Developing Solutions Together

The Aachen Colloquium Sustainable Mobility celebrates its 30th anniversary this year. Under the scientific management of Prof. Dr. techn. Franz Pischinger and Prof. Dr.-Ing. Jürgen Helling, the first “Aachen Colloquium Automobile and Engine Technology” took place in 1987. The underlying idea of treating the two topics of engine and automobile together and searching for solutions in joint efforts generated great enthusiasm among the international participants.

Today, more than 30 years later, we are expanding the basic idea of interdisciplinary collaboration, as it has proven to be right and important. At this year’s Aachen Colloquium, we are not only looking at the automobile and its engine, but at the topic of mobility as a whole, with findings from research and industry. An important focus is the development of sustainable solutions for efficient, safe and environmentally friendly mobility of the future.

The 30th Aachen Colloquium Sustainable Mobility

This year, you can look forward again to 100 specialist presentations from renowned companies and institutes. In our detailed program overview you will find innovative topics as mobility and vehicle concepts of tomorrow, automated and connected driving, fuel cells, battery systems and electric drive units. This is rounded off by the red-hot subject of hydrogen, zero-impact emissions, life cycle analyses and strategy considerations in the automotive industry.

The plenary lectures by selected experts will be a special highlight of the event. Markus Duesmann, chairman of the board of AUDI AG, will speak on the topic of electromobility as an opportunity and driver for growth. Dr.-Ing. Stefan Hartung, member of the board of management of Robert Bosch GmbH, will give an outlook on the mobility of the future in his presentation. Prof. Dr. Ralf G. Herrtwich, Senior Director of NVIDIA, will deal with the intelligence of cars and Dr. Ahn, Senior Vice President, will offer an insight into the future vision of electric vehicles at Hyundai Mobis.

Outside of the lecture halls, you can expect numerous well-known companies who will personally present their innovations and answer your questions. As in each year, the Aachen Colloquium offers various opportunities for discussion and direct exchange with experts from all over the world. For the 30th anniversary, you can also look forward to other interesting program items.

We look forward to your participation in the anniversary event 30th Aachen Colloquium Sustainable Mobility!
The demands placed on mobility and sustainability have grown exponentially. There can be little doubt that the automotive industry as a whole is entering a new era. In times of transition, it is good to know that reliability and innovation are available from a single source. As a leading technology group with a global reach, we offer pioneering solutions for any type of drive concept. Alongside steadily evolving lightweighting expertise that can be applied to any drive system, we supply components for lithium-ion batteries. Through our new joint venture EKPO Fuel Cell Technologies, we offer high-performance fuel cell stacks and components. In doing so, we are helping to shape the future of mobility.

www.elringklinger.com
### Program Booklet 30th Aachen Colloquium

#### Conference Agenda

**Monday, October 4th, 2021**

<table>
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<tr>
<th>Time</th>
<th>Event</th>
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<tr>
<td>18:00</td>
<td>Welcome Reception &amp; Opening of the Technical Exhibition</td>
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<tr>
<td>18:45</td>
<td>Poster presentations</td>
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**Tuesday, October 5th, 2021**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>08:30</td>
<td>Opening Plenary Session</td>
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<tr>
<td>10:00</td>
<td>Break</td>
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<tr>
<td>10:30</td>
<td>Battery Systems</td>
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<tr>
<td>12:00</td>
<td>Lunch Break</td>
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<tr>
<td>13:30</td>
<td>Fuel Cells I</td>
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<tr>
<td>15:30</td>
<td>Break</td>
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<tr>
<td>16:30</td>
<td>Zero Impact Emission Concepts</td>
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**Wednesday, October 6th, 2021**

<table>
<thead>
<tr>
<th>Time</th>
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<tbody>
<tr>
<td>08:30</td>
<td>Hybrid &amp; Range-Extender-Concepts</td>
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<tr>
<td>10:00</td>
<td>Break</td>
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<tr>
<td>11:00</td>
<td>New Engine Technologies</td>
</tr>
<tr>
<td>13:00</td>
<td>Lunch Break</td>
</tr>
<tr>
<td>14:00</td>
<td>Hydrogen Combustion Engine</td>
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<tr>
<td>15:30</td>
<td>Break</td>
</tr>
<tr>
<td>16:00</td>
<td>Closing Plenary Session</td>
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</table>
Markus Duesmann was born on June 23, 1969 in Heek, North Rhine-Westphalia. In 1991, he completed his studies of mechanical engineering at Steinfurt University of Applied Sciences with a degree in engineering. He began his career in 1992 as a design engineer for a V12 series-production engine at Mercedes-Benz in Stuttgart. In 1995, he moved to the development service provider FEV GmbH in Aachen, where he held various positions, the last of which was head of the engine mechanics division.

In 2004, he took over the position of main department manager for new diesel engines at DaimlerChrysler AG in Stuttgart, and in 2005 became head of Formula 1 development at Mercedes-Benz in Brixworth in the United Kingdom.

In 2007, Markus Duesmann moved to BMW AG as head of Formula 1 powertrain. After holding several responsible positions at that company, he was Board of Management Member for Purchasing and Supplier Network at BMW AG from October 2016 until July 2018.

The Supervisory Board of AUDI AG appointed Markus Duesmann as Chairman of the Board of Management of AUDI AG effective April 1, 2020. Since then, he has also had Board of Management responsibility for Volkswagen Group Research and Development. Additionally he is entrusted with responsibility for the China business of the AUDI AG and with Board of Management responsibility for Product Lines at AUDI AG.

Dr. Stefan Hartung has been a member of the board of management of Robert Bosch GmbH since January 2013. Since January 2019, he has been chairman of the Mobility Solutions business sector, and responsible for the Powertrain Solutions and Electrical Drives divisions. Prior to this, he was responsible for the Energy and Building Technology as well as the Industrial Technology business sectors, in addition to the Bosch Connected Industry business unit.

Born in Dortmund in 1966, Stefan Hartung is married and has two children. He studied mechanical engineering, specializing in manufacturing technology, at RWTH Aachen, where he also submitted his PhD on quality management methods in 1993.

He joined Bosch und Siemens Hausgeräte GmbH in Munich in 2004. Before that, he worked for the Fraunhofer Society and the management consultants McKinsey & Company in Düsseldorf.
Prof. Dr. Ralf G. Herrtwich  
Senior Director Automotive Software  
NVIDIA, Berlin

Ralf G. Herrtwich runs automotive software development for NVIDIA in Europe. He currently focusses on artificial intelligence for autonomous vehicles and new automotive computing architectures. Past assignments in Dr. Herrtwich’s career include managing the Automotive and Services Business Units of HERE Technologies as well as developing self-driving vehicles for Mercedes-Benz. In 2013, his team made an S-Class re-enact the world’s first overland drive, covering the historic 65-miles Bertha Benz Route autonomously in regular traffic. A computer scientist by education, Dr. Herrtwich started his career in academia at TU Berlin and UC Berkeley. He then held management positions with IBM and several telecommunication start-ups before joining Daimler in 1998 to manage its Advanced Engineering Centers on Telematics & Infotainment and, later, Driver Assistance & Chassis Systems. Since 2009, he also is honorary professor for vehicle information technology at the Technical University of Berlin. In recognition of his contributions to computing innovations in the car industry, he was named Fellow of the German Computer Science Society in 2019.

Dr. Byung-Ki Ahn  
Senior Vice President der Electric Powertrain BU,  
R&D Division Hyundai MOBIS, Korea

Dr. Byung-Ki Ahn, born in 1963, studied Mechanical Engineering at the Seoul National University in Korea. In 1991, Dr. Ahn moved to the USA, where he obtained his doctoral degree at Virginia Tech, followed by occupations as Senior Research Scientist at the Pacific Northwest Nat'l Lab and as Senior Engineer at UTC Fuel Cells. In 2004, he returned to Korea to begin his career at Hyundai MOBIS as Chief Researcher. From 2006 until 2017, Dr. Ahn directed the Fuel Cell and Eco-friendly vehicle Performance Development groups at Hyundai Motor, before returning to Hyundai MOBIS. Currently, Dr. Ahn fulfils the position as Senior Vice President of the Electric Powertrain BU, R&D Division at Hyundai MOBIS in Korea.
Our Vision for a Digital Future!

...and we keep innovating mobility for the next 40 years

software defined cars  sustainability  driving pleasure

Creating Ideas & Driving Innovations

www.fka.de/en/ack2021
Poster presentations Monday, October 4th 2021, 18:45

### Europa

Session chair of the poster presentation
**Prof. Dr. Hermann Rottengruber**, IMS, Otto-von-Guericke University

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<tr>
<th>Poster 1</th>
<th>Lukas Laarmann, FH Aachen</th>
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<tr>
<td><strong>Human Hybrids, Shared Vehicle and Airtaxis – Facing Sustainable Future with Mobility Thinking</strong></td>
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<table>
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<tr>
<th>Poster 2</th>
<th>Prof. Dr. Andreas Lohner, TH Köln</th>
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<td><strong>eWheel2Car - A New Approach of Retrofitting Cars</strong></td>
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<th>Poster 3</th>
<th>Prof. Dr. Vinod Rajamani, FH Dortmund</th>
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<tbody>
<tr>
<td><strong>Lifecycle Analysis of the Hydrogen Combustion Engine and its Technology Enablers</strong></td>
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<tr>
<th>Poster 4</th>
<th>Tobias Brinkmann, VKA RWTH Aachen</th>
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<tbody>
<tr>
<td><strong>Traffic-efficient and Energy-Optimized Longitudinal Control of an Autonomous Vehicle Using Deep Reinforcement Learning</strong></td>
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<thead>
<tr>
<th>Poster 5</th>
<th>Swantje Konradt, Otto-von-Guericke-Universität Magdeburg</th>
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<tbody>
<tr>
<td><strong>Energetic Optimization of a PEM Fuel Cell Vehicle</strong></td>
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<tr>
<th>Poster 6</th>
<th>Pia Sophie Charlotte Dautzenberg, ika, RWTH Aachen</th>
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<tbody>
<tr>
<td><strong>Identification and Evaluation of Trust- Relevant Driving Situations for Automated Driving (SAE Level4/5)</strong></td>
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</tbody>
</table>
Opening Plenary Session at the Europa Hall

08:30  Welcome
Univ.-Prof. Dr. rer. nat. Dr. h.c. mult.
Ulrich Rüdiger
Rector, RWTH Aachen University

08:40  Introduction to the 30th Aachen Colloquium
Univ.-Prof. Dr.-Ing.
Stefan Pischinger
Director, VKA, RWTH Aachen University

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

09:00  Electromobility – Opportunity and Driver for Growth
Dipl.-Ing.
Markus Duesmann
Chairman of the Board of Management and Board of Management Member for Product Lines at AUDI AG

09:20  Future of Mobility
Dr.-Ing.
Stefan Hartung
Member of the Board of Management, Robert Bosch GmbH

09:40  Plenary Discussion
## Technical Presentations Program Tuesday, October 5th, 2021 Session 1

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<tr>
<th>Battery Systems</th>
<th>Automotive Strategy Concepts I</th>
<th>Thermal Management</th>
<th>Automated Driving – Architecture &amp; Impact</th>
<th>Chassis – Virtual Development Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Europa</strong></td>
<td><strong>Berlin</strong></td>
<td><strong>Lissabon</strong></td>
<td><strong>Brüssel</strong></td>
<td><strong>K1 Aachen</strong></td>
</tr>
<tr>
<td>Ultra-Fast Charging Urban Delivery Vehicles</td>
<td>Smartphones on Wheels – How OEMs and Suppliers can Win the Race for Software Domination</td>
<td>Multiphysics Design and Analysis of Electric Vehicles</td>
<td>UNICARagil – Agile Development of Self-Driving Vehicles</td>
<td>Systematic Integration of Simulation and Driving Test to Evaluate Rollover Behavior of SUVs</td>
</tr>
<tr>
<td>Future Battery Systems – Affordable, Safe and Highly Integrated</td>
<td>Future Automotive Value Creation Strategies</td>
<td>Integrated Thermal Management System for Battery Electric Vehicles (BEV)</td>
<td>Integration of a Vehicle Operating Mode Management into UNICARagil’s Automotive Service-oriented Software Architecture</td>
<td>Frequency-Dependent Categorization of Vehicle Vertical Dynamics Regard to Subjective Human Perception</td>
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<tr>
<td><strong>Session Chair</strong></td>
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<tr>
<td>Prof. Dr. Henning Wallentowitz – ika, RWTH Aachen University</td>
<td>Dr. Jens Kotte – fka GmbH</td>
<td>Dr. Christoph Menne – FEV Europe GmbH</td>
<td>Prof. Andre Seeck – Bundesanstalt für Straßenwesen (BAST)</td>
<td>Univ.-Prof. Dr.-Ing. Christian Schindler – ifs, RWTH Aachen University</td>
</tr>
</tbody>
</table>

**Session Chair**

- 10:30 – 11:00: Prof. Dr. Henning Wallentowitz – ika, RWTH Aachen University
- 11:00 – 11:30: Dr. Jens Kotte – fka GmbH
- 11:30 – 12:00: Dr. Christoph Menne – FEV Europe GmbH
- 12:00 – 12:30: Prof. Andre Seeck – Bundesanstalt für Straßenwesen (BAST)

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<td><strong>Berlin</strong></td>
<td><strong>Lissabon</strong></td>
<td><strong>Brüssel</strong></td>
<td><strong>K1 Aachen</strong></td>
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<tr>
<td><strong>Hydrogen Powertrain Designs for European Long-Haul Trucks</strong></td>
<td><strong>Life Cycle Assessment of Electric Vehicles</strong></td>
<td><strong>Modular Propulsion System Design as Cornerstone for Agility for Global Electrified Platforms</strong></td>
<td><strong>LiDAR Sensor Calibration without the Need of Physical Targets</strong></td>
<td><strong>Optimization of the Brake-Stability using an Electronically Controlled Limited Slip Differential (eLSD)</strong></td>
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<tr>
<td><strong>Fuel Cell Freeze Start – From Simulation and Benchmarking to System Optimization</strong></td>
<td><strong>Holistic Evaluation of Components &amp; Systems for xEV – Life Cycle Assessment as Decisive Factor in the Innovation Process?</strong></td>
<td><strong>Development of a Shiftable High-Speed E-Drive with a Complex-Compound Planetary Gear Set</strong></td>
<td><strong>How to Build a Highly Accurate Digital Twin – Intelligent Infrastructure in the Corridor for New Mobility – ACCorD</strong></td>
<td><strong>Accuracy Requirements for the Road Friction Estimation of a Friction-adaptive Automatic Emergency Brake (AEB)</strong></td>
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<td></td>
<td>U. Ellmers – Federal Highway Research Institute (BAS)</td>
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<td>G. Steiner, A. Mamakos, A. Klug, G. Steiner</td>
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<td>AVL List GmbH</td>
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### Session Chair
- Univ.-Prof. Dr.-Ing. Lutz Eckstein - ika, RWTH Aachen University
- Prof. Dr. Jan-Welm Biermann - VW Commercial Vehicles
- Prof. Dr. Thomas Form - ika, RWTH Aachen University
- Prof. Dr. Dirk Abel - IRT, RWTH Aachen University
- Prof. Dr. Pim van der Jagt - AB Dynamics Europe GmbH
# Technical Presentations Program Tuesday, October 5th, 2021 Session 3

## Zero Impact Emission Concepts

### Europa
- **Presentation Title**: Aftertreatment Technologies Supporting the Path Towards Zero-Impact Emissions
  - **Speaker**: D. Rose, T. Bager, P. Nicolin, F. Jung
  - **Institute**: Corning GmbH
- **Presentation Title**: Zero Impact Pollutant Emissions and 50 % Real-World Efficiency – The Future of CI Powertrains
  - **Speaker**: C. Menne, M. Ehrly, R. Zegers, P. Recker
  - **Institute**: FEV Europe GmbH
- **Presentation Title**: Modelling of Exhaust Emissions from a PHEV Hybrid Vehicle
  - **Speaker**: F. Nicolás, M. Loszka, I. Cheimariotis, V. Prevost, S. Zinola, G. Pont – IFPEN
  - **Institute**: Siemens Industry Software

### Berlin
- **Presentation Title**: How Battery Pack Safety can be Improved with an Innovative Fluid for Thermal Management
  - **Speaker**: N. Champagne – TOTAL
- **Presentation Title**: Thermal Management System Tipping Points for High Power Charging of Battery Electric Vehicles
  - **Speaker**: J. Wong, R. Pearson, J. Saikeld – bp
  - **Institute**: T. Rachow – Bosch

### Lissabon
- **Presentation Title**: Future Regulatory Technology Options to Reduce Risk in Application for Heavy-Duty Diesel Engines
  - **Speaker**: C. Webb, P. Stephenson, M. Meijer, A. Coumans – Paccar Technical Center
  - **Institute**: J. Kramer, R. Brueck – Vitesco Technologies Emitec GmbH
- **Presentation Title**: Challenges for CV Powertrains Meeting Strict Future Low-Emission Regulations – Will Electrification Be the Solution?
  - **Speaker**: S. Maufroy, Y. Frekers, J. Schatorjé, A. Balaji, T. Eymann, J. Weber, O. Hermann, G. Coolen, A. Aghababaei – DENSO Automotive Deutschland GmbH
  - **Institute**: P. Mendoza, J. Demuynck, D. Bosteels – AECC aisbl

### Brüssel
- **Presentation Title**: Development of an Autonomous Family Vehicle using a Scenario-Based Design Approach
  - **Speaker**: T. Schräder, R. Graubohm, T. Stolte, M. Maurer – TU Braunschweig
- **Presentation Title**: A Matrix-Based Model for the Systematic Transfer of Requirements into Vehicle Modules and Functions
  - **Speaker**: A. Riddoch, T. Roß, A. Twer, H. Gronau – AUDI AG
  - **Institute**: C. Sieg, F. Küçükay – TU Braunschweig
  - **Institute**: F. Mantwill – Helmut Schmidt Universität Hamburg

### K1 Aachen
- **Presentation Title**: Steer-by-Wire – Experience, Potentials and Solutions for Future Mobility
  - **Speaker**: H. Hülge, M. Dann – Schaeffler Paravan Technologie GmbH & Co. KG
  - **Institute**: T. Sandmann, D. Wegener, P. Ziemann, L. Eckstein – fka GmbH
- **Presentation Title**: Modular and Scalable System Integration for Electric Vehicles: The Integrated Axle Module (IAM) by BENTELER and Bosch
  - **Speaker**: M. Kollmeier, U. Hammelmaier – Benteler Automobiltechnik GmbH
- **Presentation Title**: Impact of Tyre Modelling on Vehicle Soiling
  - **Speaker**: D. Mutlyashki, T. Linden – 3DS

## Battery Cooling

### Europa
- **Presentation Title**: Innovative Battery Cooling System Using Immersion Cooling for Mainstream BEV
  - **Speaker**: C. Rouaud – RICARDO
  - **Institute**: M. Lashbrook – M&I Materials Ltd.
  - **Institute**: S. Charmer – WMG, University of Warwick

### Berlin
- **Presentation Title**: Ultra-Low NOx Emissions with Close-Coupled Emission Control System on a Heavy-Duty Truck Application
  - **Speaker**: P. Mendoza, J. Demuynck, D. Bosteels – AECC aisbl
  - **Institute**: T. Wilkes, L. Robb, P. Recker – FEV Europe GmbH

### Lissabon
- **Presentation Title**: Participatory Development of an Mobility Station- A Real-Lab Approach in a Residential Neighborhood in Zwickau.
  - **Speaker**: P. Ziegert, T. Teich, T. Neumann, D. Junghans
  - **Institute**: E. Höhne, S. Leonhardt – Stadt Zwickau

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## Heavy Duty Emission Concepts

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## Mobility & Vehicle Concepts I

### Europa
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  - **Speaker**: N. Champagne – TOTAL

### Berlin
- **Presentation Title**: Thermal Management System Tipping Points for High Power Charging of Battery Electric Vehicles
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## Chassis Systems

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  - **Speaker**: N. Champagne – TOTAL

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  - **Institute**: T. Sandmann, D. Wegener, P. Ziemann, L. Eckstein – fka GmbH
Technical Presentations Program Wednesday, October 6th, 2021 Session 1

**Hybrid & Range-Extender-Concepts**

**Europa**

The Fourth Generation Plug-In Hybrids Drives at Mercedes-Benz. An Important Milestone on the Road to Transformation
M. Klöpfer – Mercedes-Benz AG

**Berlin**

Prediction and Simulation of Cold Start Emission Behavior using eFuels
J. Villforth, A. C. Kulzer, H.-P. Deeg – Dr. Ing. h.c. F. Porsche AG
M. Bargende – Universität Stuttgart

**Lissabon**

Low-Temperature NOx Reduction by H2 in the Exhaust of Diesel Engines
S. Kureti, E. Eßer – TU Freiberg
P. Eilts, L. Heckemüller – TU Braunschweig
T. Morawietz, Schwan Hosseiny, A. Friedrich – DLR Stuttgart

**Brüssel**

Design Aspects of Electric Traction Drives Using the Example of an 800 V System
C. Carstensen, C. Neuhaus, M. Heger – paragon electrodrive GmbH

**K1 Aachen**

Human-Machine-Interaction Safety of Level 2 Systems: Development of a Performance-Based Test and Assessment Procedure
A. Wiggerich – Bundesanstalt für Straßenwesen (BASt)

**Application of Alternative Fuels**

**Berlin**

BorgWarner's Injection System Solutions for Natural Gas and Hydrogen
G. Hoffmann, G. Dober, L. Doradoux, G. Meissonnier, W. Ploch, C. Cardon

**Lissabon**

ICE2025+: Ultimate System Efficiency
C. Wouters, S. Pischinger, – VKA, RWTH Aachen University
A. Kuznik, C. Beidl – TU Darmstadt
F. Negüs, M. Bargende – University of Stuttgart
E. Wenz, P. Eilts – TU Braunschweig

**Brüssel**

Active Thermal Field Weakening – A new Degree of Freedom to Increase E-Motor Efficiency
A. Wahl, A. I. Ramones, C. Monissen, J. Andert – VKA, RWTH Aachen University

**K1 Aachen**

Display of Range Changes in Electric Trucks: HMI Concept Evaluation in a Virtual Reality Simulator Study
A.-L. Köhler, P. Dautzenberg, P. Westerkamp, G. Voß, S. Ladwig – ika, RWTH Aachen University
F. Niehaus – Daimler Truck AG

**Reports from FVV-Projects**

**Berlin**

Effects of Different Low Carbon Fuels on Performance and Emissions of Compression Ignition Engines
F. C. Pesce; A. Vassallo – PUNCH Torino
P. Gaillard, V. Gordillo – Aramco Overseas

**Lissabon**

Cathode Air Quality Requirements for LT-PEM Fuel Cells
J. Scholta, T. Wagner, M. A. Schmid, V. Valter –ZSW

**Brüssel**

Optimizing Electric Motor Controls with Dynamic Motor Drive

**K1 Aachen**

Efficient Warning Systems: Effects of the Proximity of Audio Warnings on Driving Behaviour
J. Hogema – TNO

**Electric Motors**

**Berlin**

The SYTECH Engine Family - Analysis, Testing, Market Applications and Production Planning
R. Tamba, G. Fountain, M. Kavarnos, J. Psonis – SYTECH
L. Yang – SYTECH Powertrain Technologies Co. Ltd.

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**HMI & User Experience**

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### Technical Presentations Program

**Wednesday, October 6th, 2021 Session 2**

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<td>Peter Eilts</td>
<td>Dirk Adamczyk</td>
<td>Prof. Bernhard Geringer</td>
<td>Prof. Dieter Moormann</td>
<td>Dr. Norbert W. Alt</td>
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<td>TU Braunschweig</td>
<td>ZF Friedrichshafen AG</td>
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<td>FEV Group GmbH</td>
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#### New Engine Technologies

- **Weight Reduction and Functional Improvement of Future ICES with Additive Manufacturing and Composite Materials**

- **Development of the Second-Generation VC-TURBO, KR15DDT Engine**

- **Research on Swirl Induced Lean Spark Assisted Compression Ignition of Gasoline**

- **Additive Manufacturing of High-performance Powertrain Components**
  - F. Ickinger, M. Klampfl – Dr. Ing. h. c. F. Porsche AG, V. Schall, D. Abele – Mahle International GmbH

#### Automotive Strategy Concepts II

- **Battery vs. Fuel Cell**
  - M. Baum, W. Bernhart, C.-S. Ernst – Roland Berger GmbH

- **Strategies for the Electrification of Commercial Vehicles**
  - C. Foltz, J. Neuhausen, F. Andre, A. Wild – PwC Strategy& (Germany) GmbH

- **Vehicle Cost Analysis for Road Vehicles until 2050**
  - S. Kraus, J. Reul, T. Grube, D. Stolten – Forschungszentrum Jülich GmbH

- **Accelerate R&D Transformation: Aligning Engineering Skills to Future Needs**

- **Predictive and Heat-managed Operating Strategy for a Fuel Cell Electric Vehicle**
  - M. Pietruck, C. Massonet, D. Backes, L. Eckstein – ika, RWTH Aachen University

#### Fuel Cells II

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  - P. Geskes, S. Biba, M. Baumann, M. Berger – MAHLE Filtersysteme GmbH

- **Verification & Validation of Automated Driving**

- **Testing for Tactical Safety of Autonomous Vehicles**

- **A Needle in a Haystack – How to Derive Relevant Scenarios for Testing Automated Driving Systems in Urban Areas**

#### Verification & Validation of Automated Driving

- **Positive Risk Balance as a Maxim for a Safety Oriented Development of Automated Driving**
  - N. Kauffmann, F. Fahrenkrog, L. Drees, F. Raisch – BMW Group

- **Analysis and Active Mitigation of Fatigue in Power Electronic Inverters**
  - C. van der Broeck – FEV Europe GmbH

- **DENSOs Novel Development Approach for Power Electronics and its Control**

- **Wide-Bandgap SiC Semiconductors – Advantages and Limitations in EV Drive Applications**
  - M. Schubert – Leadtrave Technology Germany GmbH, Y. Xia, J. Shen – Leadtrave Technology

#### Power Electronics

- **400 V Powerelectronic for Highest Efficiency Demands**

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Technical Presentations Program

Wednesday, October 6th, 2021 Session 3

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<td>Univ.-Prof. Dr.-Ing. Tobias Kuhnimhof</td>
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<td>Daimler Truck AG</td>
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### Hydrogen Combustion Engines

#### Europa
- PUNCH H2-ICE & Flybrid KERS for Decarbonizing Off-Highway Applications
  - S. Scalabrini – PUNCH Hydrocells

#### Berlin
- Valve Train System for P0 and P1 Hybrid Powertrains

#### Lissabon
- Design of an Electric Drive Axle for Heavy Distribution Traffic
  - R. Uerlich, S. Köller, L. Eckstein – ika, RWTH Aachen University

#### Brüssel
- Highly Accurate Scenario and Reference Data for Automated Driving
  - L. Vater, R. Krajewski, L. Eckstein – ika, RWTH Aachen University

#### K1 Aachen
- EDAG CityBot Ecosystem: A Holistic Mobility System for the Smart City of Tomorrow
  - J. Barckmann – EDAG

### 48V Technologies

#### Europa
- Mild Hybrid Solutions, Concepts and CO2 Effects
  - G. Cariccia, S. Brandin – DAYCO EUROPE SRL
  - A. Tonoli - Politecnico di Turin

#### Berlin
- Scalable Approach for 48 V and E-Drives
  - M. Uhl, R. Peck, R. Benz, C. Hözl – SEG Automotive Germany GmbH

#### Lissabon
- GKN's Highy Efficient Components for Future AWD

#### Brüssel
- Automated Statistical Validation using Big Data

### Commercial Vehicle & All-Wheel Drive Technologies

#### Europa
- Heavy Duty Vehicles for Sustainable Transport
  - G. Sandkuhler – FAUN Umwelttechnik GmbH & Co. KG

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### Data for Automated Driving

#### Europa
- Learning Delta Policies for Automated Driving via Reinforcement Learning
  - M. Templer, J. Kaste, P. Hochrein, B. Mennenga – Volkswagen AG

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### Mobility & Vehicle Concepts II

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### Program booklets
- 30th Aachen Colloquium
- Sustainable Mobility Colloquium
- Aachen
- Europa Berlin Lissabon Brüssel K1 Aachen
Closing Plenary Session in the Europa Hall

16:00  What it Takes to Make Cars More Intelligent
Prof. Dr. Ralf G. Herrtwich
Senior Director Automotive Software, NVIDIA, Berlin

16:20  Mobis, a Reliable Partner to Share the Future Vision of EV
Dr. Byung-Ki Ahn
Senior Vice President Electric Powertrain BU, R&D Division Hyundai MOBIS, Korea

16:40  Plenary Discussion

17:00  Closing Address
Univ.-Prof. Dr.-Ing. Stefan Pischinger
Director, VKA, RWTH Aachen University

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

17:15  End of Colloquium
ZERO CO₂ MOBILITY – CONCEPTS FOR TODAY AND TOMORROW

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Your participation at the 30th Aachen Colloquium

This year we are again planning a face-to-face event at the Eurogress Aachen. Of course, we prepared a hygiene concept and follow the latest regulations to ensure a safe visit to the event. The entire presentation program, the technical exhibition and the banquet will be part of the event. Unfortunately, the test track program will not take place this year.

In addition, we are offering online participation this year, so that participants who are affected by possible travel restrictions can also attend the Aachen Colloquium. For the online event, participants will receive access to an online platform on which the lectures will be streamed live. During the lectures and the following discussion round, questions can be asked via chat. Participants can also visit the exhibitors’ pages and get in touch with them. A chat tool offers the opportunity to exchange information and network with all participants on site and online.

This digital program booklet will be continuously updated and supplemented with news. The most recent version is always available on our website.

Registration for participation in Aachen and online is possible on our website. We recommend an early registration.

The organizing team is happy to answer your questions regarding your participation. We are looking forward to a successful Colloquium in Aachen and online!

info@aachen-colloquium.com

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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.

Exhibitior List – Ground level

01  DENSO AUTOMOTIVE Deutschland GmbH
02  MAHLE GmbH
03  Faurecia
04  FEV Europe GmbH
05  iwis motorsysteme GmbH & Co. KG
06  Tenneco
07  Ricardo
08a Emotors
08b Gates Industrial Europe
09  Hitachi Astemo
10  HUSCO Automotive Europe GmbH
11  HORIBA Europe GmbH
12  AVL List GmbH
13  Albonair GmbH
14  IAV
15  ElringKlinger AG
16  fka GmbH
17  innocam.NRW - Kompetenznetzwerk für automatisierte und vernetzte Mobilität NRW
18  Schaeffler Technologies AG & Co. KG
19  Felss Group GmbH
20  BorgWarner
21  M.TEC ENGINEERING GmbH
22  JB CarConcept GmbH
Exhibitior List – 1st Floor

23 Dassault Systemes Deutschland GmbH
24 FH Aachen - Faculty of Aerospace Engineering
25 ELTRO GmbH
26 IHI Hauzer Techno Coating B.V.
27 IHS Markit
28 Leadrive Technology Germany GmbH
29 Celeroton AG
30 Freudenberg Performance Materials SE & Co. KG
31 ETO GmbH
32 Springer Vieweg | Springer Fachmedien Wiesbaden GmbH
33 LEE Hydraulische Miniatuurkomponenten GmbH
34 SEGULA Technologies GmbH
35 Garrett Motion
36 VEMAC GmbH & Co. KG
37 Sonceboz SA
38 Freudenberg FST GmbH
39a Aurobay
39b t.b.a
40 KAMAX Automotive GmbH
41 Miba Group
Traditional Banquet in Aachen

The traditional banquet on Tuesday evening offers culinary and musical delights in historic buildings of the city of Aachen around the Aachener market. 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.

For your agenda

Tuesday, October, 5th 2021
7.30pm Entrance
8.00pm Start
12th Aachen Acoustics Colloquium
Development and Research in Automotive Acoustics

November 22 – 24, 2021
Parkhotel Quellenhof 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)

www.aachen-acoustics-colloquium.com
Next year the Aachen Colloquium will take place for the 31st 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 2021: www.aachener-kolloquium.de

**Main Topics for 2022**

- Alternative Fuels and High Efficiency Combustion Processes
- Automated Driving (Level 3+), Databases & AI
- Battery Systems, Management & Safety
- Vehicle Electrical Systems & 48V Technologies
- Fuel Cells
- Dedicated Hybrid Engines & Transmissions
- Chassis, Vehicle Dynamics & Tire Technology
- Electric Drive Units & Electric Motors
- Energy & Thermal Management
- Driver Assistance & Connected Driving (ADAS)
- HMI & User Experience
- Sustainable Mobility Concepts (incl. Micro Mobility)
- Sustainability, LCA & Balances
- New Vehicles, Architectures & Interior Concepts
- Commercial & Offroad Vehicle Drive Technologies
- Sensors & Perception of Environment in Vehicles and Infrastructure
- Automotive Strategies
- Zero-Impact Emission Concepts

**Important Dates**

- Deadline for abstracts: February 2022
- Notification of the authors: from April 2022
- Deadline for submission of the manuscripts for the conference proceedings: July 2022
- 31th Aachen Colloquium Sustainable Mobility: October 10th – 12th, 2022
Registration
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.aachener-kolloquium.de/en)
2) Receive confirmation by e-mail
3) Wait and settle the invoice
4) Registration completion after Receipt of payment

Participation Fee
Participation in Aachen:
Participants 1050 € (plus VAT)
University members 525 € (plus VAT)

Participation online:
Participants 750 € (plus VAT)
University members 375 € (plus 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.

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

Conference Language
The lectures will be simultaneously translated into German and English. Headsets are available for free. The proceedings will be published in English only.

Conference Office
Monday, Oct. 4th, 2021 04:00pm - 07:00pm
Tuesday, Oct. 5th, 2021 07:30am - 06:00pm
Wednesday, Oct. 6th, 2021 07:30am - 05:00pm

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