Program for Combustion Control
June 28th-29th, 2017
Novotel in Aachen, Germany
The automotive world is facing rapid changes. Real world driving emissions are in the focus of the public, well-established technologies are reassessed and new players enter the global market. To achieve a sustainable and eco-friendly mobility the development of efficient and clean combustion engines is one of the key requirements. Most of the promising and novel approaches require innovative closed-loop control approaches, detailed physical models, powerful control logics and new sensor concepts.

The Symposium for Combustion Control was established in 2015 to foster the interaction between the scientific community and the automotive industry. Its focus are the latest theoretical and application-driven developments for the control of next generation combustion engines. After two exciting and successful symposia, the third Symposium for Combustion Control will take place on June 28th-29th, 2017, with the goal to continue the discussion of the recent topics. Due to its high reputation among researchers and the industry, Aachen is an excellent venue for this event.

Organizers

Prof. Dr.-Ing. Stefan Pischinger, Head of the Institute
Prof. Dr.-Ing. Jakob Andert, Junior Professor for Mechatronic Systems for Combustion Engines
Institute for Combustion Engines
RWTH Aachen University

Prof. Dr.-Ing. Dirk Abel, Head of the Institute
Dr. -Ing. Thivaharan Albin, Senior Engineer
Institute of Automatic Control
RWTH Aachen University

Prof. Dr.-Ing. Heinz Pitsch, Head of the Institute
Institute for Combustion Technology
RWTH Aachen University

Scientific Committee

We would like to thank the external members of our Scientific Committee for supporting the Symposium for Combustion Control.

Prof. Dr.-Ing. Michael Bargende
Chairman
FKFS Institute of Automotive Engineering and Vehicle Engines Stuttgart

Dr.-Ing. Hartwig Busch
Director of the Centre for Applied Low-Carbon Propulsion Systems
Coventry University

Prof. Dr. Peter Fussey
Industrial Research Engineering and Design University of Sussex
Technical Lead for Engine Control
Ricardo

Dr.-Ing. Michael Henn
Leader Department of Engine Mechanics and Electronics
Volkswagen AG

Prof. Dr.-Ing. Dr. h.c. Rolf Isermann
Head of the Research Group for Control Systems and Process Automation
Institute of Automatic Control of the Darmstadt University of Technology

Supported by

DFG Forschungsgemeinschaft
DFG Research Group 2401: Optimization-Based Multiscale Control of Low-Temperature Combustion Engines
Selected presentations of the Symposium for Combustion Control will be published in a special SCC volume of the renowned “International Journal of Engine Research” after the symposium.

Impact Factor: 1.479
Ranking:
- Transportation Science & Technology 16 out of 32
- Thermodynamics 26 out of 58
- Engineering, Mechanical 42 out of 132
Welcome and Opening
08:15 Welcome and Opening by the Organizing Professors

Keynote Speech
08:25 Combustion Control: Open Loop or Closed Loop - What is the Future?
Dr.-Ing. Michael Krüger
Senior Vice President
Robert Bosch GmbH

Emission Aftertreatment
09:10 Experimental Validation of a Virtual Engine-Out NOx Sensor for Diesel Emission Control
D. Escobar Valdivieso, P. Mentink, S. Külah, F. Willems, A. Forrai
TNO Automotive

09:40 Non-Linear MPC Applied to Multivariable Thermal and Chemical Control of SCR Aftertreatment
J. Sowman, A. Cruden
University of Southampton
D. Laila
University of Coventry
P. Fussey, A. Truscott
Ricardo UK Ltd

Diesel Engine Control
11:15 Combustion Control as an Enabler for Fuel Consumption, Variability and Calibration Work Load Reduction on Diesel Engines
B. Fulton, D. Roettger, M. van Nieuwstadt, C. Maerschank, Y. Tu
Ford Motor Company

11:45 Experimental Validation of Combustion Control with Multi-Pulse Fuel Injection
X. Luo, S. Velayutham
Eindhoven University of Technology
F. Willems
TNO Automotive

12:15 Experimental Investigation and Analysis of Performance and Emissions Characteristics of a Single-Cylinder Compression Ignition Dual-Fuel-Engine for Model-Based Combustion Control
M. Korkmaz, B. Jochim, J. Beeckmann, H. Pitsch
ITV, RWTH Aachen University
D. Ritter, D. Abel
IRT, RWTH Aachen University

12:45 Lunch
**Keynote Speech**

14:00  Combustion Control – An Enabler for Efficient and Reproducible Engine Systems Research

Prof. Dr. Christopher Onder
Department of Mechanical and Process Engineering
ETH Zurich

---

**Real-Time Applications**


J. Fortl, J. Keller, J. Beer
Continental Automotive GmbH
J. Macek
Czech Technical University in Prague

15:15  Crank-Angle Resolved Semi-Physical Combustion Model with Parameter Estimation for Real-Time Application

A. Weber, R. Isermann
Technische Universität Darmstadt

15:45  Real-Time Diesel Engine Modelling for HiL Based ECU Calibration

R. Tharmakulasingam, M. Kötter, T. Scheel, J. Richenhagen
FEV Europe GmbH
F. Xia, S.-Y. Lee, J. Andert
VKA, RWTH Aachen University

16:15  Break

---

**Control-Oriented Modeling**

16:45  MIMO Control of a Diesel Engine Using a Control-Oriented Model

Y. Yamasaki, R. Ikemura, M. Takahashi, S. Kaneko, A. Uemichi
University of Tokyo

17:15  Time-Continuous Modeling and Nonlinear Modelbased Predictive Control of Gasoline Controlled Auto Ignition – Simulative Validation

E. Nuss, T. Albin, D. Abel
IRT, RWTH Aachen University
J. De Schutter, M. Diehl
Albert-Ludwigs-Universität Freiburg

17:45  Modeling and Control of a Free-Piston Linear Generator

M. Keller, D. Abel, T. Albin
IRT, RWTH Aachen University
B. Jochim, J. Beeckmann, H. Pittsch
ITV, RWTH Aachen University

19:00  Dinner
**Dinner on June 28th, 2017**

19:00  Reception and Welcome

The dinner will take place at the restaurant LivingRoom close to the historical city hall. The dinner is free of charge for attendees. The fee for accompanying persons is € 50.

Address:

LivingRoom
Büchel 22
52062 Aachen

+49 241 21131
www.livingroom-aachen.de
**Keynote Speech**

08:15  Partially Premixed Combustion – Temperature Sensitive as HCCI and Injection Timing Sensitive as Diesel  
Prof. Bengt Johansson  
Clean Combustion Research Center  
King Abdullah University of Science and Technology

**Combustion Diagnostics**

09:00  Comparison Between Pressure- and Ion Current-Based Closed-Loop Combustion Control Performance  
N. Cavina, N. Rojo, A. Businaro  
University of Bologna

09:30  Combustion Diagnosis and Phase Estimation Based on a Modified Form Tandem Ion Current Detection System on a PFI Engine  
Y. Chao, H. Lu, J. Deng, Z. Hu, Z. Wu, L. Li  
Tongji University

**Poster Session**

10:00  Poster Presentations

10:45  Break

**Combustion Modeling**

11:15  CFD Investigations of Direct Water Injection for Control of HCCI Combustion  
B. Lawler, M. Rahimi Boldaji, A. Sofianopoulos, S. Mamalis  
Stony Brook University

11:45  Development of a Tabulated Chemistry-Based Approach for Combustion and Emissions Real-Time Simulations Using Detailed Chemistry  
A. Matrisciano, A. Borg, H. Lehtiniemi  
LOGE AB  
T. Franken  
Ford-Werke GmbH  
C. Netzer, F. Mauss  
Brandenburg University of Technology

12:15  A Physics-Based Model for Real-Time Prediction of Ignition Delay of Multiple Fuel Injections in Direct Injection Diesel Engines  
J. Samuel, A. Ramesh  
Indian Institute of Technology Madras

12:45  Numerical Investigation of Load Effects on Particulate Emissions in Gasoline Spark-Ignition Engines  
E. Distaso, R. Amirante, P. Tamburrano  
Politecnico di Bari  
R. Reitz  
University of Wisconsin-Madison

13:15  Final Remarks and End of the Symposium
Registration

Please register for the Symposium for Combustion Control at:
www.scc-aachen.de

Payment

The registration fee of € 650 (plus 19% VAT) also includes the dinner on June 28th as well as the printed and digital proceedings. Your registration will be confirmed by the invoice which will be sent to you. Registration is completed after receipt of payment.

Please note that in case of cancellation prior to May 15th, 2017, the participant’s fee will be reimbursed (less € 65 exclusive of 19% VAT for administrative costs). After that, the participant’s fee cannot be reimbursed.

Hotel Reservation

To receive special rates at the Novotel, please book your hotel room only by phone or e-mail:
Phone: +49 241 5159-100
E-mail: h5326-RE1@accor.com
Password: Symposium for Combustion Control

Further hotels can be found here:
http://www.aachen-tourist.de/hotels
Phone: +49 241 18029-50

Parking

We recommend to use the Novotel underground car park.

General/Authors

Serge Klein
Institute for Combustion Engines
RWTH Aachen University
Phone: +49 241 80-48105
E-mail: klein_se@vka.rwth-aachen.de

Attendees

Birgit Schaefer-Hamm
Institute for Combustion Engines
RWTH Aachen University
Phone: +49 241 80-48020
E-mail: hamm@vka.rwth-aachen.de

Venue

Novotel Aachen City
Peterstraße 66, 62062 Aachen, Germany
Phone: +49 241 51590
www.novotel.com