



17TH STUTTGART INTERNATIONAL SYMPOSIUM

AUTOMOTIVE AND ENGINE TECHNOLOGY

14TH AND 15TH MARCH 2017 | HAUS DER WIRTSCHAFT, STUTTGART

PROGRAM

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**“Some call it work.
I call it: electrifying.”**

Andreas Petz, Developer of E-Machines at Audi. His goal is maximum efficiency. This was proved in his work with the Audi R8 e-tron. No wonder that the knowledge gained from this model flows into other models, like the Audi e-tron quattro concept. It's just one of the many examples of all you can achieve when work doesn't feel like work. More electrifying jobs at vorsprung-bei-audi.de

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RESEARCH & DEVELOPMENT IN AUTOMOTIVE AND ENGINE TECHNOLOGY



WELCOME MESSAGE

WINFRIED KRETSCHMANN

From March 14-15, 2017, the Stuttgart International Symposium »Automotive and Engine Technology« of the Research Institute of Automotive Engineering and Vehicle Engines Stuttgart (FKFS) is taking place for the 17th time. As the patron, I heartily welcome all participants, from home and abroad, to our state capital!

Mobility is a prerequisite for freedom, participation in society, economic development, personal development and prosperity. Individual transport with cars, trains and buses, air travel and commercial traffic ensure mobility in the region. At the same time, today's transport system is also a burden for people, the climate and the environment. The state government is aiming for a new kind of mobility: which is compatible with the climate and the environment, affordable, socially and economically efficient, and which secures our quality of life. As a car manufacturing state, Baden-Wuerttemberg is characterized by a highly-innovative vehicle and mobility industry.

Just as the age of the automobile started in Baden-Wuerttemberg, so must our state be at the forefront of developing the mobility of the future.

Therefore I am delighted that this year's Stuttgart International Symposium »Automotive and Engine Technology« is focusing on »The Future of Private Transport« and will be getting to grips with the challenges of new and sustainable mobility concepts. After all, the understanding and practical implementation of mobility will change fundamentally in the coming years and decades. As one of the largest industry conferences relating to automotive and engine technology, the Symposium is not only a platform for creative minds to exchange opinions, but also an important global showcase for the automotive manufacturers and think tanks of Baden-Wuerttemberg.

I thank the Research Institute of Automotive Engineering and Vehicle Engines Stuttgart and all the participating companies for the planning and implementation of the Symposium, which underlines the significance of Baden-Wuerttemberg as an automotive hub. I wish the participants inspiring lectures and exciting discussions!

Winfried Kretschmann
Prime Minister of the
State of Baden-Wuerttemberg



» SCIENTIFIC ADVISORY BOARD



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» A WARM WELCOME

Historically, the automobile in Germany only became a symbol of wealth and status for a significant proportion of the population with the „German economic miracle“, more than fifty years ago. In the meantime, owning one's own car is almost a basic requirement and, for many people, is the most important means of transport – as well as being the epitome of private transport. But, over the years, enormous challenges have resulted from this. Traffic jams in built-up areas, environmental pollution, noise, threatened shortages of resources and a lack of parking spaces means the time has come to start thinking differently.

This applies to Germany in the same way as to all industrialized or industrializing countries of the world. Nowadays, many people already no longer rely exclusively on their own car for mobility, but instead are trying out new mobility concepts. However, the user is not prepared to do without his or her freedom of mobility – quite the opposite: mobility is becoming increasingly individual. So, on the one hand, completely new challenges are arising to solve the existing problems. On the other hand, new offers must be developed for private transport, which are technically sound, economically feasible and which are accepted by the population.

What role will the automotive industry play here? What will it look like, the car of the future? Will it even still have a steering wheel and pedals? Will there only be one drive concept in the future, or will diversity be a permanent feature? And what contributions can research in mechatronics, IT and computer science make to all these changes? There are many questions to be answered when we discuss the future of private transport.

The 17th Stuttgart International Symposium for »Automotive and Engine Technology« March 14 and 15, 2017

offers an important platform for this. In sessions running in six parallel strands, experts from industry and business will discuss these developments and share their latest discoveries.

In addition, at the end of the Symposium you can look forward to an exciting panel discussion on the subject. Use this forum in the Haus der Wirtschaft for discussing and exchanging ideas – and visit the accompanying trade show too!

We look forward to welcoming you to Stuttgart – the birthplace of the automobile – and wish you two highly-interesting days at the 17th Stuttgart International Symposium!

Prof. Dr. Michael Bargende

Prof. Dr. Hans-Christian Reuss

Prof. Dr. Jochen Wiedemann



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OVERALL VIEW



TUESDAY, 14TH MARCH 2017

8:00	Registration/Signing-in					
	KÖNIG-KARL-HALLE 2ND FLOOR					
9:00	Welcome Prof. Dr. Michael Bargende, Chairman of the Board FKFS, Managing Director IVK, University of Stuttgart Opening Address Prof. Dr. Dr. Wolfram Ressel, Chancellor of the University of Stuttgart					
9:15	MAHLE Products and Systems Driving Today's and Tomorrow's Powertrain Wolf-Henning Scheider, Chairman of the Management Board and CEO MAHLE GmbH					
10:00	Coffee break					
	KÖNIG-KARL-HALLE 2nd floor	MEIDINGER-SAAL 1st floor	BERTHA-BENZ-SAAL 1st floor	REUTLINGEN ROOM 2nd floor	KARLSRUHE ROOM 1st floor	MANNHEIM ROOM 1st floor
10:30	Recruiting for Excellence pg. 8	Le Mans and the Future of Motorsports pg. 8	E-Mobility pg. 8	Tires pg. 9	FVV Projects pg. 9	Digitization I pg. 9
12:00	Lunch break					
	KÖNIG-KARL-HALLE 2ND FLOOR					
13:00	Mobility for tomorrow – Solutions for the private transport Prof. Dr. Peter Gutzmer, Deputy CEO and Chief Technology Officer Schaeffler AG					
13:30	20 Years Common Rail in Passenger Cars pg. 8	Vehicle Technology I pg. 8	E-Powertrain pg. 8	RDE pg. 9	Thermal Management pg. 9	Additive Manufacturing pg. 9
15:30	Coffee break					
16:00	Automated Driving and Networked Vehicles I pg. 10	Vehicle Technology II pg. 10	Hybrids pg. 10	Processes pg. 11	Mechanics/Components I pg. 11	ARENA2036 pg. 11
18:00	End of the parallel sections					
18:30	Social evening to take place in the »Alte Stuttgarter Reithall« pg. 11					



WEDNESDAY, 15TH MARCH 2017

	KÖNIG-KARL-HALLE 2nd floor	MEIDINGER-SAAL 1st floor	BERTHA-BENZ-SAAL 1st floor	REUTLINGEN ROOM 2nd floor	KARLSRUHE ROOM 1st floor	MANNHEIM ROOM 1st floor
8:30	Automated Driving and Networked Vehicles II pg. 12	SI Engines pg. 12	Driving Dynamics pg. 12	Charging Systems and Energy pg. 13	CI Engines pg. 13	Digitization II pg. 13
10:00	Coffee break					
10:25	Intelligence & Emotion – The Future of the automobile Ola Källenius, Board Member Daimler AG					
11:00	Development Methods/ Product Development Process pg. 12	Advanced Driver Assistance Systems pg. 12	Emissions pg. 12	Driving Dynamics/ Test Technology pg. 13	Driving Surface pg. 13	New technical ergonomic approaches in automobile production pg. 13
12:30	Lunch break					
13:30	20 Years Common Rail in Commercial Vehicles pg. 14	Automated Driving pg. 14	Driving Dynamics/ Driving Comfort pg. 14	Turbo Charging/ Gas Exchange pg. 15	Mechanics/ Components II pg. 15	Small Engines pg. 15
15:00	Coffee break					
	KÖNIG-KARL-HALLE 2ND FLOOR					
15:30	Panel discussion »The Future of Private Transport« Moderation: Johannes Winterhagen, Redaktionsbüro delta eta					
16:30	Keynote					
16:45	Closing remarks Prof. Dr. Jochen Wiedemann, Board of Directors FKFS, Professor of Automotive Engineering IVK, University of Stuttgart					
17:00	End of the event					

PROGRAM TUESDAY, 14TH MARCH 2017

KÖNIG-KARL-HALLE 2nd floor

9:15 Plenary session

10:00 Coffee break

KÖNIG-KARL-HALLE 2nd floor

Recruiting for Excellence

Chairperson: Prof. Dr. Jochen Wiedemann

10:30 Recruitment for excellence – the German Path for Research University
Wolfram Ressel, University of Stuttgart

11:00 Assessing Job Candidates for Fit – How Headhunters Select and Hire the Best Job Candidate
Wolfgang Eckelt, Eckelt Consultants Executive Search GmbH

11:30 Let's be remarkable – Recruiting@Bosch
Jörg Stock, Robert Bosch GmbH

MEIDINGER-SAAL 1st floor

Le Mans and the Future of Motorsports

Chairperson: Prof. em. Dr. Günter Hohenberg

10:30 TDI at Le Mans
Ulrich Baretzky, AUDI AG

11:00 Porsche 919 Hybrid – Background of development
Malte Huneke, Dr. Ing. h.c. F. Porsche AG

11:30 WRC: Production technology drives Motorsport, Formula 1: Motorsport drives production technology
Donatus Wichelhaus, Volkswagen Motorsport GmbH

BERTHA-BENZ-SAAL 1st floor

E-Mobility

Chairperson: Prof. Dr. Klaus Dietmayer

10:30 Quiet, Powerful, long lasting Power – Battery driven Forrestry, Lawn- and Garden Tools
Heiko Roskamp, ANDREAS STIHL AG & Co. KG

11:00 Prediction of auxillary power consumption as a basis for an auxillary consumers control in BEVs
Kurt Kruppok, C. Gutenkunst, R. Kriesten, IEEM, HS Karlsruhe; E. Sax, ITIV, Karlsruhe Institute of Technology (KIT)

11:30 Car-and-more-Sharing of E-Vehicles in the project SaxMobility II and the results
Rene Budich, M. Hübner, HTW Dresden

12:00 Lunch break

20 Years Common Rail in Passenger Cars

Chairperson: Prof. Dr. Michael Bargende

13:30 Bosch Common Rail for Passenger Car / Light Duty – the first 20 Years
Thomas Wintrich, M. Krüger, D. Naber, C. Hinrichsen, D. Zeh, C. Uhr, D. Köhler, Robert Bosch GmbH

14:00 20 years of CDI Diesel engines – a success story of common rail at Mercedes-Benz
Peter Lückert, M. Ellwanger, S. Arndt, M. Paule, Daimler AG

14:30 TDI: yesterday – today – tomorrow
Thomas Reuss, M. Gruber, A. J. Kerckhoff, AUDI AG

15:00 Operation strategy and control of a Dual-Injectionsystem for gasoline engines
Gerald Graf, A. Kiefer, M. Leder, Robert Bosch GmbH

Vehicle Technology I

Chairperson: Dr. Andreas Wagner

13:30 Numerical investigation of road simulation in model scale wind tunnel
Henrik Heidorn, A. Wäschle, Daimler AG; T. Kuthada, FKFS; J. Wiedemann, FKFS/ IVK, University of Stuttgart

14:00 PhD program HYBRID: Concepts for actuation on demand CVT's
Peter Musch, W. Klement, HS Esslingen; M. Bargende, FKFS/ IVK, University of Stuttgart; I. Krastev, Robert Bosch GmbH

14:30 Analysis of a laboratory-based measure concept for the acoustics of high pressure fuel pumps
Simon Schindler, Daimler AG

15:00 Roadmap to a de-fossilized Powertrain
Ulrich Schulmeister, Robert Bosch GmbH

E-Powertrain

Chairperson: Prof. Dr. Nejila Parspour

13:30 Influence of rotor position sensor on the design of electric drive system
Norbert Neidig, R. Lehmann, Daimler AG

14:00 Efficient NVH-modelling for squirrel-cage induction drives in EV applications
Philipp Kotter, W. M. Bischof, Robert Bosch GmbH; C. Köpf, HS Esslingen; K. Wegener, IWF, ETH Zürich

14:30 Thermal modelling of electric machine during the early development phase
Robert Lehmann, Daimler AG

15:00 Design of Permanent Magnet Synchronous Machines for Self-Sensing Control in Electric Vehicles
Lei Chen, G. Götting, Robert Bosch GmbH; I. Hahn, EAM, Friedrich-Alexander-Universität Erlangen-Nürnberg

15:30 Coffee break

KÖNIG-KARL-HALLE 2nd floor

9:15 Plenary session

10:00 Coffee break

RAUM REUTLINGEN 2nd floor**Tires**

Chairperson: Prof. Dr. Stefan Böttinger

10:30 Experimental identification method of the changes in tire dynamic characteristics by rolling*Takahiro Uesaka, Honda R&D Co., Ltd. Automobile R&D Center***11:00 Understanding of transient tire behavior by measuring carcass deformation and contact patch shape***Pavel Sarkisov, J. Kubenz, G. Prokop, IAD, TU Dresden; S. Popov, Staatliche TU Moskau „N. E. Bauman“***11:30 Modelling of high volume agricultural tyres for driving dynamics investigations***Alexander Bürger, S. Böttinger, University of Hohenheim***RAUM KARLSRUHE** 1st floor**FVV Projects**

Chairperson: Dr. Karl Kollmann

10:30 Investigation of thermodynamic and chemical influences on knock for the working process calculation*Aleksandar Fandakov, IVK, University of Stuttgart; M. Grill, FKFS; M. Bargende, FKFS/ IVK, University of Stuttgart; A. Casal Kulzer, Dr. Ing. h.c. F. Porsche AG***11:00 Development of optimized engine heating strategies by means of variable valve train on PC Diesel applications***Kai Deppenkemper, M. Günther, S. Pischinger, VKA, RWTH Aachen University***11:30 Multivariable air path and fuel path control for a diesel engine with homogeneous combustion***Philipp Skarke, C. Auerbach, M. Bargende, IVK, University of Stuttgart***RAUM MANNHEIM** 1st floor**Digitization I**

Chairperson: Andreas Bildstein

11:00 Ways to future production*Dietmar Michel, Daimler AG***11:30 On the Way to the Cyber Physical Car***Bernhard Budaker, Fraunhofer IPA*

12:00 Lunch break

RDE

Chairperson: Prof. Dr. Helmut Eichlseder

13:30 vRDE – A Virtual Extension of the RDE Tool Chain*Markus Wenig, D. Artukovic, N. Framke, C. Armbruster, Gamma Technologies GmbH***14:00 A step towards RDE compliance of light duty Diesel engines by using valve train variabilities***Michael Elicker, W. Christgen, F. Himsel, V. Schmidt, Schaeffler Technologies AG & Co. KG; M. Brauer, R. Pohlke, IAV GmbH***14:30 Impact of varying ambient conditions during RDE on the measurement result of the AVL Gas PEMS iS***Volker Pointner, T. Schimpl, G. Orasche, AVL List GmbH***15:00 Measures to Fulfill „Real Driving Emission (RDE)“ with Diesel Passenger Cars***Dirk Naber, A. Kufferath, M. Krüger, R. Maier, S. Scherer, H. Schumacher, Robert Bosch GmbH***Thermal Management**

Chairperson: Prof. Dr. Lutz Eckstein

13:30 Fast Models For Battery Cooling System Design*Ed Tate, A. Alajbegovic, W. Jansen, A. Bushell, B. Stegmann, C.-W. Chang, Exa Corporation***14:00 Aerodynamics, Thermal Management and Protection for daily use and race track: Extreme requirements for the new Porsche Panamera***Markus Henrich, M. Brzoza, O. Fischer, J. Niewöhner, Dr. Ing. h.c. F. Porsche AG***14:30 Thermal Management of a Battery Electric High Performance Sportscar: Optimization of Heat Dissipation***Alexander U. Kayser, J. Wiedemann, FKFS/ IVK, University of Stuttgart; T. Kuthada, FKFS; N. Widdecke, IVK, University of Stuttgart***15:00 Analysis of the thermal behavior of a Honda SUV car using a coupled 3D-CFD CHT simulation***Frederik Posselt, M. Pottiez, B. Leonard, K. Claramunt, NUMECA Ingenieurbüro***Additive Manufacturing**

Chairperson: Oliver Refle

13:30 Plasma spherodized metals for additive manufacturing*Ivica Kolaric, Fraunhofer IPA***14:00 Non-destructive Testing of 3D-Hybrid Components using Air-coupled Ultrasound***Wolfgang Essig, M. Kreutzbruck, IKT, University of Stuttgart***14:30 Additive Moulding & -Manufacturing at VMR***Thomas Viebrans, VMR GmbH & Co. KG***15:00 Development of a lightweight car body in metal-sandwich construction***Michael Kriescher, M. Hampel, T. Grünheid, Deutsches Zentrum für Luft- und Raumfahrt e.V.*

15:30 Coffee break

PROGRAM TUESDAY, 14TH MARCH 2017

KÖNIG-KARL-HALLE 2nd floor

Automated Driving and Networked Vehicles I

Chairperson: Prof. Dr. Hans-Christian Reuss

16:00 Intelligent Drive – on the way to automated driving
Christoph von Hugo, Daimler AG

16:30 Early Level 5 Automation by restrictions of use case
Michael Bolle, Robert Bosch GmbH

17:00 Automated Driving: Where are we today, where do we want to go?
Harald Naunheimer, ZF Friedrichshafen AG

MEIDINGER-SAAL 1st floor

Vehicle Technology II

Chairperson: Prof. Dr. Thomas Maier

16:00 Potential of a cabin heating concept that combines convective air heating and radiation surfaces
Daniel Perak, FEV GmbH; D. Hemkemeyer, VKA, RWTH Aachen University

16:30 Challenges on the development of fine dust filter for vehicle interiors
Thomas Heininger, E. Hallbauer, C. Götzmann, MANN+HUMMEL Innenraumfilter GmbH & Co. KG

17:00 Investigation of refraction properties of light at wetted vehicle glass planes
Thomas Landwehr, IVK, University of Stuttgart; T. Kuthada, FKFS; J. Wiedemann, FKFS/ IVK, University of Stuttgart

17:30 Subjects based validation of ergonomic checks in tractors through motion capturing
Timo Schempp, S. Böttinger, University of Hohenheim

BERTHA-BENZ-SAAL 1st floor

Hybrids

Chairperson: Prof. Dr. Christian Beidl

16:00 Consequences on subsystems of electrified drive system caused by reorganisation of driving functions
Katharina Bause, U. Reichert, S. Ott, A. Albers, IPEK, Karlsruhe Institute of Technology (KIT)

16:30 Extended operating strategies of a PHEV with turbocharged-DI-SI-engine using catalyst properties
Felix Kercher, IVK, University of Stuttgart; M. Auerbach, S. Grams, AUDI AG; M. Bargende, FKFS/ IVK, University of Stuttgart

17:00 Heuristic Control Strategies for Parallel Hybrid Vehicles using Model-based Application
Georg Beierlein, R. Ließner, R. Feichert, B. Bäker, IAD, TU Dresden

17:30 Fuel/CO₂ savings in real driving using machine learning HEV operating strategy
Mark Schudeleit, W. Gu, F. Küçükay, IfF, TU Braunschweig; M. Zhang, TU Clausthal

18:00 Finish



RAUM REUTLINGEN 2nd floor**Processes**

Chairperson:
Prof. Dr. Karl-Ludwig Krieger

- 16:00 Model-driven Development of Software-intensive Systems based on open-source language workbench**
Vincent Braibant, Siemens Industry Software GmbH; F. Urciuoli, Siemens PL
- 16:30 Concepts for holistic interpretation and validation of vehicle diagnostics**
Barbara Krausz, M. Breuning, Daimler AG; K. Komarek, M. Grimm, FKFS; H.-C. Reuss, FKFS/ IVK, University of Stuttgart
- 17:00 Metric-based strategies for quality assurance of automotive embedded software**
Christopher Kugler, S. Kowalewski, RWTH Aachen University; J. Richenhagen, A. Schloßer, R. Maquet, FEV GmbH
- 17:30 Effective Regression Testing for Model-based Automotive Software using Stochastic Error Propagation Analysis**
Andrey Morozov, T. Chen, K. Ding, K. Janschek, IFA, TU Dresden

18:00 Finish

RAUM KARLSRUHE 1st floor**Mechanics/Components I**

Chairperson: Prof. Dr. Bernhard Geringer

- 16:00 High Efficient Oil Separator for the Crankcase Ventilation in passenger car application**
Thomas Schleiden, T. Grein, M. Zürker, T. Warth, T. Wörz, MANN+HUMMEL GmbH
- 16:30 Pressure Measurements of a Timing Chain Tensioner: An Investigation of Sensor Location and Type**
Thomas A. Lenz, Dr. Ing. h.c. F. Porsche AG; H. Zimmermann, Iwis Motorsysteme GmbH & Co. KG; M. Bargende, FKFS/ IVK, University of Stuttgart
- 17:00 Friction Power Measurements with a Fired HDD Engine – Method and First Result**
Thomas Deuß, H. Ehnis, R. Schulze Temming, R. Künzel, MAHLE International GmbH

RAUM MANNHEIM 1st floor**ARENA2036**

Chairperson: Thomas Dietz

- 16:00 Digital Reality for Factory – from production to product**
Denis Wohlfeld, Faro Europe GmbH & Co. KG
- 16:30 Method for 3D measurement and evaluation of joint geometries for adaptive robotic arc welding in the automotive industry**
Alexander Kuss, T. Dietz, Fraunhofer IPA
- 17:00 Microservice-oriented master control for AGV in the automotive factory of the future**
Timur Tasci, ISW, University of Stuttgart
- 17:30 Utilizing the Digital Prototype for a Closed Simulation Process Chain and Data Management**
Christian Liebold, DynaMore Gesellschaft für FEM Ingenieur-dienstleistungen mbH

Tuesday, 14th March 2017 | 18:30 in the »Alten Stuttgarter Reithall« Maritim Hotel | Seidenstraße 34 | 70174 Stuttgart
Experience an exceptional evening with amusing entertainment.

Program:

18:30 Sparkling wine reception

19:00 Welcome by Prof. Dr. Michael Bargende,
FKFS Chairman of the Board of Management and Chair in Automotive Powertrains at the IVK, Stuttgart University

Followed by: Dinner

**Live Act:
Echoes**

The Echoes have been carrying out an exciting experiment since 2015: Acoustic Pink Floyd – with no amplifiers or safety net. With their acoustic show „Barefoot To The Moon“ the band, led by the exceptional guitarist and singer Oliver Hartmann, along with a string quartet from the Bohemian Symphony Orchestra Prague, make a breathtaking interpretation of the British rock giants' complex songs.

Evening program ends at approx. 23:00.



THE MUSIC OF PINK FLOYD LIKE YOU'VE NEVER HEARD IT BEFORE

PROGRAM WEDNESDAY, 15TH MARCH 2017

KÖNIG-KARL-HALLE 2nd floor

Automated Driving and Networked Vehicles II

Chairperson: Prof. Dr. Hans-Christian Reuss

8:30 Deep Learning – Enabling Cars to See, Think, and Learn for self-driving
Serkan Arslan, NVIDIA GmbH

9:00 Future Cars: Robots on Wheels
Lars Reger, NXP Semiconductors Germany GmbH

9:30 Compact Radar Sensors enabling Autonomous Driving
Christian Amsel, D. Stapel, Hella KGaA Hueck & Co.

MEIDINGER-SAAL 1st floor

SI Engines

Chairperson: Prof. Dr. Stefan Pischinger

8:30 The first series particulate filter for gasoline engines of Mercedes-Benz
Peter Lanzerath, R. Wunsch, C. Schön, Daimler AG

9:00 Onboard water recovery for water injection in high efficiency gasoline engines
Christoph Käppner, N. Garrido Gonzalez, J. Drückhammer, H. Lange, M. Henn, Volkswagen AG

9:30 A quasi-theoretical predictive 0D combustion model for 1D gasoline engine simulation
Yoshihiro Nomura, S. Yamamoto, M. Nagaoka, Toyota Central R&D Labs., Inc.; S. Diel, K. Kurihara, Toyota Motorsport GmbH; R. Shimizu, E. Murase, Toyota Motor Corporation

BERTHA-BENZ-SAAL 1st floor

Driving Dynamics

Chairperson: Prof. Dr. Hermann Winner

8:30 Analysis method for the identification of the steering force measurement's main influencing factors
Mario Weinberger, G. Vena, BMW Group; D. Schramm, University of Duisburg-Essen

9:00 Characterization and Degradation of Active Chassis Systems
Kilian Dettlaff, IVK, University of Stuttgart; U. Schaaf, I. Scharfenbaum, A. Wagner, AUDI AG; J. Wiedemann, FKFS/ IVK, University of Stuttgart

9:30 Development of an Axle Design Process for the Chassis Design within the Early Development Stage
Hendrik Abel, G. Prokop, IAD, TU Dresden; R. Clauß, A. Wagner, AUDI AG

10:00 Coffee break

Development Methods/ Product Development Process

Chairperson: Prof. Dr. Jochen Wiedemann

11:00 Audi Chassis Development – Attribute-based Component Design
Andreas Wagner, S. van Putten, AUDI AG

11:30 Increasing the efficiency in vehicle development – Innovative tools of an engineering service provider
Bernhard Bihr, S. Tafel, B. Kudicke, Bosch Engineering GmbH

12:00 Future challenges for commercial vehicle development
Christian Kohrs, Volkswagen Trucks & Bus AB

Advanced Driver Assistance Systems

Chairperson: Prof. Dr. Ansgar Trächtler

11:00 Detection of driver attention based on driving data, interior camera and a capacitive steering wheel
Tobias Schüttke, K. Gillmeier, Dr. Ing. h.c. F. Porsche AG; F. Diederichs, Fraunhofer IAO; D. Spath, IAT, University of Stuttgart

11:30 Validation environment for function development and coverage of ADAS in the car development process
Sebastian Lutz, M. Behrendt, A. Albers, IPEK, Karlsruhe Institute of Technology (KIT); R. Hettel, T. Düser, AVL Deutschland GmbH

12:00 Automated Driving with New Levels at Perceived Safety & Comfort Feeling
Erich Ramschak, J. Holzinger, E. Bogner, AVL List GmbH

Emissions

Chairperson: Prof. Dr. Peter Eilts

11:00 3rd Gen DNOX-system by Bosch – a next step in evolution
Michael Raff, E. Weingarten, T. Höffken, Robert Bosch GmbH

11:30 Impact of phosphorus poisoning on a conventional Lean NOx Trap for diesel passenger cars
Michael Maurer, BMW Motoren GmbH/ TU Graz; H. Eichlseder, IVT, TU Graz; T. Fortner, P. Holler, S. Zarl, BMW Motoren GmbH

12:00 The Diesel in the Focus of Urban Air Quality – Exhaust Concepts to Fulfill RDE Requirements
Johannes Hipp, C. Beidl, TU Darmstadt; C. Tomanik, U. Göbel, I. Grissted, Umicore AG & Co. KG

12:00 Lunch break

RAUM REUTLINGEN 2nd floor**Charging Systems and Energy**

Chairperson: Prof. Karl-Ernst Noreikat

- 8:30 Communication system enables grid integration of E-Mobility**
Ursel Willrett, IAV GmbH

- 9:00 7 kW Inductive Charging: Comparison of Circular and Bipolar Coil Topologies**
Philipp Schumann, O. Blum, U. Brenner, B. Mader, Robert Bosch GmbH

- 9:30 Evaluation method for energy storage concepts**
*Jens Bachstein, A. Daberkow, HS Heilbronn;
H.-C. Reuss, FKFS/ IVK, University of Stuttgart*

RAUM KARLSRUHE 1st floor**CI Engines**

Chairperson: Prof. Dr. Georg Wachtmeister

- 8:30 Study of the Influence of Low Needle Lifts Process in Diesel Nozzle-flow Simulation**
Chao Gong, R. Baar, ILS, TU Berlin

- 9:00 Cylinder Deactivation Improves Diesel Aftertreatment and Fuel Economy for Commercial Vehicles**
James McCarthy, Eaton

- 9:30 Implementing a real time exhaust gas temperature model for a diesel engine with ASC@ECU**
Simon Wunderlin, A. Hurstel, E. Kloppenburg, Robert Bosch GmbH

RAUM MANNHEIM 1st floor**Digitization II**

Chairperson: Dr. Bernhard Budaker

- 8:30 A contribution to an improved joining simulation on the example of a front hood**
Mathias Liewald, IFU, University of Stuttgart; F. Schuler, M. Rupp, Adam Opel AG

- 9:00 Big Data 4 Engineers – Human Centered Perspectives**
Alexander Paar, Stephan Blankenburg, Z. De Luca-Hellwig, TWT GmbH Science & Innovation

- 9:30 IT Compliance in the Calibration Process**
Thomas Wambara, AVL Deutschland GmbH; G. Storfer, AVL List GmbH

10:00 Coffee break

**Driving Dynamics/
Test Technology**

Chairperson: Prof. Dr. Ferit Küçükay

- 11:00 Kinematic-based force-/position control of a hexapod in a HiL axle test rig**
Andreas Kohlstedt, S. Olma, P. Traphöner, K.-P. Jäker, A. Trächtler, Heinz Nixdorf Institut Universität Paderborn

- 11:30 Simulation-based identification of excitation spectra for a dynamic suspension test rig**
Christoph Zauner, G. Boisdequin, T. Maulick, Dr. Ing. h.c. F. Porsche AG

- 12:00 Investigations of the process of road matching on powertrain test rigs**
Sebastian Weber, J. Fischer, M. Körner, Mercedes-AMG GmbH; B. Bäker, IAD, TU Dresden; Y. Dursun, F. Kirschbaum, R. Jakobi, Daimler AG

Driving Surface

Chairperson: Prof. Dr. Corinna Salander

- 11:00 A method to predict skid resistance from texture using a rubber friction model**
Markus Oeser, A. Ueckermann, ISAC, RWTH Aachen University

- 11:30 Development of a real time Friction Estimation Procedure**
Gerd Müller, S. Müller, ILS, TU Berlin

- 12:00 A Numerical Drainage Model to simulate Infiltration into Porous Pavements for higher Road Safety**
Irmgard Rucker, W. Ressel, ISV, University of Stuttgart

New technical ergonomic approaches in automobile production

Chairperson: Florian Blab

- 11:00 Ergonomics in product development process at Daimler AG - a holistic approach**
Attila Pirger, P. Wittemann, S. Bürkner, Daimler AG

- 11:30 Status demonstration of the interdisciplinary development regarding the upper limb exoskeleton "Stuttgart Exo Jacket"**
Tobias Rogge, A. Ebrahimi, J. Lefint, Fraunhofer IPA

- 12:00 Evaluating aspects of potential influences on human beings by wearing exoskeletal systems**
Urban Daub, F. Blab, Fraunhofer IPA

12:00 Lunch break

PROGRAM WEDNESDAY, 15TH MARCH 2017

KÖNIG-KARL-HALLE 2nd floor

20 Years Common Rail in Commercial Vehicles

Chairperson: Prof. Dr. Thomas Koch

13:30 High Expectations – The History of Common Rail Fuel Injection Development for Daimler Truck Engines
Uwe Gärtner, Daimler AG

14:00 The development of the Common Rail Injection System – a retrospect on ups and downs
Christian Weiskirch, W. Gotre, B. Röthlein, R. Rothenaicher, MAN Truck & Bus AG

14:30 Current and future Technology Trends of Injections Systems for Commercial Vehicle Applications
James Kewley, R. Judge, M. Graham, C. Cardon, Delphi

MEIDINGER-SAAL 1st floor

Automated Driving

Chairperson: Prof. Dr. Clemens Gühmann

13:30 Fully Automated Vehicles: Challenges, Expectations and Methods
Florian Bock, R. German, Friedrich-Alexander-Universität Erlangen-Nürnberg; C. Sippl, Audi Electronics Venture

14:00 Software architecture for highly automated driving: Easier and faster system development
Oliver Wagner, Elektrobit Automotive GmbH

14:30 A virtual environment for the development and validation of highly automated driving systems
Karl Kufieta, M. Ditze, TWT GmbH Science & Innovation

BERTHA-BENZ-SAAL 1st floor

Driving Dynamics/ Driving Comfort

Chairperson: Prof. Dr. Thomas Vietor

13:30 Subjective Perception and Evaluation in the Virtual Test Drive
Minh-Tri Nguyen, J. Pitz, W. Krantz, IVK, University of Stuttgart; J. Neubeck, FKFS; J. Wiedemann, FKFS/ IVK, University of Stuttgart

14:00 Initial design method of primary ride by bounce/pitch natural frequencies - verification with production car
Koichi Matsumoto, Honda R&D Co., Ltd.

14:30 Method development for the objective characterisation of the dynamic system behaviour of air springs
Emre Boyraz, C. Kandler, M. Gantikow, Dr. Ing. h.c. F. Porsche AG; D. Schramm, Universität Duisburg-Essen

15:00 Coffee break

KÖNIG-KARL-HALLE 2nd floor

15:30 Plenary session with Panel discussion

17:00 End of Conference



RAUM REUTLINGEN 2nd floor**Turbo Charging/Gas Exchange**

Chairperson: Prof. Dr. Roland Baar

- 13:30 Port Development Process – Systematic Approach for best Gas Exchange**
Wolfgang Berg, U. Hofmann, IAV GmbH

- 14:00 Coupled 1D-quasi3D fluid dynamic models for the simulation of IC engine intake and exhaust systems**
Augusto Della Torre, G. Montenegro, A. Onorati, Politecnico di Milano

- 14:30 A new approach for the CHT-Simulation of heat transfer in radial turbine stages**
Sinan Özdemir, Pankl APC Turbo-systems GmbH; R. Baar, TU Berlin; H.-P. Schmalzl, HS Mannheim

RAUM KARLSRUHE 1st floor**Mechanics/Components II**Chairperson:
Prof. Dr. Hermann Rottengruber

- 13:30 Strength-Analysis of a crankcase with a multibody-simulation**
Stefan Jetter, F.-O. Müller, R. Weller, Daimler AG; B. Bertsche, IMA, University of Stuttgart

- 14:00 A Miller Cycle Engine Without Compromise – The Magma Concept**
Richard Osborne, Ricardo UK Ltd.; T. Downes, S. O'Brien, Ricardo Innovations; K. Pendlebury, Ricardo UK Ltd.; M. Christie, Ricardo US

- 14:30 Diesel Filtration: New flexible modular solutions for challenging packaging situations**
Martin Klein, C. M. Sturgess, A. Klotz, K.-E. Hummel, R. Bernewitz, S. Eichinger, MANN+HUMMEL GmbH

RAUM MANNHEIM 1st floor**Small Engines**

Chairperson: Prof. Dr. Ulrich Spicher

- 13:30 Stratified charged two-stroke engine – CFD development and verification**
Niklas Enander, Husqvarna AB

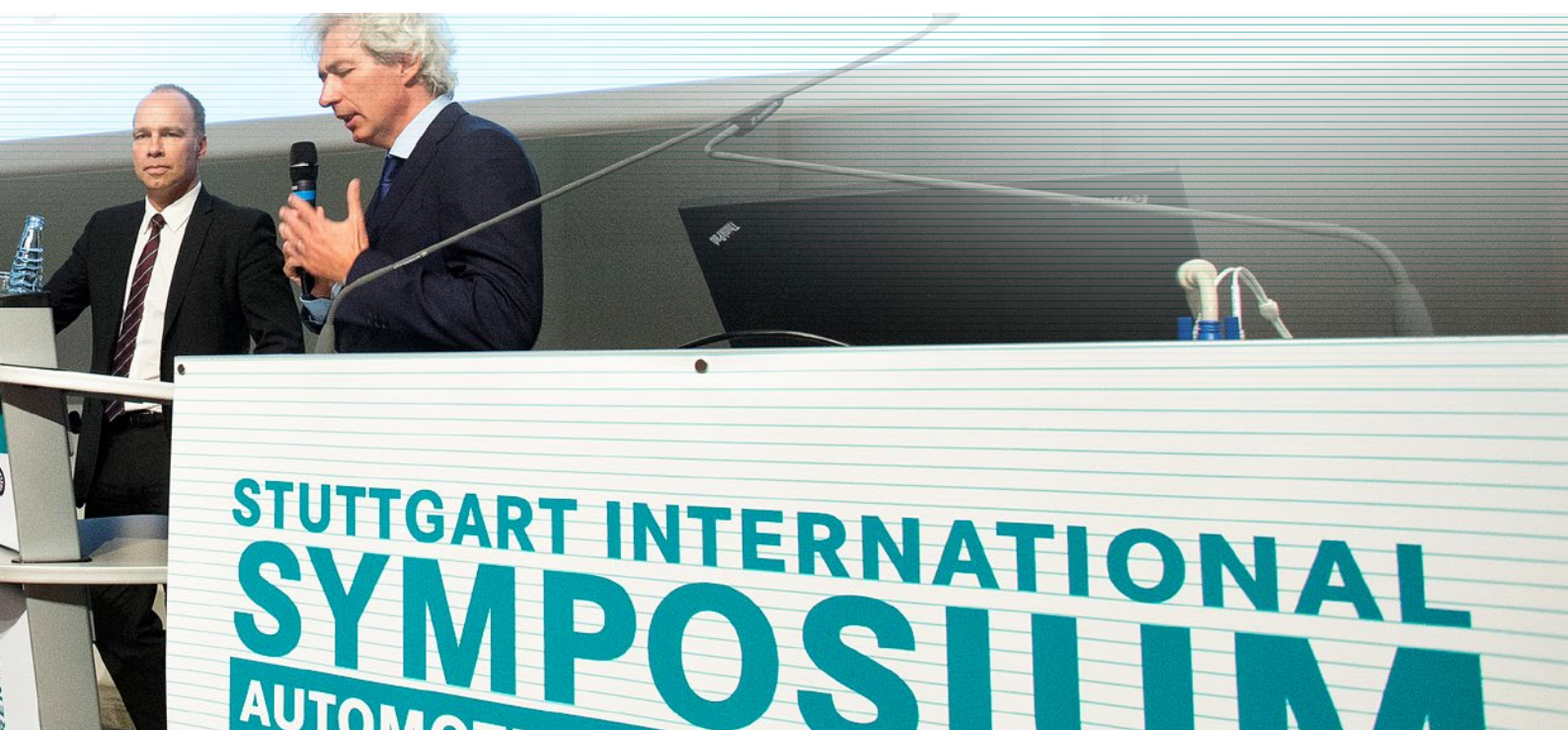
- 14:00 Small engine innovations – current and future**
Jeff Coad, Briggs & Stratton

- 14:30 Lightweight design in handheld power tools**
Carel Karrar, S. Meuser, A. Wolf, ANDREAS STIHL AG & Co. KG

15:00 Coffee break

KÖNIG-KARL-HALLE 2nd floor**15:30 Plenary session with Panel discussion**

17:00 End of Conference



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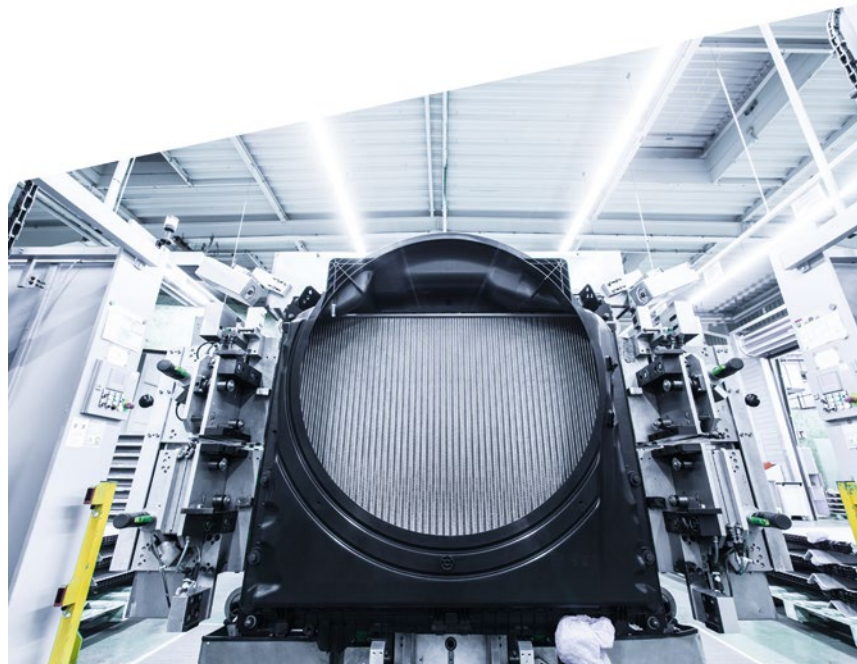
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- » Presentation title in German and in English (max. 100 characters incl. spaces)
- » The name of the presenter and any co-authors, company address, phone number and e-mail addresses
- » Short summary (abstract, max. 1,500 characters)
- » Assignment within one of the named topic areas
- » Short entry about the innovative value of the presentation

DATES

Submission of proposals by: 4 September 2017

Notification of acceptance: October 2017

The symposium program will be available in November 2017

Submission of presentation manuscript by: 19 January 2018

FOCUS TOPICS 2017

- » **AUTOMOTIVE TECHNOLOGIES**
- » **VEHICLE ENGINES**
- » **AUTOMOTIVE ELECTRONICS AND SOFTWARE**
- » **AUTOMOTIVE PROCESS AND MANUFACTURING TECHNOLOGIES**

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FKFS Research Institute of Automotive Engineering and Vehicle Engines Stuttgart | Uta Fuchs | Pfaffenwaldring 12
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Proposals can be submitted starting 1 May 2017 on the symposium's website at www.stuttgart-symposium.de

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» EXHIBITION

On Tuesday and Wednesday, an accompanying exhibition will take place in the foyers of the event facilities. Manufacturers and suppliers to the automotive industry will present the latest developments in vehicle, engine and measurement technology.

Exhibition maps and detailed exhibitor profiles are available on site. Find out more about the exhibitors www.stuttgarter-symposium.de

Exhibition opening times:

Tuesday 14th March 2017 | 8:00 – 18:00 | 16:00 – 19:00 »Meet the Expert«, career event for students

Wednesday 15th March 2017 | 8:00 – 15:30

If you are also interested in attending the Symposium as an exhibitor at the symposium, please contact

Philipp Sautter | Phone +49 711 4605376-7 | p.sautter@emendo-events.de

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INFORMATION ABOUT THE SYMPOSIUM

» EVENT LOCATION & DIRECTIONS

EVENT LOCATION

Haus der Wirtschaft | Willy-Bleicher-Straße 19 | 70174 Stuttgart
Phone +49 711 123-0 | www.hausderwirtschaft.de

DIRECTIONS

Information on arrival www.hausderwirtschaft.de/anfahrt

By public transport:

- » **Tram:** lines S1 to S6, stop estelle city center (Stadtmitte)
- » **Metro:** U9 and U14, stop Friedrichsbau/Exchange (Börse)

Information on arrival by public transport, please visit www.vvs.de

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The maximum daily rate is €12.

Address for navigation system
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*Taxi fare between Stuttgart Main Train Station and Haus der Wirtschaft:
approx. € 12*

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- Medical-engineering
- Imaging processing
- Robotic and automation
- Biological-engineering
- Functional materials
- Clean-room technology
- Leight weight technology
- Surface technology
- Digital printing technology
- Energy technology
- Machine tool

qualification
knowledge transfer

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- Quality management
- Factory planning
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- Key competencies
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During the break times you are welcome to use one of the three catering stations: in the exhibition area of the Eyth- and List-Saal and next to the König-Karl-Halle.

REGISTRATION

The registration desk is located in the foyer on the 1st floor.

Opening times:

Tuesday 14th March 2017 | 8:00 – 18:30

Wednesday 15th March 2017 | 7:30 – 17:30

Phone +49 711 4605376-8

SHUTTLE-SERVICE

With friendly support of AUDI AG, Daimler AG and Dr. Ing. h.c. F. Porsche AG, you may take advantage of a free shuttle service and be driven to your hotel, the airport or train station.

Please book your travel request at the Information Counter on the 2nd floor in front of the König-Karl-Halle.

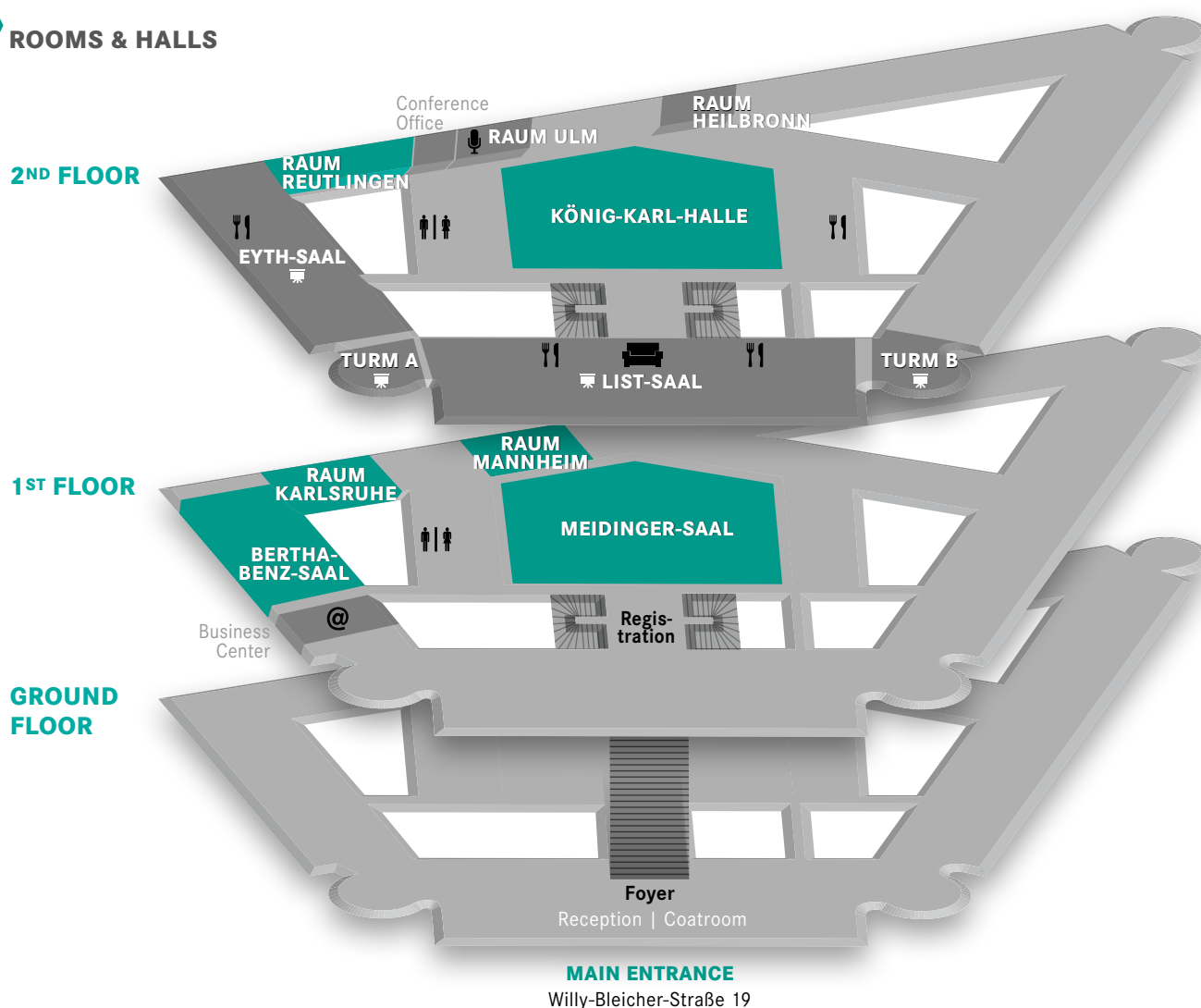
In the morning there is a shuttle service from the Maritim Hotel to the Haus der Wirtschaft.

Please consider that only transfers in the Stuttgart area are provided.

LANGUAGE

The official symposium language is German. All presentations will be simultaneously interpreted in both directions.

» ROOMS & HALLS



INFORMATION ABOUT THE SYMPOSIUM

» FEES

Symposium participation fee	€ 995 excl. VAT
Participants with university discount	€ 495 excl. VAT
Doctoral candidate	€ 360 excl. VAT

Day ticket	€ 595 excl. VAT
Day ticket with university discount	€ 395 excl. VAT
Day ticket doctoral candidate	€ 260 excl. VAT

The participation fee includes:

- » Access to all events on both days and with a day ticket respectively for the day booked
- » Conference documentation
- » Lunch, cold drinks and coffee at break times
- » Access to the formal evening reception on 14th March 2017

Students	€ 119 including VAT
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For **students of the University of Stuttgart** a limited number of free tickets are available. These can be collected upon presentation of the certificate of enrollment of: **Institute for Internal Combustion Engines and Automotive Engineering IVK** Further information: symposium@fkfs.de

» PAYMENT

After your online registration, you have the choice of online payment (by debit, credit card or PayPal), as well as payment by invoice. The payment on site is only possible by credit card or ATM card, cash can not be accepted.

» PARTICIPANTS

The Stuttgart International Symposium is aimed at managers and employees of car manufacturers and their suppliers in the fields of research and development, manufacturing, aerodynamics, simulation, drive and transmission, as well as development service providers, software companies and universities.

» REGISTRATION

Sign up now: www.stuttgarter-symposium.de

» TERMS & CONDITIONS OF PARTICIPATION OF COMPANIES

1 General

The Research Institute of Automotive Engineering and Vehicle Engines Stuttgart FKFS, Pfaffenwaldring 12, 70569 Stuttgart is organising the 17th Stuttgart International Symposium on Automotive and Engine Technology 2017. These Terms & Conditions apply for the registration of the 17th Stuttgart International Symposium. Other agreements must be confirmed in writing by FKFS.

2 Registration and Confirmation

You can check the registration portal or register via email. After your registration you will receive a written confirmation. Your data will be electronically stored in a database for internal purposes. It will not be passed on to third parties.

3 Cancellation of a participant

If cancellation occurs before 17th February 2017 a processing fee of € 50.00 will be charged. In case of cancellation before 28th February 2017, a processing fee in the amount of 50 % of the bill will be charged. Subsequently the processing fee is equivalent to the amount of the registration fee. The same applies if the participant fails to appear. The cancellation must be in written form. Relevant for the term protection is the date of the postmark. We are happy to accept a substitute participant at no additional cost. This excludes free passes for students.

4 Cancellation by the organizer

For short-term default of a speaker due to force majeure, illness, accident or any other circumstances the FKFS is not responsible for, another qualified person is appointed to the exclusion of any claims for damages. FKFS reserves the possibility of a final cancellation of the event due to technical or organizational reasons, such as failure to achieve the minimum number of participants, force majeure or other circumstances the FKFS is not responsible for. Already paid participation fees will then be refunded. Any further claim for reimbursement of expenses shall not exist.

5 Participation fee and conditions of payment

We ask for payment within 14 days after receipt of invoice. The participation fee for the complete conference includes access to all events on both days, the conference documentation, lunch at the venue each day, refreshments and participation in formal evening reception. When booking a day ticket the admission is limited to all events on a particular day. Students (including PhD candidates) are excluded from receiving the conference documents and from participating at the evening reception. The remaining services are not affected by this restriction.

6 Copyright

The conference documentation may not be reproduced or distributed to third parties without written consent from FKFS. Audio and video recordings of the event are not allowed.

7 Filming and photography

At the Stuttgart International Symposium photographers contracted by FKFS will take pictures of the event as well as of participants and presenters. Images and pictures in which participants are visible in their entirety or in part are property of FKFS and may be reproduced for publication. This authorization can be revoked at any time, though this shall only apply to any future publications, not for material already published.

8 Applicable law and jurisdiction

German law applies. Jurisdiction is Stuttgart. These terms and conditions exist in German and English. In the event of a discrepancy or ambiguity, the German version is binding.

9 Other provisions

Should one or more provisions of the conditions be or become invalid, the validity of the remaining terms and conditions remain unaffected.

» MEET THE EXPERT / CAMPFIRES

With the title "Meet the Expert", students will have the opportunity to come into direct dialog with experts from leading companies in the automotive industry. Experts will advise students about possibilities for student term papers, bachelor and master theses, dissertations, internships and also career and entry opportunities. The range of exhibitors ranges from global players to medium-sized enterprises. Additionally, students can find out about participating companies' exciting research and development fields during short presentations in our CampFire events – with a corresponding atmosphere. More information at: www.stuttgarter-symposium.de

» EVENT VIDEO



Get to know the Stuttgart International Symposium by having a look at our new event video.



» BUSINESS CENTER

Stay on top of your working day during the Stuttgart International Symposium by making use of our business center, complete with all the essentials. The space is complete with WiFi, power connections and mobile phone charging stations.

» LOUNGE

Allow yourself a break and take a seat in our lounge area. Here you can converse with clients, partners, colleagues, speakers and other symposium participants.

MEET THE EXPERT

**CAREER EVENT
IN THE COURSE OF THE
17TH STUTTGART
INTERNATIONAL
SYMPOSIUM**

STUTT GART 14 MARCH 2017

Enhance the prospects of your post-graduate career. **Experts of the automotive and supplying industry give you advice and inform you about your opportunities at the beginning of your career.**

14 March 2017 · 16:00–19:00 h, Haus der Wirtschaft, Willi-Bleicher-Straße 19, 70174 Stuttgart
Admission free for students.

Contact: karin.sutter@ivk.uni-stuttgart.de
www.stuttgarter-symposium.de

THE **FKFS**
is pleased to announce:



**2ND STUTTGART
SHANGHAI SYMPOSIUM**
AUTOMOTIVE AND ENGINE TECHNOLOGY

22 – 23 May 2017 | Shanghai, China



**STUTTGART INTERNATIONAL
SUMMER SCHOOL MOBILITY**

June – July 2017 | Stuttgart, Germany



**11TH FKFS CONFERENCE
PROGRESS IN VEHICLE AERODYNAMICS
AND THERMAL MANAGEMENT**

26 – 27 September 2017 | Stuttgart, Germany



**12TH CONFERENCE
ON GASEOUS FUEL POWERED VEHICLES**

24 – 25 October 2017 | Stuttgart, Germany



**18TH STUTTGART
INTERNATIONAL SYMPOSIUM**
AUTOMOTIVE AND ENGINE TECHNOLOGY

13 – 14 March 2018 | Stuttgart, Germany



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Kraftfahrwesen und
Fahrzeugmotoren
Stuttgart