

5th mobileM Colloquium

October 30th - 31st, 2018

RWTH Aachen University, Germany



5th mobileM Colloquium

October 30th - 31st, 2018

The challenge to drastically reduce worldwide greenhouse gas emissions despite growing energy demand requires decisive changes in energy supply, conversion and storage technologies. For the transport sector the electrification of the drivetrain combined with increasing electrical power generation from renewable sources is a promising approach to decrease the dependency on shortening crude oil and gas resources.

5th mobileM Colloquium

The 5th mobileM Colloquium is a discussion panel for young researchers and professionals covering the areas of electrical energy storage, electrical drive systems, system simulation and control, topology and thermal management as well as range extender modules.

Research Training Group mobileM

mobileM (Integrated Energy Supply Modules for Roadbound E-Mobility) is a Research Training Group of RWTH Aachen University funded by Deutsche Forschungsgemeinschaft (DFG). It explores the physical foundations of electro-chemical energy storage for mobile propulsion and its combination with novel fuel-operated range extender units.

Presentation Program

Tuesday, October 30th, 2018

Welcome and Opening

10:30 Opening Address
Prof. Stefan Pischinger, VKA of RWTH Aachen University

Electrical Drive System

10:45 Techniques to Identify, Assess, and Control Electro-Thermal-Mechanical Response for Maximizing the Utilization of Power Electronic Modules
Timothy Polom, University of Wisconsin-Madison

11:15 Development of a Kinematic-Electric Powertrain for Future 48-Volt Electrical Systems
Daniel Butterweck, IEM of RWTH Aachen University

11:45 Design of High-Density and High-Frequency DC-DC-Converters
Alexander Stippich, ISEA-LEA of RWTH Aachen University

12:15 Influence of Mechanical Stress on the Magnetic Behavior of Electrical Steel Sheet
Jan Karthaus, IEM of RWTH Aachen University

12:45 Lunch Break

Poster Session

Tuesday, October 30th, 2018

Power Electronics

- 13:30** Design Challenges of SiC Devices for Low- and Medium-Voltage DC-DC Converters
A. Sewerger, ISEA of RWTH Aachen University
- 13:45** Reducing Device Stress and Switching Losses Using Active Gate Drivers and Improved Switching Cell Design
G. Engelmann, ISEA of RWTH Aachen University
- 14:00** Active DC-Power Filters for Switched Reluctance Drives under Single-Pulse Operation
A. Klein-Hessling, ISEA of RWTH Aachen University
- 14:15** Power Module Integrated Device Driver and Sensing Circuitry
M. Laumen, ISEA of RWTH Aachen University

Energy Storage

- Multiphysics-Simulation of the Gas Diffusion Layer (GDL) of a Polymer Electrolyte Membrane Fuel Cell (PEMFC)
S. Martin, LET of Universität Duisburg-Essen
- Chemically Modified Nanostructured Carbon Electrodes for Lithium-Oxygen Batteries
P. Wunderlich, AC of RWTH Aachen University
- Modelling of Silicon-Carbon-Composite Anodes
F. Frie, ISEA of RWTH Aachen University
- Modular Simulation Environment for Fuel Cell Systems
S. Tinz, VKA of RWTH Aachen University

Combustion Engines

- 13:30** Detailed Investigation of Emission Formation Mechanisms and Post-Reactions for a Gasoline Engine in Electrified Powertrains
S. Esposito, VKA of RWTH Aachen University
- 13:45** Laminar Burning Velocity of Market Type Gasoline Surrogates as a Performance Indicator in Internal Combustion Engines
R. Hesse, ITV of RWTH Aachen University
- 14:00** Model-Based Control of Combustion Rate for Compression Ignition Engines using Multi-Pulse Fuel Injection
D. Ritter, irt of RWTH Aachen University
- 14:15** Wearing-In of Journal Bearings under Non-Stationary Conditions
F. König, IME of RWTH Aachen University

Simulation & Control

- Thermal Comfort Simulation for Vehicle Cabins
D. Backes, ika of RWTH Aachen University
- Testbench for Investigating Insulation Failure due to High $\frac{du}{dt}$
V. Grau, ISEA of RWTH Aachen University
- Modelling and Simulation of Drive Train Acoustics
M. Jaeger, IEM of RWTH Aachen University
- Model-Based Control of Fuel Cell Hybrid Vehicles
V. Neisen, irt of RWTH Aachen University

Presentation Program

Tuesday, October 30th, 2018

Electrical Energy Storage

- 14:30** Some Aspects of Metallic Lithium in Batteries
Edwin Knobbe, BMW AG
- 15:00** Identification and Quantification of Various Effects Affecting the
Performance of Lithium-Ion Batteries within the Lifetime
Prof. Dirk Uwe Sauer, ISEA-ESS of RWTH Aachen University
- 15:30** Investigation of the Mechanical Stress Inside a Lithium-Ion Battery
and their Impact on Aging
Lisa Willenberg, ISEA-ESS of RWTH Aachen University
- 16:00** Liquid Cell in Situ TEM of Cathode Materials for Lithium-Ion Batteries:
Challenges and Perspectives
Simon Jakobi, IAC of RWTH Aachen University

Presentation Program

Wednesday, October 31st, 2018

Simulation & Control

- 08:30** EV Cabin Comfort – An Efficient Way to Optimize Drive Range
Marc Graaf, SynergyTM
- 09:00** Vehicle Simulation and Control under Consideration of the Thermal
Energy Demand
Prof. Lutz Eckstein, ika of RWTH Aachen University
- 09:30** Service-Oriented Software Architecture for Electric and
Autonomous vehicles
Bassam Alrifaae, Embedded Software of RWTH Aachen University
- 10:00** Simulation-Based Assessment of ADAS with Stochastic Variation
of Scenarios
Dominik Raudszus, ika of RWTH Aachen University
- 10:30** Coffee Break

Topology & Thermal Management

- 11:00** Dedicated Hybrid Transmission – The Hybrid Transmission of the Future?
Theodor Gassmann, GKN Driveline
- 11:30** Efficient Thermal Management Topologies for Electric Vehicles
Prof. Stefan Pischinger, VKA of RWTH Aachen University



Presentation Program

Wednesday, October 31st, 2018



- 12:00 Cooling of Power Electronics – Predicting the Cooling Efficiency of Impinging Jets
Enno Sabelberg, WSA of RWTH Aachen University
- 12:30 Optimized Operational Strategies for Thermal Management of Electric Vehicles
Carsten Wulff, VKA of RWTH Aachen University
- 13:00 Lunch Break

Range Extender Module

- 13:45 tbd
Jörg Wind, Daimler AG
- 14:15 Development of a 30 kW Fuel Cell Stack for a Range Extender Module
Prof. Angelika Heinzl, LET of Universität Duisburg-Essen
- 14:45 LES of Combustion and Pollutant Formation in Compression Ignition Engines
Marco Davidovic, ITV of RWTH Aachen University
- 15:15 Ammonia Cracking for Hydrogen Production for Fuel Cells
Florian Nigbur, LET of Universität Duisburg-Essen
- 15:45 Concluding Remarks