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32 AACHEN
COLLOQUIUM
SUSTAINABLE MOBILITY

EUROGRESS AACHEN,
GERMANY

OCTOBER 9th-11th, 2023

Note: This document is a digital program booklet. Accordingly, it is updated regularly. The current version of this document can always be found on the Colloquium website:

<https://www.aachener-kolloquium.de/en/information/program/lecture-program.html>

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Driving Experience: Circus Minimus

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General Information

Foreword

The world of mobility is changing.

The increasing climate challenge that our society is facing dominates every day's news. Undiscussable, one very important part of the influencing factors is the transport and mobility sector. Therefore, politicians are intensively discussing mobility strategies of the future. It is obvious, we need to be innovative and must drive various technologies in order to meet the diverse demands of different users and markets. And this is where we come in as mobility experts and engineers from research and industry. Since this challenge is a worldwide task that we can only solve together, we are looking forward to this year's international exchange at the 32nd Aachen Colloquium Sustainable Mobility.

The 32nd Aachen Colloquium Sustainable Mobility

The selected lecture program offers insights into various topics in more than 100 technical presentations and discussions. The speakers will present research results and innovations from diverse fields, such as drive technologies, digitalization, automation, complete vehicle, mobility concepts and driving dynamics. Discussions will be sparked by dedicated strategy sessions and new interaction formats.

The opening and closing plenary sessions frame

the program with high-level representatives from selected companies. We are looking forward to welcoming Arnd Franz, CEO of MAHLE, Gürçan Karakas, CEO of Togg, Frederik Zohm, Executive Board Member for Research and Development at MAN and Atsushi Ogawa, COO at Honda Motor R&D at the opening plenary session. Matthias Jurytko, CEO of Cellcentric, Peter Laier, Member of the Board of ZF Group and Gerrit Marx, CEO of IVECO group and further invited guests will join the plenary discussion on the topic "Sustainable Transport under ESG Perspective" which will round up the Colloquium on Wednesday.

The latest research results from universities will be presented in the poster session. The speakers will upload a pitch in our event app which is available during the Colloquium and the posters will be part of the exhibition.

Between the lectures, you will have time to visit the technical exhibition. More than 40 international companies will present their products, services and ideas. Get personally in touch with the exhibitors and experience new innovations first hand.

Outside of the event location, you can experience mobility yourself in our Circus Minimus where you can drive and test novel vehicle concepts. Moreover, outstanding vehicles with a street licence are available for a tour around Aachen. Besides the technical program, the event offers

various opportunities to network and exchange ideas with speakers, exhibitors and fellow participants, for example during the opening evening on Monday or the traditional banquet in the historic city center of Aachen on Tuesday.

The Aachen Colloquium takes place not only in Aachen, but worldwide online. Participants from all over the world can easily follow the lectures, ask questions and connect with the attendees digitally.

We are very much looking forward to your participation at the 32nd Aachen Colloquium Sustainable Mobility!



Stefan Pischinger
Univ.-Prof. Dr.-Ing.
Stefan Pischinger
Director
TME, RWTH Aachen University

Lutz Eckstein
Univ.-Prof. Dr.-Ing.
Lutz Eckstein
Director
ika, RWTH Aachen University

Foreword

The important topics of sustainability and the mobility of the future are the focus of the 32nd Aachen Colloquium Sustainable Mobility. As Lord Mayor, I am particularly pleased about this, because here on site we are working intensively on the mobility turnaround. Only if we implement it can we achieve the climate protection targets.

Our mobility should be safe, convenient and affordable for everyone. It should be quiet, clean and emission-free. We bear responsibility for future generations.

Aachen is part of the EU mission "100 climate-neutral and smart cities by 2030" and was recently awarded funding together with the cities of Münster and Mannheim. This gives us in Aachen a huge push forward in the implementation of climate neutrality. Therefore mobility is a very important building block in this.

You can learn about the latest research results and developments for sustainable, environmentally friendly mobility in the numerous presentations at the 32nd Aachen Colloquium Sustainable Mobility. Topics include automated driving, the latest battery systems, electric drives and strategies & concepts of the automotive industry.

The traditional event, which is a flagship for the city of Aachen, is jointly organized by Professor Stefan Pischinger and Professor Lutz Eckstein.

In order to achieve the common goal of sustainability, the focus is on networking. In the trade exhibition, there will be the opportunity to make contacts and exchange ideas in person. The Start-Up Area in the Eurogress, which has been created in cooperation with the digitalHUB, also invites visitors to do so. Those who want to experience vehicle concepts live will be in good hands at the vehicle presentations and the "Circus Minimus". For example, one can marvel at small, compact e-scooters that can be used to quickly and effortlessly traverse the city center, e-motors that rely on the amplification of muscle power, and actuators that revolutionize maneuvering through dense city traffic. The event will conclude with a plenary discussion on "Sustainable Transport under ESG Perspective."

I wish all participants an interesting exchange about opportunities, experiences and ideas. Discuss and use the technologies and concepts for a future-oriented mobility and let us shape the way to an emission-free future together!



Sibylle Keupen
Lord Mayor of the City Aachen

SESSION OVERVIEW

KEYNOTE SPEAKERS

TECHNICAL PRESENTATION PROGRAM

SPEAKERS & SESSION CHAIRS

Conference Agenda

Europa

Berlin

Lissabon

Brüssel

K1 Aachen

Monday, October 9th, 2023

18:00 Lobby: Welcome Reception &
Opening of the Technical Exhibition

Tuesday, October 10th, 2023

08:30 Opening Plenary Session

10:30 Break

| | | | | | |
|-------|-------------------|-----------------|------------|---|----------------------|
| 11:00 | Battery Systems I | New ICE Engines | Strategy I | Current trends in AD - A Start-up View | Thermal Management I |
|-------|-------------------|-----------------|------------|---|----------------------|

12:30 Lunch Break

| | | | | | |
|-------|--------------------|--------------|-------------|-------------------|-----------------------|
| 14:00 | Battery Systems II | Fuel Cells I | Strategy II | Level-2-Hands-off | Thermal Management II |
|-------|--------------------|--------------|-------------|-------------------|-----------------------|

16:00 Break

| | | | | | |
|-------|---------------------|---------------|--|----------------------|-----|
| 16:30 | Battery Systems III | Fuel Cells II | Mobility & Sustainability - Concepts & Strategies | Architectures for AD | FVV |
|-------|---------------------|---------------|--|----------------------|-----|

Wednesday, October 11th, 2023

| | | | | | |
|-------|----------|------------------------------|--|---------------------------|------------------|
| 08:30 | H2-ICE I | EDU I Concept Development | Sustainability in Mobile Propulsion I | Software Defined Vehicles | Vehicle Dynamics |
|-------|----------|------------------------------|--|---------------------------|------------------|

10:00 Break

| | | | | | |
|-------|-----------|---|-------------------|--------------------------|---------------|
| 10:30 | H2-ICE II | Electrification of Commercial Vehicles | Emission Concepts | SW and Development of AD | Steer-by-Wire |
|-------|-----------|---|-------------------|--------------------------|---------------|

12:30 Lunch Break

| | | | | | |
|-------|---|----------------------|--------------|-----------------------------|---------|
| 14:00 | Sustainability in Mobile Propulsion II | EDU II Components | Digital Twin | Verification and Validation | Chassis |
|-------|---|----------------------|--------------|-----------------------------|---------|

15:30 Break

15:40 Closing Plenary Session

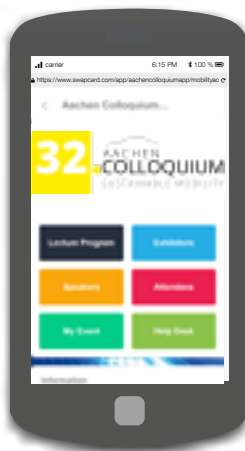


Download our event app

You will receive the login data shortly before the event starts!



- Plan your individual program
- See the list of participants
- Ask questions for the discussion
- Find out more about the exhibitors
- Arrange your meetings
- Chat with fellow participants
- Download the conference proceedings



Keynote Speakers



Arnd Franz
CEO
MAHLE GmbH

After studying business administration, Arnd Franz started his career in 1992 with Deutsche Industrie-Holding GmbH & Co. KG, Frankfurt am Main, initially in Group Controlling and then as Commercial Director of several subsidiaries. He was then Commercial Director with TEV GmbH, Erlensee and Director Finance with Magna Seating Systems Europe GmbH, Lohr am Main. Franz, who was born in Stuttgart, joined MAHLE Tennex North America Inc., Murfreesboro (USA) as Managing Director in 2001. In subsequent years, he held various positions at the Stuttgart headquarters of the MAHLE Group: he was Director Controlling of MAHLE Filtersysteme GmbH from 2004, Member of the MAHLE Management Committee responsible for Aftermarket from 2006 and Member of the MAHLE Management Board responsible for Sales and Application Engineering and Aftermarket from 2013 to 2019 before becoming CEO of LKQ Europe.

Arnd Franz is committed to clean, safe, affordable mobility. He supports fair competition between the best technologies for a carbon-neutral future mobility. In his current role as MAHLE CEO he has launched a new strategy for the technology group. MAHLE 2030+ comprises three strategy fields: electrification, thermal management and efficient internal combustion engines that can run on hydrogen and other non-fossil fuels, such as e-fuels. Applying all available technologies is the fastest way to climate neutrality.

Keynote Speakers



Gürcan Karakaş
Chief Executive Officer
Togg

M. Gürcan Karakaş was born in Antalya in 1965 and grew up in Germany. In 1988 he graduated from Middle East Technical University (METU) with a degree in mechanical engineering. In the same year he joined Aselsan in Ankara. In 1990 he started his career at Bosch. In 2002 he joined the executive board and in 2004 he was promoted to CEO of Bosch Türkiye. In 2007 he took over the management of global sales and the Bosch Car Service network at the Bosch Automotive Aftermarket division in Karlsruhe. In 2011, he took over the management of marketing and sales and automotive strategies at Bosch headquarters. In 2013 he returned to active operational business and became a member of the Board of Directors of the Electrical Drives division with global responsibilities with a focus on the NAFTA and Asia markets.

After a long and successful career at Bosch, on September 1, 2018, he took over responsibility as CEO of the Turkish mobility technology and ecosystem provider Togg.



Atsushi Ogawa
Chief Executive Officer, Honda Motor R&D
Chief Operating Officer,
Innovative Research Excellence

Mr. Atsushi Ogawa joined Honda in 1998. After assigned to Fundamental Technology Research Center in Wako, he was engaged in the development of aerodynamic performance and high-efficiency engine of HondaJet, aerodynamic performance of F1, and so on. In 2005, he transferred to Automobile Development Center and worked on aerodynamics development for mass-production vehicles and racing vehicles, then in 2019, he became a Senior Chief Engineer Head of Dynamics at Innovative Research Excellence and Automobile Center. In 2020, he was appointed as the COO of Innovative Research Excellence. After that, he was appointed as the Managing Officer in 2022. Which leads to now.

Honda R&D Co., Ltd. is a company that develops advanced technology for Honda Motor Co., Ltd. (commonly called Honda), a Japanese automobile manufacture. Honda pursues enhancement in safety and other performance and reduction of environmental impact in mobility products including automobiles and motorcycles based on innovative technologies. Honda R&D Co., Ltd. plays a vital role in Honda's technical development.

Keynote Speakers



Dr. Frederik Zohm

Executive Board Member for Research & Development
MAN Truck & Bus AG

As Member of the Executive Board for Research and Development, Frederik Zohm strives for sustainable and fossil free transport solutions. The engineer with a doctorate from RWTH Aachen University has been working in the commercial vehicle industry for almost 20 years. Throughout his career, Frederik Zohm has worked at EvoBus, Mitsubishi Fuso Truck and Bus Corporation, Rolls-Royce Power Systems Holding, Daimler Truck and TRATON Group.

MAN Truck & Bus is one of Europe's leading commercial vehicle manufacturers and transport solution providers, with an annual revenue of more than 11 billion € (2022). The company's product portfolio includes trucks, buses/coaches, vans and diesel and gas engines along with services related to passenger and cargo transport. MAN Truck & Bus is a company of TRATON SE and employs approximately 33,000 people worldwide.

Participants of the closing plenary discussion



Dr. Matthias Jurytko

Chief Executive Officer
cellcentric GmbH & Co. KG

Dr. Matthias Jurytko is CEO of the cellcentric GmbH & Co. KG. Prior to his current position, Dr. Jurytko was Head of the Mercedes-Benz Wörth plant. He has a background in business engineering and studied at the Karlsruher Institute for Technology (KIT). He obtained his PhD at the University of Hohenheim.

Dr. Jurytko joined the former Mercedes-Benz AG in 1990. After various stations in Stuttgart, Kassel, South Africa and Rastatt, he took over the controlling and accounting department at Mercedes-Benz Engines in Mannheim from 2001, before taking over responsibility for controlling of the Powertrain Division Daimler Trucks in 2006. In 2009, Dr. Jurytko moved to Gaggenau and became Head of Product Areas incl. torque converters, cutting and shaping technology, equipment and tool construction as well as international logistics. In 2011, he was given responsibility for the Mercedes-Benz Gaggenau plant.



Dr. Peter Laier
Member of the Board, ZF Group

"Sustainability is deeply rooted within ZF DNA and manifests in our processes and technologies" states Dr. Peter Laier, Member of the Board of Management of the ZF Group with responsibility for Commercial Vehicle Solutions and Industrial Technology, Production and India Region.

After completing his studies in mechanical engineering, Dr. Laier began his professional career at Continental in 2000. At the same time, he completed his Ph.D. in 2001 at the University of Stuttgart, Germany. At Continental, he assumed various management roles in Germany and Japan until 2012. After holding Board positions at Osram and Benteler International, Dr. Laier joined Knorr-Bremse in 2016, where he was a member of the Board with responsibility for the commercial vehicle division until 2021. Dr. Laier has been a member of the ZF Group Board of Management since January 2023.

ZF is a global technology company supplying systems for passenger cars, commercial vehicles and industrial technology, enabling the next generation of mobility. ZF allows vehicles to see, think and act. In the four technology domains of Vehicle Motion Control, Integrated Safety, Automated Driving, and Electric Mobility, ZF offers comprehensive product and software solutions for established vehicle manufacturers and newly emerging transport and mobility service providers. ZF electrifies a wide range of vehicle types. With its products, the company contributes to reducing emissions, protecting the climate and enhancing safe mobility.

With some 165,000 employees worldwide, ZF reported sales of €43.8 billion in fiscal 2022. The company operates 168 production locations in 32 countries.

Participants of the closing plenary discussion



Gerrit Marx
Chief Executive Officer
IVECO Group

Gerrit Marx has more than 20 years of experience in roles of increasing importance in different locations around the world and in a variety of industrial segments, with a specific in-depth focus on automotive industries. He holds a degree in Mechanical Engineering ("Diplom Ingenieur") and an MBA ("Diplom Kaufmann") from RWTH Aachen University, and a Doctorate in Business Administration from Cologne University.

From 1999 to 2007, Mr Marx worked at the global consulting firm McKinsey & Company, focusing on operational improvement programmes in the automotive and aerospace industries in Europe, Brazil, and Japan.

He joined Daimler AG in 2007 to head the global controlling function for vehicle and powertrain component projects, as well as market-entry / mergers and acquisitions for three truck brands in North America, Europe, and Asia. This led him to the role of President and Chief Executive Officer at Daimler Trucks China in 2009 and subsequently, President of Skoda China with Volkswagen AG, overseeing imports and joint venture business relations in both roles.

In 2012 Mr Marx joined the European leadership team of Bain Capital as a member of their portfolio group, driving and leading transformational change programs. This role also encompassed due diligence and merger and acquisition activities, with specific focus on automotive and industrial assets, and also included interim roles such as Chief Executive Officer of Wittur Group, a global Tier-1 supplier to the elevator industry.

Gerrit Marx joined CNH Industrial in January 2019 as President of Commercial and Specialty Vehicles.

Since the spin-off of Iveco Group from CNH Industrial on 1st January 2022, Mr Marx has served as Chief Executive Officer of the newly formed Company.

Poster Presentations

Poster 1

Lukas Laarmann, FH Aachen

Automotive Safety Approach for Air Taxis

Poster 2

Vinod Rajamani, FH Dortmund

Dynamic Waste-Heat-Recovery for Efficient
Application of Fuel-Cells in Commercial Vehicles

Poster 3

Ventseslav Yordanov, RWTH Aachen University

The Chassis as a Data Source for the Digital Twin of the
Road System

Poster 4

Alexander Lampkowski, FH Dortmund

Acceleration behavior of commercial vehicles with regard to
appending norms and guidelines for body and cargo security

Poster 5

Saud Sattar, Coventry University

Real-Time In-situ Optical Analysis For Detecting Electrolyte
Degradation In Li-ion Pouch Cells

Poster 6

Stefan Kraus, Forschungszentrum Jülich (IEK-3)

Model-based scenario for a defossilized German
transport sector

Poster 7

Fabio Fatigati, University of L'Aquila

Development of an innovative Low Speed Sliding
Rotary Vane Pump for Heavy duty Internal Combustion
Engine cooling

Poster 8

Václav Jirovský, Czech Technical University in Prague

Sustainable approach to car-sharing services

Poster 9

Harold Schock, MSU Michigan State University

High-Efficiency, High-Dilute Active Turbulent Jet Engine
Enabled by Mechanical Prechamber Air Control

Poster 10

Shantanu Pardhi, Vrije Universiteit Brussel (VUB)

Integrated multi-objective energy management of long-dis-
tance plug-in series hybrid coach

Poster 11

Daniel Sigmund, Technische Hochschule Köln

Testing & Evaluation of a Low Voltage Inverter for In-Wheel
Switched Reluctance Machines for Motorcars on a Testbench

Poster 12

Paul Muthyala - RWTH Aachen University

The Electrified Journey for the Long Run: Energy Savings of a
Heavy-Duty Hybrid Electric Truck

Poster 13

Sakura Akahoshi - University of Tsukuba

How do correct and false monitoring requests affect drivers'
forward gaze rate in conditional automated driving?

Poster 14

**Wolfgang Gruel - Esslingen University of Applied
Sciences**

Bringing affordable MOBILITY to the People

Opening plenary session in the Europa Hall



08:30

Welcome



Univ.-Prof. Dr. rer. nat. Dr. h.c. mult.

Ulrich Rüdiger

Rector, RWTH Aachen University

Introduction to the 32nd Aachen Colloquium

Univ.-Prof. Dr.-Ing.

Stefan Pischinger

Institute Director, TME, RWTH Aachen University

Univ.-Prof. Dr.-Ing.

Lutz Eckstein

Institute Director, ika, RWTH Aachen University



08:40

Efficiency in Motion – Holistic Efficiency Improvements with Solutions from MAHLE

Arnd Franz

CEO, MAHLE

09:00

#Redefine Mobility

Mehmet Gürcan Karakaş

CEO, Togg

09:20

Honda's Challenge: Carbon Neutrality, Zero Accidents, and New Mobility Areas Leveraging Core Technologies

Atsushi Ogawa

COO, Innovative Research Excellence, Honda Motor R&D

09:40

MAN on the way to CO₂-free transportation

Dr. Frederik Zohm

Executive Board Member for Research & Development, MAN

10:00

Plenary discussion

Technical Presentations Program Tuesday, October 10th, 2023 Session 1

Session Leader
Dr. Christoph Menne
FEV

Session Leader
Prof. Dr.-Ing. Bernhard Geringer
ifa, TU Wien

Session Leader
Dr.-Ing. Jens Kotte
fka GmbH

Session Leader
t.b.d.

Session Leader
Prof. Dr.-Ing. Reinhold Kneer
WSA, RWTH Aachen University

Battery Systems I

New ICE Engines

Strategy I

Current trends in AD - A Start-up View

Thermal Management I

Europa

Berlin

Lissabon

Brüssel

K1 Aachen

Trends in Battery Management for Lithium-Ion Batteries

D. Jöst, F. Ringbeck, K. Quade, D. U. Sauer
- ISEA, RWTH Aachen University

60 years of Porsche flat-six engines

M. Baumann, C. Pleuß, R. Schmidt,
M. Hendeß, T. Wasserbach - Porsche AG

Future vehicle HMI – Trends and implications for automotive OEMs, suppliers and tech players

S. Rilling, J. Giebels, M. Gavrila
- Oliver Wyman

Vay's teledrive-first approach to autonomous driving

F. Scelsi - Vay

Scenario-based development and verification environment for thermal management systems

P. Muhl - Porsche AG
L. Eckstein - ifa, RWTH Aachen University

Future role of Sodium-Ion technology to provide cost efficient battery packs

H. Löbbberding, M. Stapelbroek, M. Rudolph,
A. Averbeg, K. Poch, T. Lüdiger - FEV

MAZDA e-SKYACTIV D 3.3L Diesel Engine

D. Shimo, S. Morinaga, H. Okazawa,
T. Kobayashi, H. Minamoto, D. Fukuda,
T. Yamaguchi - Mazda Motor Corporation

Unlocking the Potential of Future Vehicle Architectures – Challenges and Implications

M. Redhead, A. Busse, I. Olschewski -
fka GmbH

Continuous Testing for Embedded Software Processes: Bridging the Gap Between CI/CD and Complex Ecosystems

B. Loup - Mindmotiv GmbH

Simulation of cooling oil flow in electrical machines using a 3D CFD/ CHT approach

L. Sharifian, J. de Smet, N. Shahangian -
Toyota Motor Europe
R. Beykrich, A. Jeckel, S. Klier, L. Grupe - FEV

Useases for LTO batteries in public transportation

J. Roth, F. Štátný - EBZ nano power s.r.o.

The New Aurobay 250 PS, 2.0 L Miller Engine

M. Denny, A. William, A. Helmantel - Aurobay

Software Defined Vehicle in the VUCA world – Balancing value chain resilien- ce and performance needs

W.-D. Hoppe - Arthur D. Little

The Future of Autonomous Shuttle Transportation Services: A Roadmap for Successful Implementation in the United States

H. Braun - Guident Corp

Electro-thermal Pre-design of a Dual-star e-Drive for Electric Vehicle Application

M. Sanchez-Torres, M. Petit, A. Lievre- Valeo
F. Pasteur, F. Sellier - Siemens Digital
Industry Software

Technical Presentations Program Tuesday, October 10th, 2023 Session 2

Session Leader
Univ.-Prof. Dr.-Ing. Lutz Eckstein
ika, RWTH Aachen University

Session Leader
Univ.-Prof. Dr.-Ing. Stefan Pischinger
tme, RWTH Aachen University

Session Leader
Dr.-Ing. Jörg Leyers
ZF Friedrichshafen AG

Session Leader
Philipp Niermann
VDA, Technische Vorschriften & Werkstoffe

Session Leader
Dr. David Hemkemeyer
FEV

Battery Systems II

Fuel Cells I

Strategy II

Level-2-Hands off

Thermal Management II

Europa

Berlin

Lissabon

Brüssel

K1 Aachen

Factorial Energy: Transformational
Semi-Solid-State Technology

R. Koerver - Factorial Energy

Fuel cell powertrain adoption for heavy
duty vehicles; Reducing cost and
simplifying integration

T. Chadeesingh, D. Lamb, B. Hibberd,
B. Todd - Ballard Motive Solutions

Not bigger but smarter – How to
right-size electric vehicles and their
batteriesSite

C. Koehler, T. Stahl - Strategy Engineers
GmbH & Co. KG

BMW Highway Assist – first Level 2
Hands-Free System incl. Hands-Free-
Lane-Change in Germany

R. Krüger - BMW

Holistic Thermal Management using a
R744 heat pump system

D. Wolf, M. Flack, M. Göckler- Schaeffler
Technologies

S-BEV – Launch of a modular Battery
Swapping Station Solution with tailored
Logistic Vehicle Platform

S. Steinwascher - GETEC Getriebe Technik
GmbH

Fuel cell aging modelling for
accelerated durability test cycle
generation"

Y. Liu, A. Schloßhauer, M. Zübel, M. Walters,
D. Lückmann, M. Thewes - FEV

Lithium-ion battery market and
emerging battery technologies

D. Gallus - Roland Berger

Ford BlueCruise

P. Nold - Ford of Europe
P. Zegelaar - Ford-Werke GmbH

Thermal Management Systems for
Future Truck Powertrains

R. Lutz, L. Art, M. Jung - MAHLE Behr GmbH &
Co. KG

Observing and prolonging the battery
lifetime via cloud monitoring and a
digital twin

Sebastian Kawollek M. Kuipers, K.-P. Kairies,
G. Angenendt
- ACCURE Battery Intelligence GmbH

Ageing of Fuel Cell Systems under
Heavy-Duty and Bus Applications

F. Henkel, C. Mohrdieck - cellcentric GmbH &
Co. KG

Chinese EV players in Europe:
Quo vadis?

C. Brickenstein, Christian Foltz PwC
Strategy& (Germany) GmbH
Jun Jin, PricewaterhouseCoopers Manage-
ment Consulting (Shanghai) Limited

The L2H-off project: Addressing
potential challenges for hands-free
monitoring

J. Josten - fka GmbH

Innovative cooling method for a power
dense e-motor with phase changing
material

R. Dircks - Eagle Simrax B.V.
T. Uchiyama, T. Imura, Y. Tokunaga,
T. Iwa - Eagle Industry Co., Ltd.

AI-powered BMS for better, safer and
greener batteries

U. Genc, C. Kurtulus, U. Yavas - Eaton
Technologies

Development of an integrated fuel cell
system simulator for multi-purpose
application

S. Hasegawa, M. Kageyama, M. Kawase- Department
of Chemical Engineering, Kyoto, Y. Ikogi - Toyota
Motor Corporation, S. Kim - Tokyo University of
Agriculture and Technology

European Powertrain Outlook – Road
to Net Zero

W. Hossenally - S&P Global

Driver Monitoring as an Essential
Building Block for System Safety

D. Manstetten, M. Meyer - Robert Bosch
GmbH

Status of legal regulation in EU for
PFAS – Influence on Thermo Manage-
ment Systems of BEVs and PHEVs

R. Heckt, F. Wieschollek - HANON Systems
Deutschland GmbH

Technical Presentations Program Tuesday, October 10th, 2023 Session 3

Session Leader
Dr. Norbert Alt
FEV

Session Leader
Prof. Dr.-Ing. Harry Hoster
Zentrum für Brennstoffzellentechnik

Session Leader
Prof. Lutz Fügner
Hochschule Hof

Session Leader
Prof. Dr.-Ing. Dieter Moormann
FSD, RWTH Aachen University

Session Leader
Martin Nietsche
FVW e.V.

Battery Systems III

Fuel Cells II

Mobility & Sustainability - Concepts & Strategies

Architectures for AD

FW

Europa

Berlin

Lissabon

Brüssel

K1 Aachen

15 minutes charging, real 400 km driving. Hofer powertrain's contribution to the D-SEe research project
K. A. Boehm, G. Sluka- hofer powertrain GmbH

Multiscale water management simulation in Proton Exchange Membrane Fuel Cell
Y. Shestakovskiy, A. Islam, H. Otomo, R. Salazar-Tio, G. Balasubramanian, B. Crouse, D. Mukutmoni, S. Kandasamy, V. Jambhekar, M. Plagnard
- Dassault Systems Deutschland GmbH

Mission net-zero: How the target can be achieved
P. Schaufuss, P. Schäfer, A. Mertens-von Rüden - McKinsey & Company, Inc.

UNICARagil - Results of the disruptive project on driverless automated transport
T. Wopen, R. van Kempen, L. Eckstein - ika, RWTH Aachen University

Zero-Impact Tailpipe Emission Powertrains
T. Kossioris, R. Maurer, S. Sterlepper, M. Günther, S. Pischinger- TME, RWTH Aachen University

Battery recycling: The economics of a multi-billion Euro circular economy in the making
M. Volkening, K. Sagner - FEV Consulting

How to develop and design a Fuel Cell Stack for Aviation?
D. Weber, J. Letzgus, N. Petersen - Aerostack GmbH

Study and proposal of CO2 emission reduction measures by automobile manufacturers
T. Matsubara, H. Takeuchi, H. Sakamoto, K. Tsuchiya, T. Uehara - Toyota Motor Corporation

ASOA - Framework & Middleware for Software-defined Vehicles
Alexandru Kampmann, Bassam Alrifaa, Stefan Kowalewski - i11, RWTH Aachen University

ICE 2030 - Limits of SI engine efficiency in hybridised powertrains
P. Eilts, C. Beidl, A. Casal Kulzer, M. Bargende, S. Pischinger, A. Kuznik, F. Negüs, V. Kelich, E. Wenz, C. Göbel, A. Döhler- TU Braunschweig

Investigating the effect of battery swelling in a lithium-ion battery module
C. Stoker, Y. Hahn - Dassault Systemes

Field experience and future potential of fuel cell propulsion systems
M. Alt, C. Wieser, R. Fontaine, K. Baron, R. Matthe - Stellantis

Future of Automotive Mobility | What might mobility providers' role be in tomorrow's value chain
B. Middendorf, I. Schmuckall - Deloitte Consulting GmbH

AUTOtech.agil - Architektur und Technologien zur Orchestrierung automobiltechnischer Agilität
R. van Kempen, T. Wopen, L. Eckstein - ika, RWTH Aachen University

PEM-FC cold start simulation
M. Bahr - Zentrum für Brennstoffzellen Technik GmbH
M. Schmitz - TME, RWTH Aachen University

Technical Presentations Program Wednesday, October 11th, 2023 Session 1

Session Leader
Prof. Dr.-Ing. Helmut Eichlseder
ivt, TU Graz

Session Leader
Prof. Jakob Andert
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Session Leader
Alexander Nase
FEV

Session Leader
Univ.-Prof. Dr.-Ing. Lutz Eckstein
ika, RWTH Aachen University

Session Leader
Dr.-Ing. Christoph Elbers
ZF Friedrichshafen AG

H2-ICE I

EDU Concept Development I

Sustainability in Mobile
Propulsion I

Software Defined Vehicles

Vehicle Dynamics

Europa

Berlin

Lissabon

Brüssel

K1 Aachen

Hydrogen Combustion Engine : challenges and solutions towards industrial applications

J. Op de Beeck, J. Costa, M. Carvalho-Barreto, K. Potaczek, S. Takamoto - Plastic Omnium

Identification and Update of Thermal Models in Digital Twins of ePowertrain Motor

J. Garcia Urbieto, M. Marijuán, P. Díaz, A. Rodríguez, I. García, S. Armentia, F. González - GKN Automotive

Life Cycle Based Powertrain Concept Development in a Sustainable World

A. Balazs, A. Müller, S. Dreisbach, A. Schulte, B. Schroeder, D. Lückmann, T. Uhlmann - FEV
H. Wegner, B. Knobloch - FEV Consulting
J. Kexel, J. Müller, F. Herkenrath - TME, RWTH Aachen University

Vehicle APIs as enabler of the software-defined vehicle

F. Beer, A. Achtzehn - Robert Bosch GmbH

Improved Lateral Dynamics of BEVs – Alternatives to Torque Vectoring

C. Gillen, R. Fitz, M. Kessler, A. Freiburg - GKN Driveline International GmbH

Light Commercial Vehicle with a H2 Engine Hybrid Powertrain

J. N. Geiler, T. Rabe, E. Schünemann - Robert Bosch GmbH, K. M. Springer - Ford-Werke GmbH, M. Blomberg - TME, RWTH Aachen University, M. Kirzinger - FKFS

Accurate reduced motor models for powertrain systems optimization

F. Vidal-Naquet, G. Barbierato - IFP Energies nouvelles

Towards a Sustainable Vehicle Concept Part 2: Extreme Cost Reduced EDU with high efficiency and sustainability

C. Danzer, S. Günther, V. Ambrosius, T. Arnold, T. Orlik, T. Voigt, M. Prüger, M. Barth, R. Kockisch, M. Lindner, A. Fandakov, H. Rabba, M. Sens - IAV GmbH

E/E industrialization with MBSE for Series Development of Software Defined Vehicles

J. Richenhagen, C. Granrath, H. Ligtelijn, J. J. Gehrt, J.-P. Hake, A. Kugler - FEV.io

Torque Management Solutions for Battery Electric Vehicles

M. Magnusson, P. Peterson, G. Domingues - BorgWarner Sweden
K. van Maanen - BorgWarner, Inc.
A. Bongards, W. Wenzel - BorgWarner Stuttgart GmbH

H2 ICE technologies as key enabler for the decarbonization of the heavy duty sector

N. Rapetto - FPT Industrial S.P.A.

dynamic and efficient - the new powertrain APP550 boosting the ID.Family

L. Hentschel, K. Bennewitz - Volkswagen AG

Blue Gasoline – A solution towards CO2 neutral mobility for existing and new vehicles with availability already today

T. Garbe, K. Michels, T. Lippmann - Volkswagen, A. Kollbeck, F. Balthasar J. Strunk - Shell Global Solutions GmbH, H.-P. Deeg, J. Villforth - Porsche AG, H. Krämer - Audi AG, M. Storch, D. Hartmann - Robert Bosch GmbH

Automotive Safety Software Architecture: A Fault-Tolerant Safety-Critical Software Architecture for Modern Vehicles

V. Mohan Prabhu, S. Kowalewski - RWTH Aachen University, G. Keßler, M. Jentges - FEV.io

Vehicle Dynamics in Automated Driving – Subjective Evaluation of Uncertainty in Highly Dynamic Overtaking Situations

J. Pelzer, I. Feger, L. Eckstein, S. Ladwig - ika, RWTH Aachen University, J. Lützwow, P. Peltzer, J. Josten - fka GmbH

Technical Presentations Program Wednesday, October 11th, 2023 Session 2

Session Leader
Prof. Dr.-Ing. Thomas Koch
IFKM, Kalsruher Institut für Technologie (KIT)

Session Leader
Prof. Dr.-Ing. André Casal Kulzer
FKFS, University of Stuttgart

Session Leader
Prof. Dr.-Ing. Christian Beidl
vkm, Technische Universität Darmstadt

Session Leader
Prof. Dr. rer. nat. Rumpé
SE, RWTH Aachen University

Session Leader
Prof. Dr.-Ing. Georg von Tardy-Tuch
TARDY | technical consulting

H2-ICE II

Electrification of Commercial Vehicles

Emission Concepts

SW and Development of AD

Steer-by-Wire

Europa

Berlin

Lissabon

Brüssel

K1 Aachen

Challenges and Opportunities in developing a H2 High Specific Power Turbo-Charged Engine

M. Medda, V. Calia, M. Di Sacco, F. Gullino, S. Paltrinieri, N. Silvestri, F. Zaffino - Ferrari

Dynamic charging with eHighway - ready for roll-out

H. G. Grünjes, F. Buehs, H. Molthan
- Siemens Mobility GmbH

System & product options to meet Euro 7 heavy-duty PN10 limits under challenging in-service operation

D. Rose, A. Mamakos - Corning GmbH
S. Viswanathan, S. He - Corning Inc.

Optimization of a lateral driver assistance function by combining classical approaches and artificial intelligence

C. Olbrich, L. Witt, D. Munning
- Volkswagen AG
D. Engel - HAW Hamburg

Robust position control of a steer-by-wire rack actuator

C. Frohn, C. Kreis, B. Boßdorf-Zimmer
- Volkswagen AG
R. Henze - TU Braunschweig

On the road experience with a LCV H2ICE: A practical path to eliminate emissions

G. Dober, J. L. Beduneau, L. Doradoux, G. Meissonnier, M. Da Graca D. Baralon, A. Laurent, Y. Rimlinger, L. Breton, W. F. Plock - PHINIA

Integration of Real Driving Data into the Electric Powertrain Design Process for Heavy Duty Trucks

G. Witham, D. Swierc, A. Rozum, L. Eckstein
- ika, RWTH Aachen University

Reaching Euro 7 targets with a with a burner-based diesel aftertreatment system: an experimental study

C. Pozzi, C. Ciaravino, A. Donniacuo, G. Previtero - PUNCH Torino SpA
N. Totaro - PUNCH Softronix

Optimized Development Processes for Software-Defined Vehicles

M. Herrmann - IPG Automotive GmbH

Four Wheel Steering – Development of Corner Module and Driving modes for High Steering Angles

H.-K. Moon, J.-H. Jeong, M.-Y. Seo, J.-H. Kim - Hyundai Motor Group, K. O. Ger, C. Ludwig - Hyundai Motor Europe Technical Center, D. Wegener - fka GmbH, L. B. P. Majiade- ika, RWTH Aachen University

Hydrogen ICE: State of the art and future potential for real-world application

H. Eichlseder, P. Grabner, E. Schutting - TU Graz, M. Schneider - Forschungsgesellschaft für Verbrennungskraftmaschinen und Thermodynamik

Customized EDU systems from micromobility to heavy-duty applications

M. Stapelbroek, J. Nowack, A. Wördndle, M. Schröder, T. Flecke, G. Hellenbroich, A. Küsters, B. Katthöfer, R. Fleuren, R. Beykirch, T. Walter, D. Werry, S. Wolters, N. Morozov - FEV

The Exhaust Aftertreatment for Future Worldwide Internal Combustion Engines; From Passenger Car up to Trucks

R. Brück, J. Hodgson, L. Pace, M. Presti
- Emitec Technologies GmbH

Flexible deployment of application software based on an end-2-end API stack with a holistic mobility system

A. Henkel, A. Hamann, E. Ruppel, M. Danzeisen, D. Dyrbusch, T. Oexner, A. Lapp, D. Elias - Robert Bosch GmbH

Potential of differential braking as backup system for steering actuators

L. Salzwedel - Volkswagen AG
J. Iatropoulos, R. Henze - Institut für Fahrzeugtechnik, TU Braunschweig

Study on Performance Optimization of Influencing Factors on Hydrogen Combustion System

S. Jian, G. Dingwei, L. Haipeng, C. Zhijun, M. Deyong, Z. Zhiyong - Great Wall Motor

Electric Axles for Medium Duty Commercial Vehicles

J. Shutty, C. Kurmaniak, R. Blissenbach, H. Nanjundaswamy, P. Hegde - BorgWarner US

Measuring Real-World Brake Wear Particle Emissions on Public Roads

M. P. Huber, P. Fischer - TU Graz

Teleoperated Driving: Closing gaps to Automated Driving?

F. Reimer - fka GmbH

Safety concepts for a steer-by-wire superposition function at the stability limit of driving dynamics

J. Birkemeyer, L. Borkowski - Volkswagen AG

Technical Presentations Program Wednesday, October 11th, 2023 Session 3

Session Leader
Dr. Johannes Scharf
FEV

Session Leader
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tme, RWTH Aachen University

Session Leader
Prof. Dr.-Ing. Stefan Kowalewski
i11, RWTH Aachen University

Session Leader
Prof. Dr.-Ing. Klaus Dietmayer
Universität Ulm

Session Leader
Dr.-Ing. Christian Hartweg
Stellantis

Sustainability in Mobile
Propulsion II

EDU II Components

Digital Twin

Verification and Validation

Chassis

Europa

Berlin

Lissabon

Brüssel

K1 Aachen

14:00

Intelligent H2 Fueling - An Innovation
to improve the Economy of Hydrogen
Mobility

S. Barth, M. Kopp, F. Jomrich, T. Brachmann,
F. Rass - Honda R&D Europe (Deutschland)
GmbH

Thermal Design of NanoLam DC Link
Capacitors

M. Breuer, S. Schmitt, K. Grimm,
S. Moormann - Rheinmetall Polycharge

Powertrain Digital Twinning for
Real-world Emissions Compliance

S. Whelan, A. Mason, O. Mellor
- HORIBA MIRA

Virtual Assessment of Advanced Driver
Assistant Systems and Automated
Driving

F. Fahrenkrog, A. Das, M. Hammouda,
F. Fischer - BMW AG

Alternative Steering Control Concepts
- Assessment with Holistic Approach

K. O. Ger, N. Munkler - Hyundai Motor
Europe Technical Center
J. Bae - Hyundai Motor Group
J. Bavendiek, T. Sandmann - fka GmbH

14:30

Overview on LONGRUN project results
L. Virnich - FEV

Next Generation 800V SiC High-Speed
E-Drive Technology for Electric Mobility

H. Nanjundaswamy, P. David, M. Ishihara,
A. Mayer, M. Cohen, A. Diko, A. Mateski, C.
Adiaman- BorgWarner US

Cloud-based Digital Twin Solution for
Predictive e-Mobility Applications

L. Schäfers, S. Pischinger - TME, RWTH
Aachen University
M. Wegener, R. Savelsberg, A. Alberti,
G. Cecchini - FEV
K. Badalian - MMP, RWTH Aachen University

The Hi-Drive driving scenario database

A. Etamad - Volkswagen AG
M. Sonntag - ika, RWTH Aachen University

Novel electrohydraulic displacement
machine for use in active chassis of
electrified vehicles

R. Kemnitz, J. Endrejat, T. Rubitzko - RAPA
Automotive GmbH & Co.KG

15:00

Sustainable electric powertrain at all
levels – a deep dive into circular
economy approach from Bosch

T. Triboulet, M. Schmidt, J. Pleli,
F. Schmidt - Robert Bosch GmbH

Efficiency trends for electric traction
drives

A. Rambetius, A. Bucher, A. Pawellek,
A. Böhm, H. Baburajan, M. Steinmüller,
M. Müller, M.-I. Bin-Ismaïl - Valeo

Design of a virtual optimization
environment for the simulation
parameters of a powertrain test bench

J. Schilling - Universität Stuttgart/ Porsche AG
J.-M. Wilmsen - Porsche AG, H. Schmidt,
G. Prokop - IAD Dresden, H.-C. Reuss - IFS
Stuttgart

SUNRISE: Safety Assurance Framework
for Connected and Automated Mobility
Systems

D. Becker, J. Beckmann, P. Legran,
N. Wagener - ika, RWTH Aachen University

A comprehensive study on tire
operating conditions and tire lateral
friction in near-rollover driving
conditions

C. Ludwig - TU Dresden
F. Birnbaum - Audi AG
G. Prokop - TU Dresden



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15:40

Plenary Discussion - Sustainable Transport under ESG Perspective



Dr. Matthias Jurytko
CEO, Cellcentric



Dr. Peter Laier
Member of the Board, ZF Group



Gerrit Marx
CEO, IVECO Group

16:40 Closing Address

Univ.-Prof. Dr.-Ing.

Stefan Pischinger

Institute Director, TME, RWTH Aachen University

Univ.-Prof. Dr.-Ing.

Lutz Eckstein

Institute Director, ika, RWTH Aachen University



16:45 End of Colloquium

A futuristic scene featuring a white FEV building, a white car, a white truck, a drone, and wind turbines. The scene is set on a road with green grass and a blue sky. A large red semi-transparent shape is overlaid on the right side of the image.

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We love technology. And we understand it deeply. This enables us to pioneer ideas and shape strategies that keep our clients, partners and our people ahead of the game. Then we explore, challenge, test and learn – continually improving the solutions we implement and the ways we work together. This helps us develop world-class innovations – on and off the road. For a better future and a greater quality of life for everyone.

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am Stand 23.

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DRIVING EXPERIENCE: CIRCUS MINIMUS

TECHNICAL EXHIBITION

TRADITIONAL BANQUET

OUTLOOK 2024

GENERAL INFORMATION

Circus Minimus

Driving Experience: Circus Minimus

The way we travel has always been in a constant state of change. Driven by a continuous development process, the mobility solutions are designed to get us from A to B faster, further, more comfortably and, for some time now, more sustainably and in line with our needs. Especially in urban areas, the call for new possibilities and solutions that meet current and future requirements is becoming louder, especially for individual transportation.

The Circus Minimus of the Aachen Colloquium Sustainable Mobility offers you the opportunity to test such new vehicle concepts and innovative operating strategies, which for example rely on the amplification of muscle power through e-motors, actuators that revolutionize maneuvering through dense urban traffic, or simply small, compact e-scooters with which you can quickly and effortlessly cross the city center, directly in front of the Eurogress and thus gain an insight into the current state as well as future micromobility.

You will also have the opportunity to present your own concepts and discuss them with a broad audience of experts.

More information:

<https://www.aachener-kolloquium.de/en/information/program/test-track.html>



Exhibitor List - Ground Floor

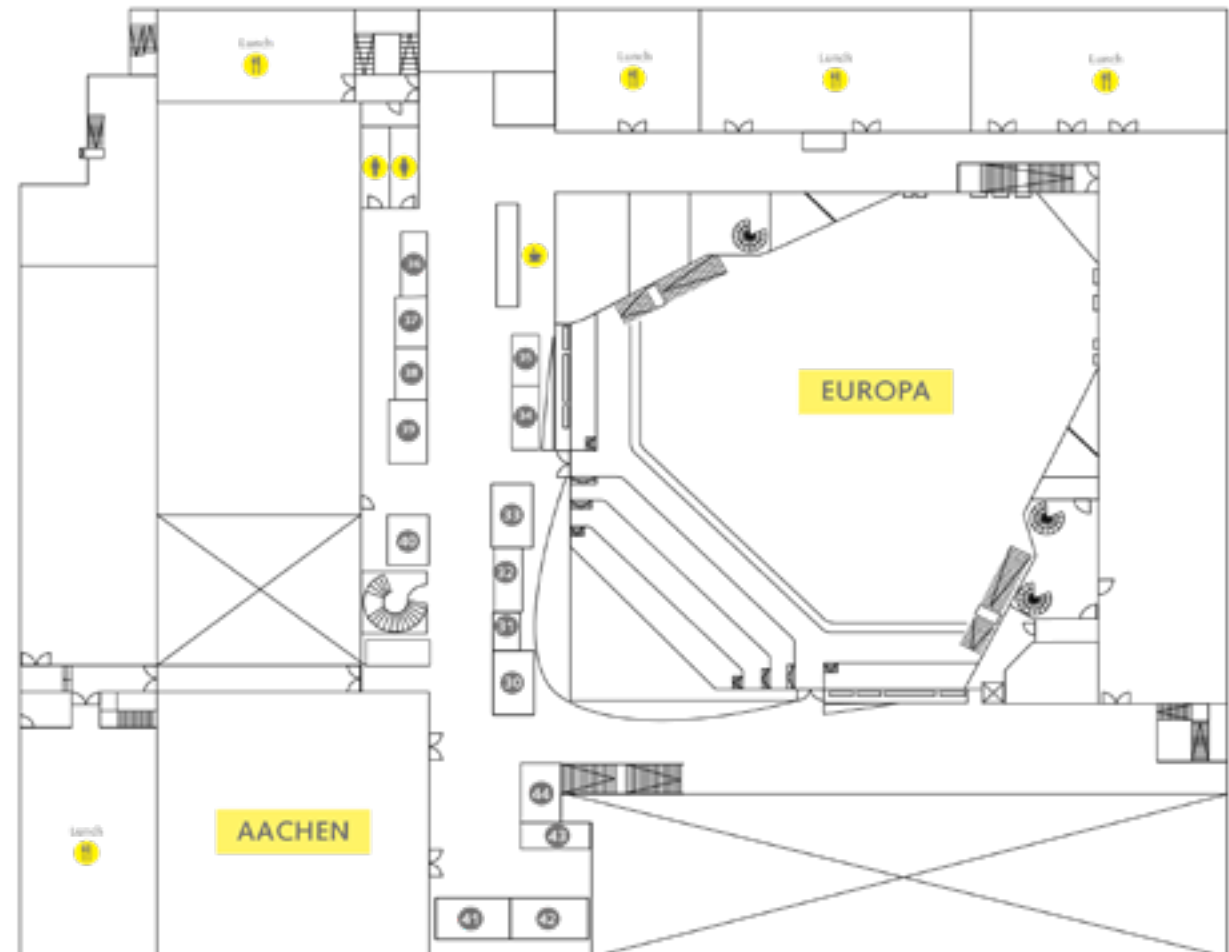
At this year's technical exhibition you have the opportunity to get to know the latest mobility technologies and concepts. International companies present their innovations and are available for direct contact and exchange on site.

- 01 DENSO AUTOMOTIVE Deutschland GmbH
- 02 Dassault Systemes Deutschland GmbH
- 03 Siemens Industry Software GmbH
- 04 SEI Automotive Europe GmbH
- 05 FEV
- 06 iwis mobility systems GmbH & Co KG
- 06a VEMAC GmbH & Co. KG
- 07 Freudenberg FST GmbH
- 08 HORIBA Europe GmbH
- 09 ACTech GmbH
- 10 LONGRUN
- 11 Tenneco
- 12 BorgWarner
- 14 Saint-Gobain Performance Plastics Pampus GmbH
- 15 Autocrypt Technologies GmbH
- 16 EMITECH-Group
- 17 Emotors
- 18 AVL List GmbH
- 19 RAPA Automotive GmbH & Co. KG
- 20 IAV GmbH
- 21 Aurobay
- 22 fka GmbH
- 23 ETO GRUPPE
- 24 Handtmann Systemtechnik GmbH & Co. KG
- 25 Emitec Technologies GmbH
- 26 Magnet-Schultz GmbH & Co. KG
- 27 PHINIA
- 28 Hyundaiwia
- 29 dSPACE GmbH



Exhibitor List - First Floor

- 30 Sonceboz SA
- 31 Springer Vieweg
- 32 ATESTEO GmbH & Co. KG
- 33 Shanghai Vehinfo Technologies Co., Ltd.
- 34 Toshiba Digital Solutions Corporation
- 35 ELTRO GmbH
- 36 REALIS SIMULATION
- 37 t.b.d.
- 38 Helbako GmbH
- 39 PLASTIC OMNIUM
- 40 Melecs EWS GmbH
- 41 Blum-Novotest GmbH
- 42 Garrett Motion
- 43 EKK Eagle Industry Co., Ltd.
- 44 CTS Corporation



Topics 2023:

- » Functional Safety
- » LiDAR Testing
- » LevelXdata
- » Steer by Wire

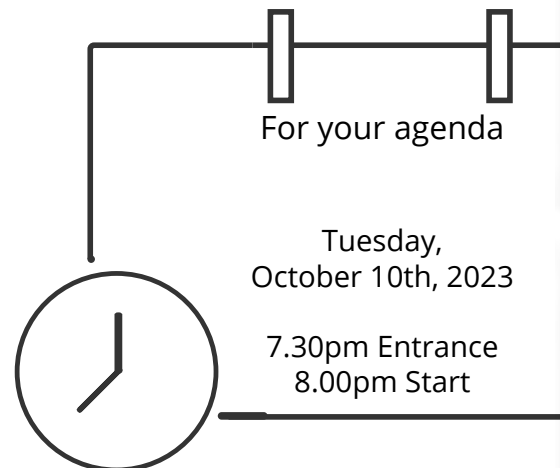


Find out more at
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Traditional Banquet

Traditional Banquet in Aachen

The traditional banquet on Tuesday evening offers culinary and musical delights in the historic buildings around the Aachener market place. Meet your business partners in a relaxed atmosphere to further deepen the impressions of the day together and use the opportunity to create new contacts.



November 27 – 29, 2023

Aachen, Germany

Topics

Acoustics of Electric Drives and Hybrid Cars

Active Sound Design and Active Components

Drive Train Acoustics (Engine, Gearbox, Drive Shafts)

Infotainment in the Vehicle

Multi-Modality – Noise and Vibrations

Numerical Methods, Simulation, Virtual Reality

NVH Measurement, System-Analysis, Measurement Technology

Sound Quality, Trouble-Shooting, Sound Design

Vehicle Acoustics (Body, Mechatronic Components, Tire Road Noise)

AAC 2023



14TH AACHEN ACOUSTICS COLLOQUIUM

Development and Research in Automotive Acoustics

PLENARY SPEAKERS

Prof. Dr. Jesko Verhey

Otto-von-Guericke University Magdeburg

Tobias Hillers

Dr. Ing. h.c. F. Porsche AG



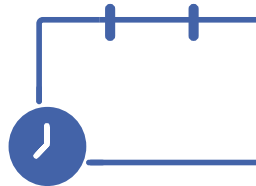
www.aachen-acoustics-colloquium.com

Outlook Aachen Colloquium 2024

Next year the Aachen Colloquium will take place for the 33rd time. You are warmly invited to submit a lecture proposal on one of the main topics. You will find the submission form on our website from December 2023: <https://www.aachener-kolloquium.de/en/>

Important Dates

Deadline for abstracts
February 2024



Notification of the authors
from April 2024

Deadline for submission of the manuscripts for the
conference proceedings
August 2024

33. Aachen Colloquium Sustainable Mobility
October 7th – 9th, 2024

Main Topics for 2024

Full Vehicle & Mobility Concepts

- Data-driven Development Processes: Processing, Use, Protection and Evaluation
- Chassis & Vehicle Dynamics
- Functional Safety
- Sustainability, Recycling, LCA & Balances
- New Vehicles, Architectures & Interior Concepts
- Strategies and Business Models of the Automotive Industry: Sustainable / Digital / Multimodal / ...
- Zero-Impact Emission Concepts

Drive Technologies

- Alternative Fuel Application
- Battery Systems, Management & Safety
- Vehicle Electrical Systems & 48V Technologies
- Fuel Cells
- Electrification & Hybridization
- Energy & Thermal Management

Digitalization and Automation

- Automated Driving (Level 3+), Databases & AI
- Digital Development Process: Digital Twin, AI, Methods and Simulation
- Driver Assistance & Connected Driving (ADAS)
- Innovative E/E Vehicle Architectures
- Sensors & Perception of Environment in Vehicles and Infrastructure
- Software Development for the Automobile (incl. Cyber Security)
- Traffic Simulation and Scenarios

General Information

Registration

Since the beginning of May 2023

We recommend an early registration. The terms and conditions of the Aachen Kolloquium GbR are available on the event website:

<https://aachener-kolloquium.de/en/terms-and-conditions-gtc.html>

Procedure of Registration

- 1) Registration (only online via www.aachen-colloquium.com/registration)
- 2) Receive confirmation by e-mail
- 3) Settle the invoice
- 4) Registration completion after Receipt of payment

Participation Fee

Participation Fee: 1310,- €*

Participation Online: 750,- €*

University Members 50 % Discount*

*All prices are exclusive of VAT.

Payment Delays

In accordance with the terms and conditions, the participant fees must be paid by the due date stated on the invoice and at the beginning of the event. Please contact us if you are unable to meet this requirement.

Conference Documents

Licences for single or multiple use of the complete conference proceedings as well as individual papers can only be ordered online via

www.aachen-colloquium.com/proceedings

Conference Language

The lectures will be given in English only. The proceedings will be published in English only.

Conference Office

| | |
|--------------------------|-------------------|
| Monday, Oct. 9th, 2023 | 04:00pm - 07:00pm |
| Tuesday, Oct. 10th, 2023 | 07:30am - 06:00pm |
| Wed., Oct. 11th, 2023 | 07:30am - 05:00pm |

Organizer

Aachener Kolloquium
Fahrzeug- und Motorentechnik GbR
Steinbachstraße 7
52074 Aachen
Germany

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