offerings include Zinc/Iron phosphating processes & solid lubricant (PTFE/Moly) coating to brake components.

POLYTEC INC

BOOTH **516**

16400 Bake Pkwy
Irvine, CA 92618
United States

polytec.com

Polytec is the world's leading manufacturer of laser vibrometers. The requirement of a noiseless brake system always poses an important challenge when developing a new vehicle. The solution to the problem is made easier today by using a combination of analytical FE methods and measuring processes like 3-D laser vibrometry.

EXHIBITOR PROFILE

PREFERRED AUTOMOTIVE COMPONENTS

Booth **509**

GOLF SPONSOR

30 Forest Pkwy
Shelton, CT 06484
United States

pacomponents.com

Preferred Automotive Components, located in Shelton, CT offers an expanded line of components for the Automotive Aftermarket Brake Industry and OEM. Their wealth of knowledge in design, development and manufacturing provides new technology and innovative product to the industry. PAC's strong commitment to their customers is what drives technical solutions.

PROCOTEX CORPORATION SA APPLY CARBON SA

Booth **609**

Belgium
Rue Theodor Kluber 8
Dottignies 7711
Belgium

procotex.com

Apply Carbon SA (France) / Procotex Corporation SA (Belgium) Procotex Corporation / Apply Carbon, is a Belgian company group specialized in chopping and milling of aramid and carbon fibers. We offer different grades of dry milled short aramid fibers suitable for friction (brake pads/linings), gaskets, coatings and many other applications.

RIMSA METAL TECHNOLOGY SA

BOOTH **215**

Armenteres s/n - nave 21
Pol. Ind. Matacas Saint Feliu De Llobre
Barcelona E-08980
Spain

rimsa.com

Since 1985, at rimsa, we have been continuously developing a wide range of innovative materials which can solve the prevailing challenges of the Global Friction Industry. Our new products have been demonstrated to enhance the performance of brake pads at high temperature and are suitable for copper-free formulations.

SADECA AUTOMOTIVE SLU

BOOTH **314**

Can Clapers 25
Sentmenat 08181
Spain

sadeca.com

Sadeca is located in Barcelona and was founded on 1983. After these years of rigor, automotive passion and competitive spirit we have become a leader in cable manufacturing for the automotive industry. We are specialized in the development, design and production of brake wear sensors, brake system hardware and several industrial wire harness applications for passenger cars, commercial vehicle and trucks for OEM/OES and AM segments.

SHAMOKIN CARBONS

BOOTH **202**

453 Venn Access Rd
Coal Township, PA 17866
United States

carbons.net

Established in 1935, Shamokin Carbons is a family owned and operated company dedicated to developing high-performance products that meet the demands of all friction application. As the world's fastest growing processor of graphite and carbon. Multiple ISO processing facilities. Shamokin has exclusive relationships with the largest mine in Mexico and Mexican processing facilities.

SHOWA DENKO CARBON INC

BOOTH **507**

GOLF SPONSOR

478 Ridge Rd
Ridgeville, SC 29472
United States

sdk.co.jp/english.html

Showa Denko Carbon, Inc. specializes in the production of artificial graphite particles for high performance friction materials used in OE, OES and aftermarket vehicle applications. The company uses high quality raw materials, high temperature production processes and a certified quality system to provide products with consistent and reliable material properties.

SPECIALTY LUBRICANTS CORPORATION

Booth **602**

GOLF SPONSOR

8300 Corporate Park Dr
Macedonia, OH 44056
United States

speclubes.com

Specialty Lubricants Corporation is a manufacturer and private label packager of Brake Lubricants. Our products have been proven to reduce noise in the braking system. We manufacture both Silicone and Synthetic greases which include different solids including Ceramic, Moly, and PTFE. Our newest Silicone Moly grease reduced noise by 95% by applying it the backing plate and moving hardware. These products can be private labeled in portion pouches, squeeze tubes, brush top jars, or bulk containers for assembly in the plant.

STERLING FIBERS

BOOTH **514**

5005 Sterling Way
Pace, FL 32571
United States

sterlingfibers.com

Sterling Fibers is an ISO 9001 certified USA based company serving the friction material industry since 1988. Sterling Fibers offers a variety of acrylic based fibers and pulps for the friction material industry. Sterling's flagship product, CFF V110 pulp, provides preforming ability equal to aramid at a much lower price.

EXHIBITOR PROFILE

SUPERIOR GRAPHITE

BOOTH 402

10 S Riverside Plz Ste 1470
Chicago, IL 60606
United States
superiorgraphite.com

Innovating since 1917, Superior Graphite provides continuous electro-thermal treatment/purification of graphite & carbons, advanced sizing, and custom-mix technologies for energy/thermal management, metallurgy, friction modification, drilling material additives, nonoxide ceramics, and polymers/CASE materials. The company's purpose-created solutions de.

TAM CERAMICS INC

BOOTH 214

4511 Hyde Park Blvd
Niagara Falls, NY 14305
United States
tamceramics.com

TAM Ceramics operates on 35-acres of research, development, storage and manufacturing facilities that produce a wide range of high quality engineered ceramic powders for the process industries. Our products are shipped to a diverse base of domestic and international customers that represent the refractory, chemical, automotive, and electronics sectors.

TAPRATH ELASTOMERS LLP

BOOTH 304

305/6 Belscot Tower Link Rd
Mumbai, Maharashtra 400053
India
taprath.com

Taprath Elastomers, with North American partner Milin Environmental, has over 10 years' experience supporting customers with their Nitrile Powders, SBR Powders and Mineral Fibres. From Taprath Elastomers' global presence, Milin brings unrivaled customer support to friction & gasket markets, and partners with Taprath in continually developing new markets and products.

TIANJIN KIMWAN CARBON TECHNOLOGY & DEVELOPMENT CO LTD

Booth 503

Hedong District
5th Floor Innovation Building, 174 Jintang Road,
Tianjin 300180
China
kimwan.cn

Tianjin Kimwan Carbon is engaged in research and development, manufacturing and sales of new special carbon and graphite materials. Main products include: friction materials like artificial graphite, calcined petroleum coke, high resilience graphite; carbon raiser, graphite electrodes, graphite parts, graphite crucibles, anode materials, etc.

TRELLEBORG SEALING SOLUTIONS

Booth 407

GOLF SPONSOR

15701 Centennial Dr
Northville, MI 48168
United States
rubore.com

Trelleborg Sealing Solutions (TSS), Kalmar is one of the world's leading manufacturers of noise damping shims/insulators for disc brake pads. TSS-Kalmar manufactures a wide range of noise damping shims / insulators that are used when endurance against thermal, chemical and mechanical stress is required. This is combined with out-standing sound damping, sealing, vibration insulation, compressibility and bonding capacity.

UTIL GROUP

BOOTH 502

270 Spinnaker Way
Concord, Ontario L4K 4W1
Canada
utilgroup.com/en

UTIL Group is the leading global source for integrally molded backing plates, brake shoes, hardware, and shims. With more than 1,400 employees distributed across four plants that supply products and services worldwide, UTIL prides itself on complying with the highest quality and efficiency standards, while fully meeting all customer expectations.

WALDRAFF TECHNOLOGIES

BOOTH 416

Paul-Henri-Spaak Str 15
Köln 51069
Germany
waldraff.info

WALDRAFF provides special solutions for the automotive friction industry from tooling, glue coating lines, finishing lines to turn key projects (complete brake pad production lines). More than 40 years of experience brought WALDRAFF to a worldwide supplier status in this specialized industry!

WANDA MACHINES

BOOTH 707

Jingyuetan Economic Development Area
No.500 Jinbi Street
Changchun City 130117
China
wanda-machine.com

WANDA machines since 1980, the company WANDA MACHINES, has been dedicated to the manufacture of individual machines or complete lines of production, for both light & heavy vehicles as well as industrial applications including laboratory testing equipment.

EXHIBITOR PROFILE

WINHERE BRAKE PARTS INC BOOTH 706

1331 Schiferl Rd
Bartlett, IL 60103
United States
winherebrake.com

Founded in 1996, Winhere is the largest professional manufacturer of brake discs and drums in China, we build 52 Million units of brake rotors and 10 Million sets of brake pads as annual capacity to service our OEM and aftermarket customers globally. Winhere is National Green Manufacturer winner in China, we have established our own R&D center to design and produce brake parts with various materials, structures and specifications to meet different requirements.

WOLVERINE ADVANCED MATERIALS Booth 415

5850 Mercury Dr Ste 250
Dearborn, MI 48126
United States
wamglobal.com

Wolverine Advanced Materials is a leading developer and manufacturer of high-performance materials. Our core competency is in performance-critical, specialty elastomer-coated metals that offer damping and sealing solutions in the automotive brake, NVH, and sealing industries. Extensive industry knowledge and innovative materials have made Wolverine a desired and trusted global supplier for over 80 years.

XINLIDA AUTO PARTS LLC BOOTH 219

380 N Terra Cotta Rd Ste D
Crystal Lake, IL 60012
United States
xinlida-ap.com

Xinlida Auto Parts is your global solution for brake components, offering offer full line coverage! Xinlida's global headquarters is located in Cangzhou China and their Americas headquarters is located in Crystal Lake, Illinois. Additionally, Xinlida has 4 state-of-the-art satellite Distribution Centers strategically located throughout Europe and in Juarez Mexico.

ZEON CHEMICALS LP BOOTH 505

Zeon Chemicals LP
4111 Bells Ln
Louisville, KY 40211
United States
zeonchemicals.com

ZEON makes the future today through the power of chemistry. Producing innovative elastomers since 1950, ZEON is a world leader in specialty elastomers, polymers, and chemicals. with a global network of plants in Asia and North America, and R&D laboratories in the US, Japan, China, and Singapore.

AD INDEX

Company	Booth#	Page	Web Address
iTAPROCHIM	204	13	www.itaprochim.it
Link Engineering Company	403	Back Cover	www.linkeng.com
Meneta Group	603	Inside Front Cover	www.meneta.com
Penoles	Sponsor	Inside Back Cover	www.penoles.com.mx



CALL FOR PAPERS/PRESENTATIONS

Brake Colloquium & Exhibition

October 11-14, 2020 | San Antonio, Texas

There have been significant changes in brake development over the years and based upon future industry and end-user braking requirements the Technical Program Committee invites you to share your latest technical ideas and advancements with fellow industry professionals and decision makers from around the world at the Brake Colloquium. The Colloquium is the forum for executives, decision makers, engineers, research institutions and academic professionals to come together to share the science on brake developments from around the world so be a part of helping shape the future of brake development as we enter into the world of automated and electrified vehicle technology.



Industries of Focus

- Commercial Vehicle
- Motorcycle
- Passenger Cars, Trucks & SUVs
- Performance and Aftermarket Vehicles
- Aerospace
- Wind Turbine
- Railway Cars

Topics Under Consideration

- Friction Materials
- Raw Materials
- Disc and Drum Materials/ Design
- Backing Plates
- Noise Shims and Grease
- Automotive Brakes
- Commercial Vehicle Brakes
- Railway Brakes
- Wheel Bearings/ Seals
- Impact of Fuel Economy on Brake Design
- High Performance Brakes
- Electric/Electronic Braking

- Braking for Electric, Hybrids, and Automated Driving
- Testing and Measurement
- NVH
- CAE
- Fundamental Mechanisms of Friction and Vibration
- New Innovative Technologies/ Products
- Actuator and Actuation Systems
- Calipers/Brake Corners/ Wheel Bearings/Assembly
- Advancements in Wet Friction
- Brake Fluids
- Aftermarket Brakes and Components
- Regulations and Standards
- Emission and Environmental
- Manufacturing and Quality
- Brake Hoses
- Controls & Mechatronics for Hybrid and Conventional Vehicles
- AEB
- ADAS
- Other

Abstracts must be submitted online via website page to only ONE session. Offered papers shall not have been previously published; and if accepted, contributors will not release their paper for publication through other media.

- Paper acceptance will be based on organizer moderated peer review of a review ready manuscript.
- Refer to the author resources site at volunteers.sae.org/authors.htm for other useful information in preparing your paper.
- Portal for submission of abstracts will be open on **September 22, 2019**
- Abstract Deadline for submitting paper offers **March 8, 2020**
- Review Ready Manuscripts due to session organizers **April 19, 2020**
- Final Manuscripts and copyright assignments due to SAE **August 3, 2020**
- Authors will be charged a nominal registration fee for colloquium attendance.

General Author Resources Page
volunteers.sae.org/authors.htm

How to Write an SAE International Technical Paper
volunteers.sae.org/authors/sae_tech_paper.pdf

Reviewer Resources
If you are interested in becoming a paper reviewer, guidance and judgement information is provided here volunteers.sae.org/reviewers.htm

For questions contact
Monica Hare
SAE International
+1.724.772.8521
monica.hare@sae.org

SUBMIT

Venue

The 2020 Brake Colloquium is being hosted in San Antonio, TX at the JW Marriott. Located 15 miles from the San Antonio International Airport, the JW Marriott San Antonio Hill Country Resort & Spa is well placed in the stunning Texas Hill Country near wineries, Shops at La Cantera, SeaWorld, Natural Bridge Caverns, TPC San Antonio and Six Flags Fiesta Texas. San Antonio is a major city in south-central Texas with a rich colonial heritage. The Alamo, an 18th-century Spanish mission preserved as a museum, marks an infamous 1836 battle for Texan independence from Mexico. Following the San Antonio River, the miles-long River Walk is a landmark pedestrian promenade lined with cafes and shops. HemisFair Park's 750-ft. Tower of the Americas overlooks the city.



MG FRICTION

Designed to enhance brake compounds
and improve performance

MG FRICTION is a family of magnesium oxides specially developed for the friction market. Our products meet the criteria of both, OEM and after market manufacturers.

Magnelec, S.A. de C.V., as a vertically integrated producer of magnesium oxide from raw material up to the finished product, guarantees consistent quality, product availability and on time deliveries.

Let us be your partner!



MAGNELEC, S. A. DE C.V.

Calzada Manuel Gómez Morín 444 Col. Torreón Residencial,
Torreón, Coah. CP 27268

Teléfonos: 52 (871) 729-5500, EXT 7672, 7673, 7674

Fax: 52 (871) 729-5687, 729-5781

e-mail: pedro_munoz-rodriguez@penoles.com.mx

www.penoles.com.mx

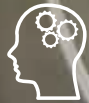


Test Smarter.

Equipment. Testing. Support.

Link Engineering Company designs and manufactures precision test equipment, and provides comprehensive laboratory and vehicle level testing services.

We specialize in developing innovative custom solutions.



Custom Solutions



Control & Acquisition



Brakes



Transmission & Driveline



Wheel End



Steering



Springs



Servo Dynamics



LINK operates the largest brake testing laboratory in the world, and is the technical lead in numerous global working groups.



Visit us at Booth #403

www.linkeng.com