

## 6<sup>th</sup> International Conference





14 - 16 February 2017 | Berlin, Germany

Solutions for smart thermal energy distribution, fast charging and battery's thermal management improvement

#### Learn from these experts among others:



Chairman:
Dr. Dirk Neumeister,
Head of Concepts and Systems
MAHLE International GmbH, Germany



Dr. Petr Šedivý, Head of Interior Aerodynamics and Methodology Development, **ŠKODA AUTO A.S., Czech Republic** 



Anouk Hol,
Concept Development Aerodynamics
and Energy Specialist,
VDL Enabling Transport Solutions, Netherlands



Dr. Christian Hainzlmaier,
Director Product Engineering
Electric Heating,
Webasto Thermo & Comfort SE, Germany



Alfred Jeckel, HV Battery Design and Testing, Thermal Management HV Components, **Daimler AG, Germany** 



Thomas Gillet, Thermal Systems Innovation PhD Researcher, **Renault SAS, France** 

3 FULL DAYS 14+ SPEAKERS 2 ROUND TABLES 1 PANEL 6 WORKSHOPS
UNLIMITED NETWORK OPPORTUNITIES

#### Why should you attend?

- Learn about contemporary strategies for energy efficient thermal comfort of passengers in passenger and commercial vehicles
- Understand how to monitor battery aging and prevent thermal runaways while increasing charging speed
- Learn from different OEM's experiences and achievements and find out what are their current challenges
- Improve systems efficiency and reliability through advanced modelling and simulation
- Advance powertrain architecture for optimum thermal distribution



#### Meet our contributing experts:



Chairman: Dr. Dirk Neumeister, Head of Concepts and Systems MAHLE International GmbH, Germany



Dr. Petr Šedivý, Head of Interior Aerodynamics and Methodology Development, ŠKODA AUTO A.S., Czech Republic



Anouk Hol, Concept Development Aerodynamics and Energy Specialist, **VDL Enabling Transport** Solutions, Netherlands



Dr. Christian Hainzlmaier, Director Product Engineering Electric Heating, Webasto Thermo & Comfort SE,

Germany



Alfred Jeckel, HV Battery Design and Testing, Management HV Components, Daimler AG, Germany



Thomas Gillet, Thermal Systems Innovation PhD Researcher, Renault SAS, France



Dr. Antti Lajunen, Post-Doctoral Fellow, McMaster Automotive Resource Centre, Canada



Markus Hackmann, Partner. Head of e-mobility. P3 Group, Germany



Dipl.-Ing. Jörg Gissing, Head of Thermal management department, Forschungsgesellschaft Kraftfahrwesen Aachen mbH, Germany



Dr. Bernhard Brunnsteiner, Lead engineer structural electrified powertrain systems, AVL List GmbH, Austria



Dr. Carlos Ziebert, Head of the Battery Calorimeter Center, Karlsruhe Institute of Technology, Germany



Christian Huber, CEO. Li.plus, Germany



Dr. Andreas Melcher, Senior Researcher. Karlsruhe Institute of Technology, Germany



Prof. Dr. Noshin Omar, Director of Battery Innovation Center Vrije Universiteit Brussel, Belgium

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### Conference Day One I Tuesday, 14 February 2017



08:30 Registration and welcome coffee



#### Who is who

Discover who else is participating in the conference. The matchmaking picture wall will help you identify who you want to meet at the conference. Sponsored by FUJiFILM



09:00 Opening by Dr. Dirk Neumeister

#### 09:10 10 kW, 800 Volts - new trends in future electric heating for passenger and commercial electric vehicles

- Trends in heater concepts and systems design
- · Perspectives of 800 Volts technology implementation for electric heating
- Implementing 10 KW heating for larger cabins
- Future trends in commercial vehicle segment

Dr. Christian Hainzlmaier, Director product engineering electric heating, Webasto Thermo & Comfort SE, Germany

09:50

#### Speed networking



Get in touch with the other conference guests in quick paced 1-1 meetings - make sure you bring a stack of business cards.



10:20 Refreshment break and networking

#### 10:50 Assessment of HV components in electrified trucks and buses

- Thermal modeling methodology
- · Thermal impact on aging of HV battery, e-motor and power electronics
- · Prediction of component lifetime during real world driving conditions
- Safety assessment of thermal runaways of Li-Ion batteries

Dr. Bernhard Brunnsteiner, Lead engineer structural electrified powertrain systems, AVL List GmbH, Austria

#### **DECENTRALIZED HEATING SOLUTIONS**

#### 11:30 Implementation as well as subjective and objective assessment of heating panels - thermal and acoustic evaluation

- · Methodical process for the design of panel heating systems
- · Concepts for panel heating systems and comparison of fluidic and electric systems
- Control concept for a electric panel heating system
- Proband studies for subjective thermal and acoustic comfort evaluation and comparison with objective measurements

Dipl.-Ing. Jörg Gissing, Head of thermal management department, Forschungsgesellschaft Kraftfahrwesen Aachen mbH, Germany

#### **DESIGN AND OPTIMIZATION OF ENERGY EFFICIENT HVAC SYSTEMS**

#### 12:10 Efficient thermal management within electric buses

- · Limited but possible opportunity for waste heat recovery
- Bus climate systems heating of the cabin without ICE
- Novel thermal technology approach: heat pump solution
- Latest development in thermal management available for city buses

Anouk Hol, Concept development aerodynamics and energy specialist, VDL Enabling Transport Solutions, The Netherlands

12:50 Networking luncheon

#### Development of a model of an automotive multi-evaporator air-conditioning system (MEAC)

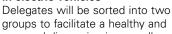
- State-of-the-art on MEAC
- Numerical simulation with LMS Imagine.Lab Amesim® 1D software
- Comparison with first experimental results from the test bench

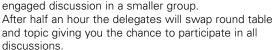
Thomas Gillet. Thermal systems innovation PhD researcher, Renault SAS, France

Round table session



#### **Energy efficient climate comfort** in electric vehicles





#### Table 1: Efficient strategies of air heating and cooling in e-vehicles

Moderator: Dr. Petr Šedivý, Head of interior aerodynamics and methodology development, ŠKODA AUTO A.S., Czech Republic

Table 2: Best practices in achieving energy balance

Moderator to be confirmed soon

16:00 Refreshment break and networking

#### THERMAL MODELLING AND SIMULATION

#### 16:30 Simulation of energy efficiency and performance of cabin thermal management in electric vehicles

- · Modeling of HVAC system with heat pump for electric vehicles
- Evaluation of system efficiency and performance
- Impact of thermal management on driving range
- · Efficiency of thermal systems vs. passenger comfort

Dr. Antti Lajunen,

Post-Doctoral Fellow, McMaster Automotive Resource Centre, Canada

Panel discussion



How can we ensure thermal comfort of passengers with spending as less energy as possible?



Selected experts of the day will

join the panel to discuss their vision and experiences, and come to the best solution in the following topics:

- Ideas on how to achieve perfect interplay between the drivetrain (e-motor, battery or hybrid engine) and the cabin heating system
- Low energy heating technologies & decentralized heating sources as an alternative to "conventional" air heating
- Best practices on smart materials implementation for heat extraction and cooling
- Materials and technologies for cabin insulation to reach the lowest heat dissipation

With the selected speakers of the day

Closing remarks of Dr. Dirk Neumeister and end of 17:50 day one

18:30 **Evening event** 



Join us for an informal evening get-together! This is an excellent opportunity for you to meet the other attendees and make new business contacts.



08:00 Registration and welcome coffee

08:30 Opening by Dr. Dirk Neumeister

#### INNOVATIVE BATTERY THERMAL **MANAGEMENT & TESTING METHODS**

#### 08:40 Advanced Battery Thermal Management for **Battery Electric Vehicles**

- Present and future thermal management options
- · Advanced simulation tools
- Increasing safety levels
- · Decreasing solutions' costs

Prof. Dr. Noshin Omar, Director of battery innovation center, Vrije Universiteit Brussel, Belgium

#### 09:20 PCM integration into battery packs - adding safety and increasing efficiency

- · An overview on passive cooling via Phase Change Materials (PCM)
- · Case study for battery thermal management of an all-electric vehicle
- Enhanced safety by passively preventing thermal runaway propagation

Christian Huber, CEO, Li.plus, Germany

10:00 Refreshment break and networking

#### 10:30 Thermal challenges of Li-lon batteries for future electric powertrains

- · Thermal characteristics of Li-Ion battery
- Fast charging
- · High energy density Li-Ion cells
- New cooling methods

Alfred Jeckel,

HV battery design and testing, Thermal management HV components, Daimler AG, Germany

#### 11:10 Methodologies for electrochemical and thermal characterization of Li-ion cells to improve thermal management and prevent thermal runaway

- Combined electrochemical-thermal characterization techniques for cells: battery calorimetry, thermography
- Influence of ageing phenomena on different modes of heat generation
- · Combination of experiments with multi-scale electric, electrochemical and thermal simulations
- Using thermal and thermodynamic data in battery management systems

Dr. Carlos Ziebert,

Head of the battery calorimeter center,

#### Karlsruhe Institute of Technology, Germany

#### 11:50 Battery price development until 2025

- Current state of the battery market for PHEV/ BEV
- Outlook on cell technology roadmap
- Deep dive in battery price development (Cell, Module, System)

Markus Hackmann,

Partner, Head of e-mobility, P3 Group, Germany

12:30 Networking luncheon

#### 14:00 Mathematical modelling and simulation of the thermal behaviour of Li ion cells with respect to thermal runaway

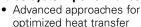
- · Mathematical modelling of the thermal evolution of Li-ion cells
- Implementation/Simulation
- · Classification of the thermal state of cells
- Incorporation in battery management systems

Dr. Andreas Melcher, Senior researcher,

Karlsruhe Institute of Technology, Germany

#### **OPTIMIZED THERMAL MANAGEMENT FOR E-MOTORS** (Co-located with Advanced E-Motor Technology)

#### Novel concepts to enhance heat transfer to significantly raise system performance



- Technical requirements and challenges
- · Pushing the limits: Effective solutions for smart heat transfer

Speaker to be confirmed soon

#### 16:30 R&D in thermal management of e-motors

- Data, analysis methods, and experimental techniques to improve and better understand thermal management of e-motors
- New materials and parts designs for better passive thermal performance
- Exploring possibilities of efficient heat transfer to compliment passengers comfort

Speaker to be confirmed soon

#### 17:10 Optimize design for cooling systems for e-motors

- Understanding thermal processes through simulation of e-motors
- · Design for thermal efficiency and optimal heat
- · Optimize working modes to achieve the best performance

Speaker to be confirmed soon

#### 17:50 Collocated technical round table discussions



Delegates will be sorted into two groups to facilitate a healthy and engaged discussion in a smaller group.

After twenty minutes the delegates will swap round table and topic giving you the chance to participate in all discussions.

**Table 1:** Thermal management strategies for modern E-Motors in order to achieve the best performance

Table 2: Comparing practices of thermal simulation in order to understand the way to an ideal design

Moderators to be confirmed soon

18:30 Closing remarks of Dr. Dirk Neumeister and end of conference





#### "You can succeed on your own terms but you can't succeed alone"

Join our interactive workshops and benefit from in-depth sessions, hosted by selected industry experts. Our industry experts will share their expertise with a limited group of peers. Our workshop leaders will actively foster open exchange and discussion to help you face challenges, discover solutions, and make decisions crucial to business excellence.

08:30 Workshop registration and welcome coffee

#### 09:00 - 11:30 Workshop A

#### Combined electrochemical-thermal characterization and modelling of Li-ion cells to prevent thermal runaway

Use this workshop to gain further understanding into the combined electrochemical-thermal characterization and modelling of Li-ion cells. The workshop will be divided in two parts

The first part will explore the characterization of Li-ion cells in battery calorimeters under different thermal conditions in order to study the influence of ageing phenomena on different modes of heat generation and to collect data that can be used in battery and thermal management systems.

In the second part, a general thermal model will be derived, discussed and extended with respect to thermal runaway. You will have the opportunity to discuss the application of such model and give simplifications of the model suitable for the use in thermal management systems and for solving issues of thermal runaway.

Moderators: Dr. Andreas Melcher, Dr. Carlos Ziebert Karlsruhe Institute of Technology, Germany

#### 09:00 - 11:30 Workshop B

#### Innovative e-motor design and smart material packaging

In this workshop you will discuss the following aspects: How will the next-generation e-motor design look like? What are the current challenges in e-motor technology design and how can they be addressed?

How does smart material packaging in e-motor technology look like?

And what are the ways to improve efficiency, cost, weight and production?

11:30 - 12:30 Networking luncheon

#### 12:30 - 15:00 Workshop C

Alternative heating solutions with heat-based cabin surfaces This workshop's primary goal is to discuss and find solutions for minimizing thermal energy consumption without compromising cabin comfort. Smart solutions on reducing climate control need with zone-based cabin temperature controls as well as possibilities of dashboard and steering wheel heating will be explored with the ultimate goal of energy optimization. What are the current trends and how can you advance cabin comfort to the next level?

#### 12:30 - 15:00 Workshop D

#### Global market trends of e-motor development from light to heavy duty vehicles

This session is designed to give you a profound insight into latest and upcoming market trends of e-motor technology for both, light and heavy duty vehicles. You will discuss the future trends of e-motor technology in Europe, USA and Asia. How is the European market preparing to react on the Chinese market? How will the next 1-5 years look like in this respect?

15:00 - 15:15 Networking break

#### 15:15 - 17:45 Workshop E

#### Implementation of modern heat transfer materials for passive cooling improvement and systems cost reduction

This workshop's primary goal is to learn about modern materials and their appliance in maximizing passive thermal energy dissipation without increase in systems cost. There are ways to achieve **optimal heat transfer** from electronic components – by using passive measures such as radiators and dissipation plates. Such systems costs are cheaper than the ones with active cooling thus a competitive advantage can be achieved. Join us and learn more about it.

#### 15:15 - 17:45 Workshop F

#### Thermal management for e-motors

To significantly improve efficiency of e-motor technology thermal management is of very high importance. This workshop is an interactive session which will focus on understanding the relevance of **heat transfer** when it comes **to improve performance** and efficiency of e-motors. In this interactive session you will discuss the recent findings related to innovation of thermal management and the possibilities and limitations.







Co-located with Advanced E-Motor Technology 2017

# Management for EV/HEV

14 - 16 February 2017 | Berlin, Germany

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- Conference documentation

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Please indicate your choice on our workshop day on Thursday, 16 February 2017 Workshop A 🔲 | Workshop B 🔲 | Workshop C 🔲 | Workshop D 🔲 | Workshop E 🔲 | Workshop F 🔲

- A: Combined electrochemical-thermal characterization and modelling of Li-ion cells to prevent thermal runaway
- Innovative e-motor design and smart material packaging
- Alternative heating solutions with heat-based cabin surfaces
- Global market trends of e-motor development from light to heavy duty vehicles
- Implementation of modern heat transfer materials for passive cooling improvement and systems cost reduction
- Thermal management for e-motors

Only one discount applicable per person.

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#### Venue and Accommodation

#### Berlin, Germany

Hotel information follow soon.

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