

## Tuesday, September 26, 2023

7:10 a.m.

Anmeldung / **Registration**

08:10

H. Zellbeck; TU Dresden

Begrüßung / **Salutation**

08:30 a.m.

Á. Diez, C. Leroux, Z. Baumann, R. Böwing; INNIO Jenbacher GmbH & Co OG  
R. Berger, R. Ryser, M. Gisiger; Accelleron Turbo Systems Switzerland Ltd.

**Supercharging of hydrogen engines for decentralized power generation**

Aufladung von Wasserstoff-Motoren zur dezentralen Energieversorgung

09:00 a.m.

D. Woike, T. Konrad, A. Morano, P. Holand; MAN Energy Solutions SE

**Data-based methods for the efficient development of large bore engine for sustainable fuels**

Datenbasierte Methoden zur effizienten Entwicklung von Großmotoren für nachhaltige Kraftstoffe

09:30 a.m.

P. Grzeschik, P. Biewer, C. Funke; DEUTZ AG

T. Leonard, G. Iosifidis, J. Ehrhard; IHI Charging Systems International GmbH

**Layout and Development of a Turbocharger for a Hydrogen Internal Combustion Engine in Mobile Machinery Applications**

Auslegung und Entwicklung eines Abgasturboladers für einen Wasserstoff-Verbrennungsmotor in Mobilien Arbeitsmaschinen

10:00 - 10:30 a.m. – *Pause / Break*

10:30 a.m.

B. Seba, Y. Hohl, U. Weiß; Liebherr Machines Bulle SA, Switzerland

**Decarbonisation of heavy-duty Off-Road engines using hydrogen/HVO fuel: A review of the power train design**

11:00 a.m.

L. Jaeger, P. Pribyl, F. Akar, P. Foucek, F. Eckl, P. Davies;

Garrett Motion, Czech Republic

F. Paulicelli, S. Kumar, M. Mirzaeian; FPT Industrial, Italy

S. Langridge; FPT Industrial, Switzerland

**Divided Flow VNT for HD Truck Engines**

11:30 a.m.

B. Biedermann, T. Malischewski, S. Löser; MAN Truck & Bus SE

*Supplement to last year's speech:*

**MAN marine dual fuel engine (hydrogen / diesel) for reduced CO<sub>2</sub> emissions**

*Ergänzung zum letztjährigen Vortrag:*

MAN Marine Dual Fuel Motor (Wasserstoff / Diesel) zur CO<sub>2</sub> Reduzierung

12:00 a.m.

J. Achenbach; RWTH Aachen University, Lehrstuhl für Thermodynamik

mobiler Energiewandlungssysteme (TME)

B. Jagodzinski, A. Schloßhauer, M. Stadermann, L. Virnich;

FEV Europe GmbH

**Boosting Concepts for Hydrogen Combustion Engines for Commercial Applications**

Aufladekonzepte für Wasserstoffverbrennungsmotoren für Nutzfahrzeuganwendungen

12:30 - 02:00 p.m. – *Pause / Break*

02:00 p.m.

K. Prevedel, A. Eckart, W. Hochegger, P. Kapus, H. Seitz;

AVL List GmbH, Austria

**From Theory to Practice: Boosting of future Engines – dedicated hybrid Engines and Hydrogen Fuel**

Von der Theorie zur Praxis: Aufladung in zukünftigen Motorkonzepten - Motoren für Hybridantriebe und Wasserstoff

02:30 p.m.

J. Sierra Castellanos, N. Bontemps; Garrett Motion SA, France

M. André; IFP Energies nouvelles, France

L. Rolando; Politecnico di Torino, Italy

**Project PHOENICE and the role of an E-Turbo in a high efficiency PHEV**

03:00 p.m.

N. Brinkert, S. Hoyer, F. Weinert; Mercedes-Benz AG

M. Glose, N. Illian, M. Karres; Mercedes-Benz-AMG GmbH

**The innovative turbocharging concept of the new 4 cylinder AMG engine M139 L**

Die innovative Abgasturboaufladung des neuen 4-Zylinder AMG Motors M139 L

03:30 - 04:00 p.m. – *Pause / Break*

04:00 p.m.

D. Dörner, R. Ruhnow; Continental Aerospace Technologies GmbH

J. Hunt; Continental Aerospace Technologies Ltd., USA

**Supercharging in aviation; turbocharging for altitude compensation**

04:30 p.m.

N. Taniguchi, T. Kanzaka; Mitsubishi Heavy Industries, Ltd., Japan

T. Verstraete; von Karman Institute for Fluid Dynamics, Belgium

**Parametric Optimization of Centrifugal Compressor using Adjoint Method**

05:00 p.m.

K. Douglas, S. Szymko; Bowman eTurbo Systems, UK

**Development and validation of a two-stage electric compressor system to overcome turbocharger lag on high-speed internal combustion engines**

05:30 p.m.

A. Sajedin, P. Verma, R. Dewhirst, C. M Wilson, S. J. Mann, J. Archer;

Cummins Turbo Technologies, UK

**Numerical and Experimental Investigation of Performance of Split nozzle, Twin-entry and Sector-divided turbines**

08:00 p.m. – *Abendveranstaltung / Evening Event*

## Wednesday, September 27, 2023

08:30 a.m.

D. Kaiser, B. Ebersbach, L. Beckmann, M. Bertau;

TU Bergakademie Freiberg, Institut für Technische Chemie

M. Bertau, Fraunhofer Institute for Ceramic Technologies and Systems IKTS,

Fraunhofer Technology Center for High-Performance Materials THM

**E-Fuels – more than sustainable?**

E-Fuels – mehr als nur nachhaltig?

09:00 a.m.

P. Thorau, K. Mahler, K. Stenzel, C. Reiser; WZ Roßlau gGmbH

B. Buchholz; Universität Rostock

**Analysis of requirements for turbocharging systems of future ammonia engines**

Anforderungsanalyse für Aufladesysteme zukünftiger Ammoniakmotoren

09:30 a.m.

K. Gschiel, S. Roiser, M. Schneider, K. Wilffing, H. Eichlseder; TU Graz, Austria

**Measures to improve the transient behaviour of hydrogen ICE**

Maßnahmen zur Verbesserung des Instationärverhaltens von Wasserstoff-Verbrennungsmotoren

10:00 - 10:30 a.m. – *Pause / Break*

10:30 p.m.

S. Oezdemir, F. Schmitt, C. Rudek; BorgWarner Systems Engineering GmbH

V. Cogo, G. Prante, K. Wittek; Heilbronn University

**The Boosting system for an Off-road Hydrogen Internal Combustion Engine**

11:00 p.m.

T. Waldron, J. Brin; SuperTurbo Tech, USA

H. F. Seitz; AVL List GmbH, Austria

**SuperTurbo Equipped Hydrogen Internal Combustion Engine Test Results**

11:30 p.m.

N. S. Al-Hasan, I. Sandor, P. Naik, S. Nibler, J. Simader;

BMTS Technology GmbH & Co. KG

A. H. Taylor; BMTS Technology US Corporation, USA

**Boosting Technology Comparison for Fuel Cell Applications**

Vergleich von Aufladetechnologien für Brennstoffzellenanwendungen

12:00 p.m.

A. Dafis, D. Wintergoller, H. Rottengruber;

Otto-von-Guericke-Universität Magdeburg, Institut für Mobile Systeme (IMS)

**Boosting of Closed-Cycle Hydrogen Engines – Comparison of Basic Topologies**

Aufladung von Wasserstoff-Kreislaufmotoren – ein Vergleich grundsätzlicher Topologien

12:30 - 02:00 p.m. – *Pause / Break*

02:00 p.m.

M. Graßmeyer, T. Roß, F. Atzler, R. Werner;

TU Dresden, Lehrstuhl Verbrennungsmotoren und Antriebssysteme

**CO<sub>2</sub> neutral and efficient – new fun to drive with a supercharged motorcycle engine**

CO<sub>2</sub>-Neutralität und Effizienz – Neuer Fahrspaß mit aufgeladenem

Motorradantrieb

02:30 p.m.

C. Martinetz, W. Eifler; Ruhr-Universität Bochum

C. Blum; TTI Turbo Technik Innovation GmbH

**Nonlinear MPC Load Control Approach for a turbo-electrical charged Gasoline Engine**

Nichtlinearer modellprädiktiver Regelungsansatz für einen turboelektrisch aufgeladenenen BDE-Motor

03:00 p.m.

P. Traversa, M. Elicker, N. Morelli, S. Harges;

Schaeffler Technologies AG & Co. KG

**Innovative Air-Path Concepts: Support for Emission Legislation Compliance and alternative Combustion Processes for Heavy-Duty Engines**

Innovative Luftpfad-Konzepte: Unterstützung zur Einhaltung der Emissionsvorschriften und alternativer Brennverfahren für Schwerlast-Motoren

03:30 p.m.

J. Jorzick; Oerlikon Balzers Coating Germany GmbH

O. Hunold; Oerlikon Surface Solutions AG Pfäffikon, Liechtenstein

**Oerlikon surface solutions for Turbo Chargers and Fuel Cell systems**

04:00 p.m.

H. Zellbeck; TU Dresden

Schlusswort / **Conclusion**

## 27<sup>th</sup> SUPERCHARGING CONFERENCE 2023

### Conference Chairman

Prof. Dr.-Ing. H. Zellbeck  
Technische Universität Dresden

E-mail: [info@aufladetechnische-konferenz.de](mailto:info@aufladetechnische-konferenz.de)  
Homepage: <https://aufladetechnische-konferenz.de>

### Conference Location

Hilton Dresden  
An der Frauenkirche 5, 01067 Dresden, Germany

### Registration

S-GET EVENT & SERVICE GmbH  
Sachsenallee 28  
01723 Kesselsdorf, Germany

Telefon: +49 35204-793030  
Fax: +49 35204-793029  
E-Mail: [service@s-get.de](mailto:service@s-get.de)

The registration form at <https://aufladetechnische-konferenz.de> contains further information and the general terms and conditions.

Participation Fee If registered	onsite	virtual participation
Regular attendanc	1.695,00 €	1.200,00 €
University members	1.200,00 €	950,00 €

All prices plus 19 % VAT!

The conference fee includes the participation in the conference, the conference documents as well as for the participants on site the catering during the coffee and lunch breaks and the evening event.

Participation is free of charge for speakers.

### Associated Exhibition

An associated exhibition runs alongside the conference where interested companies will have the opportunity to present their products, processes and services on the subject and to explain them through personal consultation. Further information can be obtained from the conference management or at our website <https://aufladetechnische-konferenz.de>.

### Hotel Reservation

Please have a look at our conference website for booking information:  
<https://aufladetechnische-konferenz.de>.



## 27<sup>th</sup> SUPERCHARGING CONFERENCE 2023

### New: hydrogen engines, charging systems for fuel cells, Methanol and Ammonia engines

The 27<sup>th</sup> SUPERCHARGING CONFERENCE on September 26<sup>th</sup> / 27<sup>th</sup> 2023 in Dresden provides a forum to experts from all over the world. The latest developments in supercharger techniques will be presented by OEMs and suppliers. The conference will be held as a hybrid event: interested parties can participate in the face-to-face event or virtually via live stream.

The aim of the supercharging is the increase of the brake mean effective pressure. The engine power increase had to prove a significant reduction of the specific fuel consumption. In order to improve the delayed boost pressure while the high load demand increases, new solutions have been developed. Especially with regard to vehicle engines, nowadays downsizing (less cylinder, lower total displacement) makes a high demand on the dynamic behavior. Solutions are: smaller exhaust gas turbochargers, the variable turbine geometry or sequential turbocharging as well as multi-stage charging. In addition to these thermodynamic systems, other sources of energy have been used in order to make boost pressure temporarily available: kinetic energy with the help of a mechanical charge or electrical energy with the help of an additional electric charge. The exhaust gas recirculation provides an important contribution to reduce the NO<sub>x</sub>-emission. In addition to the recirculated exhaust gas the engine needs to be supplied with enough fresh air. Thus, a significant increase of the boost pressure is required. Studies on Real Driving Emission (RDE) show that high dynamic load demands increase the NO<sub>x</sub> and particle emission, super-

charging can reduce them.

### New requirements are posed by hydrogen engines with increased boost pressure demand in lean-burn operation, as well as by the fuel cell.

The optimization of the supercharging for internal combustion engines requires a precise knowledge of the whole system behavior. Simulation models help to predict the operational behavior very well. The 3D calculation is an important tool for the optimization of air and exhaust path. Nowadays the control of these systems is also done by real-time models. At the high dynamic engine test bench the whole system is tested and the model-based control is optimized by additional structures.

The 27<sup>th</sup> SUPERCHARGING CONFERENCE on September 26 / 27 2023 in Dresden focuses on recent results and development methods. Speakers will be engine developing engineers, manufacturers of supercharging systems and of other important components. The engines that will be discussed at the conference offer a wide range, from car engines up to the slow-speed two-stroke marine engine.

This conference offers an excellent exchange of knowledge and experience for everyone working on the development of supercharged powertrains.

The conference will be held in German and English supported by simultaneous translation from German into English language.

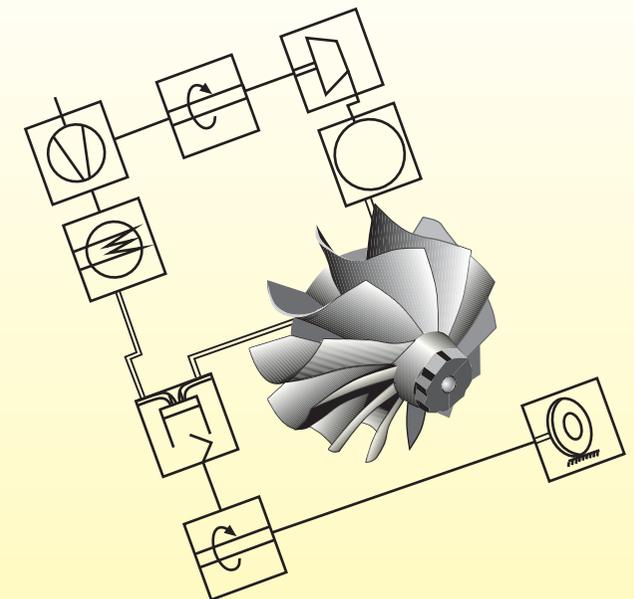
### Main focus subjects

- New supercharged diesel-, gasoline- and gas engines
- **New: Hydrogen engines**
- **Methanol and Ammonia engines**
- Innovative (electric) supercharging conceptions and components
- **New: Charging systems for fuel cells**
- Numerical simulation methods
- Charging to reduce exhaust emissions
- Complete system performance; control strategies
- Development methods and tools for components and for complete engines

## 27<sup>th</sup> SUPERCHARGING CONFERENCE 2023

SEPTEMBER 26 - 27, 2023, DRESDEN

### Conference program



## 27. AUFLADETECHNISCHE KONFERENZ 2023

26. - 27. SEPTEMBER, DRESDEN

### Tagungsprogramm