

Noise and Vibration Conference & Exhibition

Technical Session Schedule

As of 06/16/2019 07:41 pm

Monday, June 10

Engineering for Automotive Pass-by and Minimum Noise Requirements (WKSP)

Session Code: NVCWK7

Room Ballroom C

Session Time: 2:40 p.m.

Pass-by Noise regulations are evolving as they are adapted to match constantly changing vehicles and driving conditions. Test methods are becoming more complex with a change in the driving and vehicle conditions. Also, worldwide, the trend is towards a reduction in the maximum acceptable levels driven by latest regulations put in place in EU and Japan. Front loading pass-by noise engineering early during the vehicle development process is becoming ever necessary as OEMs are competing to reduce the vehicle development cycle and the time to bring new vehicles to market. During this workshop, we will present the engineering solutions available to support the vehicle development with a focus on noise requirements. After introducing the regulations for field pass-by noise, indoor pass-by noise and minimum noise for electric vehicles, we will present the challenges posed when trying to meet these regulations together with other internal or customer requirements for sound quality and performance.

Organizers - Rabah Hadjit, Bruel & Kjaer Sound/Vib Meas A/S

Presenters - Rabah Hadjit, Bruel & Kjaer Sound/Vib Meas A/S; Scott Hunt, Bruel & Kjaer North America Inc.; Douglas Moore, General Motors

Monday, June 10

Fundamentals of Acoustical Materials & Vehicle Applications Workshop (WKSP)

Session Code: NVCWK2

Room Ballroom C

Session Time: 4:30 p.m.

The Acoustical Materials Workshop will cover fundamentals of acoustical materials and basics of noise control for engineers who are new in the field of noise and vibration. It will also discuss application examples to reduce noise in electric vehicles and Class A vehicles by experts from the automotive industry.

Organizers - Rolf Hermann Balte, UGN Inc.; Andrea Lynne Frey, Autoneum North America Inc.; Jian Pan, Gissing Automotive Systems, LLC; Gang Glenn Yin, General Motors

Presenters - Steve Sorenson, Toyota Motor North America Inc.; Andrea Lynne Frey, Autoneum North America Inc.; Rolf Hermann Balte, UGN Inc.; Rui Cao, Aearo Technologies LLC, a 3M Company

Monday, June 10

Hybrid & Electric Vehicles Systems - How to Resolve Issues Relating to System Integration and evaluate multi-attribute Trade-offs like NVH and Drivability (WKSP)

Session Code: NVCWK8

Room Ballroom D

Session Time: 2:40 p.m.

The scope of the workshop is to provide a high level of understanding of the hybridization and electrification technologies implemented in the recent vehicle platforms. It also covers the complexity of the hybrid and electric architecture in conjunction with their corresponding components such as the battery pack, motors and power electronics. Finally, it steps the participants through the noise and vibration issues concerning the electric vehicle.

Organizers - Saeed Siavoshani, Siemens PLM Software

Presenters - Akshay Sheorey, Saeed Siavoshani, Siemens PLM Software

Monday, June 10

An Overview on NVH Measurements Made Easy Workshop (WKSP)

Session Code: NVCWK5

Room Ballroom D**Session Time: 4:30 p.m.**

A vast range of signal processing methods are common, when measuring and analyzing NVH data, using today's systems. Digital data is the foundation and hence, the conversion from analog to digital (and sometimes even back to analog) becomes important tasks. The question: "what is the correct sampling rate" is frequent and there are many myths that will be discussed and put to bed. The same goes with filtering, FFT analysis, time domain methods, measurement systems etc. The workshop will outline multiple easy to use methods that will help in understanding measurement quality and how to reach the goals, with the proper accuracy. A focus on "no- box" approaches will expand your toolbox for NVH measurement and analysis!

Organizers - Thomas L. Lago, QirraSound Technologies Europe AB**Presenters -** Thomas L. Lago, QirraSound Technologies Europe AB

Time	Paper No.	Title
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ORAL ONLY**Learn More About the Speaker**

Thomas L. Lago, QirraSound Technologies Europe AB

Tuesday, June 11**Tuesday Keynote: Raymond Kach, Ford Motor Company****Session Code: NVCK3****Room Ballroom AB****Session Time: 9:00 a.m.****Moderators -** Steve Sorenson, Toyota Motor North America Inc.**Keynote Speakers -** Raymond A. Kach, Ford Motor Company

Time	Paper No.	Title
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ORAL ONLY**Learn More About the Keynote**

Raymond A. Kach, Ford Motor Company

Tuesday, June 11**Vehicle Engineering NVH Panel****Session Code: NVC755****Room Ballroom C****Session Time: 10:30 a.m.**

The objective of panel discussion is offering audience opportunities to pose questions directly to panelists with various background. Panelists will share their experience and perspectives on NVH CAE and testing for product development and advanced engineering research. The topics will cover structure NVH, vibro-acoustics, wind noise and aeroacoustics, intake/exhaust and vehicle interior noise, sound quality, etc.

Organizers - Dr. Gavin Song, Ford Motor Company**Moderators -** Dr. Gavin Song, Ford Motor Company; Dr. Weiguo Zhang, FCA US LLC**Panelists -** Prof. J. Stuart Bolton, Purdue University; Dr. Perry Gu, Geely Automobile Research Institute; Dr. Robert Powell, Dassault Systèmes SIMULIA; Dr. Pranab Saha, Kolano and Saha Engineers Inc.;

Time	Paper No.	Title
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ORAL ONLY**Learn More About the Vehicle Engineering NVH Panelists**

Dr. Gavin Song, Ford Motor Company; Dr. Weiguo Zhang, FCA US LLC; Dr. Perry Gu, Geely Automobile Research Institute; Dr. Robert Powell, Dassault Systèmes SIMULIA; Dr. Pranab Saha, Kolano and Saha Engineers Inc.; Prof. J. Stuart Bolton, Purdue University

Tuesday, June 11

Vehicle/ Body Chassis Analysis

Session Code: NVC752

Room Ballroom C

Session Time: 2:30 p.m.

This session includes papers in the areas of static, dynamic, and fatigue characterization of elastomers, bushings, mounts and shock absorbers used in the mobility industry. Particular emphasis is given to new and innovative analysis and testing methodologies to quantify the non-linear properties of these systems in addition to the effects of temperature, frequency, and aging. Papers dealing with specific applications and case studies of existing methodologies are also welcome.

Organizers - Thomas L. Lago, QirraSound Technologies Europe AB; Weiguo Zhang, FCA US LLC; Gavin Song, Ford Motor Company; Christopher Shaw, FCA; Gary Newton, Bruel & Kjaer North America Inc.

Time	Paper No.	Title
2:30 p.m.	2019-01-1492	Test and Analysis of Electromagnetic Noise of an Electric Motor in a Pure Electric Car <i>Qiang Kang, Perry Gu, Chao Gong, Geely Automobile Research Institute; Shuguang Zuo, Tongji University</i>
2:50 p.m.	2019-01-1493	Interior Floor Engineering: The Dynamic-vs-Static-Stiffness Compromise <i>Flavio Pezzani, Philippe Godano, Francesca Ronzio, Roberto D'Amico, Autoneum Management AG</i>
3:10 p.m.	2019-01-1495	Role of Dynamic Stiffness in Effective Isolation <i>Balavardhan Reddy Dasabai, John Deere India Pvt, Ltd.; Yuzhen Yang, Deere & Company</i>

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00655, and also individually. To purchase visit collections.sae.org

Tuesday, June 11

Body Structure/ Chassis- Interior Noise, Vibration Source, and Tire (Part 1 of 2)

Session Code: NVC751

Room Ballroom C

Session Time: 4:00 p.m.

This session covers static and dynamic issues in the body and chassis that contribute to noise and vibration problems in vehicles. Included in this session are modal studies, measurement and analysis methods, transfer path analysis, design guidelines, recommended practices, and modeling techniques for noise and vibration control of the body and chassis.

Organizers - Gabriella Cerrato, Bruel & Kjaer Sound/Vib Meas A/S; Paul R. Donovan, Illingworth & Rodkin Inc.; Eric Frank, Bruel & Kjaer Sound/Vib Meas A/S; David W. Herrin, Univ. of Kentucky; Farokh Kavarana, Nissan Motor Co., Ltd.; Thomas L. Lago, QirraSound Technologies Europe AB; Gary Newton, Bruel & Kjaer North America Inc.; Mohamad Qatu, Eastern Michigan Univ.; Christopher Shaw, FCA; Gavin Song, Ford Motor Company; Prakash T. Thawani, Denso International America Inc; Weiguo Zhang, FCA US LLC

Chairpersons - Gary Newton, Bruel & Kjaer North America

Time	Paper No.	Title
4:00 p.m.	2019-01-1507	Application of Model Order Reduction to Nonlinear Finite Element Tire Models for NVH Design <i>Daniel De Gregoriis, Goodyear SA/KU Leuven; Frank Naets, KU Leuven/DMMS Lab, Flanders Make; Peter Kindt, Goodyear SA; Wim Desmet, KU Leuven/DMMS Lab, Flanders Make</i>
4:20 p.m.	2019-01-1509	Development of an Accelerated Test for Tire Flat-Spotting <i>Farokh Kavarana, Scott Fritz, Nissan Technical Center North America</i>

4:40 p.m. **2019-01-1508** **Exterior Acoustics Using Infinite Elements**
Anurag Rajagopal, Dilip Mandal, Junji Saiki, Ujwal Patnaik, Altair Engineering

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Tuesday, June 11

Hybrid and Electric Vehicles (Part 1 of 2)

Session Code: **NVC550**

Room Ballroom D

Session Time: **10:30 a.m.**

This session discusses the noise sources, noise signatures, noise control strategy, and NVH technology unique to electric and hybrid powered vehicles. It is intended to bring a greater awareness of the NVH characteristics of these new vehicles to all NVH practitioners. At the same time, it will provide a forum so that advances in power systems, drive trains, batteries, and energy storage can be addressed with appropriate NVH technology as needed.

Organizers - *Saeed Siavoshani, Siemens PLM Software; Barry R. Wyerman; In-Soo Suh, Aptiv PLC*

Time	Paper No.	Title
10:30 a.m.	2019-01-1450	Machine Learning Based Technology for Reducing Engine Starting Vibration of Hybrid Vehicles <i>Kento Shimode, Keisuke Ishizaki, Masashi Komada, Toyota Motor Corp.</i>
10:50 a.m.	2019-01-1451	Power Electronic Noise-Simulation Measurement Comparison <i>Borislav Klarin, AVL-AST d.o.o.; Peter Olbrich, AVL Software and Functions Gmbh; Markus Resch, Thomas Resch, Stephan Brandl, AVL LIST GmbH; Hartwig Reindl, AVL Software and Functions Gmbh</i>
11:10 a.m.	2019-01-1452	The New Challenges of NVH Package for BEVs <i>Grégoire Lepoittevin, Jan Horak, Davide Caprioli, Autoneum Holding AG</i>
11:30 a.m.	2019-01-1453	Target Setting Process for Hybrid Electric Drives Using TPA, Jury Study, and Torque Management <i>Vinod Singh, FCA US LLC; Aniket Parbat, InDepth Engineering Solutions; Anil Charan, FCA US LLC</i>
11:50 a.m.	2019-01-1454	NVH Aspects of Electric Drive Unit Development and Vehicle Integration <i>Thomas Wellmann, Todd Tousignant, Kiran Govindswamy, Dean Tomazic, FEV North America, Inc.; Christoph Steffens, Peter Janssen, FEV Europe GmbH</i>
12:10 p.m.	2019-01-1455	Integrated Multi-Physics Simulation for Full-Vehicle Low Frequency NVH Optimization in HEVs <i>Llorenç Foraste Gomez, Jonathan Zeman, Gamma Technologies LLC; Jack Liu, Ford Motor Company</i>

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Tuesday, June 11

Hybrid and Electric Vehicles (Part 2 of 2)

Session Code: **NVC550**

Room Ballroom D

Session Time: **1:30 p.m.**

This session discusses the noise sources, noise signatures, noise control strategy, and NVH technology unique to electric and hybrid powered vehicles. It is intended to bring a greater awareness of the NVH characteristics of these new vehicles to all NVH practitioners. At the same time, it will provide a forum so that advances in power systems, drive trains, batteries, and energy storage can be addressed with appropriate NVH technology as needed.

Organizers - Saeed Siavoshani, Siemens PLM Software; Barry R. Wyerman; In-Soo Suh, Aptiv PLC

Time	Paper No.	Title
1:30 p.m.	2019-01-1456	Benefit of a Lightweight Frunk Federico Di Marco, Flavio Pezzani, Andreas Daving, Luca Mazzarella, Autoneum Management AG
1:50 p.m.	2019-01-1457	Determination of Vehicle Interior Noise due to Electric Motor John G. Cherng, University of Michigan- Dearborn
2:10 p.m.	2019-01-1458	Structural Vibration and Acoustic Analysis of a 3-Phase AC Induction Motor Anand Krishnasarma, Allan Taylor, Javad Baqersad, Kettering University; Peyman Poozesh
2:30 p.m.	2019-01-1461	Multiphysics Multi-Objective Optimization for Electric Motor NVH Henry Zhang, Joe Ricci, ANSYS, Inc.; Haiwei Cai, Southeast University; Yijiang Jia, ANSYS, Inc.
2:50 p.m.	ORAL ONLY	SAE Holistic Approach to Hybridization & Electrification Educational SAE has placed tremendous efforts to establish the required infrastructure to educate engineering community task force and prepare them for the race to the vehicle electrification conversion. As a part of this effort, a series of courses has been developed lasting from a day to a comprehensive engineering academy program. The details of the programs will be shared during this session. Saeed Siavoshani, Siemens PLM Corp.
3:10 p.m.	2019-01-1459	Open-Access Testbench Data for NVH Benchmarking of E-Machines under Electromagnetic Excitations Emile Devillers, L2EP; Karine Degrendele, EOMYS Engineering; Michel Hecquet, L2EP; Jean-Philippe Lecointe, LSEE; Jean Le Besnerais, EOMYS Engineering; Guillaume Cousin, OROS

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Tuesday, June 11

Science Fair

Session Code: NVCSCI

Room Exhibit Hall

Session Time: ALL DAY

The Science Fair display is a hands-on, a video demonstration, or a collection of acoustical materials and instrumentation demonstrating a multitude of engineering efforts being used in the field of acoustics. All displays will be beneficial to the overall atmosphere of the conference. Display submissions will be subjected to a selection process. Displays will be available on the exhibit floor during show hours and will be voted on by attendees for "Best of Show" award.

Organizers - David B. Reed, Janesville Acoustics

Time	Paper No.	Title
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- ORAL ONLY** **Brake Noise Testing**
The display will explain the importance the automotive industry places on testing brake noise. The contents will include, primary reasons for brake noise, basic development process after brake performance has been defined, Dynamometer and wheel house testing and differences in testing with accelerometers, laser and microphones.
 Gary Gonzales, GRAS Sound and Vibration
- ORAL ONLY** **The Ralph Hillquist Collection of Vintage Acoustical Instrumentation**
A display of Ralph Hillquist's personal collection of microphones, sound-level meters, analyzers, calibration devices, and graphic level recorders.
 Pranav Sriganesh, Ohio State Univ.
- ORAL ONLY** **Old Instrumentation: Without the Past the Future Does Not Exist**
This will display instruments like different sound level meters, impedance tube, graphic level recorders, and reel to reel and cassette analog and digital tape recorders.
 Pranab Saha, Kolano and Saha Engineers Inc.
- ORAL ONLY** **Some Automotive Acoustic and Sound Quality Equipment, Methods and Facilities, Late 1950s to Late 1980s**
 Wade Bray, HEAD acoustics Inc.
- ORAL ONLY** **The GUI of Damping**
Hands on display on the performance of damping
 Pranab Saha, Sagar Sunil Patil, Kolano and Saha Engineers Inc.
- ORAL ONLY** **General Motors Binaural History: 1952-1975**
 Wade Bray, HEAD acoustics Inc.

Tuesday, June 11

Chat with the Expert- Pranab Saha

Session Code: **NVCCHAT4**

Room Exhibit Hall

Session Time: **1:30 p.m.**

<i>Time</i>	<i>Paper No.</i>	<i>Title</i>
	ORAL ONLY	Sound Package Materials and Performance Evaluation- Where we are heading? <i>Pranab Saha, Kolano and Saha Engineers Inc.</i>

Tuesday, June 11

Chat with the Experts- Thomas Lago

Session Code: **NVCCHAT6**

Room Exhibit Hall

Session Time: **1:30 p.m.**

<i>Time</i>	<i>Paper No.</i>	<i>Title</i>
	ORAL ONLY	Signal Processing for NVH Applications <i>Thomas L. Lago, QirraSound Technologies Europe AB</i>

Tuesday, June 11

Chat with the Experts- Dan Maguire

Session Code: **NVCCHAT7**

Room **Exhibit Hall**

Session Time: **1:30 p.m.**

<i>Time</i>	<i>Paper No.</i>	<i>Title</i>
	ORAL ONLY	Vehicle Active Control - Technical and Logistical Integration Scenarios and their Impact/Success for All Stakeholders <i>Daniel Maguire, Noise Quieting Associates LLC</i>

Tuesday, June 11

Chat with the Experts-Jim Thompson

Session Code: **NVCCHAT8**

Room **Exhibit Hall**

Session Time: **1:30 p.m.**

<i>Time</i>	<i>Paper No.</i>	<i>Title</i>
	ORAL ONLY	Career Path Decisions: Technical versus Administrative <i>James K. Thompson, JKT Enterprises</i>

Tuesday, June 11

Instrumentation: Systems, Sensors and Methods(Part 1 of 2)

Session Code: **NVC652**

Room **Grand Gallery Room B**

Session Time: **10:30 a.m.**

This session covers instrumentation sensors, systems and methods used in the measurement and analysis of noise and vibration. Analysis methods internal to instrumentation will also be covered.

Organizers - *Thomas L. Lago, QirraSound Technologies Europe AB; Wade R. Bray, HEAD acoustics Inc.*

<i>Time</i>	<i>Paper No.</i>	<i>Title</i>
10:30 a.m.	2019-01-1500	Testing Methods and Signal Processing Strategies for Automatic Transmission Transient Multiplexed Pressure Data <i>Mark Woodland, Jason Blough, Darrell Robinette, Carl Anderson, Michigan Technological University; Steve Frait, Ram Sudarsan Devendran, Ford Motor Company</i>
10:50 a.m.	2019-01-1501	Developing a Custom Data Acquisition Software Package for a Self-contained Acoustic Test Facility <i>Richard Kolano, Sagar Patil, Pranab Saha, Kolano and Saha Engineers, Inc.</i>
11:10 a.m.	2019-01-1464	Noise and Vibration End-of-Line Production Testing and Analysis Challenges <i>Chris Moon, Bruel & Kjaer North America, Inc.</i>
11:30 a.m.	2019-01-1463	Improved Measurement Procedures for Engine Noise Reduction with Advanced Microphones <i>Jan Hansen, Per Rasmussen, GRAS Sound & Vibration</i>
11:50 a.m.	2019-01-1462	Design and Validation of Low-Cost Intensity Probe <i>Karan Gundre, Andrew Barnard, Michigan Technological University</i>

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Tuesday, June 11

Instrumentation: Systems, Sensors and Methods (Part 2 of 2)

Session Code: NVC652

Room Grand Gallery Room B

Session Time: 1:30 p.m.

This session covers instrumentation sensors, systems and methods used in the measurement and analysis of noise and vibration. Analysis methods internal to instrumentation will also be covered.

Organizers - Thomas L. Lago, QirraSound Technologies Europe AB; Wade R. Bray, HEAD acoustics Inc.

Time	Paper No.	Title
1:30 p.m.	ORAL ONLY	Problems with Kurtosis as a Vibration Test Method Ben Shank, Thermotron Industries
1:50 p.m.	2019-01-1466	Psychoacoustic Order Tonality Calculation Julian Becker, Roland Sottek, HEAD acoustics GmbH
2:10 p.m.	2019-01-1467	Tonal Annoyance Metric Development for Automotive Electric Vehicles Glenn Pietila, William Seldon, Timothy Roggenkamp, Timothy Bohn, General Motors

Tuesday, June 11

Panel Discussion by Presenting Authors, with Audience Questions, on the Information Presented in both Sections of the Instrumentation: Systems, Sensors and Methods Session NVC-652

Session Code: NVC652-1

Room Grand Gallery Room B

Session Time: 4:00 p.m.

Organizers - Wade Bray, HEAD acoustics Inc.; Thomas Lago

Panelists - Karan Gundre; Jan Hansen, GRAS Sound and Vibration; Chris Moon, Bruel & Kjaer; Sagar Patil, Kolano and Saha Engineers Inc.; Glenn Pietila, General Motors; Ben Shank, Thermotron Industries; Roland Sottek, Head acoustics GmbH; Mark Woodland, Michigan Technological Univ.;

Tuesday, June 11

Subjective Response (Part 1 of 2)

Session Code: NVC480

Room Grand Gallery Room C

Session Time: 4:00 p.m.

This Subjective Response session seeks manuscripts concerning subjective testing and analysis related to vehicle/equipment noise and vibration, usually referred to as sound quality and vibration quality. The focus is on both subjective and objective tools and methods that can be used either to design sound or vibration quality into the final product, or to characterize and eliminate undesired sounds or vibrations.

Organizers - Gregory Goetchius, Lucid Motors; Daniel Rauchholz, Janesville Acoustics; Steve Sorenson, Toyota Motor North America Inc.

Chairpersons - Gregory Goetchius, Lucid Motors

Time	Paper No.	Title
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- 4:00 p.m.** **2019-01-1521** **Sound Analysis Method for Warble Noise in Electric Actuators**
Nathan T. Parker, General Motors
- 4:20 p.m.** **2019-01-1523** **Door Closure Sound Quality Engineering Process**
Todd Freeman, Bruel & Kjaer North America, Inc.; Bret Engels, Brüel & Kjaer Sound And Vibration A/S

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Tuesday, June 11

NVH Challenges of Vehicle Lightweighting

Session Code: **NVC950**

Room Grand Gallery Room D

Session Time: **10:30 a.m.**

The purpose of this session is to describe solutions for weight savings and to explain the NVH impact of these weight reductions. Weight savings can come from interior and structural parts of vehicle through various solutions of material selection to new dampening compounds. NVH countermeasures for these weight reduction solutions will be outlined so that lightweight design for next generation vehicles can be implemented with attention to noise and vibration throughout the vehicle.

Organizers - Pranab Saha, Kolano and Saha Engineers Inc.; Yuksel Gur, Ford Motor Company; Gordon Ebbitt, Ebbitt Acoustical Consulting LLC; Jian Pan, Gissing Automotive Systems LLC; Alan Parrett, General Motors; Barry R. Wyerman, Monadnock Non-Wovens LLC

Chairpersons - Yuksel Gur, Ford Motor Company

Assistant Chairpersons - Jian Pan, Gissing Automotive Systems LLC

Time	Paper No.	Title
10:30 a.m.	2019-01-1504	The Identification of Minimum Weight Sound Packages That Meet Specified Vehicle Interior Sound Pressure Levels Hyunjun Shin, J. Stuart Bolton, Purdue University- West Lafayette
10:50 a.m.	2019-01-1506	Acoustic Effects of Lightweighting in a Sport Utility Vehicle Andrea Lynne Frey, Autoneum North America, Inc.
11:10 a.m.	2019-01-1502	Reducing Vehicle Interior NVH by Means of Locally Resonant Metamaterial Patches on Rear Shock Towers Luca Sangiuliano, Claus Claeys, Elke Deckers, KU Leuven - DMMS lab, Flanders Make; Jasper De Smet, MotionS lab, Flanders Make; Bert Pluymers, Wim Desmet, KU Leuven - DMMS lab, Flanders Make
11:30 a.m.	2019-01-1503	A Non-Contact Technique for Vibration Measurement of Automotive Structures Vanshaj Srivastava, Javad Baqersad, Kettering University

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Tuesday, June 11

Aerodynamic Noise Methods & Applications (Part 1 of 2)

Session Code: **NVC200**

Room Grand Gallery Room D

Session Time: **1:30 p.m.**

This session contains presentations on both experiments and simulations pertaining to noise caused by air flow. Applications described range from flow-induced noise in academic wind tunnels to interior noise in vehicles, both in wind tunnel conditions and on the road.

Organizers - Robert Powell, Sivapalan Senthoooran, Dassault Systemes Simulia Corp; Christopher Shaw, FCA

Time	Paper No.	Title
1:30 p.m.	2019-01-1475	Turbulent Pressure Spectra for Separated Flow Conditions Richard DeJong, Calvin Engineering; Kurtis DeVries, Calvin College
1:50 p.m.	2019-01-1469	Wind Noise Transmission Loss for Separated Flow Conditions Richard DeJong, Calvin Engineering; Steve Sorenson, Toyota Motor North America, Inc.
2:10 p.m.	2019-01-1470	Structural Vibration of an Elastically Supported Plate due to Excitation of a Turbulent Boundary Layer Jonmarcos Diaz, Kevin Maki, Nickolas Vlahopoulos, University of Michigan
2:30 p.m.	2019-01-1471	Calculation Process with Lattice Boltzmann and Finite Element Methods to Choose the Best Exterior Design for Wind Noise Guillaume Baudet, Cecile Dutrion, Remi Lorenzi, Felix Gendre, Shanshan Geng, Renault
2:50 p.m.	2019-01-1472	A Computational Process to Effectively Design Seals for Improved Wind Noise Performance Nicholas Oettle, Jaguar Land Rover; Robert Powell, Sivapalan Senthoran, Philippe Moron, Dassault Systemes SIMULIA
3:10 p.m.	2019-01-1473	A Transient SEA Model for Transmission of Non-Stationary Wind Noise Paul Bremner, AeroHydroPLUS; Scott Clifton, TMR; Chris Todter, Keppel Professional Services

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Tuesday, June 11

Aerodynamic Noise Methods & Applications (Part 2 of 2)

Session Code: NVC200

Room Grand Gallery Room D

Session Time: 4:00 p.m.

This session contains presentations on advanced experimental and numerical techniques for reducing noise created by automotive HVAC systems. Sources of noise caused by cooling fluid and those caused by air flow will be described, along with successful treatments to reduce both sources of unwanted noise.

Organizers - Robert Powell, Sivapalan Senthoran, Dassault Systemes Simulia Corp; Christopher Shaw, FCA

Time	Paper No.	Title
4:00 p.m.	2019-01-1474	The Mechanism of Hissing Noise in the Automotive Cabin and Countermeasures for its Reduction Atsushi Itoh, ZongGuang Wang, Mitsubishi Motors Corporation
4:20 p.m.	2019-01-1476	Towards a Quiet Vehicle Cabin Through Digitalization of HVAC Systems and Subsystems Aeroacoustics Testing and Design Vincent Vidal, Adrien Mann, Jonas Verriere, Minsuk Kim, Dassault Systemes SIMULIA; Fabrice Ailloud, Manuel Henner, Olivier Cheriaux, Valeo Thermal Systems

Tuesday, June 11

Heavy Duty Truck / Off-Highway

Session Code: NVC450

10:30 a.m.

Room Grand Gallery Room E

Session Time:

This session covers noise and vibration in heavy trucks and buses and all other off-road vehicles. Special attention will be focused on the noise and vibration problems found in these vehicles, as opposed to passenger cars and light trucks, and to the engineering solutions required to solve these problems. Included in the session are discussions of special measurement methods, modeling specifically directed to these vehicles, and NVH materials with special properties to address unique problems.

Organizers - Satyajeet P. Deshpande; Charles Moritz, Blachford Inc.

Time	Paper No.	Title
10:30 a.m.	2019-01-1478	A Case Study on Golf Car Powertrain NVH Sources and Mitigation Methods Steven Carter, Kenneth Buczek, Roush Industries, Inc.; Adam Clark, Club Car, LLC; Mayuresh Pathak, Roush Industries, Inc.
10:50 a.m.	2019-01-1480	Mitigation of Community Noise from a Vacuum Excavator Using Simulations Rahul Sanal, Karthik Mahadevan Muthuraman, Robert Powell, Dassault Systemes Simulia Corp.; Vernon Stellman, Craig Clevenger, Jeff Smith, Charles Machine Works
11:10 a.m.	2019-01-1481	Comparison of Measurement Methods for Evaluating Displacement of Commercial Vehicle Seats James Haylett, CVG; Peter Johnson, University of Washington
11:30 a.m.	2019-01-1479	Noise and Vibration Prediction and Validation for Off-Highway Vehicle Cab Using Hybrid FE-SEA Methodology Parag Chaudhari, John Deere India Pvt., Ltd.; Joseph Sullivan, Jinghao Liu, Sanghoon Suh, John Deere C&F
11:50 a.m.	2019-01-1477	Analyzing Field Environments to Understand Product Failure Causes Jade Vande Kamp, Vibration Research

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Tuesday, June 11

Rail & Ship

Session Code: NVC280

Room Grand Gallery Room E

Session Time: 1:30 p.m.

This session is devoted to NVH topics for rail and ship vehicles such as locomotives, railcars, commercial shipping, luxury liners and yachting. Potential topics would include any NVH development issues pertinent to rail and marine vehicles, noise or vibration target-setting for perception and measurement methodology.

Organizers - Hether Fedullo, Ford Motor Company

Time	Paper No.	Title
1:50 p.m.	2019-01-1498	Structural-Acoustic Modeling and Optimization of a Submarine Pressure Hull James Spain, University of Michigan; Geng Zhang, Michigan Engineering Services, LLC; Nickolas Vlahopoulos, University of Michigan

Tuesday, June 11

Powertrain Intake / Exhaust (Part 1 of 2)

Session Code: NVC180

10:30 a.m.

Room Grand Gallery Room F

Session Time:

This session covers experimental, computational, and analytical efforts related to the basic mechanisms and control techniques of noise and vibration in the breathing system (induction, combustion chamber, and exhaust) of naturally aspirated and supercharged/turbocharged engines. Noise sources include airborne, flow, flow- acoustic and flow- structure coupling.

Organizers - Rick D. Dehner, OSU Center for Automotive Research; Francisco David Denia, Universitat Politecnica de Valencia; Raymond A. Kach, Ford Motor Company; Philip Keller, BorgWarner Inc.; Ahmet Selamet, Ohio State University

Time	Paper No.	Title
10:30 a.m.	2019-01-1486	Numerical Modeling of Internal Helmholtz Resonators Created by Punching Small Holes on a Thin-Walled Tube Hao Zhou, T. W. Wu, University of Kentucky
10:50 a.m.	2019-01-1483	Engine Exhaust Noise Optimization Using Sobol DoE Sequence and NSGA-II Algorithms Ishwinder Pal Singh Sethi, Devendra Nene, Anand Shivajirao Patil, Tafe Motors and Tractors Limited
11:10 a.m.	2019-01-1482	Development of a Muffler Insertion Loss Flow Rig Jonathan Chen, D. W. Herrin, University of Kentucky
11:50 a.m.	2019-01-1491	A Study on NVH Performance Improvement of TPE Air Intake Hose Based on Optimization of Design and Material Hyunsoo Jung, Hyundai Motor Company; Jungkook Jin, Mahle Donghyun Filter System Co., Ltd.; Jong Min Park, Hyundai Motor Company; Yong Sun (Steven) Jin, DuPont Engineering Polymers; Won Hee Han, Dupont Korea; Younghae Kim, Mahle Donghyun Filter System Co., Ltd.; Yu Gu, DuPont China Holding Co., Ltd.

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Tuesday, June 11

Powertrain Intake / Exhaust (Part 2 of 2)

Session Code: NVC180

Room Grand Gallery Room F

Session Time: 1:30 p.m.

This session covers experimental, computational, and analytical efforts related to the basic mechanisms and control techniques of noise and vibration in the breathing system (induction, combustion chamber, and exhaust) of naturally aspirated and supercharged/turbocharged engines. Noise sources include airborne, flow, flow- acoustic and flow- structure coupling.

Organizers - Rick D. Dehner, OSU Center for Automotive Research; Francisco David Denia, Universitat Politecnica de Valencia; Raymond A. Kach, Ford Motor Company; Philip Keller, BorgWarner Inc.; Ahmet Selamet, Ohio State University

Time	Paper No.	Title
1:30 p.m.	2019-01-1490	Surge Prediction in a Single Sequential Turbocharger (SST) Compressor Using Computational Fluid Dynamics Ahsanul Karim, Robert Wade, Ford Motor Company; Anthony Morelli, Ford Powertrain Operations; Keith Miazgowicz, Brian Lizotte, Ford Motor Company

1:50 p.m.	2019-01-1488	<p>On the Measurement and Simulation of Flow-Acoustic Sound Propagation in Turbochargers</p> <p><i>Hendrik Ruppert, Felix Falke, Stefan Pischinger, Marco GÄ¼nther, Institute for Combustion Engines, RWTH Aachen University; Ralf Stienen, FEV Europe GmbH</i></p>
2:10 p.m.	2019-01-1487	<p>Prediction of Broadband Noise in an Automotive Centrifugal Compressor with Three-Dimensional Computational Fluid Dynamics Detached Eddy Simulations</p> <p><i>Rick Dehner, Ahmet Selamet, Ohio State University</i></p>
2:30 p.m.	2019-01-1489	<p>New Psychoacoustic Criteria for Turbocharger Aero Noise</p> <p><i>Alexandre Rigault, Garrett Advancing Motion; Fred Kihm, Nicolas Baron, HBM Prenscia</i></p>
2:50 p.m.	2019-01-1484	<p>Turbocharger Centrifugal Compressor Casing Treatment for Improved BPF Noise Using Computational Fluid Dynamics</p> <p><i>Ahsanul Karim, Ford Motor Company; Matthew Mckean, Ford Product Development; Rick Dehner, Ahmet Selamet, Ohio State University; Chris Tiernan, Ford Motor Company; Anthony Morelli, Ford Powertrain Operations; Keith Miazgowicz, Ted Mull, Ford Motor Company</i></p>

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Wednesday, June 12

Wednesday Keynote: The Sound of Synergy- John Maxon, Gulfstream Aerospace Corp.

Session Code: NVCK1

Room Ballroom AB

Session Time: 9:00 a.m.

Moderators - Steve Sorenson, Toyota Motor North America Inc.

Keynote Speakers - John Maxon, Gulfstream Aerospace Corp.

Time	Paper No.	Title
	ORAL ONLY	The Sound of Synergy

John Maxon, Gulfstream Aerospace Corp.

Wednesday, June 12

Body Structure/ Chassis- Interior Noise, Vibration Source, and Tire (Part 2 of 2)

Session Code: NVC751

Room Ballroom C

Session Time: 10:30 a.m.

This session covers static and dynamic issues in the body and chassis that contribute to noise and vibration problems in vehicles. Included in this session are modal studies, measurement and analysis methods, transfer path analysis, design guidelines, recommended practices, and modeling techniques for noise and vibration control of the body and chassis.

Organizers - *Gabriella Cerrato, Bruel & Kjaer Sound/Vib Meas A/S; Paul R. Donovan, Illingworth & Rodkin Inc.; Eric Frank, Rabah Hadjit, Bruel & Kjaer Sound/Vib Meas A/S; David W. Herrin, Univ. of Kentucky; Farokh Kavarana, Nissan Motor Co., Ltd.; Thomas L. Lago, QirraSound Technologies Europe AB; Gary Newton, Bruel & Kjaer North America Inc.; Mohamad Qatu, Eastern Michigan Univ.; Christopher Shaw, FCA; Gavin Song, Ford Motor Company; Prakash T. Thawani; Weiguo Zhang, FCA US LLC*

Time	Paper No.	Title
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10:30 a.m.	2019-01-1511	Extensive Correlation Study of Acoustic Trim Packages in Trimmed Body Modeling of an Automotive Vehicle Ji Woo Yoo, Hyundai & Kia Corp.; Markus Brandstetter, Free Field Technologies; ChanHee Jeong, MSC Software Corp.; Jonathan Jacqmot, Free Field Technologies; Ki-Sang Chae, Hyundai Motor Company
10:50 a.m.	2019-01-1510	Dynamics of Amphibious All-Terrain Vehicle's Chassis Having Vibration Energy Harvesting Dampers George Nerubenko, Nermar, Ltd.; Dmytriy Gurevych, Mega Automation, Inc.; Pavel Kolomier, PK&MM Engineering, Ltd.

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Wednesday, June 12

Transmission & Driveline (Part 1 of 3)

Session Code: NVC680

Room Ballroom C

Session Time: 1:30 p.m.

This session deals with analytical, computational and experimental studies of the dynamic response including noise and vibration of automotive driveline system and components. Typical topics of interests include, but not limited to, torque converters, gear noise, axle noise driveline system dynamics, transmission noise and vibrations, powertrain dynamics, transient dynamic response and propshaft balancing.

Organizers - Hether Fedullo, Ford Motor Company; Kiran Govindswamy, FEV Inc.; Mohamad Qatu, Eastern Michigan Univ.; Jeff Orzechowski, FCA; Teik C. Lim, Univ. of Texas-Arlington; In-Soo Suh, Aptiv PLC

Time	Paper No.	Title
1:30 p.m.	2019-01-1554	Target Development for Transmission and Electric Motor NVH Todd Tousignant, Alex Ford, Kiran Govindswamy, FEV North America, Inc.; Justin Dech, Frederick Vanhaaften, Matthew Hettenhouse, Ford Motor Company
1:50 p.m.	2019-01-1559	Driveline NVH Integration of An NA Truck Program Ying Peng, Zhenghong Shi, Christopher Folts, Gregory Kopp, Zhaohui Sun, Alexander Sandstrom, American Axle & Manufacturing
2:10 p.m.	2019-01-1560	Vibro-Acoustic Analysis for Modeling Propeller Shaft Liner Material Rajith R. Jayaratne, Yu Liu, Mark Gehringer, Jeff Rayce, Wallace Hill, General Motors
2:30 p.m.	2019-01-1529	The Utilization of Onboard Sensor Measurements for Estimating Driveline Damping Jon Furlich, Jason Blough, Darrell Robinette, Michigan Technological University
2:50 p.m.	2019-01-1556	Investigation and Improvement of a Bouncing Torsional Vibration in Automotive Dual Mass Flywheel by Combining Testing and 1D CAE Modeling Approach Yoshihiro Yamakaji, Daisuke Yoshimoto, EXEDY Corp.; Nobutaka Tsujiuchi, Akihito Ito, Doshisha University
3:10 p.m.	2019-01-1558	New Half Shaft Bench Test Methodology for NVH Characterization Saeed Siavoshani, Prasad Balkrishna Vesikar, Siemens PLM Software; Wei Yuan, Ahmad Abbas, Francisco Antonio Sturla, FCA US LLC

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Wednesday, June 12

Transmission & Driveline (Part 2 of 3)

Session Code: NVC680

Room Ballroom C

Session Time: 4:00 p.m.

This session deals with analytical, computational and experimental studies of the dynamic response including noise and vibration of automotive driveline system and components. Typical topics of interests include, but not limited to, torque converters, gear noise, axle noise driveline system dynamics, transmission noise and vibrations, powertrain dynamics, transient dynamic response and propshaft balancing.

Organizers - Hether Fedullo, Ford Motor Company; Kiran Govindswamy, FEV Inc.; Mohamad Qatu, Eastern Michigan Univ.; Jeff Orzechowski, FCA; Teik C. Lim, Univ. of Texas-Arlington; In-Soo Suh, Aptiv PLC

Time	Paper No.	Title
4:00 p.m.	2019-01-1553	Dual Clutch Transmission Vibrations during Gear Shift: A Simulation-Based Approach for Clunking Noise Assessment <i>Enrico Galvagno, Luca Dimauro, Gianluca Mari, Mauro Velardocchia, Angelo Domenico Vella, Politecnico di Torino</i>
4:20 p.m.	2019-01-1557	Investigation on Cyclic Noise in Vehicle Creeping during Stop-Go Traffic Conditions <i>Abhishek Lakhanlal Vaishya, Archan Sunibhai Pujara, Devendra Kumar Khare, Kingshuk Satpathy, Maruti Suzuki India Limited</i>
4:40 p.m.	2019-01-1526	Kinematic Analysis and Simulation of the Double Roller Tripod Joint <i>Yinyuan Qiu, Wen-Bin Shangguan, South China University of Technology</i>
5:00 p.m.	2019-01-1561	Experimental Investigation on Gear Rattle Noise Reduction in Passenger Car <i>Devendra Kumar Khare, Abhishek Lakhanlal Vaishya, Archan Sunibhai Pujara, Radhe Krishna, Kingshuk Satpathy, Ved Prakash Choudhary, Anant Pandey, Maruti Suzuki India Limited</i>
5:20 p.m.	2019-01-1555	Development of an Analytical Method for Rear Differential Gear Whine Noise Utilizing Principal Component Contribution by OTPA and CAE <i>Miho Nakatsuka, Tetsuya Miwa, Toyota Motor Corp.; Junji Yoshida, Osaka Institute of Technology</i>
5:40 p.m.	2019-01-1527	Optimization of Hypoid Gear Tooth Profile Modifications on Vehicle Axle System Dynamics <i>Chia-Ching Lin, Yawen Wang, Kan Wang, University of Texas- Arlington; Weiqing Zhang, Shouli Sun, Chongqing University of Technology; Teik C. Lim, University of Texas- Arlington</i>

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Wednesday, June 12

Fundamentals of Structure Borne NVH Workshop (WKSP)

Session Code: NVCWK1

Room Ballroom C

Session Time: 6:00 p.m.

Join in Wednesday evening for fundamental NVH Source-Path-Receiver concepts at the 2019 Structure Borne NVH Workshop. Since its inception in 2003, the SB NVH workshop has been a primer for the newly initiated NVH Engineer covering isolation and attenuation principles along with practical methods for reducing noise and vibration. A theoretical foundation will explain low-frequency NVH, below 100 Hz, and mid-frequency, up to 500 Hz, with guidelines for performance achievement. Experience the acclaimed "NVH Toolbox" with a "hear it live" demo. The seasoned Engineer will benefit from a comprehensive review of NVH principles. Recent advances in NVH technology will be discussed to guide emerging Electric Car propulsion issues.

Workshop refreshments sponsored by Altair

Organizers - Alan E. Duncan, Automotive Analytics LLC; Gregory Goetchius; Jianmin Guan, Altair Engineering
Presenters - Alan E. Duncan, Automotive Analytics LLC; Gregory Goetchius; Jianmin Guan, Altair Engineering

Wednesday, June 12

Active Sound Enhancement / Cancellation Methods & Applications

Session Code: NVC100

Room Ballroom D

Session Time: 1:30 p.m.

This session addresses the strategies and methods for implementing active noise and vibration control, including sound enhancement, in a vehicle. It will cover sensors and transducers, feedback systems, control algorithms, software for active control, noise and vibration cancellation devices, noise and vibration measurement systems, and case studies.

Organizers - Jeff Orzechowski, FCA; Thomas L. Lago, QirraSound Technologies Europe AB; Vikas Juneja, FCA US LLC; Gordon Ebbitt, Ebbitt Acoustical Consulting LLC; Farokh Kavarana, Nissan Motor Co., Ltd.

Time	Paper No.	Title
1:30 p.m.	2019-01-1528	Subband Adaptive Filtering Algorithms for Active Broadband Noise Control in Impulsive Vehicle Noise Environment Guo Long, Kan Wang, Teik Lim, University of Texas- Arlington
1:50 p.m.	2019-01-1565	Effects of the Feature Extraction from Road Surface Image for Road Induced Noise Prediction Using Artificial Intelligence Shunsuke Nakamura, Masashi Komada, Toyota Motor Corp.; Yuichi Matsumura, Kojiro Matsushita, Gifu University; Keisuke Ishizaki, Toyota Motor Corp.
2:10 p.m.	2019-01-1566	Drivetrain Noise Source Identification and Active Noise Control of a Heavy Off-Road Vehicle Hailin Ruan, Wei Huang, Longchen Li, Gissing Tech. Co., Ltd.; Zuguo Xia, Dongfeng Motor Technical Center; Xiaojun Chen, Xiujie Tian, Keda Zhu, Changwei Zheng, Jiapeng Zhao, Renjie Dai, Gissing Tech. Co., Ltd.
2:30 p.m.	2019-01-1567	Performance Testing and Analysis of Multi-Channel Active Control System for Vehicle Interior Noise Using Adaptive Notch Filter Lijun Zhang, Xiyu Zhang, Dejian Meng, Tongji University
2:50 p.m.	2019-01-1569	Multi-Physics and CFD Analysis of an Enclosed Coaxial Carbon Nanotube Speaker for Automotive Exhaust Noise Cancellation Suraj Madhav Prabhu, Andrew Barnard, Steven Senczyszyn, Michigan Technological University
3:10 p.m.	2019-01-1571	Use of Active Vibration Control to Improve Vehicle Refinement while Expanding the Usable Range of Cylinder Deactivation Jeff Orzechowski, Gaurav Agnihotri, Vikas Juneja, FCA US LLC

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Wednesday, June 12

Fundamentals and Insights of Sound Quality Engineering Workshop (WKSP)

Session Code: NVCWK4

Room Ballroom D

Session Time: 6:00 p.m.

The Sound Quality Workshop 2019 will begin with a step back from the usual foreground topics to consider "the forest instead of the trees": what the human brain in Soundscape does, to reset understandings. Humans practically cannot hear without mental activity assembling every heard event and its meaning. This cannot be described in a short outline but will be clear on presentation. The author gave an invited paper at InterNoise 2018 on this topic and has been urged to teach it: what underlies perception and for sound quality engineers, how to think, leading to what to do. Following this start, the topics will be straightforward and practical: analyses in frequency and in time; using two or more simultaneous measurements to quantify according to the human receiver, and many tips. The Workshop will be given to attendees via memory sticks at the conclusion.

Organizers - Wade R. Bray, HEAD acoustics Inc.

Presenters - Wade Bray, HEAD acoustics Inc.

Wednesday, June 12

Chat with the Experts- Wade Bray

Session Code: NVCCHAT1

Room Exhibit Hall

Session Time: 1:30 p.m.

<i>Time</i>	<i>Paper No.</i>	<i>Title</i>
	ORAL ONLY	Sound Quality, Its Relationships and Applications Wade R. Bray, HEAD acoustics Inc.

Wednesday, June 12

Chat with the Experts- Patricia Davies

Session Code: NVCCHAT2

Room Exhibit Hall

Session Time: 1:30 p.m.

<i>Time</i>	<i>Paper No.</i>	<i>Title</i>
	ORAL ONLY	Noise & Vibration- Connecting Experiment and Models Patricia Davies, Purdue University

Wednesday, June 12

Chat with the Experts- Peter Johnson

Session Code: NVCCHAT3

Room Exhibit Hall

Session Time: 1:30 p.m.

<i>Time</i>	<i>Paper No.</i>	<i>Title</i>
	ORAL ONLY	Recent Developments in Whole Body Vibration, Seating and Comfort Peter W. Johnson, Univ. of Washington

Wednesday, June 12

Chat with the Experts- Greg Goetchius

Session Code: NVCCHAT5

Room Exhibit Hall

Session Time: 1:30 p.m.

<i>Time</i>	<i>Paper No.</i>	<i>Title</i>
	ORAL ONLY	Powertrain NVH Considerations for Electric Vehicles Gregory Goetchius

Wednesday, June 12

Acoustics and Vibration Methods

Session Code: NVC350

Room Grand Gallery Room B

Session Time: 10:30 a.m.

This session provides a good overview of recent innovations to modeling and visualization techniques, tools, and methodology, both analytical and experimental involved in identifying, calculating and modifying various noise and vibration sources and paths in vehicles, aircraft and various consumer products and assist in the design and validation of noise and vibration targets. Also included are Whole Body and Hand Arm Vibration experienced by drivers as well as acoustical design factors of audio, infotainment, and hands free devices.

Organizers - Rabah Hadjit, *Bruel & Kjaer Sound/Vib Meas A/S*; Weiguo Zhang, *FCA US LLC*; Gary Newton, *Bruel & Kjaer North America Inc.*

Chairpersons - Gary Newton, *Bruel & Kjaer North America*

<i>Time</i>	<i>Paper No.</i>	<i>Title</i>
10:30 a.m.	2019-01-1530	Comparison between Finite Element and Hybrid Finite Element Results to Test Data for the Vibration of a Production Car Body <i>Nickolas Vlahopoulos, University of Michigan; David Sander, Virtual Vehicle Research Center; Sungmin Lee, University of Michigan; Elmar BÄ¶hler, Virtual Vehicle Research Center; Geng Zhang, Michigan Engineering Services, LLC</i>
10:50 a.m.	2019-01-1535	A New Method for Mid- to High-Frequency Vibration Analyses of Beam Structures <i>Bingen Yang, Yichi Zhang, University of Southern California</i>
11:10 a.m.	2019-01-1538	Determining Vibro-Acoustic Characteristics and Structural Damping of an Elastic Monolithic Panel <i>Antonio Figueroa, Shiloh Industries, Inc.; Sean Wu, Lingguang Chen, Wayne State University</i>
11:30 a.m.	2019-01-1533	A Comparison of Near-Field Acoustical Holography Methods Applied to Noise Source Identification <i>Tongyang Shi, J Stuart Bolton, Purdue University</i>
11:50 a.m.	2019-01-1534	Performance of Additive Manufactured Stacks in a Small Scale Thermoacoustic Heat Engine <i>Fabio Auriemma, Yaroslav Holovenko, Tallinn University of Technology</i>
12:10 p.m.	2019-01-1531	Augmenting Vehicle Production Audit with Objective Data and Sound Quality Metrics to Improve Customer Experience in a Changing Automotive Landscape <i>Brian Thom, Gabriella Cerrato, Bruel & Kjaer Sound and Vibration A/S; Mark Sturgill, Ford Motor Company</i>

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Wednesday, June 12

Subjective Response (Part 2 of 2)

Session Code: NVC480

10:30 a.m.

Room Grand Gallery Room C

Session Time:

This Subjective Response session seeks manuscripts concerning subjective testing and analysis related to vehicle/equipment noise and vibration, usually referred to as sound quality and vibration quality. The focus is on both subjective and objective tools and methods that can be used either to design sound or vibration quality into the final product, or to characterize and eliminate undesired sounds or vibrations.

Organizers - Gregory Goetchius; Daniel Rauchholz, Janesville Acoustics; Steve Sorenson, Toyota Motor North America Inc.

Chairpersons - Gregory Goetchius

Time	Paper No.	Title
10:30 a.m.	2019-01-1522	Preliminary Study of Perceived Vibration Quality for Human Hands Jennifer M. Bastiaan, Kettering University; Edward Green, Sophie Kaye, Bruel & Kjaer North America, Inc.
10:50 a.m.	2019-01-1518	Separation, Allocation and Psychoacoustic Evaluation of Vehicle Interior Noise Christian Schumann, RWTH Aachen University; Florian Doleschal, Otto von Guericke University Magdeburg; Stefan Pischinger, RWTH Aachen University; Jesko Verhey, Otto von Guericke University Magdeburg
11:10 a.m.	2019-01-1520	A Process to Improve Passenger Vehicle Sound and Vibration Quality Using a Combination of SPC and CAE Analysis Yulei Wang, SGMW; Giovanni Rinaldi, Bruel & Kjaer North America, Inc.; Bret Engels, Bruel & Kjaer Sound And Vibration A/S; Xiaolei Song, Altair Engineering
11:30 a.m.	2019-01-1519	Development and Application of an Objective Metric for Transient Engine Clatter Noise Aniket Parbat, InDepth Engineering Solutions; Anil Charan, FCA US LLC

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Wednesday, June 12

Student Paper Competition (Group 1)

Session Code: NVCSTP1

Room Grand Gallery Room C

Session Time: 4:00 p.m.

Student competition sponsored by 3M

Organizers - Thierry Bourdon, Continental Automotive France SAS; Pranab Saha, Kolano and Saha Engineers Inc.

Time	Paper No.	Title
4:20 p.m.	2019-01-1503	A Non-Contact Technique for Vibration Measurement of Automotive Structures Vanshaj Srivastava, Javad Baqersad, Kettering University
4:40 p.m.	2019-01-1525	Blocked Force Determination on Thin Plate Structures Including Applications Keyu Chen, David Herrin, University of Kentucky
5:00 p.m.	2019-01-1528	Subband Adaptive Filtering Algorithms for Active Broadband Noise Control in Impulsive Vehicle Noise Environment Guo Long, Kan Wang, Teik Lim, University of Texas- Arlington

5:20 p.m. **2019-01-1526** **Kinematic Analysis and Simulation of the Double Roller Tripod Joint**
Yinyuan Qiu, Wen-Bin Shangguan, South China University of Technology

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Wednesday, June 12

System NVH Approach - Influence of Coupled Parts

Session Code: **NVC580**

Room Grand Gallery Room D

Session Time: **10:30 a.m.**

This session covers the relationships between vibration and noise that can be generated throughout the vehicle. Included in this session are modal vibration studies related to noise, vibration transfer paths throughout the vehicle, and coupling of vibration and acoustical modes. Both experimental and analytical approaches are included in this session.

Organizers - *Thierry Bourdon, Continental Automotive France SAS*

Time	Paper No.	Title
10:30 a.m.	2019-01-1543	Comparing Interior Cabin SPL Suppression Performance Based on Vying Flat Sample Data and Requirements <i>Allen Teagle-Hernandez, California State University- Long Beach; Fumihiko Ide, Honda R & D Americas, Inc.; Shota Ichikawa, K and A JPN; Kengo Yabe, Honda R & D Americas, Inc.; Takehisa Matsuda, HSEA Technology, Inc.</i>
10:50 a.m.	2019-01-1545	System Interactions Affecting NVH Performance of an Electric Vehicle Drivetrain <i>Melanie Michon, Robert Holehouse, Annabel Shahaj, Hisham Jafarali, Venkatakrishna Janakiraman, Romax Technology, Ltd.</i>
11:10 a.m.	2019-01-1541	Structure-Borne Prediction on a Tire-Suspension Assembly Using Experimental Invariant Spindle Forces <i>Jesús Ortega Almirán, Fabio Bianciardi, Patrick Corbeels, Siemens Industry Software NV</i>
11:30 a.m.	2019-01-1542	Robust NVH Engineering Using Experimental Methods - Source Characterization Techniques for Component Transfer Path Analysis and Virtual Acoustic Prototyping <i>Kevin Wiene, Michael Sturm, Robert Bosch Automotive Steering LLC; Andy Moorhouse, Joshua Meggitt, University of Salford</i>
11:50 a.m.	2019-01-1544	Evaluation of Uncertainties in Classical and Component (Blocked Force) Transfer Path Analysis (TPA) <i>Andy Moorhouse, Joshua Meggitt, Andrew Elliott, University of Salford</i>
12:10 p.m.	2019-01-1540	A Comparison of Two Source Characterisation Techniques Proposed for Standardisation <i>Daniël van den Bosch, Maarten van der Seijs, VIBES Technology; Dennis de Klerk, M&I/Ilker-BBM VAS</i>

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Wednesday, June 12

Materials (Part 1 of 3)

Session Code: **NVC850**

Room Grand Gallery Room D**Session Time: 1:30 p.m.**

This session will cover materials used to solve noise and vibration problems in vehicles. Topics covered will include new and traditional NVH materials, materials with unique or special NVH properties, case studies covering applications of NVH materials to solve specific vehicle problems, modeling of materials, manufacturing or processing of NVH materials, and engineering and design principles for the use of NVH materials.

Organizers - Pranab Saha, Kolano and Saha Engineers Inc.; Satyajeet P. Deshpande, 94 Decibel LLC; Jason T. Kunio, Bruel & Kjaer North America Inc.; Jian Pan, Gissing Automotive Systems LLC; David B. Reed, Janesville Acoustics; Steve Sorenson, Toyota Motor North America Inc.; Barry R. Wyerman, Monadnock Non-Wovens LLC

Chairpersons - Satya Deshpande, 94 Decibel LLC

Assistant Chairpersons - David B. Reed, Janesville Acoustics

Time	Paper No.	Title
1:30 p.m.	2019-01-1578	The History of Laminated Steel Dennis Huckins, Soundown Corp.; Peter Jackson, Antiphon/C&A/ AAP (retired); James Shedlowsky, General Motors (retired)
1:50 p.m.	2019-01-1584	Fast Accurate Non-Destructive Measurement of Absorber Impedance and Absorption Paul B. Murray, Morrisbrand, Ltd.; Jon Alexander, 3M Company; Jason Kunio, Flemming Larsen, Bruel & Kjaer Sound and Vibration A/S
2:10 p.m.	2019-01-1576	Early Research on Additively Manufactured Sound Absorbers Weiyun Liu, David Herrin, University of Kentucky
2:30 p.m.	2019-01-1574	Broadband Membrane-Type Acoustic Metamaterial Structures with Polymorphic Anti-Resonance Modes Qianqian Zhang, Gissing Tech. Co., Ltd.; Guojian Zhou, Xiâ€™an Jiaotong University; Xiujie Tian, Yuying Jiang, Gissing Tech. Co., Ltd.; Jiu Hui Wu, Xiâ€™an Jiaotong University; Wei Huang, Keda Zhu, Gissing Tech. Co., Ltd.
2:50 p.m.	2019-01-1580	Experimental Study of Acoustic and Thermal Performance of Sound Absorbers with Microperforated Aluminum Foil Gang Glenn Yin, Alan Parrett, General Motors; Felipe G. Salazar Prieto, General Motors De Mexico S de R L de CV; Timothy J. Roggenkamp, General Motors
3:10 p.m.	2019-01-1582	Modeling of Micro-Perforated Heat Baffle Allen Teagle-Hernandez, California State University- Long Beach; Fumihiko Ide, Honda R & D Americas, Inc.; Shota Ichikawa, K and A JPN; Kengo Yabe, Honda R & D Americas, Inc.; Takehisa Matsuda, HSEA Technology, Inc.

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Wednesday, June 12

Materials (Part 2 of 3)

Session Code: NVC850

Room Grand Gallery Room D
Session Time: 4:00 p.m.

This session will cover materials used to solve noise and vibration problems in vehicles. Topics covered will include new and traditional NVH materials, materials with unique or special NVH properties, case studies covering applications of NVH materials to solve specific vehicle problems, modeling of materials, manufacturing or processing of NVH materials, and engineering and design principles for the use of NVH materials.

Organizers - Pranab Saha, Kolano and Saha Engineers Inc.; Satyajeet P. Deshpande, University of Nebraska-Lincoln; Jason T. Kunio, Bruel & Kjaer North America Inc.; Jian Pan, Gissing Automotive Systems LLC; David B. Reed, Janesville Acoustics; Steve Sorenson, Toyota Motor North America Inc.; Barry

R. Wyerman, Monadnock Non-Wovens LLC

Chairpersons - Jian Pan, Gissing Automotive Systems LLC

Assistant Chairpersons - Jason T. Kunio, Bruel & Kjaer North America Inc.

Time	Paper No.	Title
4:00 p.m.	2019-01-1524	Design of Lightweight Fibrous Vibration Damping Treatments to Achieve Optimal Performance in Realistic Applications Yutong Xue, J Stuart Bolton, Herrick Laboratories, Purdue University; Thomas Herdtle, 3M Company
4:20 p.m.	2019-01-1577	Optimization of Multi-Layer Panel Constructions Using Experimental Modeling via Transfer Matrix Method Edward Ray Green, John Anton, Bruel & Kjaer North America, Inc.
4:40 p.m.	2019-01-1583	Fast Broadband Curved Insertion Loss Simulation of an Inner Dash Insulator Using a Cylindrical Transfer Matrix Method Spectral Approach Arnaud Duval, Mickael Goret, Treves; Gerard Borello, Interac

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Wednesday, June 12

Student Paper Competition (Group 2)

Session Code: NVCSTP2

Room Grand Gallery Room E

Session Time: 4:00 p.m.

Student competition sponsored by 3M

Organizers - Thierry Bourdon, Continental Automotive France SAS; Pranab Saha, Kolano and Saha Engineers Inc.

Time	Paper No.	Title
4:20 p.m.	2019-01-1527	Optimization of Hypoid Gear Tooth Profile Modifications on Vehicle Axle System Dynamics Chia-Ching Lin, Yawen Wang, Kan Wang, University of Texas- Arlington; Weiqing Zhang, Shouli Sun, Chongqing University of Technology; Teik C. Lim, University of Texas- Arlington
4:40 p.m.	2019-01-1458	Structural Vibration and Acoustic Analysis of a 3-Phase AC Induction Motor Anand Krishnasarma, Allan Taylor, Javad Baqersad, Kettering University; Peyman Poozesh
5:00 p.m.	2019-01-1500	Testing Methods and Signal Processing Strategies for Automatic Transmission Transient Multiplexed Pressure Data Mark Woodland, Jason Blough, Darrell Robinette, Carl Anderson, Michigan Technological University; Steve Frait, Ram Sudarsan Devendran, Ford Motor Company
5:20 p.m.	2019-01-1459	Open-Access Testbench Data for NVH Benchmarking of E-Machines under Electromagnetic Excitations Emile Devillers, L2EP; Karine Degrendele, EOMYS Engineering; Michel Hecquet, L2EP; Jean-Philippe Lecointe, LSEE; Jean Le Besnerais, EOMYS Engineering; Guillaume Cousin, OROS

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Wednesday, June 12

Engine & Installed Components

Session Code: NVC150

Room Grand Gallery Room F

Session Time: 10:30 a.m.

This session is focused on base engine, mounts, accessories, fuel injection system, combustion system, turbo chargers, EGR system, transmission related design or development noise and vibration topics. With the advent of GDI engines- the performance vs. NVH relationship has become more interesting and challenging. The focus of this session is to share experiences on analyzing, testing, and developing solutions to structural noise and vibration problems from powertrain sources.

Organizers - Kalyan Singh Bagga, Abdelkrim Zouani, Ford Motor Company; Todd Tousignant, FEV North America Inc.

Time	Paper No.	Title
10:30 a.m.	2019-01-1548	Optimal Pressure Relief Groove Geometry for Improved NVH Performance of Variable Displacement Oil Pumps Abdelkrim Zouani, Vidya Marri, Ford Motor Company
10:50 a.m.	2019-01-1551	Machine Learning Algorithm for the Prediction of Idle Combustion Uniformity Xiaoqi Li; Abdelkrim Zouani, Ford Motor Company
11:10 a.m.	2019-01-1550	Model Verification of CAE with NVH-Test Acting on Downsized Car Engines Urban RÅnnqvist, Volvo Cars, Engine Vibrations CAE; Janos Ribarits, NVH-testing Powertrain
11:30 a.m.	2019-01-1549	Development of 1D Model of Impact Force in Powertrain Equipment Yuma Yoshimaru, Makoto Kondo, Yukie Omuro, Masashi Inaba, Denso
11:50 a.m.	2019-01-1525	Blocked Force Determination on Thin Plate Structures Including Applications Keyu Chen, David Herrin, University of Kentucky

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Wednesday, June 12

Powertrain Systems

Session Code: NVC151

Room Grand Gallery Room F

Session Time: 1:50 p.m.

This session is focused on base engine, mounts, accessories, fuel injection system, combustion system, turbo chargers, EGR system, transmission related design or development noise and vibration topics. With the advent of GDI engines- the performance vs. NVH relationship has become more interesting and challenging. The papers of this session will have both experimental and analytical approaches to problem solving.

Organizers - Kalyan Singh Bagga, Hether Fedullo, Ford Motor Company; Rabah Hadjit, Bruel & Kjaer Sound/Vib Meas A/S; In-Soo Suh, Aptiv PLC; Todd Tousignant, FEV North America Inc.; Prakash T. Thawani, Denso International America Inc; Thierry Bourdon, Continental Automotive France SAS; Jeff Orzechowski, FCA

Time	Paper No.	Title
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1:50 p.m.	2019-01-1588	New Method for Decoupling the Powertrain Roll Mode to Improve Idle Vibration Syed F. Haider, Ahmad Abbas, Francisco Sturla, FCA US LLC
2:10 p.m.	2019-01-1587	Structure-Borne Path Identification of Rumbling Noise in a Passenger Car Based on In-Situ Blocked Force Transfer Path Analysis Sang Kwon Lee, Kanghyun An, Taejin Shin, Yeunsoo Kim, Inha University; Doohee Han, Hyundai & Kia Corp.; Insoo Jung, Hyundai Motor Group
2:30 p.m.	2019-01-1589	Design and Development of Partial Engine Encapsulation for Interior Noise Reduction in Commercial Vehicles Sourabh Jadhav, Saahil Saxena, Yadhu S. Aswan, VE Commercial Vehicles, Ltd.

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Wednesday, June 12

Student Paper Competition (Group 3)

Session Code: NVCSTP3

Room Grand Gallery Room F

Session Time: 4:00 p.m.

Student competition sponsored by 3M

Organizers - Thierry Bourdon, Continental Automotive France SAS; Pranab Saha, Kolano and Saha Engineers Inc.

Time	Paper No.	Title
4:20 p.m.	2019-01-1529	The Utilization of Onboard Sensor Measurements for Estimating Driveline Damping Jon Furlich, Jason Blough, Darrell Robinette, Michigan Technological University
4:40 p.m.	2019-01-1502	Reducing Vehicle Interior NVH by Means of Locally Resonant Metamaterial Patches on Rear Shock Towers Luca Sangiuliano, Claus Claeys, Elke Deckers, KU Leuven - DMMS lab, Flanders Make; Jasper De Smet, MotionS lab, Flanders Make; Bert Pluymers, Wim Desmet, KU Leuven - DMMS lab, Flanders Make
5:00 p.m.	2019-01-1482	Development of a Muffler Insertion Loss Flow Rig Jonathan Chen, D. W. Herrin, University of Kentucky
5:20 p.m.	2019-01-1524	Design of Lightweight Fibrous Vibration Damping Treatments to Achieve Optimal Performance in Realistic Applications Yutong Xue, J Stuart Bolton, Herrick Laboratories, Purdue University; Thomas Herdtle, 3M Company

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Wednesday, June 12

The Fundamentals of Muffler and Silencer Design Workshop (WKSP)

Session Code: NVCWK3

Room Grand Gallery Room F

Session Time: 6:00 p.m.

In many industries, muffler and silencer design is primarily accomplished via trial and error. Prototypes are developed and tested, or numerical simulation (finite or boundary element analysis) is used to assess the performance. While these approaches reliably determine the transmission loss, designers often do not understand why their changes improve or degrade the muffler performance. Analyses are time consuming and models cannot be changed without some effort. The intent of the current seminar is to summarize a) plane wave simulation techniques, b) numerical simulation using finite and boundary element methods, c) analysis of catalysts and diesel particulate filters, d) source models, e) muffler testing, and f) special concerns for the analysis of large silencers.

Organizers - Tamer Elnady, David W. Herrin, Tim Wu, Univ. of Kentucky

Presenters - David Herrin, Univ. of Kentucky; Xin Hua, Eaton Coporation; Jinghao Liu, Deere & Company

Thursday, June 13

Thursday Keynote: Making Acoustics and Vibration Concepts Accessible Through the Use of Animations- Daniel Russell, Penn State University

Session Code: NVCK2

Room Ballroom AB

Session Time: 8:30 a.m.

Moderators - Steve Sorenson, Toyota Motor North America Inc.

Keynote Speakers - Daniel A. Russell, Penn State Univ-University Park

<i>Time</i>	<i>Paper No.</i>	<i>Title</i>
	ORAL ONLY	Learn More About the Keynote
		Daniel A. Russell, Penn State Univ-University Park

Thursday, June 13

Transmission & Driveline (Part 3 of 3)

Session Code: NVC680

Room Ballroom C

Session Time: 10:00 a.m.

This session deals with analytical, computational and experimental studies of the dynamic response including noise and vibration of automotive driveline system and components. Typical topics of interests include, but not limited to, torque converters, gear noise, axle noise driveline system dynamics, transmission noise and vibrations, powertrain dynamics, transient dynamic response and propshaft balancing.

Organizers - Kiran Govindswamy, FEV Inc.; Jeff Orzechowski, FCA; Teik C. Lim, Univ. of Texas-Arlington; In-Soo Suh, Aptiv PLC; Hether Fedullo, Ford Motor Company; Mohamad Qatu, Eastern Michigan Univ.

<i>Time</i>	<i>Paper No.</i>	<i>Title</i>
10:00 a.m.	2019-01-1563	Improvement of Hypoid Gears Dynamics Performance Based on Tooth Contact Optimization Weiqing Zhang, Chongqing University of Technology; Yawen Wang, Chia-Ching Lin, Teik Lim, University of Texas- Arlington; Xiaodong Guo, Chongqing University of Technology; Kan Wang, University of Texas-Arlington; Yong Zheng, Chongqing University of Technology
10:20 a.m.	2019-01-1552	Design Optimization of Differential Bevel Gear for NVH Improvement Zhenghong Shi, Jui Chen, Mohsen Kolivand, Zhaohui Sun, Gregory Kopp, Ying Peng, American Axle & Manufacturing
10:40 a.m.	2019-01-1564	Fault Feature Extraction of Elliptically Shaped Bearing Raceway Yingying Guo, Xuezhi Zhao, South China University of Technology

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Thursday, June 13

Vibro Acoustic Analysis

Session Code: NVC355

Room Grand Gallery Room B

Session Time: 10:00 a.m.

This session covers the relationships between vibration and noise that can be generated throughout the vehicle. Included in this session are modal vibration studies related to noise, vibration transfer paths throughout the vehicle, and coupling of vibration and acoustical modes. Both experimental and analytical approaches are included in this session.

Organizers - Gary Newton, Bruel & Kjaer North America Inc.; Taner Onsay, FCA; Bryce Gardner, ESI Group

Chairpersons - Gary Newton, Bruel & Kjaer North America Inc.

Time	Paper No.	Title
10:00 a.m.	2019-01-1597	Assessment of Automotive Environmental Noise on Mobile Phone Hands-Free Call Quality Jeffrey Pruetz, Channing Watson, Todd Tousignant, Kiran Govindswamy, FEV North America, Inc.
10:20 a.m.	2019-01-1593	Vibroacoustic Model's Likelihood Computation Based on a Statistical Reduction of Random FRF Matrices Laurent Gagliardini, PSA Group; Christian Soize, Universit� Paris-Est; Justin Reyes, PSA Group
11:20 a.m.	2018-01-1483 *	Squeak Noise Prediction for Systems with Dry Friction Damping Konrad Weisheit, Steffen Marburg, TUM - Chair of Vibroacoustics
11:40 a.m.	2019-01-1596	Numerical Methodology of Tuning a System to Target Frequencies by Adding Mass Longhan Chen, Randy Gu, Oakland University

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Thursday, June 13

Materials (Parts 3 of 3)

Session Code: NVC850

Room Grand Gallery Room D

Session Time: 10:00 a.m.

This session will cover materials used to solve noise and vibration problems in vehicles. Topics covered will include new and traditional NVH materials, materials with unique or special NVH properties, case studies covering applications of NVH materials to solve specific vehicle problems, modeling of materials, manufacturing or processing of NVH materials, and engineering and design principles for the use of NVH materials.

Organizers - Pranab Saha, Kolano and Saha Engineers Inc.; Satyajeet P. Deshpande, University of Nebraska-Lincoln; Jason T. Kunio, Bruel & Kjaer North America Inc.; Jian Pan, Gissing Automotive Systems LLC; David B. Reed, Janesville Acoustics; Steve Sorenson, Toyota Motor North America Inc.; Barry R. Wyerman, Monadnock Non-Wovens LLC

Chairpersons - Steve Sorenson, Toyota Motor North America Inc.

Assistant Chairpersons - Barry Wyerman, Monadnock Non-Wovens LLC

Time	Paper No.	Title
10:00 a.m.	2019-01-1581	An Acoustic Target Setting and Cascading Method for Vehicle Trim Part Design Weiwei Wu, Peiran Ding, Xiaowu Zi, Beinan Liu, ESI Group

10:20 a.m.	2019-01-1575	Material Characterization of Multi-Layered Noise Control Treatments from Random-Incidence Transmission Loss Wenlong Yang, Ricardo de Alba Alvarez, ESI North America; Ravi (S, T,) Raveendra, ESI US R&D
10:40 a.m.	2019-01-1579	Determining Sound Transmission Loss of SAE J1400 Control Sample Wanlu Li, Jian Pan, Autoneum North America, Inc.
11:00 a.m.	2019-01-1573	Equivalent Material Properties of Multi-Layer, Lightweight, High-Performance Damping Material and Its Performance in Applications Taewook Yoo, 3M Company; Georg Eichhorn, 3M Deutschland GmbH; Ronald Gerdes, Seungkyu Lee, Thomas Herdtle, 3M Company

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Thursday, June 13

Aircraft Interior Noise

Session Code: NVC300

Room Grand Gallery Room E

Session Time: 10:00 a.m.

This session covers innovative methods, tools, and processes for reducing aircraft interior noise. Abstracts focusing on lightweight solutions to interior noise and vibration issues are being sought. All aspects of vibro-acoustic studies to reduce cabin noise are welcome in this session. Potential topics may include experimental methods or findings, analytical predictions and correlations, source mitigation, vibro-acoustic package design, sound quality metrics, noise and vibration troubleshooting and resolution, or practical applications of advanced lightweight aerospace materials or technologies.

Organizers - Michel Beyer, Eaton; Hether Fedullo, Ford Motor Company; Mark Moeller; Todd Eric Rook, General Electric Aviation

Time	Paper No.	Title
10:00 a.m.	Panel	Aircraft Interior Noise Panel Discussion

Organizers - Mark Moeller

Moderators - Richard DeJong, Calvin Engineering

Panelists - Paul Bremner, AeroHydroPLUS; Richard DeJong, Calvin Engineering; John Maxon, Gulfstream Aerospace Corp.; Ignatius Vaz, Barry Controls Aerospace;

Thursday, June 13

Diesel

Session Code: NVC900

Room Grand Gallery Room F

Session Time: 10:00 a.m.

The diesel NVH session is focused on issues related to making diesel engines achieve better NVH characteristics. Topics include both analytical and experimental techniques for developing low noise diesel engines and components. Related topics covered in this session include linear and torsional vibration of diesel engines, as well as features intended to reduce diesel specific intake and exhaust noise problems, such as turbocharger whine.

Organizers - Thomas Reinhart, Southwest Research Institute; Dhanesh Purekar, Cummins Inc.; Michel Beyer, Eaton; Kalyan Singh Bagga, Ford Motor Company

Time	Paper No.	Title
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- 10:00 a.m.** **2019-01-1590** ***The Influence of Connecting-Rod Specifications on the Combustion-Noise Generation from a Diesel Engine***
Hitoshi Oguchi, Koki Minato, Takehiko Seo, Masato Mikami, Yamaguchi University
- 10:20 a.m.** **2019-01-1592** ***Characteristics of Bending Stress with Whirling at the Rear End of a Crankshaft in an Inline 4-Cylinder High Speed Diesel Engine***
Shinichiro Kobayashi, Isuzu Motors, Ltd.
- 10:40 a.m.** **2019-01-1591** ***Numerical Prediction and Verification of Noise Radiation Characteristics of Diesel Engine Block***
Devendra Mandke, Deepak Ghaisas, Sachin Pawar, John Deere Technology Center India; Sanghoon Suh, Deere & Company

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