



19TH STUTTGART INTERNATIONAL SYMPOSIUM

AUTOMOTIVE AND ENGINE TECHNOLOGY

19 - 20 MARCH 2019 | HAUS DER WIRTSCHAFT, STUTTGART

PROGRAM

As at: 21 JANUARY 2019

RESEARCH & DEVELOPMENT IN AUTOMOTIVE AND ENGINE TECHNOLOGY



GREETING

WINFRIED KRETSCHMANN



In March 2019, the Research Institute of Automotive Engineering and Vehicle Engines Stuttgart (FKFS) invites you to the 19th Stuttgart International Symposium "Automotive and Engine Technology". I heartily welcome all participants to two fascinating congress days, dealing with nothing less than the future of our mobility. I am therefore delighted to be the patron of this event once again this year.

FKFS has been demonstrating for decades that it is a reliable partner in many areas. The local automotive industry profits from a highly-regarded research institute in close proximity. Thanks to the cooperation with Stuttgart University, students are able to gain access to the regional automotive sector. As a hotbed of specialists and experts, FKFS provides a valuable source of young engineers who help keep Baden-Wuerttemberg one of the leading automotive locations in the world.

The state government holds FKFS in high esteem as a long-term cooperation partner. This is underlined, for example, by the wind tunnels the State of Baden-Wuerttemberg set up at Stuttgart University, which FKFS still operates for the University today. In the "Baden-Wuerttemberg Automotive Industry Strategic Dialog" (which was also set up by the state

government), FKFS has a permanent role in collaborative work on a concept for the future.

The clock is ticking for new mobility solutions. Climate targets are looming ever closer and it is only possible to fulfill them with new, cleaner drive technologies. This is a huge challenge. However, we must not regard it as a burden, but as an opportunity we must take in order to actively shape the mobility of the future. Because those shaping the technology will remain the global leaders in it. Therefore, it is one of the state government's key tasks to guide the car manufacturing state Baden-Wuerttemberg into a future which is both environmentally-friendly and successful. To achieve this, interlinking science, politics, business and civic society is essential.

With this year's Symposium motto, "The transformation of the automotive industry", FKFS is tackling the central challenges for the future of the automotive industry head-on. At the same time, it forms an important platform to bring various stakeholders together and enter intensive specialist discussions. I thank FKFS and all the participating companies for organizing and implementing the Symposium. I wish the participants interesting lectures, exciting discussions and new inspiration.

Winfried Kretschmann
Prime Minister of the State
of Baden-Wuerttemberg



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» A WARM WELCOME



The transformation of the automotive industry

The automotive industry is currently undergoing enormous and rapid changes. Demands upon research and development are constantly increasing, and new fields of research are arising as well. Both manufacturers and suppliers are developing new business models in order to remain competitive. The European Environment Ministers' target to reduce vehicle CO₂ emissions by a total of 35 per cent by 2030 (compared with the year 2020) highlights the necessity and urgency of a technological shift. Most discussions regarding potential solutions concern the electrification of drives, but the use of renewable fuels (or synthetic fuels) is also on the agenda.

More than a year ago, the State of Baden-Wuerttemberg set up the "Automotive Industry Strategic Dialog". This alliance of politics, business, science, trade unions, consumer organizations, environmental organizations and civic society is pursuing a holistic approach, tapping into innovation potential beyond traditional industry sector limits and aiming to drive the automotive industry in Baden-Wuerttemberg forward successfully.

Drives and emissions, autonomous driving and networking, disruptive vehicle architectures, driving dynamics control systems and thermal management: the automotive industry has plenty to talk about. Experts from science and industry will be discussing these topics and many more at the **19th Stuttgart International Symposium "Automotive and Engine Technology" from 19 – 20 March 2019** at the Haus der Wirtschaft. The latest technology, future concepts and new research results will be presented in sessions running in six parallel strands, with more than a hundred lectures.

There will be a podium discussion on the topic "The transformation of the automotive industry", with prominent participants. We have also been able to attract very high-profile speakers for our plenary lectures. There will be many opportunities for exchanging ideas; not only during the breaks and at the trade exhibition, but at the special evening event too.

We look forward to welcoming you to Stuttgart – the birthplace of the automobile – and wish you two highly-interesting days at the 19th Stuttgart International Symposium!

Prof. Dr. Michael Bargende

Prof. Dr. Hans-Christian Reuss

Prof. Dr. Jochen Wiedemann

ORGANIZERS



FKFS is an independent institute and provides research and development services for the international automotive industry. The Institute offers highly specialized test stands and test facilities with a unique range of self-developed measurement and testing, years of experience with the development of simulation tools and excellent know-how of the employees.

FKFS – Research Institute of Automotive Engineering and Vehicle Engines Stuttgart

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Prof. Dr. Michael Bargende, Managing Board Automotive Powertrains
Prof. Dr. Hans-Christian Reuss, Managing Board Automotive Mechatronics
Prof. Dr. Jochen Wiedemann, Managing Board Automotive Engineering

» IN COOPERATION WITH



FVV – Research Association for Combustion Engines

The FVV – founded in 1956 – has developed itself to the world's unique network of research in engines and turbomachinery. It promotes the collective, precompetitive research in the industry and joins industrial efficiency and emissions of engines and turbines continuously – for the benefits of the economy, environment and society. www.fvv-net.de

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» THE SYMPOSIUM APP

The latest information about the 19th Stuttgart International Symposium is available at any time on the new FKFS app. **Get the App!**



OVERALL VIEW

» TUESDAY, 19 MARCH 2019

8:00	Registration/Signing-in					
	KÖNIG-KARL-HALLE 2 nd floor					
9:00	Welcome Prof. Dr. Hans-Christian Reuss, Chairman of the Board FKFS, Managing Director IVK, University of Stuttgart Opening Address Prof. Dr. Dr. Wolfram Ressel, Chancellor of the University of Stuttgart					
9:30	Individual mobility in tomorrow's cities Wolf-Henning Scheider, Chief Executive Officer, ZF Friedrichshafen AG					
10:00	Coffee break					
	KÖNIG-KARL-HALLE 2 nd floor	MEIDINGER-SAAL 1 st floor	BERTHA-BENZ-SAAL 1 st floor	REUTLINGEN ROOM 2 nd floor	KARLSRUHE ROOM 1 st floor	MANNHEIM ROOM 1 st floor
10:30	Automated Driving vs. Attribute Branding? pg. 6	Emission (Denox) pg. 6	Electric Mobility I pg. 6	Hybrid Concepts pg. 7	Automotive Trends pg. 7	Advanced Driver Assistance Systems pg. 7
12:00	Lunch break					
13:00	Powertrain Concepts and Fuels pg. 6	Autonomous Driving I pg. 6	Electric Mobility II pg. 6	Aerodynamics pg. 7	Vehicle Concepts pg. 7	Simulation Combustion Engines pg. 7
15:00	Coffee break					
15:30	CASE & Digital vehicle – the future of mobility Georges Massing, Director User Interaction & Software, Daimler AG					
16:05	Automotive Industry – Clusters and Business Models pg. 8	SI-Engines pg. 8	Electric Mobility III pg. 8	Vehicle Dynamics – Control Systems pg. 9	Water Injection and Emission Concepts pg. 9	Engine Mechanics and Charging pg. 9
18:05	End of the parallel sections					
18:30	Social evening to take place in the “Alte Stuttgarter Reithalle” pg. 9					

» WEDNESDAY, 20 MARCH 2019

	KÖNIG-KARL-HALLE 2 nd floor	MEIDINGER-SAAL 1 st floor	BERTHA-BENZ-SAAL 1 st floor	REUTLINGEN ROOM 2 nd floor	KARLSRUHE ROOM 1 st floor	MANNHEIM ROOM 1 st floor
8:30	The new Way of Driving pg. 10	Hybrid Powertrain pg. 10	Test Bench Technology pg. 10	Software and Development Methods I pg. 11	Chassis pg. 11	Reports from FVV Projects pg. 11
10:00	Coffee break					
	KÖNIG-KARL-HALLE 2 nd floor					
10:30	E-mobility from EnBW's perspective – status and outlook Dr. Frank Mastiaux, Chief Executive Officer, EnBW Energie Baden-Wuerttemberg AG					
11:05	Emission (RDE) pg. 10	Fuel Cell pg. 10	New Vehicles pg. 10	Software and Development Methods II pg. 11	Thermal Management pg. 11	Batteries pg. 11
12:35	Lunch break					
13:30	System Architecture pg. 12	Autonomous Driving II pg. 12	48 Volt Hybrid pg. 12	Networking and Architecture pg. 13	Lightweight Design pg. 13	NVH pg. 13
14:30	Coffee break					
	KÖNIG-KARL-HALLE 2 nd floor					
15:00	Opportunities for a leading global technology provider in an era of uncertainty Dr. Mathias Pillin, Executive Vice President with responsibility for Electrification, Robert Bosch GmbH					
15:30	Panel discussion “The transformation of the automotive industry” Moderation: Johannes Winterhagen, Redaktionsbüro delta eta Participants: Dr. Nicole Hoffmeister-Kraut, Ministry of Economic Affairs, Labour and Housing of Baden-Wuerttemberg Georges Massing, Daimler AG Dr. Mathias Pillin, Robert Bosch AG Prof. Günther Schuh, e.GO Mobile AG Prof. M. A. Weissenberger-Eibl, Fraunhofer Institute for Systems and Innovation Research ISI / iTM, Karlsruhe Institute of Technology					
16:30	Keynote Dr. Nicole Hoffmeister-Kraut, Ministry of Economic Affairs, Labour and Housing of Baden-Wuerttemberg					
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, 19 MARCH 2019

KÖNIG-KARL-HALLE 2nd floor

9:00 Welcome Prof. Dr. Hans-Christian Reuss, Chairman of the Board FKFS, Managing Director IVK, University of Stuttgart
Opening Address Prof. Dr. Dr. Wolfram Ressel, Chancellor of the University of Stuttgart

9:30 Individual mobility in tomorrow's cities
 Wolf-Henning Scheider, Chief Executive Officer, ZF Friedrichshafen AG

10:00 Coffee break

KÖNIG-KARL-HALLE 2nd floor

Automated Driving vs. Attribute Branding?

Chairperson: Prof. Dr. Jochen Wiedemann

10:30 Motion control solutions for automated driving systems at BMW
 Alexander Kron, BMW AG

11:00 Is a typical Mercedes-Benz driving character still necessary with an increasing number of driver assistance systems?
 Ludger Dragon, Daimler AG

11:30 Reasons why customers will still buy premium (chassis) in the age of automated driving
 Armin Schöpfel, AUDI AG

MEIDINGER-SAAL 1st floor

Emission (Denox)

Chairperson: Prof. Dr. Georg Wachtmeister

10:30 Denoxtronic 5.3 – a modular system for applications worldwide
 Michael Raff, E. Weingarten, M. Muslija, Robert Bosch GmbH

11:00 Modular HD – EGT system with autarcic thermal management for high urban NO_x conversion
 Klaus Schrewe, B. Maurer, I. Zirkwa, C. Menne, HJS Emission Technology GmbH & Co. KG

11:30 New experimental insights in AdBlue-Spray/Wall interaction and its impacts on EGT system design
 David Schweigert, B. Damson, H. Lüders, C. Becker, Robert Bosch GmbH; O. Deutschmann, Karlsruher Institut für Technologie (KIT)

BERTHA-BENZ-SAAL 1st floor

Electric Mobility I

Chairperson: Prof. Dr. Nejila Parspour

10:30 Future e-mobility and the change in component requirements
 Lothar Schindele, D. Schütz, G. Le Hen, N. Müller, Robert Bosch GmbH

11:00 Active materials for electrical motors – leverage for reducing costs and increasing performance
 Moritz Kilper, H. Naumoski, Daimler AG

11:30 Traction energy saving potentials for electric vehicles due to multistage gearshift
 Oliver Zirn, F. Schmiel, Hochschule Esslingen; M. Dellermann, Daimler AG

12:00 Lunch break

Powertrain Concepts and Fuels

Chairperson: Prof. Dr. Michael Bargende

13:00 Technical scenarios for the decarbonization of road transport
 Stephan Neugebauer, Europäische Technologieplattform für den Straßenverkehr (ERTRAC) / BMW Group

13:30 Comparative evaluation of power-to-X processes for the supply of renewable fuels
 Wolfgang Köppel, M. Heneka, DVGW-Forschungsstelle am EBI des KIT

14:00 Modeling of real fuels for an effective virtual engine development with focus on alternative fuels
 Marco Chiodi, F. Cupo, M. Bargende, FKFS

14:30 Sustainable drive concepts for future motorsports
 Lea Schwarz, M. Bargende, IVK, Universität Stuttgart; S. Dreyer, U. Baretzky, W. Kotaschek, F. Bach, AUDI AG

Autonomous Driving I

Chairperson: Prof. Dr. Dr. Michael Weyrich

13:00 Extension of the environmental model for a neural networks based lane change prediction model
 Martin Krüger, A. Stockem Novo, T. Nattermann, M. Mohamed, ZF Group; T. Bertram, TU Dortmund

13:30 Evaluation of a present friction coefficient information for the improvement of vehicle systems
 Sebastian Staiger, S. Nosrat Nezami, M. Unterreiner, Dr. Ing. h.c. F. Porsche AG; D. Schramm, Universität Duisburg-Essen

14:00 Kinetosis at autonomous driving
 Carsten Lecon, Hochschule Aalen

14:30 One-Stop-Test solutions for autonomous driving
 Frank Heidemann, SET GmbH

Electric Mobility II

Chairperson: Franz Loogen

13:00 Impact of modulation strategies on the power loss of the DC-Link capacitor of an inverter
 Maximilian Weber, T. Zeltwanger, H. Sprenger, M. Hirsch, Robert Bosch GmbH; H.-C. Reuss, IVK, Universität Stuttgart

13:30 The Six-Step Mode: unwanted or rather the ideal voltage modulation method
 Thomas Zeltwanger, H. Sprenger, M. Damson, M. Gupta, Robert Bosch GmbH

14:00 Fail-operational powertrain for automated driving
 Ahmet Kilic, T. Shen, J. Faßnacht, Robert Bosch GmbH; H.-C. Reuss, IVK, Universität Stuttgart

14:30 Magna's full scalable approach for the electrified powertrain of the future
 Carsten Bündler, Magna Powertrain

15:00 Coffee break

10:00 Coffee break

REUTLINGEN ROOM 2nd floor**Hybrid Concepts**

Chairperson: Prof. Dr. Christian Beidl

10:30 Essential predictive information for high fuel efficiency and local emission free driving with PHEVs

Tobias Schürmann, D. Görke, S. Schmiedler, T. Gödecke, Daimler AG; K. Böhm, Hochschule Esslingen; M. Bargende, IVK, Universität Stuttgart

11:00 Analogies for the hybrid drive chain design

Michael Auerbach, O. Zirn, Hochschule Esslingen

11:30 A new distribution of torque required by the driver in a hybrid vehicle regardless of the number of actuators

Setareh Gherekhloo, C. A. Malonga Makosi, Daimler AG

KARLSRUHE ROOM 1st floor**Automotive Trends**

Chairperson: Prof. Dr. Hermann Winner

10:30 New entry OEM – a global phenomenon

David Ludwig, MAGNA STEYR Fahrzeugtechnik AG & Co KG

11:00 Consistent application of systems engineering and simulation for cross domain function integration

Marcus Boumans, U. Schulmeister, M. Johannaber, Robert Bosch GmbH

11:30 Automotive megatrends and their impact on NVH

Georg Eisele, M. Kauth, C. Steffens, FEV Europe GmbH; P. Glusk, FEV Consulting GmbH

MANNHEIM ROOM 1st floor**Advanced Driver Assistance Systems**

Chairperson: Prof. Dr. Klaus Dietmayer

10:30 A new method for the objective assessment of ADAS based on multivariate time series classification

Uwe Moser, N. Harmening, BMW Group; D. Schramm, Universität Duisburg Essen

11:00 Test methods of visual distraction by interaction with driver information- and assistance systems

Thomas Stottan, AUDIO MOBIL

11:30 Evaluation of a novel prototype for automated vehicle positioning in inductive charging

Matthias Hisung, IVK, Universität Stuttgart; D. Martinovic, FKFS; H.-C. Reuss, FKFS/IVK, Universität Stuttgart

12:00 Lunch break

Aerodynamics

Chairperson: Prof. Dr. Lennart Löfdahl

13:00 External water management: a predictive challenge

Cameron Tropea, J. Feldmann, D. Rettenmaier, P. Seiler, TU Darmstadt; M. Ade, Daimler AG

13:30 Aerodynamic study on the vehicle rear shape parameters with respect to ground simulation

Chenyi Zhang, IVK, Universität Stuttgart; D. Stoll, T. Kuthada, FKFS; J. Wiedemann, FKFS/IVK, Universität Stuttgart

14:00 Development of an SUV reference model for aerodynamic research

Max Tanneberger, C. Zhang, IVK, Universität Stuttgart, T. Kuthada, F. Wittmeier, J. Wiedemann, FKFS; J. Nies, Röchling Automotive SE & Co. KG

14:30 One size fits all: an adaptive test section design for climatic wind tunnels

Frank Baader, WBI GmbH

Vehicle Concepts

Chairperson: Prof. Dr. Thomas Maier

13:00 Evaluation of the effects of trends on vehicle concepts based on a forecast of transport demand

Peter Lukas Peters, R. Demuth, BMW Group; D. Schramm, Universität Duisburg-Essen

13:30 Potentials of modular autonomous vehicles for variable scenarios of public transport

Dennis Wedler, T. Vietor, IK, TU Braunschweig

14:00 Method for concept design and optimization of twist beam axles

Xiangfan Fang, Universität Siegen

14:30 A modular vehicle concept for passenger and goods traffic

Christian Ulrich, H. E. Friedrich, J. Weimer, S. Schmid, R. Hahn, G. Kopp, M. Münster, M. Rohrer, C. Wachter, Deutsches Zentrum für Luft- und Raumfahrt (DLR)

Simulation Combustion Engines

Chairperson: Prof. Dr. Bernhard Geringer

13:00 Continuous implementation of 0D/1D engine models in the development process of racecar powerunits

Simon Malcher, U. Baretzky, S. Dreyer, H. Diel, S. Wohlgemuth, AUDI AG; M. Grill, FKFS; M. Bargende, IVK, Universität Stuttgart

13:30 Integrated quasi-dimensional flow model with combustion and emission model for VVT diesel engines

Qirui Yang, IVK, Universität Stuttgart; M. Grill, FKFS; M. Bargende, IVK, Universität Stuttgart

14:00 A 1D co-simulation approach for the prediction of pollutant emissions of internal combustion engines during steady-state conditions and driving cycles

Angelo Onorati, T. Cerri, G. D'Errico, G. Montenegro, Politecnico Di Milano; G. Koltsakis, Z. Samaras, AUTH; V. Tziolas, N. Zingopis, K. Mikos, Exothermia; C. Bach, J. Rojewski, P. Dimopoulos Eggenschwiler, Empa

14:30 Fully integrated design exploration for in-cylinder simulation

Warren Seeley, Siemens PLM Software; S. Fischer, Siemens Industry Software GmbH

15:00 Coffee break

PROGRAM TUESDAY, 19 MARCH 2019

KÖNIG-KARL-HALLE 2nd floor

15:30 CASE & Digital vehicle – the future of mobility

Georges Massing, Director User Interaction & Software

KÖNIG-KARL-HALLE 2nd floor

Automotive Industry – Clusters and Business Models

Chairperson: Prof. Dr. Jochen Wiedemann

16:05 Automobile cluster in Germany and Baden-Wuerttemberg

Albrecht Fridrich,
RKW Baden-Württemberg GmbH

16:35 The role of clusters in supporting french automotive industry's competitiveness and innovation

Thomas Röhr, Pôle Véhicule du Futur und ESTA School of Business and Technology

17:05 The potential of collaborative business model innovation in automotive eco-systems

Georg von der Ropp,
BMI Lab Deutschland GmbH

MEIDINGER-SAAL 1st floor

SI-Engines

Chairperson: Prof. Dr. Hermann Rottengruber

16:05 Phenomenology and analysis of LSPI gas pressures

Christoph Beerens, R. Fischer,
C. Trabold, MAHLE International GmbH

16:35 Combustion stability improvement with turbulence control by air injection for a lean-burn SI engine

Takanori Suzuki, SOKEN Inc.;
B. Lehrheuer, T. Ottenwälder, M. Mally,
S. Pischinger, RWTH Aachen University

17:05 Air intake temperature cooling tanks to pressure waves action and adapted air intake geometry

Vincent Raimbault, M. Jérôme,
MANN+HUMMEL France; B. Heinz,
MANN+HUMMEL GmbH; G. Stéphane,
RENAULT; C. David, École Centrale de
Nantes; M. Bargende, IVK, Universität
Stuttgart

BERTHA-BENZ-SAAL 1st floor

Electric Mobility III

Chairperson: Prof. Karl-Ernst Noreikat

16:05 Charging concepts for E-Mobility – actual developments and future challenges

Ursel Willrett, IAV GmbH

16:35 Validation of range estimation for electric vehicles based on recorded real-world driving data

Patrick Petersen, J. Langner, S. Otten,
E. Sax, FZI Forschungszentrum
Informatik; S. Scheubner, M. Vaillant,
S. Fünfgeld, Dr. Ing. h.c. F. Porsche AG

17:05 Smart grids in mobile fleet operations

Manuel Klein, D. Mitrovic,
EKU Power Drives GmbH

17:35 Infrared-based determination of the type and condition of the road surface

Lakshan Tharmakularajah, J. Döring,
ITEM, Universität Bremen

18:05 Finish



REUTLINGEN ROOM 2nd floor**Vehicle Dynamics – Control Systems**

Chairperson: Prof. Dr. Oliver Sawodny

- 16:05 Attribute based development of advanced driver assistance systems**
Bernhard Schick, Hochschule Kempten; M. Höfer, F. Fuhr, Dr. Ing. h.c. F. Porsche AG; P. Pfeffer, MdynamiX AG
- 16:35 ITC – high performance traction control for sports car applications**
Lars Koenig, F. Schindele, A. Zimmermann, Bosch Engineering GmbH
- 17:05 Computational time optimization of a modelbased predictive roll stabilization by Neuro-Fuzzy Systems**
Philipp Maximilian Sieberg, M. Schmid, S. Reicherts, D. Schramm, Universität Duisburg-Essen
- 17:35 Integrated approach for the virtual development of vehicles equipped with brake control systems**
Fabian Fontana, IVK, Universität Stuttgart; J. Wiedemann, FKFS/IVK, Universität Stuttgart; J. Neubeck, FKFS; I. Scharfenbaum, U. Schaaf, P. Stegmann, A. Ohletz, AUDI AG

KARLSRUHE ROOM 1st floor**Water Injection and Emission Concepts**

Chairperson: Prof. Dr. Peter Eilts

- 16:05 Influence of water injection on particle emissions of SI engines**
Maïke Gern, M. Kauf, TU Berlin
- 16:35 Experimental investigations of Miller cycle combustion technology with water injection**
Nils Neumann, N. Freisinger, Daimler AG; T. Seeger, Universität Siegen
- 17:05 Reduction of cold start emissions with microwave heated catalysts**
Viola Papetti, P. Dimopoulos Eggenschwiler, D. Schreiber, Empa, Swiss Federal Laboratories for Materials Science and Technology
- 17:35 Extended cylinder deactivation strategies to improve CO₂ and pollutant emissions for light-duty diesel engine applications**
Kai Deppenkemper, M. Schönen, B. Lindemann, FEV Europe GmbH; M. Scassa, FEV Italia s.r.l.; M. Younkings, R. Wang, Tula Technology Inc.

MANNHEIM ROOM 1st floor**Engine Mechanics and Charging**

Chairperson: Prof. Dr. Wolfgang Thiemann

- 16:05 Performance evaluation of an IC-engine with a novel partial admission turbocharger concept**
Markus Schatz, F. Seeger, D. Vogt, Universität Stuttgart; S. Koch, D. Notheis, U. Wagner, Karlsruher Institut für Technologie (KIT)
- 16:35 The future hydrodynamic bearing concept from BMTS-Technology**
Rüdiger Kleinschmidt, G. Winkler, S. Schmitt, F. Stetter, BMTS Technology GmbH & Co. KG
- 17:05 Comparison chain drive vs. gear drive for a timing drive of a commercial vehicle engine**
Thomas Fink, Joh. Winklhofer Beteiligungs GmbH & Co. KG; P. Bachmair, iwis motorsysteme GmbH & Co. KG, C. Biwer, T. Saupe, FEV Europe GmbH
- 17:35 Friction dynamics of a gasoline engine during transient operation**
Tobias Funk, H. Ehnis, R. Künzel, MAHLE International GmbH; M. Bargende, IVK, Universität Stuttgart

18:05 Finish

» FESTIVE EVENING RECEPTION

Tuesday, 19 March 2019 | 18:30 in the "Alten Stuttgarter Reithalle" 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,
Board of Directors FKFS, Professor of Automotive Powertrains IVK, University of Stuttgart

Followed by: Dinner

**Live Act:
Sir Waldo Weathers**

The virtuoso saxophonist and legendary soul singer, Sir Waldo Weathers, was knighted in 2006. This passionate musician has shared a stage with other music legends such as Charley Pride, B.B. King, Phil Collins, Michael Jackson and James Brown.

With his exhilarating show, "A Tribute to James Brown", Sir Waldo Weathers and his ten-piece band bring the funk and soul of the 1980s back to life.

Evening program ends at approx. 23:00.

010 **PROGRAM WEDNESDAY, 20 MARCH 2019**

KÖNIG-KARL-HALLE 2nd floor

The new Way of Driving

Chairperson: Prof. Dr. Hans-Christian Reuss

8:30 New vehicle concepts for future business models
Horst E. Friedrich, Deutsches Zentrum für Luft- und Raumfahrt (DLR)

9:00 UNICARagil – new architectures for disruptive vehicle concepts
Dan Keilhoff, H.-C. Reuss, IVK, Universität Stuttgart

9:30 New vehicle concepts for mobile vacation
Rüdiger Freimann, Erwin Hymer Group SE; U. Gillich, G. Gumpoltsberger, ZF Friedrichshafen AG; R. Kaiser, TTT – The Team Technology

MEIDINGER-SAAL 1st floor

Hybrid Powertrain

Chairperson: Prof. Dr. Günter Hohenberg

8:30 Dedicated Hybrid Powertrain (DHP) – the hybrid powertrain as an intelligent overall system
Jörg Gindele, Magna Powertrain

9:00 Experimental investigations on ICE direct start for hybrid powertrains
Thomas Pausch, G. Vent, N. Freisinger, H. Weymann, Daimler AG; R. Baar, TU Berlin

9:30 Extended engine-in-the-Loop simulation for development of HEV energy management strategies
Bastian Beyfuss, P. Hofmann, B. Geringer, IFA, TU Wien; P. Grassl, Sohatex Engineering GmbH & Co. KG

BERTHA-BENZ-SAAL 1st floor

Test Bench Technology

Chairperson: Prof. Dr. Karl-Ludwig Haken

8:30 Test in areas of application with regulatory requirements on the example of WLTP
Jan Jacob, Werum Software & Systems AG

9:00 Chances of the digitalization in the test field for operations and product development
Roland Strixner, Kratzer Automation AG

9:30 New energies test facilities
Gregor Zemitzsch, SBI GmbH

10:00 Coffee break

10:30 E-mobility from EnBW's perspective – status and outlook

Dr. Frank Mastiaux, Chief Executive Officer, EnBW Energie Baden-Wuerttemberg AG

Emission (RDE)

Chairperson: Prof. Dr. Thomas Koch

11:05 RDE thermal management – from road to lab
Christian Beidl, J. Hipp, TU Darmstadt; S. Geneder, G. Hohenberg, IVD Deutschland GmbH

11:35 Further-on optimization of NO_x Emission under EU Real Driving Emission (RDE) regulation
Michael Krüger, S. Bareiss, A. Kufferath, D. Naber, D. Ruff, H. Schumacher, Robert Bosch GmbH

12:05 Developing GDI engines for minimum particle emissions in RDE test conditions
Ernst Winklhofer, A. Hirsch, AVL List GmbH

Fuel Cell

Chairperson: Prof. Dr. Stefan Pischinger

11:05 Using of an electrochemical compressor for hydrogen recirculation in fuel cell vehicles
Wilhelm Wiebe, S. Schmitz, DHBW Mannheim

11:35 Development of electric drive concepts for fuel cell vehicles for Germany and China
Katharina Bause, A. Braumandl, A. Stephan, Q. Xiao, M. Behrendt, Karlsruher Institut für Technologie (KIT)

12:05 Test cell adaption from engine to fuel cell development
Henning Münstermann, WBI GmbH; J. Knust, J. Fischer, SBI GmbH

New Vehicles

Chairperson: Prof. Dr. Thomas Vietor

11:05 The new Volkswagen Touareg – technical innovation on 4 wheels
Stefan Gies, J. Brüning, L. Liesner, Volkswagen AG

11:35 The aerodynamics development of the new Mercedes-Benz GLE
Etienne Pudell, Daimler AG

12:05 The aerodynamics of the new Porsche 911 Carrera
Bernd Jachowski, Dr. Ing. h.c. F. Porsche AG

12:35 Lunch break

REUTLINGEN ROOM 2nd floor**Software and Development Methods I**

Chairperson: Prof. Dr. Eric Sax

- 8:30 Safety and security – basic vulnerabilities and solutions**
Hubert B. Keller, Karlsruher Institut für Technologie (KIT)
- 9:00 Tool-based development of efficient automotive multi-core systems**
Patrick Friederich, A. Zeeb, Vector Informatik GmbH
- 9:30 Architecture and independence controller for deep learning in safety critical applications**
Ulrich Bodenhausen, AI Coaching und Vector Consulting Services GmbH

KARLSRUHE ROOM 1st floor**Chassis**

Chairperson: Prof. Dr. Xiangfan Fang

- 8:30 Evaluation of competition and virtual rear-subframes by means of the data envelopment analysis**
Martin Kundla, BMW Group; D. Schramm, Universität Duisburg-Essen
- 9:00 Evaluation of the required accuracy of chassis models in the comfort relevant frequency range by intuitive switching of the level of detail in SimulationX**
Tom Wiedemann, ESI ITI GmbH
- 9:30 Cause and effect chains analysis of rollover behavior with respect to chassis design**
Fan Chang, K. Krauter, J. Kubenz, G. Prokop, IAD, TU Dresden; S. van Putten, A. Ohletz, AUDI AG

MANNHEIM ROOM 1st floor**Reports from FVV Projects**

Chairperson: Dr. Karl Kollmann

- 8:30 Investigation of interactions between fuels and fuel leading components of Plug-In-Hybrid electric vehicles**
Sebastian Feldhoff, OWI Oel-Waerme-Institut gGmbH
- 9:00 Acoustic transmission loss in turbochargers**
Hendrik Ruppert, M. Günther, S. Pischinger, RWTH Aachen University
- 9:30 Downsizing of HD engines by air path variabilities II**
Peter Eilts, M. Betz, TU Braunschweig

10:00 Coffee break

Software and Development Methods IIChairperson:
Prof. Dr. Tobias Gerhard Flämig-Vetter

- 11:05 AI – challenges in application with bus data in the automotive sector**
Alexander Faul, M. Fluß, Vector Informatik GmbH; F. Pistorius, Karlsruher Institut für Technologie (KIT)
- 11:35 Use of a criticality metric for assessment of critical traffic situations as part of SePIA**
Matthias Lehmann, G. Prokop, IAD, TU Dresden
- 12:05 Simulating surrounding traffic for interactive driving simulators**
Michael Behrisch, D. Behnecke, Deutsches Zentrum für Luft- und Raumfahrt (DLR)

Thermal Management

Chairperson: Prof. Dr. Stefan Böttinger

- 11:05 AC-APU – a hydrogen based AC unit for electric vehicles**
Robert Hegner, C. Weckerle, I. Bürger, H. Dittus, M. Schier, H. E. Friedrich, Deutsches Zentrum für Luft- und Raumfahrt (DLR)
- 11:35 A complete digital engine cooling module catalog for balancing cooling and aerodynamics**
Satheesh Kandasamy, C. Chang, Dassault Systemes; T. Yasuda, Y. Yagi, S. Miura, Denso Corporation
- 12:05 Thermal design of hand-held power tools with electric and combustion engines**
Silke Kaminski, G. Groskopf, ANDREAS STIHL AG & Co. KG

Batteries

Chairperson: Prof. Dr. Andreas Friedrich

- 11:05 Automated & IT-backed loadprofil-generation and evaluation of lithium ion batteries**
Alexander Kohs, F. Back, T. Schilling, P. Kuppusamy, CTC cartech company GmbH; T. Freudenmann, M. El-Haji, EDI GmbH
- 11:35 Challenge battery safety – solutions by multifunctional battery housings B:HOUSE®**
Jobst Kerspe, TEB Dr. Kerspe; M. Fischer, König Metall GmbH & Co. KG
- 12:05 Prognosis of the life time of urban bus batteries in the context of the overall system design**
Martin Ufert, TU Dresden

12:35 Lunch break

012 **PROGRAM WEDNESDAY, 20 MARCH 2019**

KÖNIG-KARL-HALLE 2nd floor

System Architecture

Chairperson: Prof. Dr. Dr. Gerhard Hettich

13:30 Functional architecture and E/E-Architecture – a challenge for the automotive industry

Detlef Zerfowski, Andreas Lock, Robert Bosch GmbH

14:00 Integrated avionics architectures

Reinhard Reichel, ILS, Universität Stuttgart

MEIDINGER-SAAL 1st floor

Autonomous Driving II

Chairperson: Prof. Dr. Clemens Gühmann

13:30 Safety Assessment of Autonomous and Connected Vehicles by a Model-based Traffic Simulation Framework

Mustafa Saraoglu, A. Morozov, K. Janschek, IfA, TU Dresden

14:00 Identifying relevant traffic situations based on human decision making

Christoph Sippl, F. Bock, B. Huber, AUDI AG; A. Djanatliev, R. German, Friedrich-Alexander Universität Erlangen-Nürnberg

BERTHA-BENZ-SAAL 1st floor

48 Volt Hybrid

Chairperson: Prof. Dr. Helmut Eichlleder

13:30 Comparing 48V mild hybrid concepts using a Hybrid-Simulation-Toolkit

Anita Bongards, S. Mohon, BorgWarner Inc.

14:00 From virtual to reality – how 48V systems and operating strategies improve diesel emission

Hannes Wancura, M. Weißbäck, H. Mitterecker, AVL List GmbH; C. Kaup, AVL Schrick GmbH; S. Lange, AVL Deutschland GmbH; S. Hoffmann, B. Unterberger, HMETC GmbH

14:30 Coffee break

KÖNIG-KARL-HALLE 2nd floor

15:00 Opportunities for a leading global technology provider in an era of uncertainty

Dr. Mathias Pillin, Executive Vice President with responsibility for Electrification, Robert Bosch GmbH

15:30 Panel discussion “The transformation of the automotive industry”

Moderation: Johannes Winterhagen, Redaktionsbüro delta eta

Participants:

Dr. Nicole Hoffmeister-Kraut, Ministry of Economic Affairs, Labour and Housing of Baden-Wuerttemberg
Georges Massing, Daimler AG
Dr. Mathias Pillin, Robert Bosch AG
Prof. Günther Schuh, e.GO Mobile AG
Prof. Marion A. Weissenberger-Eibl, Fraunhofer Institute for Systems and Innovation Research ISI / iTM, Karlsruhe Institute of Technology

16:30 Keynote

Dr. Nicole Hoffmeister-Kraut, Ministry of Economic Affairs, Labour and Housing of Baden-Wuerttemberg

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



REUTLINGEN ROOM 2nd floor**Networking and Architecture**

Chairperson: Prof. Dr. Karl-Ludwig Krieger

13:30 A lifecycle model to support continuous component evolution in embedded automotive systemsLukas Block, Universität Stuttgart;
O. Riedel, F. Herrmann, Fraunhofer IAO**14:00 Comparing current and future E/E-Architecture trends of commercial vehicle and passenger car**

Tenny Benckendorff, Bosch Engineering GmbH; A. Lapp, T. Oexner, T. Thiel, Robert Bosch GmbH

KARLSRUHE ROOM 1st floor**Lightweight Design**

Chairperson: Prof. Dr. Horst E. Friedrich

13:30 Lightweight brake rotors with thermally sprayed ceramic coatings as friction surfaces

Rainer Gadow, S. Popa, A. Killinger, Universität Stuttgart

14:00 Lightweight forging initiative III: forging technology contribution to lightweight designHans-Willi Raedt, Hirschvogel Automotive Group; T. Wurm, Georgsmarienhütte GmbH;
A. Busse, fka - Forschungsgesellschaft Kraftfahrwesen mbH**MANNHEIM ROOM** 1st floor**NVH**

Chairperson: Prof. Dr. Frank Gauterin

13:30 The impact of Pass-by Noise Legislation on the design of exhaust systems

Jan Krüger, P. Wink, Eberspächer Exhaust Technology GmbH & Co. KG

14:00 Simulation of torsional tire vibration and its relevant vehicle chassis parameters

Wenrui Han, G. Prokop, IAD, TU Dresden; T. Roscher, AUDI AG

14:30 Coffee break

17:00 End of the event



EXHIBITION

» 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 19 March 2019 | 8:00 – 18:00

Wednesday 20 March 2019 | 8:00 – 15:30

» LIST OF EXHIBITORS AT THE 19TH STUTTGART INTERNATIONAL SYMPOSIUM

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DLR Institut für Fahrzeugkonzepte

dSPACE GmbH

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und Fahrzeugmotoren Stuttgart (FKFS)

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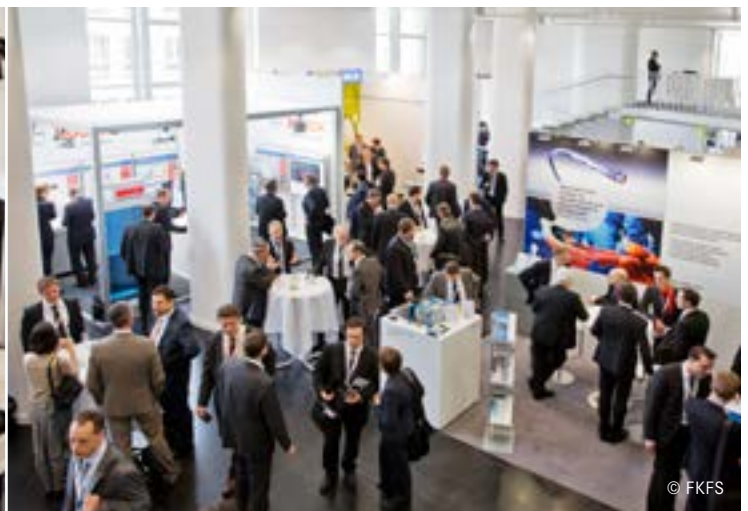
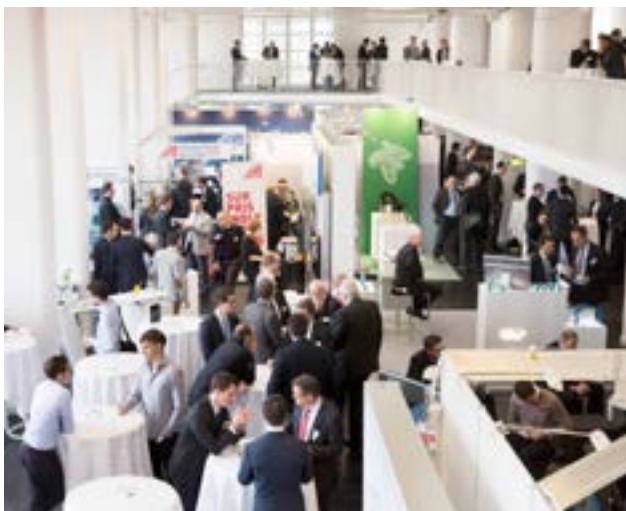
Your contact:

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INFORMATION ABOUT THE SYMPOSIUM

»» EVENT LOCATION

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

»» INFORMATION & CONTACT

Questions about the event
info@fkfs-symposium.de | Phone +49 711 4605376-8

»» ACCOMMODATION

Hotel Maritim
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Maritim Hotel Stuttgart | Seidenstraße 34 | 70174 Stuttgart
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»» SERVICE ON-SITE REGISTRATION

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

Opening times:
Tuesday, 19 March 2019 | 8:00 – 19:00
Wednesday, 20 March 2019 | 7:30 – 17:30
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With friendly support of 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.

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- » Lunch, cold drinks and coffee at break times
- » Access to the formal evening reception on 19 March 2019¹

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Institute for Internal Combustion Engines and Automotive Engineering IVK Further information: symposium@fkfs.de

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The Stuttgart International Symposium is aimed at the management and employees of automotive manufacturers and their suppliers working in research, development and production, as well as development service providers, software companies, associations, politicians and universities.

»» REGISTRATION

Register now at www.stuttgarter-symposium.de
You can find the conditions of participation for the event online at fkfs-veranstaltungen.de/3/terms-and-conditions/

»» IMPRINT

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