Vienna Motor Symposium 2023

44th International Vienna Motor Symposium 26 – 28 April 2023

- Driveline Technologies and their Ecological Balance
- Charging Technologies
- Hydrogen Storage
- Powertrain Electrification
- New Battery Technologies
- Powertrain Electrification – Components
- Hybrid Technologies
- Hydrogen Engines
- Fuel Cell Propulsion
- Regenerative Fuels / E-Fuels
- Hydrogen Combustion Process
- Alternative Combustion Processes
- New Engine Concepts / Emission Reduction
- Electric Drives
- Autonomous Driving / Connectivity

Virtual Hall

- Additional videos

Programme as of December 2022

AVL

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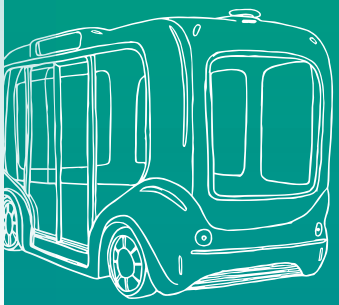
We are driven by a passion to examine the science, mechanics and philosophy of movement. By using all our imagination, creativity and pioneering spirit, we create a world that is climate neutral and one that makes safe, comfortable, green mobility a reality for everyone.

Some will call it a distant dream.
We call it **Reimagining Motion.**



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Dear Ladies and Gentlemen,

We are pleased to send you the programme for the 44th International Vienna Motor Symposium.

The focal points of this year's symposium are future climate-neutral drive solutions, co-existence of batteries, fuel cells and combustion engines and the consequences of the required turnaround for the automotive industry. Sustainability, current trends in drive systems, energy sources for mobility and scenarios for the automotive industry are further main topics.

For the first time at the Vienna Motor Symposium, the key subjects will be presented by more than 80 speakers from science, the automotive and supplier industries in three lecture halls in the Vienna Hofburg. The recordings of the lectures will also be available to the participants on a web platform after the event.

Further in-depth video lectures that could not be included in the face-to-face programme due to capacity will be available in addition in "virtual sessions" on the web platform during and after the event.

This high-profile lecture programme is supplemented by an accompanying exhibition at which the leading automotive and component companies present the latest technologies and developments.

On the first evening of the 3-day event, we invite participants and accompanying persons to a reception with the opening of the exhibition in all exhibition areas of the Hofburg Congress Center Vienna.

The mayor's invitation to a traditional "Wine Heuriger" gives the opportunity to end the second day of the congress in a relaxed atmosphere.

For accompanying persons, we offer two exclusive half-day tours to visit interesting sights in Vienna.

We look forward to your registration for the symposium and hope to welcome you personally in Vienna.

Best Regards

Univ.-Prof. Dr. Bernhard Geringer
President of the Austrian Society for Automotive Engineers

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Vienna Motor Symposium 2023

44th International Vienna Motor Symposium 26 – 28 April 2023

GENERAL INFORMATION

Congress with Exhibition

Dates:

Wednesday,	26 April 2023, 18.00 – 21.00 hrs. Reception and Opening of the Exhibition
Thursday,	27 April 2023, 8.30 – 18.30 hrs. Symposium and Exhibition 27 April 2023, 20.00 hrs., Departure Hofburg "Wine Heuriger" hosted by the Mayor of Vienna
Friday,	28 April 2023, 8.00 – 17.15 hrs. Symposium and Exhibition

Congress Venue:
Conference Centre Hofburg Vienna
Heldenplatz, 1010 Vienna, Austria

Chairman:
Univ.-Prof. Dr. B. **Geringer**
President of the Austrian Society of Automotive Engineers (ÖVK) and
Director of the Institute for Powertrains and Automotive Technology,
Vienna University of Technology, Getreidemarkt 9, 1060 Vienna, Austria

Honorary Chairman:
Univ.-Prof. Dr. H. P. **Lenz**
Founder of the Austrian Society of Automotive Engineers (ÖVK) and
former Director of the Institute for Powertrains and Automotive Technology,
initiator of the International Vienna Motor Symposia

Organizer:
Austrian Society of Automotive Engineers (ÖVK)
Elisabethstrasse 26, 1010 Vienna, Austria
Phone +43/1/585 27 41-0
https://wiener-motorensymposium.at/en/
info@oevk.at

To the Website

Organization of the Symposium:
The International Vienna Motor Symposium is organized by the Austrian Society of Automotive Engineers (ÖVK) and the Institute for Powertrains and Automotive Technology (IFA), Vienna University of Technology.

ORGANIZATIONAL INFORMATION

Registration:

The registration is possible online at https://wiener-motorensymposium.at/en/.

The General Terms and Conditions as well as the Data Protection Statement can also be found at https://wiener-motorensymposium.at/en/.

Registration Fee: € 2.640,-- incl. 20% VAT

Registration Fee ÖVK Membership: € 2.556,-- incl. 20% VAT

The registration fee includes the admission to the lectures, the exhibition, the web platform, the symposium documents, reception and exhibition opening, the "Wine Heuriger", lunch on Thursday and Friday, coffee during the breaks as well as bus transfer to the airport at the end of the symposium.

Austropa Interconvention will confirm receipt of the online registration immediately, but this is not the authorization to participate in the symposium.

A confirmation of registration (incl. invoice) or another information will follow in a few days.

The Motor Symposium is planned as a 3-day face-to-face event.

Payment:

The invoice must be paid within 3 weeks.

Booking and Cancellation Conditions Symposium Participation:

Changes and cancellations must be made in writing to Austropa Interconvention (Email: motoren@austropa.at).

For cancellation after **10 March 2023**, we are obliged to request full payment of complete registration fees, as all orders will have been placed.

Lecture Duration:

20 minutes each, followed by 10 minutes' discussion

Language of Lectures:

German and English (simultaneous translation)

Conference Papers:

Lecture texts in electronic form

Proceedings (in printed form) for an additional charge

ORGANIZATIONAL INFORMATION

Web Platform:

The web platform of the symposium provides information on the lectures, the lecturers and the exhibition. From the symposium onwards, the digital congress documents as well as the recordings of the face-to-face sessions and the video presentations of the virtual session will be available there for a limited period.

Participants will receive their login data for the web platform a few days prior to the symposium.

Student Registration:

We offer Austrian and foreign students a limited number of free student places. Certain conditions must be met if you wish to participate in the symposium. For more detailed information, please visit our website https://wiener-motorensymposium.at/en/ where you will find the application form.

The period for submitting applications will end on **28 February 2023**.

Bus Service:

Friday, 28 April 2023, 17.30 hrs. (at the end of the symposium), from entrance Congress Centre Hofburg to Vienna Airport (Schwechat). Arrival at Vienna Airport approx. 18.15 hrs. Buses will be marked "Wiener Motorensymposium".

Hotel Booking:

Austropa Interconvention has pre-reserved allotments in hotels of different categories in walking distance to the symposium venue. The booking can be arranged together with your registration to the symposium.

Booking and Cancellation Conditions Hotel:

Changes and cancellations must be made in writing to Austropa Interconvention.

Jakov-Lind-Straße 15, 1020 Vienna, Phone +43/1/588 00/521, Email: **motoren@austropa.at**.

For cancellation of hotel reservation between **28 February 2023 and 10 April 2023** a charge equivalent to the price of the first night at the hotel will be made. For cancellation after **10 April 2023** or non-occupancy of reserved rooms, the total amount of the invoice will be charged from the credit card.

Exhibition:

This top-level lecture programme is accompanied by an exhibition at which leading automotive and component companies present latest technologies and developments.

If you are interested in an exhibition space, please contact our partner company Media-Plan, Email: mp@media.co.at.

WEDNESDAY, 26 April 2023

18:00 **Reception and Opening of the Exhibition**
Registration until 21:00

THURSDAY, 27 April 2023 FESTSAAL

07:30 **Registration**

PLENARY OPENING SESSION
Chairman: Univ.-Prof. Dr. B. **Geringer**, Vienna University of Technology

08:30 **OFFICIAL OPENING**

08:45 Dipl.-Kfm. Thomas **Schmall**, Member of the Volkswagen AG Board of Management responsible for Technology and CEO Volkswagen Group Components, Volkswagen AG, Wolfsburg:
The Powerhouse: An Ecosystem from Volkswagen

09:05 Shailesh **Chandra**, Managing Director, Tata Motors Passenger Vehicles Ltd. and Tata Passenger Electric Mobility Ltd., Mumbai:
India's Path towards Electrification

09:25 Sung Hwan **Cho** PhD, CEO and President, Hyundai Mobis Co., Ldt., Seoul:
"The Future Mobility Vision of Hyundai Motors Group" – How Hyundai Motors Group is Preparing for the Future Mobility Ecosystem

09:45 Dr. Stefan **Hartung**, Chairman of the Board of Management, Robert Bosch GmbH, Stuttgart:
Mobility for Today and Tomorrow – Exciting Customers and Meeting Climate Targets

10:05 **Discussion of the lectures in this session**

10:35 **Coffee Break**

DRIVELINE TECHNOLOGIES AND THEIR ECOLOGICAL BALANCE
Chairman: Univ.-Prof. Dr. C. **Beidl**, Darmstadt University of Technology

11:15 Dr. L. **Mauler**, Porsche Consulting GmbH, Bietigheim-Bissingen:
The Future Powertrain Portfolio: Fuel Cells, eFuels, Batteries – A Matter of Application

11:45 Dipl.-Ing. Dr. techn. M. **Rexeis**, Ao. Univ.-Prof. Dipl.-Ing. Dr. techn. S. **Hausberger**, Dipl.-Ing. M. **Opetnik** BSc, Dipl.-Ing. S. **Present** BSc, Institute of Thermodynamics and Sustainable Propulsion Systems, Graz University of Technology;
Dipl.-Ing. G. **Silberholz**, Forschungsgesellschaft für Verbrennungskraftmaschinen und Thermodynamik mbH, Graz;
Dipl.-Ing. M. **Schwingshackl**, footprint-consult e.U., Weyer:
Comparison of Propulsion Technologies for Heavy-Duty Vehicles Based on EU Legislation (VECTO) and an LCA Assessment

12:15 Dr. U. **Kramer**, Ford-Werke GmbH, Cologne; Dr. D. **Bothe**, Dr. C. **Gatzen**, A. **Pfannenschmidt**, C. **Baum**, F. **Schrogl**, O. **Mahmood**, Frontier Economics Ltd., Cologne:
Sensible Pathways to Defossilised European Mobility in 2050 on a Cradle-to-Grave Basis – Scenarios Based on FVV Fuels Study IV b

12:45 **Lunch at Hofburg Conference Centre**

POWERTRAIN ELECTRIFICATION

Chairman: Univ.-Prof. Dr. B. **Geringer**, Vienna University of Technology

14:30 Dipl.-Ing. C. **Koehlen**, Dipl.-Ing. J. **Larbi**,
Mercedes-Benz, Stuttgart / Sindelfingen:
On the Way to Full Electrification at Mercedes-Benz: The Facelift of the 6-Cylinder Powertrains with Mild-Hybrid Technology

15:00 T. **Hirai** MEng, TOYOTA Motor Corporation, Aichi:
Development of Dedicated BEV Powertrain

15:30 Dr. R. **Meyer**, G. **Fröhlich**, AUDI AG, Ingolstadt;
C. **Hauck**, O. **Bitsche**, Porsche AG, Weissach:
PPE – The New e-Drive Modular System from Audi and Porsche

16:00 Dipl.-Ing. L. **Hentschel**, Dipl.-Ing. A. **Krick**, Volkswagen AG, Wolfsburg / Kassel:
Next Generation – New Powertrain for the ID. Family

16:30 **Coffee Break**

HYBRID TECHNOLOGIES

Chairman: Assoc. Prof. Dr. P. **Hofmann**, Vienna University of Technology

17:00 Dr. P. **Kapus**, Dipl.-Ing. L. **Leonhartsberger**, Dipl.-Ing. (FH) F. **Hoelbling**,
A. **Eckart** MSc, Dr. A. **Huss**, AVL List GmbH, Graz:
Holistic View on a Dedicated Hybrid Drivetrain – Thermodynamics, Thermal Management and Controls

17:30 Dipl.-Ing. M. **Krüger**, Dr.-Ing. J. **Schwarzer**, Dr.-Ing. E. **Schünemann**,
Dipl.-Ing. J. **Tophoven**, Dipl.-Ing. J. **Gömmel**, Dr.-Ing. V. **Neubert**,
Robert Bosch GmbH, Stuttgart:
Dedicated Hybrid Powertrains for Passenger Car Applications: Evaluation of Gasoline Engine Concepts and Powertrain Topologies

18:00 Dipl.-Ing. C. **Schwella**, Assoc. Prof. Dr. techn. P. **Hofmann**, Institute for Powertrains and Automotive Technology (IFA), Vienna University of Technology;
Dipl.-Ing. R. **Morawetz**, Dipl.-Ing. Dr. techn. D. **Andessner**, Dipl.-Ing. C. **Sandner**,
Miba eMobility GmbH, Vorchdorf:
Development of an Axial-Flux Permanent Magnet Machine with Directly Cooled Windings for a 48V-Mild-Hybrid Powertrain

18:30 **End of Programme**

20:00 **Transfer to "Wine Heuriger"**

20:30 **"Heuriger" Evening at the invitation of the Mayor of Vienna.
Please bring your invitation.**

REGENERATIVE FUELS / E-FUELS

Chairman: Dr. W. **Böhme**, Austrian Society of Automotive Engineers

08:00 M. **Hultman** MSc, Dr. T. **Sarjovaara**,
Neste, Sweden / Finland:
The Roadmap to Fossil Free Transport

08:30 Dipl.-Ing. T. **Herdan**,
HIF EMEA GmbH, Berlin:
E-Fuels – Not a Dream but Reality

09:00 P. O. **Calendini**,
Aramco Fuel Research Center, France:
Energizing Low-Carbon Mobility

09:30 **Coffee Break**

NEW BATTERY TECHNOLOGIES 2

Chairman: Univ.-Prof. Dr. G. **Brasseur**, Graz University of Technology

10:00 J. **Forgie**, R. **Gerson**,
Cummins Inc., Milton Keynes / Talent:
Battery Technologies for Electrified Heavy Duty Trucks

10:30 Dr. M. **Stapelbroek**, M. **Rudolph**, Dr. A. **Averberg**, T. **Klerks**, R. **Beykirch**, C. **Marten**, S. **Gul**, H. **Löbberding**, Dr. S. **Payandeh**, FEV Europe GmbH, Aachen;
F. **Pampel**, A. **Sauer**, TME, RWTH Aachen University:
Solid State Battery Cell Technology for Electric Vehicles: Challenges and Applications

11:00 Dr. H. **Manz**, Dr. G. **Mendl**, Dipl.-Ing. C. **Kirchner**, Dipl.-Ing. R. **Lamping**, Dipl.-Ing. M. **Freese**, Volkswagen AG, Wolfsburg / Salzgitter:
Tomorrows Battery Systems in Terms of Integration and Charging Concepts

11:30 Dipl.-Ing. M. **Sens**, Dipl.-Ing. M. **Clauß**, Dr.-Ing. C. **Danzer**, Dr.-Ing. A. **Fandakov**, Dr.-Ing. A. **Joos**, Dr. M. **Kalogirou**, Dr. C. **Kruschel**, Dipl.-Ing. S. **Meyer**, Dipl.-Ing. M. **Kratzsch**, IAV GmbH, Berlin:
Towards a Sustainable Vehicle Concept Part 1: The Battery - Methods and Technologies to Increase Efficiency

12:00 **Lunch at Hofburg Conference Centre**

FUEL CELL PROPULSION 2

Chairman: Univ.-Prof. Dr. S. **Pischinger**, RWTH Aachen University

13:30 N. **Joos**, R. **Wang**, J. **Kang**,
Cummins Inc., Mississauga / Columbus:
Advanced Fuel Cell Technology Solutions for Heavy Duty Vehicles

14:00 Dr. M. **Wick**, J. **Klütsch**, RWTH Aachen University; Dr. M. **Walters**, Dr. M. **Zubel**, Dr. M. **Jesser**, J. **Ogrzewalla**, Dr. A. **Schloßhauer**, Dr. D. **Lückmann**, Dr. T. **Uhlmann**, FEV Europe GmbH, Aachen; D. **van der Put**, Dr. M. **Thewes**, FEV Group GmbH, Aachen; A. **Koch**, C. **Speuser**, T. **Lüdiger**, FEV Consulting GmbH, Aachen:
300+ kW Fuel Cell Systems for Long-Haul Truck Applications – What Improvements Can be Expected with this Next Generation of Fuel Cell Systems?

14:30 Dipl.-Ing. C. **Rathberger**, J. **Bodory** MSc, Dipl.-Ing. J. **Schaeffler**, Magna Powertrain Engineering Center Steyr GmbH & Co KG, St. Valentin:
Thermal Management for Fuel Cell Vehicles – Use Cases and Challenges

15:00 **Coffee Break**

PLENARY CLOSING SESSION: VIEW TO THE FUTURE

Chairman: Univ.-Prof. Dr. H. **Eichlseder**, Graz University of Technology

15:30 Dipl.-Ing. Gerald **Killmann**, Senior Vice President Purchasing and R&D, Toyota Motor Europe, Zaventem:
Toyota Powertrain Solutions towards Sustainability, Ranging from Hybrid to Fuel Cell

15:50 Christoph **Starzynski**, Vice President Development Electric Drive and Electric Vehicle Architecture, Mercedes-Benz AG, Stuttgart:
"Electric Only" by 2030: What Will Drive Us Tomorrow?

16:10 Wayne **Griffiths**, CEO, SEAT and CUPRA, Martorell:
Powertrain Transformation – Strategies and Technological Implications

16:30 **Discussion of the lectures in this session**

17:00 **CLOSING ADDRESS**

17:15 **End of Programme**

17:30 **Bus Transfer** from Heldenplatz (Hofburg Conference Centre) to Vienna Airport (Schwechat)

08:30

Plenary Opening Session at FESTSAAL

Live Broadcast at GALERIE

10:35 **Coffee Break**

CHARGING TECHNOLOGIES

Chairman: Assoc. Prof. Dr. P. **Hofmann**, Vienna University of Technology

11:15 N. **Waxmann** MSc,
P3 Group GmbH, Stuttgart:
Megawatt Charging for Heavy Duty Vehicles in Long Haul Applications

11:45 Dr.-Ing. D. **Liebig**, Dr. M. **Gao**, Dr. J. **Brombach**, Dr.-Ing. A. **Kolbeck**, Dr. G. **Liu**, Dr. V. **Null**, K. **Rieger**, C. **Stefels**, Dr.-Ing. W. **Warnecke**, K. **Weinreich**, Dr.-Ing. K. **Wilbrand**, Shell:
Shell's Electrification Journey: From Green Power Production to Charging Solutions for Mobility

12:15 Dr. T. L. **Reichmann**,
Glock Technology GmbH, Ferlach:
Modular Stationary Energy Storage Systems Relevant for Charging Infrastructure for the Transport Sector

12:45 **Lunch at Hofburg Conference Centre**

NEW BATTERY TECHNOLOGIES 1

Chairman: Univ.-Prof. Dr. G. **Brasseur**, Graz University of Technology

14:30 G. **Paolini**, PLASTIC OMNIUM, Compiègne; Dr. A. **Teyssot**, VERKOR, Grenoble:
Innovative Low-Cost Fast Charge, Low CO_2 Footprint 800V Li-Ion Battery Pack for BEV

15:00 S. **Schade**, Robert Bosch GmbH, Stuttgart:
Battery in the Cloud: Cloud Based Analysis, Prediction, and Optimization of High Voltage Battery Lifetime

15:30 Dr. T. **Leichner**, D. **Möhring**, Dr. P. **Kritzer**, Dr. S. **Neuberger**,
Freudenberg Sealing Technologies, Weinheim:
Innovative Freudenberg Solution to Prevent Thermal Propagation in Prismatic Cell Batteries

16:00 Dr. B. **Lechner**, Dr. A. **Golubkov**, Dipl.-Ing. L. **Winder**, Dipl.-Ing. F. **Benezeder**, Dipl.-Ing. C. **Zitz**, Virtual Vehicle Research GmbH, Graz;
Dr. R. **Potenza**, Dr. G. **Prentice**, Castrol, Pangbourne Technology Centre, Reading:
Immersion vs Indirect Cooling: A Comparison of Battery Thermal Management Approaches: Fast-Charging, Battery Lifetime, and Thermal Propagation Performance

16:30 **Coffee Break**

HYDROGEN ENGINES 1

Chairman: Univ.-Prof. Dr. H. **Eichlseder**, Graz University of Technology

17:00 Dr. Y. **Chi**, Dr. B. **Shin**, Hyundai Motor Company, Namyang; Dipl.-Ing. R. **Pelzetter**, Dr.-Ing. M. **Tichy**, Dipl.-Ing. M. **Peppler**, Dipl.-Ing. S. **Hoffmann**, Hyundai Motor Europe Technical Center GmbH, Rüsselsheim; Dipl.-Ing. V. **Morel**, Aramco Overseas Company, Rueil-Malmaison; Dr.-Ing. C. **Schück**, Dr.-Ing. P. **Jochmann**, Dr.-Ing. E. **Schünemann**, Robert Bosch GmbH, Stuttgart:
Hydrogen Engine for a Passenger Car Hybrid Powertrain: Attractive Solution for Sustainable Mobility

17:30 D. **Takahashi**, N. **Matsubara**, A. **Yamashita**, K. **Nakata**,
Toyota Motor Corporation, Shizuoka / Toyota:
Toyota's Hydrogen-Engine Development to Contribute to Carbon Neutrality

18:00 J. **Wärnberg** PhD, O. **Garnemark** MSc, A. **Safari** PhD, R. **Ehleskog** PhD, H. **Krishnamoorthy** MSc, Volvo Group Trucks Technology, Gothenburg / Bangalore:
An H2 ICE Concept for the Very Heavy Truck (FH16) Applications by Volvo Group

18:30 **End of Programme**

20:00 **Transfer to "Wine Heuriger"**

20:30 **"Heuriger" Evening at the invitation of the Mayor of Vienna. Please bring your invitation.**

HYDROGEN COMBUSTION PROCESS

Chairman: Univ.-Prof. Dr. M. **Bargende**, University of Stuttgart

08:00 Dr. X. L. J. **Seykens**, Dr. E. **Doosje**, Dr. C. **Bekdemir**,
Dipl.-Ing. (FH) P. H. C. **van Gompel**, TNO, Helmond:
Hydrogen Combustion Concepts: Comparison of Port Fuel Injection with Spark Ignition and High Pressure Direct Injection (HPDI(TM)) – Power Density, Efficiency and Emissions

08:30 D. **Mumford**, S. **Baker**, S. **Ptucha**, Dr. S. **Munshi**,
Westport Fuel Systems Canada Inc., Vancouver:
Application of Westport Fuel Systems' H2 HPDITM Technology to a Demonstration Truck

09:00 Dr. T. **Uhlmann**, Dr. S. **Schaub**, Dr. L. **Virnich**,
Dr. A. **Dhongde**, V. **Müller**, FEV Europe GmbH, Aachen;
D. **van der Put**, FEV Group GmbH, Aachen;
R. **Ballard**, J. **Kavanagh**, T. **Beamish**,
J. C. Bamford Excavators Ltd., Rocester:
Hydrogen as Enabler for JCB's Pathway to Zero CO_2 for Offroad Applications

09:30 **Coffee Break**

NEW ENGINE CONCEPTS / EMISSION REDUCTION

Chairman: Univ.-Prof. Dr. G. **Hohenberg**, Darmstadt University of Technology

10:00 E. **Nakai** MSc, T. **Goto** MSc, T. **Yamamoto** BSc, M. **Kataoka** MSc, K. **Ezumi** BSc,
Dr. D. **Shimo**, M. **Hitomi** MSc, Mazda Motor Corporation, Hiroshima:
Contributing to the Environment with Internal Combustion Engines toward Carbon Neutrality – Modular Concept of Mazda SKYACTIV In-Line Powertrains as Multi-Solution Scalable Architecture

10:30 J. **Li**, Dr. Y. **Liu**, L. **Han**, X. **Li**, C. **Zhao**, CHINA FAW Group Co. Ltd., Changchun;
Dr.-Ing. M. **Hunger**, Dipl.-Ing. M. **Riess**, Dipl.-Ing. M. **Sens**,
Dr.-Ing. M. **Kleinen**, IAV GmbH, Berlin:
A Dedicated Hybrid Engine Concept with 45% BTE at Lambda 1

11:00 P. **Traversa**, Dr. M. **Elicker**, N. **Morelli**, S. **Hardes**,
Schaeffler Technologies AG & Co. KG, Herzogenaurach:
CO_2 and Pollutant Emission Reduction Using Variable Valve Train Systems for Diesel and H2 Engines in Heavy Duty Applications

11:30 R. **Brück**, Emitec Technologies GmbH, Lohmar:
Analysis of the EU7 Emission Limits; Exhaust System Solutions to Meet the Requirements

12:00 **Lunch at Hofburg Conference Centre**

HYDROGEN ENGINES 2

Chairman: Univ.-Prof. Dr. M. **Bargende**, University of Stuttgart

13:30 Ing. R. **Golisano**, Ing. S. **Scalabrini**, Ing. N. **Sacco**, Dr.-Ing. R. **Rossi**, PUNCH Hydrocells Srl, Torino; Ing. L. **Buzzi**, Ing. P. **Cerracchio**, Ing. M. **Ferrera**, Ing. F. **Numidi**, Dr.-Ing. F. **Pesce**, Ing. G. **Stirpe**, Dr.-Ing. A. **Vassallo**, Ing. A. **Zingariello**, PUNCH Torino SpA, Torino:
System Optimization in a State-of-the-Art V8 6.6l Hydrogen Engine

14:00 Dr. techn. P. **Grabner**, Dipl.-Ing. P. **Christoforetti**, Dipl.-Ing. K. **Gschiel**, Dipl.-Ing. S. **Roiser**, Univ.-Prof. Dr. techn. H. **Eichlseder**, Institute of Thermodynamics and Sustainable Propulsion Systems, Graz University of Technology:
Transient Operation of Hydrogen Engines

14:30 Dr.-Ing. J. L. **Beduneau**, L. **Doradoux** MSc, G. **Meissonnier** MSc, M. **Da Graca** MSc, Y. **Rimlinger** MSc, BorgWarner, France; Dr.-Ing. G. **Dober**, Dr. techn. W. F. **Piock**, BorgWarner, Luxembourg:
An Affordable CO_2 Free Propulsion System – H2ICE on the Road

15:00 **Coffee Break**

15:30 Plenary Closing Session at FESTSAAL

Live Broadcast at GALERIE

17:15 **End of Programme**

17:30 **Bus Transfer** from Heldenplatz (Hofburg Conference Centre) to Vienna Airport (Schwechat)

08:30

Live Broadcast
of the Plenary Opening Session

10:35 **Coffee Break**

HYDROGEN STORAGE

Chairman: Dr. W. **Böhme**, Austrian Society of Automotive Engineers

11:15 K. **Klepatz** MSc, J. C. **Jeske** MSc, M. **Behn** BSc, Prof. Dr.-Ing. H. **Rottengruber**, Otto von Guericke University Magdeburg:
Strategic Operational Management of a Hydrogen Multi-Spherical Storage System for Commercial Vehicles

11:45 J. **Hergott**, Forvia Faurecia, Bavans;
G. **Petitpas** PhD, Air Liquide Advanced Technology, Sassenage:
Cryogenic Hydrogen Storage for Long Haul Trucks: From Station to Wheels Perspective

12:15 Dr. T. **Stepan**, Dr. J. **Winklhofer**, Dipl.-Ing. T. **Breiteneder**, SAG - Salzburger Aluminium Gruppe, Lend:
Comparison of Liquified Gas Energy Carriers and Conventional Fossil Fuels with a Focus on Storage Requirements for Use in Mobile Applications

12:45 **Lunch at Hofburg Conference Centre**

POWERTRAIN ELECTRIFICATION – COMPONENTS

Chairman: Univ.-Prof. Dr. L. **Eckstein**, RWTH Aachen University

14:30 A. **Mayer**, M. S. **Cohen**, BorgWarner Inc., Auburn Hills:
Next Generation Inverter Technology for Electric Mobility

15:00 Dipl.-Ing. Dr. M. **Hofer**, Dipl.-Ing. R. **Beyerle**, Prof. Dr. M. **Schrödl**, Institute Energy Systems and Electrical Drives, Vienna University of Technology:
Thermal Analysis of the Electrical Axle Drive from Project HeAD – High Performance Electrical Austrian Drivetrain

15:30 D. **Velmurugan** PhD, C. **Wang-Hansen** PhD, F. **Strömstedt** MSc, Aurobay, Gothenburg:
Reichweitenverlängerer für batteriebetriebene Nutzfahrzeuge: Range Extenders for Battery Electric Commercial Vehicles: An Enabler for Last Mile Connectivity and 100% Fleet Electrification

16:00 K. **Kamichi** MEng, T. **Miyamoto** MEng, M. **Ishimoto** MEng, N. **Tsukamoto** MEng, N. **Takebayashi** MEng, N. **Ogawa** MEng, Toyota Motor Corporation, Aichi:
Development of e-AWD Parallel Hybrid System for SUVs

16:30 **Coffee Break**

FUEL CELL PROPULSION 1

Chairman: Univ.-Prof. Dr. S. **Pischinger**, RWTH Aachen University

17:00 Dipl.-Ing. Dr. techn. E. **Wahlmüller**, Dipl.-Ing. (FH) W. **Rumpl** MSc, Dipl.-Ing. M. **Friedl**, S. **Jones** PhD MSc, Plastic Omnium New Energies Wels GmbH, Wels; Prof. Dr. R. **Wörner**, S. **Hegde** MEng, Y. **Wiese** BEng, Prof. Dr.-Ing W. T. **Czarnetzki**, Institute for Sustainable Energy Technology and Mobility (INEM), Esslingen University; B. **Beutel** BEng, R. **Ritter**, EFA-S GmbH, Zell unter Aichelberg:
Fuel Cell Electric Drive Train for 500km Range of 4.6t LDV in Zero Emission Municipal Application

17:30 Prof. Dr. C. **Mohrdieck**, cellcentric GmbH & Co. KG, Kirchheim/Teck-Nabern:
Fuel Cells for Efficiency & Effectiveness within the Triangle Heavy-Duty Transport, Energy, and Ecology

18:00 Dipl.-Ing. Dr. R. **Döbereiner**, Dipl.-Ing. J. **Linderl**, Dipl.-Ing. (FH) R. **Steinek**, AVL List GmbH, Graz / Steyr:
Full Integration of a High-End Fuel Cell Powertrain into a European Long-Haul Tractor Unit

18:30 **End of Programme**

20:00 **Transfer to "Wine Heuriger"**

20:30 **"Heuriger" Evening at the invitation of the Mayor of Vienna. Please bring your invitation.**

ALTERNATIVE COMBUSTION PROCESSES

Chairman: Univ.-Prof. Dr. G. **Hohenberg**, Darmstadt University of Technology

08:00 Dipl.-Ing. L. **Kniestedt**, M. **Cech** MSc, Dr.-Ing. K. **Mahler**, Dr.-Ing. C. **Reiser**, WTZ Roßlau gGmbH, Dessau-Roßlau; Prof. Dr. H. **Rottengruber**, Otto von Guericke University Magdeburg:
Experimental Investigation of the Influence of Compression Ratio and Inert Gas on the Spark-Ignited Argon Power Cycle

08:30 J. E. **Dec**, D. **Lopez Pintor**, Sandia National Laboratories, Livermore; R. **Vijayagopal**, Argonne National Laboratory, Lemont:
A Viable Approach to Low-Temperature Gasoline Combustion for Off-Road, Medium- and Heavy-Duty Transportation

09:00 P. K. **Sundaram** MSc, L. M. **Grundl** MSc, Dr.-Ing. G. A. **Pang**, Prof. Dr.-Ing. C. T. **Trapp**, Universität der Bundeswehr München; F. **Loffredo** MSc, Institute for Combustion Technology, RWTH Aachen University:
Alternative Combustion Concept for a Highly Phlegmatized Hybrid Powertrain – Simulation and Validation of Dual Fuel Homogeneous Charge Compression Ignition Engine Using Chemical Kinetics with 1-D Simulation & 3-D CFD Software

09:30 **Coffee Break**

ELECTRIC DRIVES

Chairman: Univ.-Prof. Dr. C. **Beidl**, Darmstadt University of Technology

10:00 Eng (ENSAM) P. **Armiroli**, Valeo Powertrain Electrified Mobility, Creteil:
BEV Primary and Secondary eDrive Rationale in Case of 2 Axles High Voltage Architecture

10:30 A. **Whitehead**, Dr. C. **Hilton**, Protean Electric Ltd, Farnham:
How In-Wheel Motors Enable Electrification of Existing Combustion Engine Vehicles without Compromise

11:00 Dipl.-Ing. D. **Büchl**, Dr. A. **Pfeffer**, AIT Austrian Institute of Technology GmbH, Vienna; Dr. B. **Kolar**, Magna Powertrain Engineering Center Steyr GmbH & Co KG, St. Valentin; Dipl.-Ing. B. **Plenar**, Dr. A. **Zeiler**, Magna Powertrain GmbH & Co KG, Traiskirchen:
Determination and Application of Optimized Pulse Patterns for an 800V eDrive System with a Permanent Magnet Synchronous Machine

11:30 Dr.-Ing. G. **Rösel**, N. **Daun**, M. **Toens**, D. **Stojkovic**, C. **Heukenroth**, Vitesco Technologies, Regensburg / Berlin:
External Excited Synchronous Machine as Main and Auxíliary Drive

12:00 **Lunch at Hofburg Conference Centre**

AUTONOMOUS DRIVING / CONNECTIVITY

Chairman: Univ.-Prof. Dr. L. **Eckstein**, RWTH Aachen University

13:30 Dipl.-Ing. H. **Dismon**, Dipl.-Ing. K. **Kappen**,
Rheinmetall Technology Center GmbH, Düsseldorf:
Teleoperation of Vehicles – A Technology Block for the Automation of the Future Mobility

14:00 Dipl.-Wirt.-Ing. M. **Kollmeier**,
HOLON GmbH (a BENTELER Company), Paderborn:
The New HOLON Mover – Next Generation Autonomous Mover ADAS Level4. Mover Automotive Grade for Autonomous Transportation

14:30 Mag. Ing. mech. T. **Mihalj**, Assoc. Prof. Dipl.-Ing. Dr. techn. A. **Eichberger**,
Institute of Automotive Engineering, Graz University of Technology;
S. **Gopi** MTech, P. **Nitsche**, PhD MSc, Dr. techn. H.-M. **Koegeler**,
AVL List GmbH, Graz:
Scenario-Based Simulation Framework for Validation of Automated Driving Using Next Generation DoE

15:00 **Coffee Break**

15:30 **Live Broadcast**
of the Plenary Closing Session

17:15 **End of Programme**

17:30 **Bus Transfer** from Heldenplatz (Hofburg Conference Centre)
to Vienna Airport (Schwechat)

VIRTUAL HALL

Due to the large number of interesting and high-quality submissions, we are pleased to present further videos in a virtual hall. These videos are only available online on the web platform during and after the Motor Symposium in addition to lectures in the three lecture halls in the Vienna Hofburg.

AUTONOMOUS DRIVING / CONNECTIVITY

T. **Thorstensen** MSc, EFS Unternehmensberatung GesmbH, Vienna;
K. **Ni** PhD, HoloMatic Technology Co., Ltd., Beijing:
Global Race of Technologies in the Area of Assisted & Autonomous Driving Technology

H. **Li** MSc, F. **De Cristofaro** MSc, F. **Orucevic** BSc, Z. **Gu** BSc,
Institute of Automotive Engineering, Graz University of Technology:
Comparative Analysis of Critical Lane Change for Autonomous Driving Vehicles and Human Drivers

T. **Kanuric** BSc, H. **Li** MSc, Assoc. Prof. Dipl.-Ing. Dr. techn. A. **Eichberger**,
Institute of Automotive Engineering, Graz University of Technology; D. **Nalic** PhD,
MQS Automotive GmbH & Co KG, Heilbronn; P. **Pannagger** MSc, Mercedes-Benz Group AG:
Advanced Lane Detection Model for the Virtual Development of Highly Automated Functions

S. **Xiang**, A. **Hebling**, Vitesco Technologies GmbH, Regensburg:
Becoming a Data-Driven Automotive Tier-1

SOFTWARE

Dr. D. **Hemkemeyer**, FEV Europe GmbH, Aachen; P. **Schutzeich** MSc,
Chair of Thermodynamics of Mobile Energy Conversion Systems (tme), RWTH Aachen University:
Model Predictive Thermal Management Control Strategies for Battery Electric Vehicles

Prof. Dr. F. **Kauf**, Dr. H. **Skirde**, D. **Großmann**, PwC PricewaterhouseCoopers GmbH,
Munich / Düsseldorf:
Design and Operationally Implement Modular Product Architectures of Automotive Software

INNOVATIVE POWERTRAIN SOLUTIONS

T. **Tahtouh** PhD, IFP Energies Nouvelles; M. **Brignone**, Marelli Europe; J. **Gareth**, Johnson Matthey; N. **Demeilliers**, In Extenso Innovation Croissance; G. **Lucignano**, Stellantis;
Prof. F. **Millo**, Assoc. Prof. L. **Rolando**, G. **Castellano**, Politecnico di Torino;
F. **Bocchieri**, FEV Group GmbH; J. **Sierra Castellanos** MSc, Garrett Motion:
The PHOENICE Project: A Synergic Use of Innovative Technologies for the Next Generation of Green Hybrid Powertrains

Dipl.-Ing. M. **Hackmann**, Dipl.-Ing. J. **Schenk**, P3 automotive GmbH, Stuttgart:
BEV or REX – Analysis of an Electric Vehicle with Range Extender as Solution to Raw Material Crisis and CO_2-Backpack Issue

INNOVATIVE COMPONENTS

Dr. B. **Brunnsteiner**, Dr. W. **Prochazka**, AVL List GmbH, Graz:
New Cell Technologies and Cooling System for Ultra Fast Charge Batteries with No Thermal Propagation

Dr. A. H. **Taylor**, BMTS Technology US Corp, Plymouth;
P. **Naik**, S. **Nibler**, D. **Schulze**, Dr. I. **Sandor**, BMTS Technology GmbH, Stuttgart:
Optimization of Variable Geometry Turbine E-Turbo for a Heavy-Duty, On-Highway Fuel Cell Application

C. **Cardon** MSc, A. **Potter** BEng (Hons), C. **Hudson** BEng (Hons), S. **Bhari** MSc, S. **Crossley** MEng, Dipl.-Ing. (FH) B. **Gruber**, BorgWarner, UK; P. **Marois** MSc, BorgWarner, Luxembourg:
Delivering Reduced CO_2 with BorgWarner's High Efficiency Heavy Duty Fuel Injection System Integrating Advanced Closed Loop Injection Control

Dr. P. **David**, BorgWarner, Luxembourg; H. **Nanjundaswamy**, BorgWarner Inc., USA:
Sustainable Electric Drive Solutions for Future E-Mobility

Dipl.-Ing. B. **Gomot**, Dr. techn. W. F. **Piock**, BorgWarner, Luxembourg; W. **Lemmermann** BSc, R. **Krenus** BSc, M. **Passos** BSc, BorgWarner, Brazil; G. J. **Scott** BSc MBA, BorgWarner, USA:
BorgWarner's Heated Low Pressure Injection System for Sustainable Flex-Fuel Applications

M. **Naderer**, Dynamic E Flow GmbH, Valley:
New Class in Power Density of Drive Modules due to Windings Cooled with Hollow Conductors

F. **Cestari de Rizzo**, A. **Ferrarese** MSc, Tupy S.A., Joinville;
Dr. R. **Marquard**, Tupy Europe, Arnhem:
Combustion Engines for Effective Low CO_2 Emissions

FUELS AND ECOLOGICAL BALANCE

Dr. M. **Frauscher**, Dr. A. **Ristic**, AC2T research GmbH, Wiener Neustadt;
Dr. L. **Nenning**, Graz University of Technology;
Dipl.-Ing. M. **Miedler**, Dr. T. **Uitz**, OMV Downstream GmbH, Vienna:
Determination of the Influence of Potential Future Bio Diesel Components on Fuel Stability in a Diesel Hybrid Engine

Dipl.-Betriebsw. (FH) E. **Christ**, MOSOLF Transport Solutions GmbH, Kirchheim unter Teck;
Dr.-Ing. M. **Müller**, Dipl.-Ing. J. **Schenk**, MAGILITY GmbH, Kirchheim unter Teck:
TRUCK FLEET TO ZERO – A Technical Feasibility Study and a TCO-Based Assessment for the Application of Zero-Emission Commercial Vehicles in Large Fleets

R. **Hassoun** MSc Ing., Dipl.-Kfm. techn. R. **Stanek**, P3 automotive GmbH, Stuttgart;
L. **Hoffmann** MSc Ing., P3 Korea, Seoul:
Cost and Availability of Synthetic Fuels for Road Transport up to 2035 against the Background of Various Industry Needs in Terms of Raw Materials, Availability and no Alternative to Decarbonization

EVENING PROGRAMME

Opening of the Exhibition with Reception:
Wednesday, 26 April 2023, 18.00 – 21.00 hrs., registration counter will be open.

"Wine Heuriger" hosted by the Mayor of Vienna:
Thursday, 27 April 2023, 20.00 hrs., Departure Hofburg

Cultural Tickets:
Tickets for a variety of evening events (concerts, musicals, theater, etc.) can be found on the following website: https://www.wien.info/en/music-stage-shows

TOURS

While the technical programme is being presented to the participants, we offer the accompanying persons two half-day tours of interesting sights in Vienna for a surcharge. Both tours start and end at the Congress Centre Hofburg.
Exact details can be found online at https://wiener-motorensymposium.at/en/.

Half-day Tour: Treasures of the Hofburg
Thursday, 27 April 2023, 9.30 – approx. 12.45 hrs.

The Hofburg was the residence of the Habsburgs until the end of World War I 1918. The oldest part of the Hofburg already existed back then – today called "Schweizerhof".
First we have the opportunity to watch the Lipizzaner, who are accommodated in the "Stallburg", during the morning training. The Spanish Riding School is the oldest riding school in the world, where classical horsemanship has been cultivated in the Renaissance tradition of the "High School" for more than 450 years.
Afterwards we continue to the "Schatzkammer" (Treasury), which is located in the oldest part of the Hofburg. Here we will see the Austrian imperial crown as well as the crown and imperial insignia of the Holy Roman Empire.

Half-day Tour: Vision and New Beginnings – 150 Years of the Vienna World's Fair
Friday, 28 April 2023, 9.45 – approx. 13.00 hrs.

150 years ago, the world exhibition took place in Vienna. It was the driving force behind the development of Vienna into a cosmopolitan city.
A central theme of the Vienna World Fair was architecture, so Japan sent several architectural models. In the World Museum, we can see one of the largest exhibits and the central object of the Japan Room, the model of a Daimyō Residence of the Edo period (1600-1868), which was located in the Japan Pavilion.
Then our walk takes us to some of the most traditional manufacturers in Vienna. First, we visit the former imperial and royal court and chamber shoemaker Scheer, where time seems to stand still since 1816, as the history of the house is so intensely felt. Our way leads us past the jewellery Köchert to the company J. &. L. Lobmeyr, who became court glassware merchant in 1860. It supplied crystal chandeliers for the Hofburg, Schönbrunn Palace and the Bavarian royal palaces.


The new all-electric
ID.BUZZ
Volkswagen way to ZERO
Power consumption in kWh/100 km: combined 20,6 – 21,7.
CO_2 emissions combined in g/km: 0.
Displayed vehicle shows optional equipment.
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