

# REGISTRATION

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## EMENDO EVENT & CONGRESS

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Surname | First Name

Company

Department

Address

Country | Postcode | City

Telephone

Fax

Email

### REGISTRATION FEE:

Including handout as book, lunch and coffee. In case of cancellation after 15<sup>th</sup> September 2015 full participation fee will be charged.

- Registration Fee: 875 € + 19% VAT
- Students of the University of Stuttgart: free admission (without further services)
- Students of other Universities: 119 € incl. VAT

### PAYMENT

- by banktransfer after invoice

### PLEASE COMPLETE

I agree to my name and my employer's name being printed on the official list of participants

- yes  no

Date | Signature

# INFORMATION

## 10<sup>TH</sup> FKFS CONFERENCE

Progress in Vehicle Aerodynamics and Thermal Management

## ORGANIZED BY

FKFS - Research Institute of Automotive Engineering and Vehicle Engines Stuttgart  
Prof. Dr.-Ing. J. Wiedemann

## LOCATION

Universität Stuttgart | Campus Stuttgart-Vaihingen | Pfaffenwaldring 47  
70569 Stuttgart | Germany

## LECTURES

Lecture hall V47.03

## TECHNICAL EXHIBITS

Suppliers of engineering services, measurement equipment and components present their latest developments in the lobby of the lecture hall.

29<sup>th</sup> September 2015: 8.30 to 16.30

30<sup>th</sup> September 2015: 9.00 to 15.30

## HOTEL INFORMATION

Commundo Tagungshotel | Universitätsstraße 34 | 70569 Stuttgart  
Phone +49 711 6863-5415  
Fax +49 711 6863-4898, 79 €, breakfast included

RES.-NO.: 250019470  
RES.-CODE: FKFS Conference

Please do the reservation by yourself. Thank you.



## YOUR WAY TO US



### Directions by car:

From interchange Stuttgart (Autobahnkreuz Stuttgart) with A 831 or from Stuttgart City with highway B14 as far as exit »Universität«.

### Directions by train:

From the main station by train S1, S2, or S3 to stop »Universität«.

### Directions by plane:

From Stuttgart Airport take by train S2 or S3 to stop »Universität«.



Forschungsinstitut für Kraftfahrwesen und Fahrzeugmotoren Stuttgart  
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Forschungsinstitut für  
Kraftfahrwesen und  
Fahrzeugmotoren  
Stuttgart

# 10. FKFS CONFERENCE

PROGRESS IN VEHICLE  
AERODYNAMICS AND  
THERMAL MANAGEMENT

29. - 30.09.2015

FKFS  
UNIVERSITY OF STUTTGART

# PROGRAM

TUESDAY, SEPTEMBER 29<sup>TH</sup>, 2015

The development engineer is concerned with the interactions of all systems in the complete automobile to ensure that totally different components and systems work together in harmony.

Opposite requirements have often/mostly to be fulfilled. As an example, customers are expecting maximum power from the engine of their cars, however the automobile is still required to deliver an acceptable level of fuel economy. Aerodynamic drag, cooling flow through the engine compartment, thermal management in general are key elements to be considered. Styling studios often need guidance so that their design is not only attractive but also aerodynamic. Customer demands for more comfort like low cabin noises, driving stability and safety often means additional weight. Again, not to increase the entire weight of the car this additional weight either has to be compensated in other components or systems or additional fuel consumption resulting from more weight has to be compensated by further aerodynamic measures.

The vehicle development process is highly complex. Various problems are to be solved in even shorter development cycles. This requires a high demand on simulation techniques by computation or testing. Thus, developing and implementing new simulation techniques which reproduce numerous real-world effects more efficient is mandatory.

To get latest information about new car development in general, new or improved testing techniques and calculation procedures, the FKFS-Conference is the ideal location. Furthermore, it is an ideal forum to meet leading experts from industry, universities and other institutions, to exchange ideas and discuss new ones. In addition, demonstrations will show the state of the art in measurement technology applied live in FKFS Wind Tunnels and Laboratories. An exhibition at the conference location will show newest development tools.

8:00 Registration

9:00 Welcome and Introduction  
Jochen Wiedemann, FKFS

## KEYNOTE

9:15 Perspectives on Wind Tunnel Technology – Past, Present and Future  
Joel A. Walter, Jacobs Technology

## SESSION 1: AEROACOUSTICS

Chairman: Adrian Gaylard, Jaguar Land Rover

10:00 The New Daimler Automotive Wind Tunnel:  
Acoustic Properties and Measurement System  
Ralph Buckisch, Hironori Tokuno, Hartmut Knoche, Daimler AG

10:30 Three Dimensional Beamforming for Improved Noise Source Localisation  
David Sims-Williams, Charalampos Kounenis, Robert Dominy,  
Durham University; Nicholas Oettle, Jaguar Land Rover

11:00 Coffee Break

## SESSION 2: THERMAL MANAGEMENT I

Chairman: Thomas Schütz, BMW Group

11:30 Virtual Comprehensive Thermal Modelling in Order to Increase  
the Component Durability for Environmental Sustainability  
Per Westin, Petter Östlund, Vijaya Shankar, ÅF Industry  
Begoña León, Jerry Sjösten, Tore Bark, Chrisophe Duwig,  
Alexander Broniewicz, Volvo Car Corporation

12:00 e-generation: Key Technologies for the Next Generation  
of Electric Vehicles – Thermal Management  
Nikolaos Karras, Timo Kuthada, Jochen Wiedemann, IVK/FKFS

12:00 Lunch

## SESSION 3: AERODYNAMIC METHODOLOGY

Chairman: Teddy Woll, Daimler AG

13:45 Designing Quieter HVAC Systems Coupling LBM and  
Flow-Induced Noise Source Identification Methods  
Adrien Mann, Franck Pérot, Mohammed Meskine Exa Corporation

14:15 Dynamic Mode Decomposition Analysis of Flow Fields from  
Lattice-Boltzmann Simulations  
Thomas Indinger, Christoph Niedermeier, TU München

14:45 Reduction of CO2 Emissions for Energy Efficient 2020 Passenger Cars  
by Applying the State of the Art Aerodynamic Research Techniques  
Per Hamlin, ÅF Industry  
Christoffer Landström, Alexander Broniewicz, Volvo Car Corporation

15:15 Multipoint Pressure Strip Measurement for Advanced CFD Validation  
Jakub Filipický Czech Technical University in Prague  
Pavla Polická ŠKODA AUTO a.s.

15:45 Aerodynamic Optimizations of the Audi Q5 Using the Continuous  
Adjoint Method in OpenFoam  
Thomas Blacha, AUDI AG

16:15 Introduction into Demonstrations  
Timo Kuthada, FKFS

16:35 Transfer to FKFS

16:45 Demonstrations  
» Full Scale Wind Tunnel: Transient Aerodynamics/3 Belt System  
» Model Wind Tunnel: Flow Field Measurements: PIV  
» Thermal Wind Tunnel: Cooling Air Volume Flow Measurements  
» Properties Lab: Thermal Material  
» Rennteam Uni Stuttgart e.V.: Designing for Speed

18:30 Buffet Dinner

21:00 End

# PROGRAM

WEDNESDAY, SEPTEMBER 30<sup>TH</sup>, 2015

8:30 Warm-Up  
Jorg-Dieter Vagt

## SESSION 4: THERMAL MANAGEMENT II

Chairman: Burkhard Hupertz, Ford Werke GmbH

8:45 Temperature Influence on Aerodynamic Simulations  
– Steady-State to Race-Track Applications  
Kristian Haehndel, Joshua J. Pryor, ThermoAnalytics  
Darren Coe, Robert Timmis, Aston Martin

9:15 Aerothermal Investigations in the Development  
of Commercial Vehicles  
Antoine Devesa, Stephan Kopp, MAN Nutzfahrzeuge AG

9:45 Identification Methodology of Key Coefficients for  
Cooling and Heat Resistance Prediction of Vehicles  
Takashi Takiguchi, Nobuyuki Ohta,  
Yasuhiro Takii, Yusuke Yano, Honda R&D Co., Ltd.

10:15 Component Temperature Collectives for Vehicle  
Thermal Management  
Jan Eller, Nils Widdecke, Jochen Wiedemann, IVK/FKFS  
Thomas Binner, Heinrich Reister, Daimler AG

10:45 Coffee Break

## SESSION 5: UNSTEADY AERODYNAMICS

Chairman: Atsushi Ogawa, Honda R&D Co., Ltd.

11:15 Unsteady Aerodynamic Vehicle Properties of the DriveAer Model  
in the IVK Model Scale Wind Tunnel  
Daniel Stoll, Timo Kuthada, Jochen Wiedemann IVK/FKFS  
Thomas Schütz, BMW Group

11:45 The Aerodynamics Development of a New Light Commercial  
Vehicle Concept Under Uniform and Transient Flow Conditions  
Andreas Kremheller, Nissan Technical Centre Europe  
Dr. Geoff LeGood, GL Aerodynamics  
Ivor Annetts, TotalSIM Ltd.

12:15 Crosswind Sensitivity of Road Vehicles  
Jan Vančura, Brno University of Technology  
Jan Slavík, ŠKODA AUTO a.s.

12:45 Lunch

## SESSION 6: AERODYNAMIC DEVELOPMENT

Chairman: Michael Pfadenhauer, Dr.-Ing. h.c. F. Porsche AG

14:00 Commercial Vehicle Aerodynamics Beyond the Standard  
Truck-Trailer-Combination  
Thorsten Frank, Daimler AG

14:30 An Investigation of Wheel Aerodynamic Effects For a Saloon Car  
Sofie Koitrant, Gianluca Orso-Fiet, Adrian Gaylard, Jaguar Land Rover

15:00 The New Daimler Automotive Wind Tunnel:  
Design and Aerodynamic Features  
Berthold Schwartekopp, Daimler AG

15:30 Comparison of On-Road and Wind Tunnel Testing  
of Side Window Soiling Using a New Method  
Hannes Vollmer, Holger Gau, Sven Klussmann, BMW Group  
Timo Kuthada, Jochen Wiedemann, IVK/FKFS

16:00 Farewell  
Jochen Wiedemann, FKFS

