6th mobilEM Colloquium

November 5th - 6th, 2019
RWTH Aachen University, Germany
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.

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The 6th 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.

Location
Institute for Combustion Engines (VKA)
RWTH Aachen University
Forckenbeckstraße 4
52074 Aachen, Germany

Contact & Registration
Registration is free of charge.
Please announce your participation to:
Ms. Sandra Jaksch
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Presentation Program
Tuesday, November 5th, 2019

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

Simulation & Control
Session Chair: Prof. Dirk Abel, irt of RWTH Aachen University

10:45 Innovative Mechanical Components for Electric Traction Drives
Jochen Wolf, Muhr und Bender KG

11:15 Integrity and Collaboration in Dynamic Sensor Networks: Results from the DFG research Training Group I.C.Sens
Prof. Steffen Schön, Leibniz Universität Hannover

11:45 Experimental Investigations of 3D Anisotropic Mass Transfer Properties of Gas Diffusion Layers for Polymer Electrolyte Membrane Fuel Cells
Stephan Martin, LET of Universität Duisburg-Essen

12:15 Hierarchical Model Predictive Control of a Fuel Cell Hybrid Vehicle
Verena Neisen, irt of RWTH Aachen University

12:45 Lunch Break
# Poster Session

**Tuesday, November 5th, 2019**

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## Power Electronics
- **Intelligent Gate Drivers for Ultra Compact SiC Inverters**
  M. Laumen, ISEA of RWTH Aachen University
- **Comparison of High Performance Cooling Concepts for SiC Power Modules**
  A. Sewergin, ISEA of RWTH Aachen University
- **Development of a GaN-based Full-Bridge Converter with Digital-ly Adjustable Voltage Slopes**
  Vivien Grau, ISEA-LEA of RWTH Aachen University

## Energy Storage
- **Strange Gauge as Forecasting Method of the Cell Death**
  L. Willenberg, ISEA of RWTH Aachen University
- **In situ TEM Analyses of Cathode Materials in Lithium-Ion Batteries**
  S. Jakobi, AC of RWTH Aachen University
- **Energy Efficiency Comparison: Green Ammonia and Hydrogen as a Fuel**
  F. Nigbur, LET of Universität Duisburg-Essen

## Combustion Engines
- **Engine-Out Gas-Emission Simulation of Spark-Ignition Engines in Electrified Powertrains**
  S. Esposito, VKA of RWTH Aachen University
- **Large-Eddy Simulations of Combustion and Pollutant Formation in Compression Ignition Engines**
  M. Davidovic, ITV of RWTH Aachen University
- **AutoDiagnosis: Automatic Data-Driven Configuration of an Automotive Fault Diagnosis Algorithm Using Noisy Two-Stage Optimization**
  D. Stenger, irt of RWTH Aachen University

## Simulation & Control
- **Scenario-Based Testing of Connected Driving Functions**
  D. Raudszus, ika of RWTH Aachen University
- **Cooling of Power Electronics with Impinging Jets**
  E. Sabelberg, WSA of RWTH Aachen University
- **Modeling and Simulation of Drive Train Acoustics**
  M. Jaeger, IEM of RWTH Aachen University
- **An Energy Management Strategy for Fuel Cell Hybrid Train**
  K. Deng, IEM of RWTH Aachen University
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Electrical Energy Storage
Session Chair: Prof. Dirk Uwe Sauer, ISEA of RWTH Aachen University

15:15  Energy Storage beyond Lithium
       Prof. Hans Jürgen Seifert, Karlsruhe Institute of Technology

15:45  Approaching the nm Scale in the Electrical Characterization of Battery Materials
       Prof. Ulrich Simon, IAC of RWTH Aachen University

16:15  Mechanics in Silicon-Graphite Anodes
       Fabian Frie, ISEA-ESS of RWTH Aachen University

16:45  Air Electrode Design for Lithium-Oxygen Batteries
       Philipp Wunderlich, IAC of RWTH Aachen University

20:00  Dinner
       Restaurant „Karl's Wirtshaus“
       Markt 17-21, 52062 Aachen

Presentation Program
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Electrical Drive System
Session Chair: Prof. Kay Hameyer, IEM of RWTH Aachen University

08:30  Audi e-tron – The Way to Emissionfree Mobility
       Andreas Ruf, AUDI AG

09:00  Wide-Bandgap Materials – The Next Generation of Power Electronics for Propulsion Systems?
       Prof. Rik W. De Doncker, ISEA-LEA of RWTH Aachen University

09:30  Application-Specific Power Electronic Module for Highly-Integrated DC-DC-Converter
       A. Stippich, ISEA of RWTH Aachen University

10:00  Thermal Hardware-in-the-Loop Tests for Electric Traction Drive
       Konstantin Etzold, VKA of RWTH Aachen University

10:30  Coffee Break

Topology & Thermal Management
Session Chair: Prof. Stefan Pischinger, VKA of RWTH Aachen University

11:00  E-Mobility: Silent, but not Boring
       Karsten Mausolf, Volkswagen AG

11:30  Measurement of Temperature Fields inside Small Droplets: Approach and Related Challenges
       Prof. Reinhold Kneer, WSA of RWTH Aachen University
Presentation Program
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12:00  Consideration of Local Conditions for Thermal Comfort Simulations
Damian Backes, ika of RWTH Aachen University

12:30  Optimized Cooling Strategies for Electric Drivetrain Components
Carsten Wulff, VKA of RWTH Aachen University

13:00  Lunch Break

Range Extender Module
Session Chair: Prof. Angelika Heinzel, LET of Universität Duisburg-Essen

13:45  Honda Fuel Cell Vehicle Development and towards the Hydrogen Society
Takashi Moriya, Honda R&D Co., Ltd., Automobile R&D Center

14:15  Advanced Numerical Simulations of High-Efficiency Spark-Ignition Engines
Prof. Heinz Pitsch, ITV of RWTH Aachen University

14:45  Fuel Cell System Simulation – Membrane Water Management
Sören Tinz, VKA of RWTH Aachen University

15:15  An Optimized Laminar Burning Velocity Scheme for Very Lean High
EGR SI-Engine Burning Concepts
Raik Hesse, ITV of RWTH Aachen University

15:45  Concluding Remarks
Prof. Stefan Pischinger, VKA of RWTH Aachen University