FVV ANNUAL REPORT

# 2022/2023

Science for a moving society


SCIENCE
YOUNG TALENTS
NETWORK
TRANSFER
www.fvv-net.de/en

Image: Dilok Klaisataporn, iStock

# The FVV Transfer + Networking Event

**Science** for a moving society

+ Industrial Collective Research (IGF) has a particular commitment to the **transfer of knowledge and technologies**.

+ Networked actions between manufacturers and suppliers, developers and scientists, leading industrial engineers, renowned researchers and excellent young talents promote mutual understanding. This is very important to us. Contrary to purely project-related cooperation, Industrial Collective Research is geared towards lasting relations among all partners.

+ At the **FVV Transfer + Networking Events** in the autumn and spring, some 300 experts get together regularly to easily gather information about the research programme of the FVV and to discuss further research needs. Many also benefit from the knowledge transfer at the **expert conferences of our cooperation partners**.

Ideas sometimes need time and a prolific place to grow. Here at FVV you will find both.

Please save the dates of the forthcoming FVV conferences:

Spring – 14 / 15 March 2024

Autumn – 19 / 20 September 2024

See you there!

# Projects + Publications

**Science** for a moving society


## FVV Publications

The FVV as a transfer platform provides continued exchange between science, industry and society with reports from the project world, transfer + networking events and a newsletter.

www.fvv-net.de/en | Transfer | Projects

Energy sources

Turbo-charging

Hybrid power-trains

Internal combustion engines

Electric motors

Fuel cells


## MTZ Articles

MTZ is the international technical-scientific trade magazine for engineers in powertrain development with a special focus on the development of electrified and internal combustion engine powertrains. In addition, it also reports on classic topics such as friction, turbocharging or charge cycle and valve control.

www.MTZ-magazine.com

Car-to-X $C_2X$

Automated driving

HiL, SiL, MiL

RDE

Chassis technology

Lighting technology


## ATZ Articles

ATZ is the must-read international technology magazine for decision-makers in the automotive industry. For more than 120 years, it has been presenting forward-looking technology solutions in automotive research and the latest information for the daily work of engineers on the entire vehicle - chassis or bodyshell, lighting technology or air conditioning.

www.ATZ-magazine.com

# Stories

**Science** for a moving society

## Science

The FVV Website informs about research findings on important technological challenges and identifies future research needs. Discover the work of scientists and engineers who are researching the best available technologies of the future together with us!

www.fvv-net.de/en

## Newsletter

For members and friends of the FVV we issue an electronic newsletter. It informs you regularly about news from our innovation network and interesting facts about Industrial Collective Research (IGF) as well as technology funding and promotion. Sign up now! The subscription is free and can be stopped at any time.

www.fvv-net.de/en | Transfer | Newsletter

Image: Andranik Hakobyan, iStock

# Excellent Research network

**Science** for a moving society

www.fvv-net.de/en | Network | Members

www.fvv-net.de/en | Network | RTD Performers

# Members

Member companies and their representatives

| | COMPANY | LOCATION (HEADQUARTERS) | REPRESENTATIVE (SCIENTIFIC ADVISORY COMMITTEE) |
|---|---|---|---|
| A | Aalberts Surface Treatment GmbH | Kerpen | Uwe Franz |
| | ⟳ ABB Turbo Systems AG | *Renaming: Accelleron // Turbo Systems Schweiz Ltd.* | |
| | Accelleron // Turbo Systems Schweiz Ltd. | Baden (CH) | Dr. Dirk Bergmann |
| | AeroDesignWorks GmbH | Cologne | Georg Kröger |
| | Afton Chemical GmbH | Hamburg | Walter Kudlich |
| | AIP GmbH & Co. KG | Haldenwang | Christian Hartmann |
| | ⟳ AKKA GmbH & Co. KGaA | *Renaming: AKKODIS Industry Consulting GmbH* | |
| | AKKODIS Industry Consulting GmbH | Fellbach | N.N. |
| | Albonair GmbH | Dortmund | Dr. Georg Hüthwohl |
| | AM Metals GmbH | Halsbrücke | Dr. Florian Wendt |
| | ANSYS Germany GmbH | Otterfing | Dr. Wolfgang Bauer |
| | APL GmbH | Landau | Dr. Marcus Gohl |
| | Aramco Overseas Company B.V. | Den Haag (NL) | Dr. Patrick Gastaldi |
| | Arteco NV | Sint-Denijs (BE) | Dr. Serge Lievens |
| | ASG Analytik-Service AG | Neusäss | Dr. Thomas Wilharm |
| | ↓ Atlanting GmbH | Aachen | |
| | Atlas Copco Energas GmbH | Cologne | Dr. Hauke Wittich |
| | AUDI AG | Ingolstadt | Dr. Christian Brenneisen |
| | ↑ Aurobay Powertrain Engineering Sweden AB | Göteborg (SE) | Ragnar Burenius |
| | AVAT Automation GmbH | Tübingen | Frank Ganssloser |
| | AVL Deutschland GmbH | Munich | Dr. Moritz Frobenius |
| | AVL List GmbH | Graz (AT) | Prof. Dr. Peter Prenninger |
| B | B&B-AGEMA GmbH | Aachen | Dr. Karsten Kusterer |
| | BASF Catalysts Germany GmbH | Hanover | Andrzej Bucholc |
| | Bayerische Motorenwerke AG | Munich | Robert Mirlach |
| | BENTELER Automobiltechnik GmbH | Paderborn | Dr. Fabian Fricke |
| | ↓ Bertrandt Projektgesellschaft mbH | Ehningen | |
| | BorgWarner Turbo Systems GmbH | Kirchheimbolanden | Dr. Stefan Münz |
| | Bosch Engineering GmbH | Abstatt | Nico Kappel |
| C | Cataler Corporation Europe | Düsseldorf | Dr. Carsten Stoecker |
| | Caterpillar Energy Solutions GmbH | Mannheim | Dr. Sebastian Ohler |
| | Caterpillar Motoren GmbH & Co. KG | Kiel | Andreas Banck |

↑ new member ↓ resigned member

| | COMPANY | LOCATION (HEADQUARTERS) | REPRESENTATIVE (SCIENTIFIC ADVISORY COMMITTEE) |
|---|---|---|---|
| | ↑ CENmat Cutting-Edge Nanomaterials UG | Waldenbuch | Dr. Seyed Schwan Hosseini |
| | CERAM Austria GmbH | Frauental (AT) | Dr. Irene Begsteiger |
| | CFturbo GmbH | Dresden | Dr. Oliver Velde |
| | Convergent Science GmbH | Linz (AT) | Dr. Rainer Rothbauer |
| | Corning GmbH | Wiesbaden | Dr. Thorsten Boger |
| | Coryton Advanced Fuels Ltd. | Stanford-le-Hope (GB) | Ben Lampertz |
| | CTWe GmbH | Henfenfeld | Daniel Büschelberger |
| | Cutting-Edge Nanomaterials UG | Waldenbuch | Dr. Seyed Schwan Hosseiny |
| D | DAF Trucks N.V. | Eindhoven (NL) | Dam Hakstege |
| | Daido Metal Co., Ltd. | Inuyama, Aichi (JP) | Minoru Hanahashi |
| | Daimler Truck AG | Stuttgart | Myriam Florack |
| | Delta JS AG | Zurich (CH) | Dr. Joachim Schmied |
| | DERC GmbH | Oberroth | Mario Kornprobst |
| | DEUTZ AG | Cologne | Taghi Akbarian,<br>Dr. Heiner Bülte |
| | Dr. Ing. h.c. F. Porsche AG | Weissach | Dr. Peter Rothenberger |
| E | eCon Engineering Germany GmbH | Kirchheimbolanden | Uwe Tomm |
| | Efficient Energy GmbH | Feldkirchen | Dr. Daniel Porzig |
| | ELGAN Diamantwerkzeuge GmbH & Co. KG | Nürtingen | Hans-Peter Böhm |
| | Emission Partner GmbH & Co. KG | Saterland | N.N. |
| | EMITEC Technologies GmbH | Lohmar | Rolf Brück |
| | ⟳ Engineering Center Steyr GmbH & Co. KG | *Membership through Magna Powertrain Engineering Center Steyr GmbH & Co. KG* | |
| | EnginOS GmbH | Ostfildern | Christine Burkhardt |
| | ERC Additiv GmbH | Buchholz | Dr. Svetlana Crusius |
| | Evonik Industries AG | Darmstadt | Michael Seemann |
| | ↓ Exothermia SA | Pylaia (GR) | |
| F | Faurecia Emissions Control Technologies, Germany GmbH | Augsburg | Emmanuel Jean |
| | ⟳ Federal-Mogul Burscheid GmbH | *Membership through Tenneco GmbH* | |
| | ⟳ Federal-Mogul Nürnberg GmbH | *Membership through Tenneco GmbH* | |
| | ⟳ Federal-Mogul Valvetrain GmbH | *Membership through Tenneco GmbH* | |
| | ⟳ Federal-Mogul Wiesbaden GmbH | *Membership through Tenneco GmbH* | |

| | COMPANY | LOCATION (HEADQUARTERS) | REPRESENTATIVE (SCIENTIFIC ADVISORY COMMITTEE) |
|---|---|---|---|
| | FEV Europe GmbH | Aachen | Christof Schernus |
| | FKFS Forschungsinstitut für Kraftfahrwesen und Fahrzeugmotoren Stuttgart SdbR | Stuttgart | Prof. Dr. André Casal Kulzer, Hans-Jürgen Berner |
| | Ford-Werke GmbH | Cologne | Dr. Ulrich Kramer |
| | Freyberger engineering GmbH | Cologne | Dr. Jan-Hubert Wittmann |
| | FUCHS LUBRICANTS GERMANY GMBH | Mannheim | Dr. Fritz Nübling |
| | FVTR GmbH | Rostock | Martin Drescher |
| G | Gamma Technologies Inc. | Westmont (US) | Jan Böbel |
| | Garrett Advancing Motion Inc. | Rolle (CH) | Jitka Sotulářová |
| | General Electric (Switzerland) GmbH | Baden (CH) | Andreas Bauer |
| | GF Casting Solutions AG | Schaffhausen (CH) | Ilias Papadimitriou |
| | Gleitlagertechnik Essen GmbH | Essen | Dr. Stefan Verstege |
| | Gleitlagertechnik Weißbacher GmbH | Alpen | Dr. Christoph Weißbacher |
| | Gräbener Maschinentechnik GmbH & Co. KG | Netphen – Werthenbach | Fabian Kapp |
| | GTW Technik s.r.o. | Třemošná (CZ) | Jiri Sujanec |
| H | Haltermann Carless Deutschland GmbH | Hamburg | Dr. Bruno Philippon |
| | HEAD acoustics GmbH | Herzogenrath | Prof. Dr. Klaus Genuit |
| | Heinzmann GmbH & Co. KG | Schönau | Hubert Kienzler |
| | Hengst SE | Münster | Ingo Brunsmann |
| | Heraeus Deutschland GmbH & Co. KG | Hanau | Dominik Sperzel |
| | Hitachi Automotive Systems, Ltd. | Chiyoda-ku (JP) | Yoshihito Yasukawa |
| | HJS Emission Technology GmbH & Co. KG | Menden | Klaus Schrewe |
| | Honda R&D Europe (Deutschland) GmbH | Offenbach | Raoul Schmidt |
| | Howden Turbo GmbH | Frankenthal | Dr. Matthias Schleer |
| | ↑ **HTM Hydro Technology Motors GmbH** | Arzbach | Maximilian Wack |
| I | IAV GmbH | Berlin | Marc Sens |
| | IAVF Antriebstechnik GmbH | Karlsruhe | Dr. Peter Berlet |
| | ⟳ **IBIDEN Ceram GmbH** | *Umfirmierung: CERAM Austria GmbH* | |
| | IFP Energies nouvelles | Rueil-Malmaison (FR) | Bruno Walter |
| | IHI Charging Systems International GmbH | Heidelberg | Dr. Jan Ehrhard |
| | ↓ **Industrial Analytics Berlin GmbH** | Berlin | |
| | INNIO Jenbacher GmbH & Co. OG | Jenbach (AT) | Dr. Stephan Laiminger |
| | INPROSIM GmbH | Kriftel | Hartmut Chladek |

↑ new member ↓ resigned member

| | COMPANY | LOCATION (HEADQUARTERS) | REPRESENTATIVE (SCIENTIFIC ADVISORY COMMITTEE) |
|---|---|---|---|
| | Interkat Catalyst GmbH | Königswinter | Dr. Jörg Spengler |
| | INTES GmbH | Stuttgart | Dr. Reinhard Helfrich |
| | ISimQ GmbH | Warngau | Dr. Georg Scheuerer |
| | iST Ingenieurgesellschaft für Strukturanalyse und Tribologie mbH | Aachen | Dr. Jochen Lang |
| | ISUZU MOTORS Germany GmbH | Ginsheim-Gustavsburg | Ottmar Degrell |
| J | Johnson Matthey GmbH & Co. KG | Sulzbach | Paul Philips |
| K | ↓ Karl Dungs GmbH & Co. KG | Urbach | |
| | KEYOU GmbH | Unterschleißheim | Olaf Bergner |
| | Kingsbury Inc. | Philadelphia (US) | Dr. Morched Medhioub |
| | Kistler Instrumente AG | Winterthur (CH) | David Mauke, Dr. Frank Wytrykus |
| | KIT Campus Transfer GmbH | Karlsruhe | Dr. Olaf Toedter |
| | Kompressorenbau Bannewitz GmbH | Bannewitz | Dr. Ingolf Lehmann |
| | ↓ KRATZER AUTOMATION AG | Unterschleißheim | |
| | KS ENGINEERS Deutschland GmbH | Kernen | Frederik Eise |
| | KST Motorenversuch GmbH & Co. KG | Bad Dürkheim | Philipp Premel |
| L | LaVision GmbH | Göttingen | Dr. Joachim Deppe |
| | LEC GmbH Large Engines Competence Center | Graz (AT) | Dr. Gerhard Pirker |
| | Liebherr Machines Bulle SA | Bulle (CH) | Dr. Bouzid Seba |
| | LOGE Deutschland GmbH | Cottbus | Vivien Günther |
| | Lubrisense GmbH | Hamburg | Dr. Sven Krause |
| M | M. JÜRGENSEN GmbH & Co KG | Sörup | Andreas Willim |
| | Magna Powertrain Engineering Center Steyr GmbH & Co. KG | St. Valentin (AT) | Dietmar Besendorfer |
| | MAHLE Behr GmbH & Co. KG | Stuttgart | Dr. Marco Warth |
| | MAHLE International GmbH | Stuttgart | Dr. Marco Warth |
| | Main-Metall Tribologie GmbH | Altenglan | Wladimir Buchbinder, Erik Gutwein |
| | MAN Energy Solutions SE | Augsburg | Dr. Alexander Knafl |
| | MAN Truck & Bus SE | Munich | Dirk Weberskirch |
| | MANN+HUMMEL GmbH | Ludwigsburg | Markus Kolczyk |
| | Maschinenfabrik Guido GmbH | Neutraubling | Hans-Jürgen Guido |
| | MET Motoren- und Energietechnik GmbH | Rostock | Prof. Dr. Siegfried Bludszuweit |

| | COMPANY | LOCATION (HEADQUARTERS) | REPRESENTATIVE (SCIENTIFIC ADVISORY COMMITTEE) |
|---|---|---|---|
| | Metal Improvement Company LLC | Unna | Oliver Schuchardt |
| | MIBA Gleitlager Austria GmbH | Laakirchen (AT) | Gunther Hager, Falk Nickel |
| | Miba Industrial Bearings Germany Osterode GmbH | Göttingen | Stephan Faulhaber |
| | Modine Europe GmbH | Filderstadt | Dr. Frank Lippke |
| | **↓ MOT Forschungs- und Entwicklungsgesellschaft für Motorentechnik, Optik und Thermodynamik mbH** | Karlsruhe | |
| | Motorenfabrik Hatz GmbH & Co. KG | Ruhstorf | Dr. Sebastian Wohlgemuth |
| | MTU Aero Engines AG | Munich | Heinz Knittel |
| | MULTITORCH GmbH | Sinsheim | Dr. Christiane Kuhnert |
| N | NEMAK Europe GmbH | Frankfurt / Main | Dirk Ragus |
| | Neste Oyj | Espoo (FI) | Mats Hultman |
| | nexiss GmbH | Darmstadt | Dr. Markus Kaiser |
| | NGK Europe GmbH | Kronberg | Claus-Dieter Vogt |
| | **↓ Nissan Motor Co., Ltd.** | Kanagawa (JP) | |
| | NOVA WERKE AG | Effretikon (CH) | Kurt Brüngger, Philipp Schuler |
| | NUMECA – Ingenieurbüro Dr.-Ing. Th. Hildebrandt | Altdorf | Dr. Thomas Hildebrandt |
| O | Oerlikon Friction Systems (Germany) GmbH | Bremen | Dietmar Köster |
| | Omega Renk Bearings Pvt. Ltd. | Bhopal (IN) | Manbendra Bhakta |
| | **↻ Opel Automobile GmbH** | *Rebranding: Stellantis Opel Automobile GmbH* | |
| P | Pankl Turbosystems GmbH | Mannheim | Rodrigo Costa |
| | Pierburg GmbH (Rheinmetall Automotive AG) | Neuss | Heinrich Dismon |
| | Piller Blowers und Compressors GmbH | Moringen | Daniel Muth |
| | **↻ Prins Autogassystemen B.V.** | *Rebranding: Westport Fuel Systems Netherlands B.V.* | |
| | Purem GmbH | Esslingen | Dr. Rolf Jebasinski |
| R | Ricardo Deutschland GmbH | Schwäbisch Gmünd | Dr. Simon P. Edwards |
| | Robert Bosch GmbH | Stuttgart | Dr. Andreas Kufferath |
| | Rolls-Royce Deutschland Ltd. & Co. KG | Oberursel | Dr. Dirk Hilberg |
| | Rolls-Royce Solutions GmbH | Friedrichshafen | Dr. Johannes Kech |
| | RTA GmbH | St. Aegyd (AT) | Patrick Janson |
| S | Scania CV AB | Södertälje (SE) | Johan Linderyd |
| | Schaeffler Engineering GmbH | Werdohl | Lars Pfützenreuter |

↑ new member ↓ resigned member

| | COMPANY | LOCATION (HEADQUARTERS) | REPRESENTATIVE (SCIENTIFIC ADVISORY COMMITTEE) |
|---|---|---|---|
| | Schaeffler Technologies AG & Co. KG | Herzogenaurach | Andreas Strauß |
| | SEG Automotive Germany GmbH | Stuttgart | Dr. Dieter Eppinger |
| | Shell Global Solutions (Deutschland) GmbH | Hamburg | Dr. Ingo Mikulic |
| | Siemens Energy Global GmbH & Co. KG | Duisburg | Dr. Mustafa Rahim |
| | Siemens Industry Software GmbH & Co.KG | Cologne | Dr. Helge Tielbörger |
| | Steinbeis Transferzentrum Bauteilfestigkeit und -sicherheit, Werkstoff- und Fügetechnik (BWF) | Esslingen | Dr. Stephan Issler |
| | Stellantis Opel Automobile GmbH | Rüsselsheim | Dr. Matthias Alt |
| | Subaru Corporation | Tokio (JP) | Tai Ono |
| | SYMBIO A Faurecia Michelin Hydrogen Company | Venissieux (FR) | Christophe Vacquier |
| T | TEC4FUELS GmbH | Herzogenrath | Dr. Klaus Lucka |
| | Tenneco GmbH | Edenkoben | Dr. Michael Fischer |
| | Tenneco // Federal-Mogul Burscheid GmbH | Burscheid | Bartosch Gadomski |
| | Tenneco // Federal-Mogul Ignition GmbH | Föritztal | Sandro Pino |
| | Tenneco // Federal-Mogul Nürnberg GmbH | Nuremberg | Klaus Lades |
| | Tenneco // Federal-Mogul Valvetrain GmbH | Burscheid | Frank Zwein |
| | Tenneco // Federal-Mogul Wiesbaden GmbH | Wiesbaden | Joachim Häring |
| | TESONA GmbH & Co. KG | Hörselberg-Hainich | Heiko Lantzsch |
| | TheSys GmbH | Kirchentellinsfurt | Peter Ambros |
| | TotalEnergies Marketing Deutschland GmbH | Berlin | Peter Scholl |
| | TOYOTA GAZOO Racing Europe GmbH | Cologne | Paul Decker-Brentano |
| | Turbo Science GmbH | Darmstadt | Dr. Sebastian Leichtfuß |
| V | VEMAC GmbH & Co. KG | Aachen | Johannes Offergeld |
| | Volkswagen AG | Wolfsburg | Sander Robin Kuiken |
| | Volvo Car Corporation | *Membership through Aurobay Powertrain Engineering Sweden AB* | |
| | VOLVO Powertrain AB | Göteborg (SE) | Ulla Särnbratt |
| W | Westport Fuel Systems Netherlands B.V. (Prins Autogassystemen) | Eindhoven (NL) | Bart Van Aerle |
| | Winterthur Gas & Diesel Ltd. | Winterthur (CH) | Dr. Wolfgang Östreicher |
| | Woodward L'Orange GmbH | Stuttgart | Dr. Michael Willmann |
| | WTZ Motorentechnik GmbH | Dessau-Roßlau | Dr. Christian Reiser |
| Z | ZF Friedrichshafen AG | Schweinfurt | N.N. |

# Committees

Executive Committee and Management

| EXECUTIVE COMMITTEE (2022 – 2023) | | |
|---|---|---|
| **REPRESENTATIVE** | **COMPANY** | **LOCATION** (HEADQUARTERS) |
| Prof. Dr. Peter Gutzmer, ***President*** | | |
| Christopher Steinwachs, ***Deputy President*** | Siemens Energy Global GmbH & Co. KG | Berlin |
| Prof. Dr. Burkhard Göschel, ***Honorary President*** | | |
| Dr. Andreas Kufferath, ***Chairman of the Scientific Advisory Committee*** | Robert Bosch GmbH | Stuttgart |
| Karl Dums | Dr. Ing. h.c. F. Porsche AG | Weissach |
| Dr. Thomas Johnen | Stellantis Opel Automobile GmbH | Rüsselsheim |
| Dr. Evangelos Karvounis | Ford-Werke GmbH | Cologne |
| Markus Köhne | Volkswagen AG | Wolfsburg |
| Matthias Kratzsch | IAV GmbH | Berlin |
| Jürgen Lehmann | Daimler Truck AG | Stuttgart |
| Dr. Rudolf Maier | Robert Bosch GmbH | Stuttgart |
| Siegfried Pint | AUDI AG | Ingolstadt |
| Dr. Markus Schwaderlapp | DEUTZ AG | Cologne |
| Prof. Dr. Christian Schwarz | Bayerische Motorenwerke AG | Munich |
| Prof. Dr. Gunnar Stiesch | MAN Energy Solutions SE | Augsburg |
| Dr. Simon Thierfelder | Motorenfabrik Hatz GmbH & Co. KG | Ruhstorf |
| Martin Urban | Rolls-Royce Solutions GmbH | Friedrichshafen |
| Christian Verhoeven | General Electric (Switzerland) GmbH | Baden (CH) |
| Dr. Marco Warth | MAHLE GmbH | Stuttgart |
| Dr. Stefan Weber | MTU Aero Engines AG | Munich |
| Dr. Peter Wehle | Rolls-Royce Deutschland Ltd. & Co. KG | Oberursel |

| MANAGEMENT |
|---|
| Dietmar Goericke, ***Managing Director*** |
| Martin Nitsche, ***Deputy Managing Director*** |
| Matthias Zelinger, ***Deputy Managing Director*** |

| SCIENTIFIC ADVISORY COMMITTEE | | |
|---|---|---|
| **REPRESENTATIVE** | **COMPANY** | **LOCATION** (HEADQUARTERS) |
| Dr. Andreas Kufferath, ***Chairman*** | Robert Bosch GmbH | Stuttgart |
| Dr. Dirk Hilberg, ***Deputy Chairman*** | Rolls-Royce Deutschland Ltd. & Co. KG | Oberursel |

*For the list of members of the Scientific Advisory Committee, please refer to Members (pp. 8 to 13).*

## Research Committee

| | | |
|---|---|---|
| Dr. Matthias Alt | Stellantis Opel Automobile GmbH | Rüsselsheim |
| Paul Decker-Brentano | TOYOTA GAZOO Racing Europe GmbH | Cologne |
| Dr. Frank Bunar * | IAV GmbH | Berlin |
| Dr. Dieter Eppinger | SEG Automotive Germany GmbH | Stuttgart |
| Dr. Volker Formanski | Bayerische Motorenwerke AG | Munich |
| Heinz Knittel * | MTU Aero Engines AG | Munich |
| Markus Kolczyk | MANN+HUMMEL GmbH | Ludwigsburg |
| Sander Robin Kuiken | Volkswagen AG | Wolfsburg |
| Thorsten Oberpenning | Rolls-Royce Solutions GmbH | Friedrichshafen |
| Dr. Friedrich Rabenstein | Bayerische Motorenwerke AG | Munich/Garching |
| Dr. Peter Rothenberger | Dr. Ing. h.c. F. Porsche AG | Weissach |
| Dr. Volker Schmeißer / Miriam Florack | Daimler Truck AG | Stuttgart |
| Marc Sens | IAV GmbH | Berlin |
| Carsten Weber | Ford-Werke GmbH | Cologne |
| Dr. Christian Weiskirch | MAN Truck & Bus SE | Nuremberg |

** by election on 06.10.2023*

# Research and technology performers

Universities/research institutions and their representatives

| | LOCATION (HEADQUARTERS) | RTD PERFORMERS | REPRESENTATIVE (HEAD OF RESEARCH) |
|---|---|---|---|
| A | Aachen | Access eV | Dr. André Schievenbusch |
| | Aachen | Fraunhofer-Gesellschaft eV<br>Fraunhofer Institute for Production Technology IPT | Prof. Dr. Christian Brecher |
| | Aachen | RWTH Aachen University<br>Central Facility for Electron Microscopy GFE | Prof. Dr. Joachim Mayer |
| | Aachen | RWTH Aachen University<br>Combustion Technology ITV | Prof. Dr. Heinz Pitsch |
| | Aachen | RWTH Aachen University<br>Electrical Machines IEM<br>Electromagnetic Energy Conversion | Prof. Dr. Kay Hameyer |
| | Aachen | RWTH Aachen University<br>Fluid Mechanics and Institute of Aerodynamics Aachen AIA | Prof. Dr. Wolfgang Schröder |
| | Aachen | RWTH Aachen University<br>Foundry Science GI | Prof. Dr. Andreas Bührig-Polaczek |
| | Aachen | RWTH Aachen University<br>High Pressure Gas Dynamics HGD<br>Shock Wave Laboratory | Prof. Dr. Karl Alexander Heufer |
| | Aachen | RWTH Aachen University<br>Jet Propulsion and Turbomachinery IST | Prof. Dr. Peter Jeschke |
| | Aachen | RWTH Aachen University<br>Machine Elements and Systems Engineering IMSE | Prof. Dr. Georg Jacobs |
| | Aachen | RWTH Aachen University<br>Manufacturing Technology / Laboratory for Machine Tools and Production Engineering WZL | Prof. Dr. Thomas Bergs |
| | Aachen | RWTH Aachen University<br>Materials Applications in Mechanical Engineering IWM | Prof. Dr. Christoph Broeckmann |
| | Aachen | RWTH Aachen University<br>Mechatronics in Mobile Propulsion MMP | Prof. Dr. Jakob Andert |
| | Aachen | RWTH Aachen University<br>Power Electronics and Electrical Drives ISEA | Prof. Dr. c. Rik W. De Doncker |
| | Aachen | RWTH Aachen University<br>Power Plant Technology, Steam and Gas Turbines IKDG | Prof. Dr. Manfred Wirsum |
| | Aachen | RWTH Aachen University<br>Surface Engineering IOT | Prof. Dr. Kirsten Bobzin |

| | LOCATION (HEADQUARTERS) | RTD PERFORMERS | REPRESENTATIVE (HEAD OF RESEARCH) |
|---|---|---|---|
| | Aachen | RWTH Aachen University<br>Thermodynamics of Mobile Energy Conversion Systems TME | Prof. Dr. Stefan Pischinger |
| B | Berlin | Bundesanstalt für Materialforschung und -prüfung BAM | Prof. Dr. Ulrich Panne |
| | Berlin | Fraunhofer-Gesellschaft eV<br>Fraunhofer Institute for Liability and Microintegration IZM | Prof. Dr. Martin Schneider-Ramelow |
| | Berlin | Technische Universität Berlin<br>Electrical Engineering and Computer Science<br>Institute of Energy and Automation Technology IEA<br>Electrical Energy Storage Technology EET | Prof. Dr. Julia Kowal |
| | Berlin | Technische Universität Berlin<br>Electrical Engineering and Computer Science<br>Institute of Energy and Automation Technology IEA<br>Electronic Measurement and Diagnostic Technology MDT | Prof. Dr. Clemens Gühmann |
| | Berlin | Technische Universität Berlin<br>Mechanical Engineering and Transport Systems<br>Institute of Aerospace Engineering ILR<br>Aero Engines LA | Prof. Dr. Dieter Peitsch |
| | Berlin | Technische Universität Berlin<br>Mechanical Engineering and Transport Systems<br>Institute of Land and Sea Transport Systems ILS<br>Integrated Modelling of Efficient Powertrains IMEF | Prof. Dr. Clemens Biet |
| | Berlin | Technische Universität Berlin<br>Mechanical Engineering and Transport Systems<br>Institute of Land and Sea Transport Systems ILS<br>Powertrain Technologies FZA | Prof. Dr. Bernd Wiedemann |
| | Berlin | Technische Universität Berlin<br>Mechanical Engineering and Transport Systems<br>Institute of Fluid Dynamics and Technical Acoustics ISTA<br>Fluid Dynamics FD | Prof. Dr. Christian Oliver Paschereit |
| | Berlin | Technische Universität Berlin<br>Mechanical Engineering and Transport Systems<br>Institute of Fluid Dynamics and Technical Acoustics ISTA<br>Turbo Machine and Thermo Acoustics TTA | Prof. Dr. Lars Enghardt |
| | Bochum | Ruhr-Universität Bochum RUB<br>Interdisciplinary Centre for Advanced Materials Simulation ICAMS | Prof. Dr. Ingo Steinbach |

| | LOCATION (HEADQUARTERS) | RTD PERFORMERS | REPRESENTATIVE (HEAD OF RESEARCH) |
|---|---|---|---|
| | Bochum | Ruhr-Universität Bochum RUB<br>Mechanical Engineering<br>Institute of Product and Service Engineering IPSE<br>Product Development LPE | Prof. Dr. Beate Bender |
| | Bochum | Ruhr-Universität Bochum RUB<br>Mechanical Engineering<br>Institute of Thermo- and Fluiddynamics ITF<br>Thermodynamics TD | Prof. Dr. Roland Span |
| | Braunschweig | Technische Universität Braunschweig<br>Life Sciences<br>Institute of Environmental and Sustainable Chemistry IÖNC | Prof. Dr. Henning Menzel |
| | Braunschweig | Technische Universität Braunschweig<br>Mechanical Engineering<br>Institute of Automotive Engineering IfF | Prof. Dr. Roman Henze |
| | Braunschweig | Technische Universität Braunschweig<br>Mechanical Engineering<br>Institute of Internal Combustion Engines and Fuel Cells IVB | Prof. Dr. Peter Eilts |
| | Braunschweig | Technische Universität Braunschweig<br>Mechanical Engineering<br>Institute of Mechatronics and Adaptronics IMA | Prof. Dr. Markus Böl |
| | Bremen | Fraunhofer-Gesellschaft eV<br>Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM | Prof. Dr. Matthias Busse<br>Prof. Dr. Bernd Mayer |
| | Bremen | Leibniz Association eV<br>Leibniz Institute for Materials Engineering IWT<br>Manufacturing Technologies | Prof. Dr. Bernhard Karpuschewski |
| | Bremen | Leibniz Association eV<br>Leibniz Institute for Materials Engineering IWT<br>Materials Engineering | Prof. Dr. Rainer Fechte-Heinen |
| C | Chemnitz | Chemnitz University of Technology<br>Mechanical Engineering<br>Institute of Construction and Drive Technology<br>Machine Elements and Product Development | Prof. Dr. Alexander Hasse |

| **LOCATION** (HEADQUARTERS) | **RTD PERFORMERS** | **REPRESENTATIVE** (HEAD OF RESEARCH) |
|---|---|---|
| Chemnitz | Chemnitz University of Technology<br>Natural Sciences<br>Institute of Chemistry<br>Chemical Technology | Prof. Dr. Klaus Stöwe |
| Chemnitz | Fraunhofer-Gesellschaft eV<br>Fraunhofer Institute for Machine Tools and Forming Technology IWU | Prof. Dr. Welf-Guntram Drossel<br>Prof. Dr. Martin Dix<br>Prof. Dr. Steffen Ihlenfeldt |
| Chiba | Chiba University<br>Mechanical Engineering/Thermal Fluid Energy Artificial Systems<br>Science Center for Power Source Research for Next-Generation Mobility | Prof. Dr. Yasuo Moriyoshi |
| Clausthal-Zellerfeld | Clausthal University of Technology<br>Institute of Tribology and Energy Conversion Machinery ITR | Prof. Dr. Hubert Schwarze |
| Coburg | Coburg University of Applied Sciences and Arts<br>Mechanical Engineering and Automotive Technologies FMA<br>Combustion Engines | Prof. Dr. Markus Jakob |
| Coburg | Coburg University of Applied Sciences and Arts<br>Technology Transfer Center Automotive TAC | Prof. Dr. Helmut Alexander Rost |
| Cologne | DLR German Aero Space Center eV<br>Institute of Propulsion Technology AT | Dr. Andreas Döpelheuer |
| Cottbus | btu Brandenburg University of Technology Cottbus-Senftenberg<br>Mechanical Engineering, Electrical and Energy Systems<br>Institute of Electrical and Thermal Energy Systems<br>Thermodynamics/Thermal Process Engineering TDTVT | Prof. Dr. Fabian Mauß |
| Cottbus | btu Brandenburg University of Technology Cottbus-Senftenberg<br>Mechanical Engineering, Electrical and Energy Systems<br>Institute of Transport Technology<br>Structural Mechanics and Vehicle Vibrational Technology SMF | Prof. Dr. Bernd Beirow |
| Cottbus | btu Brandenburg University of Technology Cottbus-Senftenberg<br>Mechanical Engineering, Electrical and Energy Systems<br>Institute of Transport Technology<br>Combustion Engines and Flight Propulsion VFA | Prof. Dr. Heinz Peter Berg |

| | LOCATION (HEADQUARTERS) | RTD PERFORMERS | REPRESENTATIVE (HEAD OF RESEARCH) |
|---|---|---|---|
| | Cottbus | btu Brandenburg University of Technology Cottbus-Senftenberg<br>Mathematics, Computer Science, Physics, Electrical Engineering and Information Technology<br>Applied Physics and Semiconductor Spectroscopy | Prof. Dr. Jan Ingo Flege |
| D | Darmstadt | Fraunhofer-Gesellschaft eV<br>Fraunhofer Institute for Structural Durability and System Reliability LBF | Prof. Dr. Tobias Melz |
| | Darmstadt | Technical University of Darmstadt<br>Center for Structural Materials<br>State Materials Testing Institute Darmstadt and Institute of Materials Science MPA-IfW | Prof. Dr. Matthias Oechsner |
| | Darmstadt | Technical University of Darmstadt<br>Civil and Environmental Engineering<br>Steel Construction and Materials Mechanics IFSW<br>Materials Mechanics | Prof. Dr. Michael Vormwald |
| | Darmstadt | Technical University of Darmstadt<br>Computer Science<br>Interactive Graphic Systems GRIS | Prof. Dr. Dieter W. Fellner |
| | Darmstadt | Technical University of Darmstadt<br>Mechanical Engineering<br>Gas Turbines and Aerospace Propulsion GLR | Prof. Dr. Heinz-Peter Schiffer |
| | Darmstadt | Technical University of Darmstadt<br>Mechanical Engineering<br>Fluid Mechanics and Aerodynamics SLA | Prof. Dr. Jeanette Hussong |
| | Darmstadt | Technical University of Darmstadt<br>Mechanical Engineering<br>Internal Combustion Engines and Powertrain Systems VKM | Prof. Dr. Christian Beidl |
| | Darmstadt | Technical University of Darmstadt<br>Mechanical Engineering<br>Mechatronic Systems IMS | Prof. Dr. Stephan Rinderknecht |
| | Darmstadt | Technical University of Darmstadt<br>Mechanical Engineering<br>Reactive Flows and Diagnostics RSM | Prof. Dr. Andreas Dreizler |

| **LOCATION** (HEADQUARTERS) | **RTD PERFORMERS** | **REPRESENTATIVE** (HEAD OF RESEARCH) |
|---|---|---|
| Darmstadt | Technical University of Darmstadt<br>Mechanical Engineering<br>Thermo-Fluids & Interfaces TFI<br>Simulation of Reactive Thermo-Fluid Systems STFS | Prof. Dr. Christian Hasse |
| Dresden | Helmholtz-Zentrum Dresden-Rossendorf eV<br>Institute of Fluid Dynamics IFD<br>Computational Fluid Dynamics CFD | Dr. Dirk Lucas |
| Dresden | Helmholtz-Zentrum Dresden-Rossendorf eV<br>Institute of Fluid Dynamics IFD<br>Experimental Thermal Fluid Dynamics TFD | Prof. Dr. Uwe Hampel |
| Dresden | Technische Universität Dresden TUD<br>Electrical and Computer Engineering<br>Institute of Electrical Power Engineering ETI<br>Electrical Machines and Drives EMA | Prof. Dr. Wilfried Hofmann |
| Dresden | Technische Universität Dresden TUD<br>Electrical and Computer Engineering<br>Institute of Electrical Power Systems and High Voltage Engineering IEEH<br>High Voltage and High Current Engineering | Dr. Stephan Schlegel |
| Dresden | Technische Universität Dresden TUD<br>Electrical and Computer Engineering<br>Institute of Electronic Packaging Industry IAVT | Prof. Dr. Karlheinz Bock |
| Dresden | Technische Universität Dresden TUD<br>Mechanical Engineering<br>Institute of Power Engineering IET<br>Thermal Power Machinery and Plants | Prof. Dr. Andreas Jäger |
| Dresden | Technische Universität Dresden TUD<br>Mechanical Engineering<br>Institute of Lightweight Engineering and Polymer Technology ILK | Prof. Dr. Hubert Jäger |
| Dresden | Technische Universität Dresden TUD<br>Mechanical Engineering<br>Institute of Lightweight Engineering and Polymer Technology ILK<br>Function-Integrative Lightweight Engineering | Prof. Dr. Niels Modler |

| | LOCATION (HEADQUARTERS) | RTD PERFORMERS | REPRESENTATIVE (HEAD OF RESEARCH) |
|---|---|---|---|
| | Dresden | Technische Universität Dresden TUD<br>Mechanical Engineering<br>Institute of Lightweight Engineering and Polymer Technology ILK<br>Lightweight Systems Engineering and Multi Material Design | Prof. Dr. Maik Gude |
| | Dresden | Technische Universität Dresden TUD<br>Transport and Traffic Sciences<br>Dresden Institute of Automobile Engineering IAD<br>Combustion Engineering and Drive Technology LVM | Prof. Dr. Frank Atzler |
| | Dübendorf | Empa Materials Science and Technology<br>Energy, Mobility and Environment<br>Automotive Powertrain Technologies<br>Powertrain Systems Group | Dr. Patrik Soltic |
| | Duisburg | The Hydrogen and Fuel Cell Center ZBT GmbH | Dr. Peter Beckhaus |
| | Duisburg | University of Duisburg-Essen<br>Institute for Energy and Environmental Process Engineering IEUV<br>Turbomachinery TM | Prof. Dr. Dieter Brillert |
| | Duisburg | University of Duisburg-Essen<br>Institute for Energy and Materials Processes EMPI<br>Reactive Fluids | Prof. Dr. Christof Schulz |
| E | Erlangen | Fraunhofer-Gesellschaft eV<br>Fraunhofer Institute for Integrated Systems and Device Technology IISB | Prof. Dr. Jörg Schulze |
| | Erlangen | University of Erlangen-Nürnberg FAU<br>Chemical and Bio Engineering<br>Engineering Thermodynamics LTT | Prof. Dr. Stefan Will |
| | Erlangen | University of Erlangen-Nürnberg FAU<br>Chemical and Bio Engineering<br>Fluid Systems Engineering FST | Prof. Dr. Michael Wensing |
| | Erlangen | University of Erlangen-Nürnberg FAU<br>Mechanical Engineering<br>Factory Automation and Production Systems FAPS | Prof. Dr. Jörg Franke |
| | Erlangen | University of Erlangen-Nürnberg FAU<br>Mechanical Engineering<br>Polymer Technology LKT | Prof. Dr. Dietmar Drummer |

| | LOCATION (HEADQUARTERS) | RTD PERFORMERS | REPRESENTATIVE (HEAD OF RESEARCH) |
|---|---|---|---|
| F | Flensburg | Flensburg University of Applied Sciences FUAS<br>Mechanical Engineering, Process Engineering and Maritime Technologies<br>Combustion Engines / Power Systems | Prof. Dr. Michael Thiemke |
| | Frankfurt / Main | DFI DECHEMA Research Institute SdbR | Dr. Mathias Galetz<br>Dr. Jonathan Bloh |
| | Freiberg | Technische Universität Bergakademie Freiberg<br>Institute of Energy Process Engineering and Chemical Engineering IEC<br>Energy Process Engineering | Prof. Dr. Martin Gräbner |
| | Freiberg | Technische Universität Bergakademie Freiberg<br>Institute of Energy Process Engineering and Chemical Engineering IEC<br>Reaction Engineering | Prof. Dr. Sven Kureti |
| | Freiberg | Technische Universität Bergakademie Freiberg<br>Institute of Materials Engineering IWT<br>Materials Engineering | Prof. Dr. Horst Biermann |
| | Freiberg | Technische Universität Bergakademie Freiberg<br>Institute of Mechanics and Fluid Dynamics IMFD | Prof. Dr. Alfons Ams |
| | Freiberg | Technische Universität Bergakademie Freiberg<br>Institute of Mechanics and Fluid Dynamics IMFD<br>Applied Mechanics - Solid Mechanics | Prof. Dr. Björn Kiefer |
| | Freiburg | Fraunhofer-Gesellschaft eV<br>Fraunhofer Institute for Mechanics of Materials IWM | Prof. Dr. Peter Gumbsch |
| | Freiburg | Fraunhofer-Gesellschaft eV<br>Fraunhofer Institute for Mechanics of Materials IWM<br>Multiscale Modeling and Tribosimulation | Prof. Dr. Michael Moseler |
| | Freiburg | Fraunhofer-Gesellschaft eV<br>Fraunhofer Institute for Physical Measurement Techniques IPM | Prof. Dr. Karsten Buse<br>Dr. Rosita Sowade |
| | Freiburg | Fraunhofer-Gesellschaft eV<br>Fraunhofer Institute for Solar Energy Systems ISE | Prof. Dr. Hans-Martin Henning<br>Prof. Dr. Andreas Bett |
| | Freiburg | Fraunhofer-Gesellschaft eV<br>Fraunhofer Institute for Solar Energy Systems ISE<br>Electrical Storage | Dr. Matthias Vetter<br>Dr. Daniel Biro |

| | LOCATION (HEADQUARTERS) | RTD PERFORMERS | REPRESENTATIVE (HEAD OF RESEARCH) |
|---|---|---|---|
| | Freiburg | University of Freiburg<br>Engineering<br>Institute of Computer Science INF | Prof. Dr. Fabian Kuhn |
| | Freiburg | University of Freiburg<br>Engineering<br>Institute of Microsystems Engineering IMTEK | Prof. Dr. Thomas Stieglitz |
| G | Graz | Graz University of Technology<br>Institute of Machine Components and Methods of Development IME | Prof. Dr. Hannes Hick |
| | Graz | Graz University of Technology<br>Institute of Thermodynamics and Sustainable Propulsion Systems ITnA | Prof. Dr. Helmut Eichlseder |
| | Graz | Graz University of Technology<br>Institute of Thermodynamics and Sustainable Propulsion Systems ITnA<br>Emissions | Prof. Dr. Stefan Hausberger |
| H | Hamburg | Hamburg University of Technology TUHH<br>Institute of Ship Design and Ship Safety SSI | Prof. Dr. Stefan Krüger |
| | Hamburg | Hamburg University of Technology TUHH<br>Institute of Technical and Macromolecular Chemistry TMC | Prof. Dr. Gerrit A. Luinstra<br>Prof. Dr. Jakob Albert |
| | Hamburg | Hamburg University of Technology TUHH<br>Marine Engineering ASM | Prof. Dr. Friedrich Wirz |
| | Hamburg | Institute of Analytical Measurement Hamburg - IAM-Hamburg eV | Prof. Dr. Gerhard Matz |
| | Hanover | Leibniz University Hannover<br>Civil Engineering and Geodetic Science<br>Institute of Risk and Liability IRZ | Prof. Dr. Michael Beer |
| | Hanover | Leibniz University Hannover<br>Electrical Engineering and Computer Science<br>Institute of Powertrain Systems and Power Electronics IAL | Prof. Dr. Axel Mertens<br>Prof. Dr. Bernd Ponick |
| | Hanover | Leibniz University Hannover<br>Mechanical Engineering<br>Institute of Combustion Technology ITV | Prof. Dr. Friedrich Dinkelacker |
| | Hanover | Leibniz University Hannover<br>Mechanical Engineering<br>Institute of Dynamics and Vibration Research IDS | Prof. Dr. Jörg Wallaschek |

| | LOCATION (HEADQUARTERS) | RTD PERFORMERS | REPRESENTATIVE (HEAD OF RESEARCH) |
|---|---|---|---|
| | Hanover | Leibniz University Hannover<br>Mechanical Engineering<br>Institute of Machine Design and Tribology IMKT | Prof. Dr. Gerhard Poll |
| | Hanover | Leibniz University Hannover<br>Mechanical Engineering<br>Institute of Product Development and Equipment Construction IPeG | Prof. Dr. Roland Lachmayer |
| | Hanover | Leibniz University Hannover<br>Mechanical Engineering<br>Institute of Turbomachinery and Fluid Dynamics TFD | Prof. Dr. Jörg Seume |
| J | Jülich | Forschungszentrum Jülich GmbH<br>Institute of Energy and Climate Research IEK<br>Material Structure and Properties | Prof. Dr. Ruth Schwaiger |
| | Jülich | Forschungszentrum Jülich GmbH<br>Institute of Energy and Climate Research IEK<br>Materials Synthesis and Processing | Prof. Dr. Robert Vaßen |
| | Jülich | Forschungszentrum Jülich GmbH<br>Institute of Energy and Climate Research IEK<br>Troposphere | Prof. Dr. Andreas Wahner |
| K | Kaiserslautern | RPTU Kaiserslautern-Landau<br>Mechanical and Process Engineering<br>Composite Engineering Cce | Prof. Dr. Alois K. Schlarb<br>Prof. Dr. Leyu Lin |
| | Kaiserslautern | RPTU Kaiserslautern-Landau<br>Mechanical and Process Engineering<br>Institute of Vehicle Propulsion Systems LAF | Prof. Dr. Michael Günthner |
| | Karlsruhe | Fraunhofer-Gesellschaft eV<br>Fraunhofer Institute for Chemical Technology ICT<br>New Drive Systems | Prof. Dr. Martin Doppelbauer |
| | Karlsruhe | Karlsruhe Institute ITS Technology KIT<br>Institute of Thermal Turbomachinery IST | Prof. Dr. Hans-Jörg Bauer |
| | Karlsruhe | Karlsruhe Institute of Technology KIT<br>Engler-Bunte-Institute EBI<br>Combustion Technology | Prof. Dr. Dimosthenis Trimis |
| | Karlsruhe | Karlsruhe Institute of Technology KIT<br>Institute of Applied Materials IAM<br>Electrochemical Technologies ET | Prof. Dr. Ulrike Krewer |

| LOCATION (HEADQUARTERS) | RTD PERFORMERS | REPRESENTATIVE (HEAD OF RESEARCH) |
|---|---|---|
| Karlsruhe | Karlsruhe Institute of Technology KIT<br>Institute of Chemical Technology and Polymer Chemistry ITCP | Prof. Dr. Olaf Deutschmann |
| Karlsruhe | Karlsruhe Institute of Technology KIT<br>Institute of Chemical Technology and Polymer Chemistry ITCP<br>Exhaust Gas Center Karlsruhe | Prof. Dr. Olaf Deutschmann |
| Karlsruhe | Karlsruhe Institute of Technology KIT<br>Institute of Electrical Engineering ETI<br>Hybrid and Electrical Vehicles HEV<br>Hybrid Electric Vehicles | Prof. Dr. Martin Doppelbauer |
| Karlsruhe | Karlsruhe Institute of Technology KIT<br>Institute of Internal Combustion Engines IFKM | Prof. Dr. Thomas Koch |
| Karlsruhe | Karlsruhe Institute of Technology KIT<br>Institute of Physical Chemistry IPC<br>Molecular Physical Chemistry Group MOL | Prof. Dr. Matthias Olzmann |
| Karlsruhe | Karlsruhe Institute of Technology KIT<br>Institute of Thermal Process Engineering TVT | Prof. Dr. Matthias Kind<br>Prof. Dr. Thomas Wetzel |
| Karlsruhe | Karlsruhe Institute of Technology KIT<br>Institute of Technical Thermodynamics ITT | Prof. Dr. Ulrich Maas |
| Karlsruhe | Karlsruhe Institute of Technology KIT<br>Institute of Vehicle System Technology FAST | Prof. Dr. Frank Gauterin |
| Kassel | University of Kassel<br>Institute for Drive and Vehicle Technology IAF<br>Machine Elements and Tribology MT | Prof. Dr. Adrian Rienäcker |
| Kassel | University of Kassel<br>Institute of Materials Engineering IFW<br>Plastics Materials | Prof. Dr. Hans-Peter Heim |
| L Lemgo | University of Applied Sciences and Arts TH OWL<br>Mechanical Engineering and Mechatronics<br>Institute for Energy Research iFE | Prof. Dr. Thomas Schulte |
| Lemgo | University of Applied Sciences and Arts TH OWL<br>Mechanical Engineering and Mechatronics<br>Laboratory of Compressors/Turbo Engines and Fluid Dynamics | Prof. Dr. Georg Heinrich Klepp |
| Livermore, CA | Sandia National Laboratories National Technology and Engineering Solutions of Sandia, LLC.<br>Combustion Research Facility CRF | Dr. Paul C. Miles |

| | LOCATION (HEADQUARTERS) | RTD PERFORMERS | REPRESENTATIVE (HEAD OF RESEARCH) |
|---|---|---|---|
| M | Magdeburg | Otto von Guericke University Magdeburg OVGU<br>Electrical Engineering and Information Technology<br>Institute of Electric Power Systems IESY<br>Power Electronics | Prof. Dr. Andreas Lindemann |
| | Magdeburg | Otto von Guericke University Magdeburg OVGU<br>Mechanical Engineering<br>Institute of Machine Design IMK<br>Machine Elements and Tribology | Prof. Dr. Dirk Bartel |
| | Magdeburg | Otto von Guericke University Magdeburg OVGU<br>Mechanical Engineering<br>Institute of Mechanics IFME<br>Multibody Dynamics | Prof. Dr. Elmar Woschke |
| | Magdeburg | Otto von Guericke University Magdeburg OVGU<br>Mechanical Engineering<br>Institute of Mechanics IFME<br>Technical Dynamics | Prof. Dr. Jens Strackeljan |
| | Magdeburg | Otto von Guericke University Magdeburg OVGU<br>Mechanical Engineering<br>Institute of Mobile Systems IMS<br>Energy Conversion Systems for Mobile Applications | Prof. Dr. Hermann Rottengruber |
| | Magdeburg | Otto von Guericke University Magdeburg OVGU<br>University Hospital Magdeburg<br>Experimental Audiology EXA | Prof. Dr. Jesko L. Verhey |
| | Mannheim | Mannheim University of Applied Sciences<br>Tribology Competence Center KTM | Dr. Markus Grebe, M. Eng. |
| | Mittweida | Mittweida University of Applied Sciences<br>Engineering Sciences / Physics and Laser Technology<br>Laser Production Technology / High-performance Engineering LHM | Prof. Dr. Udo Löschner |
| | Munich | Fraunhofer-Gesellschaft eV<br>Fraunhofer Institute for Electronic Microsystems and Solid State Technologies EMFT | Prof. Dr. Amelie Hagelauer<br>Prof. Dr. Christoph Kutter |
| | Munich | Technical University of Munich TUM<br>School of Engineering and Design<br>Sustainable Mobile Powertrains NMA | Prof. Malte Jaensch |

| LOCATION (HEADQUARTERS) | RTD PERFORMERS | REPRESENTATIVE (HEAD OF RESEARCH) |
|---|---|---|
| Munich/Garching | Technical University of Munich TUM<br>School of Engineering and Design<br>Machine Elements / Gear Research Center FZG | Prof. Dr. Karsten Stahl |
| Munich/Garching | Technical University of Munich TUM<br>School of Engineering and Design<br>Thermodynamics | Prof. Dr. Dongsheng Wen |
| Munich/Garching | Technical University of Munich TUM<br>School of Engineering and Design<br>Thermo-Fluid Dynamics TFD | Prof. Dr. Wolfgang Polifke, PhD |
| Munich/Garching | Technical University of Munich TUM<br>School of Engineering and Design<br>Turbomachinery and Flight Propulsion LTF | Prof. Dr. Volker Gümmer |
| Munich/Garching | Technical University of Munich TUM<br>School of Engineering and Design<br>Vibroacoustics of Vehicles and Machines VIB | Prof. Dr. Steffen Marburg |
| N Nuremberg | Nuremberg Institute of Technology<br>Mechanical Engineering and Building Services Engineering<br>Institute for Automotive Engineering IFZN | Prof. Dr. Christina Singer |
| O Offenburg | Offenburg University of Applied Sciences<br>Electrical Engineering, Medical Engineering and Computer Science EMI<br>Radar and High-Frequency Technologies<br>Institute of Unmanned Aerial Systems IUAS | Prof. Dr. Marlene Harter |
| Offenburg | Offenburg University of Applied Sciences<br>Mechanical and Process Engineering M+V<br>Institute of Reliable Embedded Systems and Communication Electronics ivESK | Prof. Dr. Axel Sikora |
| Offenburg | Offenburg University of Applied Sciences<br>Mechanical and Process Engineering M+V<br>Mechanics and Materials | Prof. Dr. Thomas Seifert |
| Orléans | University of Orléans<br>PRISME Laboratory | Prof. Dr. Christine Mounaïm-Rousselle |
| P Paderborn | Fraunhofer-Gesellschaft eV<br>Fraunhofer Institute for Mechatronic Systems Design IEM | Prof. Dr. Ansgar Trächtler |
| Pfinztal | Fraunhofer-Gesellschaft eV<br>Fraunhofer Institute for Chemical Technology ICT | Prof. Dr. Frank Henning |

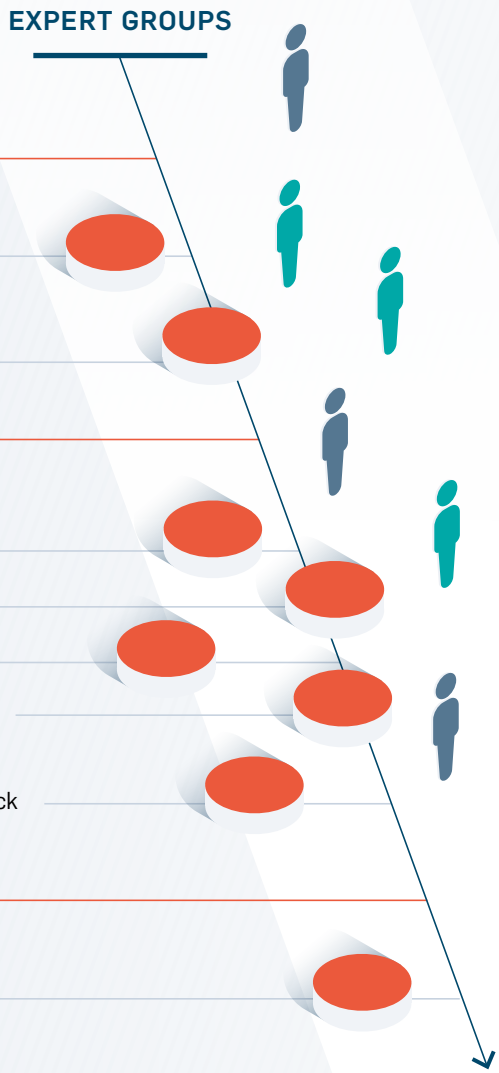
| | LOCATION (HEADQUARTERS) | RTD PERFORMERS | REPRESENTATIVE (HEAD OF RESEARCH) |
|---|---|---|---|
| | Pfinztal | Fraunhofer-Gesellschaft eV<br>Fraunhofer Institute for Chemical Technology ICT<br>Environmental Engineering | Rainer Schweppe |
| R | Rostock | University of Rostock<br>Mechanical Engineering and Marine Technologies<br>Fluid Mechanics LSM | Prof. Dr. Sven Grundmann |
| | Rostock | University of Rostock<br>Mechanical Engineering and Marine Technologies<br>Piston Machines and Internal Combustion Engines LKV | Prof. Dr. Bert Buchholz |
| | Rueil-Malmaison | IFP Énergies nouvelles S.A. (IFPEN) | Dr. Mickael Matrat |
| S | Stuttgart | Hahn-Schickard-Gesellschaft für angewandte Forschung eV | Prof. Dr. André Zimmermann |
| | Stuttgart | Institute for Materials Testing (MPA) University of Stuttgart<br>Material Behaviour and Material Modelling | Prof. Dr. Stefan Weihe |
| | Stuttgart | University of Stuttgart<br>Aerospace Engineering and Geodesy<br>Institute of Aircraft Propulsion Systems ILA | Prof. Dr. Stephan Staudacher<br>Prof. Dr. Malte Krack |
| | Stuttgart | University of Stuttgart<br>Aerospace Engineering and Geodesy<br>Institute of Aerospace Thermodynamics ITLR | Prof. Dr. Bernhard Weigand |
| | Stuttgart | University of Stuttgart<br>Computer Science and Electrical Engineering<br>Institute of Power Transmission and High Voltage Technology IEH | Prof. Dr. Stefan Tenbohlen |
| | Stuttgart | University of Stuttgart<br>Energy-, Process- and Bio-Engineering<br>Institute for Building Energetics, Thermotechnology and Energy Storage IGTE | Prof. Dr. Konstantinos Stergiaropoulos<br>Prof. Dr. André Thess |
| | Stuttgart | University of Stuttgart<br>Energy-, Process- and Bio-Engineering<br>Institute for Building Energetics, Thermotechnology and Energy Storage IGTE<br>Energy Storage | Prof. Dr. K. Andreas Friedrich |
| | Stuttgart | University of Stuttgart<br>Energy-, Process- and Bio-Engineering<br>Institute for Materials Testing, Materials Science and Strength of Materials IMWF | Prof. Dr. Stefan Weihe |

| LOCATION (HEADQUARTERS) | RTD PERFORMERS | REPRESENTATIVE (HEAD OF RESEARCH) |
|---|---|---|
| Stuttgart | University of Stuttgart<br>Energy-, Process- and Bio-Engineering<br>Institute of Thermal Turbomachinery and Machinery Laboratory ITSM | Prof. Dr. Damian Vogt |
| Stuttgart | University of Stuttgart<br>Engineering Design, Production Engineering and Automotive Engineering<br>Institute of Automotive Engineering IFS<br>Automotive Mechatronics | Prof. Dr. Hans-Christian Reuss |
| Stuttgart | University of Stuttgart<br>Engineering Design, Production Engineering and Automotive Engineering<br>Institute of Automotive Engineering IFS<br>Automotive Powertrain Systems | Prof. Dr.-Ing. André Casal Kulzer |
| Stuttgart | University of Stuttgart<br>Engineering Design, Production Engineering and Automotive Engineering<br>Institute for System Dynamics ISYS | Prof. Dr. Oliver Sawodny |
| Stuttgart | University of Stuttgart<br>Mechanical Engineering<br>Institute of Machine Components IMA | Prof. Dr.-Ing. Andreas Nicola |
| T Torino | Politecnico di Torino POLITO<br>Department of Energy DENERG<br>Center for Automotive Research and Sustainable Mobility-CARS | Prof. Federico Millo |
| U Ulm | Center for Solar Energy and Hydrogen Research ZSW SdbR<br>Fuel Cell Stack Technology | Dr. Joachim Scholta |
| V Valencia | Universitat Politècnica de València<br>Thermal Engines and Machines<br>Combustion Engines CMT | Prof. Dr. Jesús Benajes |
| Vienna | Technical University of Vienna TU Wien<br>Mechanical and Industrial Engineering<br>Institute of Powertrains and Automotive Technology IFA | Prof. Dr. Bernhard Geringer |
| Villigen | Paul Scherrer Institut PSI<br>Energy and Environment ENE<br>Bioenergy and Catalysis LaboratoryLBK | Prof. Dr. Oliver Kröcher |

| | LOCATION (HEADQUARTERS) | RTD PERFORMERS | REPRESENTATIVE (HEAD OF RESEARCH) |
|---|---|---|---|
| W | Weimar | Materials Research and Testing Institute at the Bauhaus-Universität Weimar MFPA<br>Institute of Structural Mechanics ISM<br>Structural Analysis and Component Strength | Prof. Dr. Carsten Könke |
| | Windisch | FHNW University of Applied Sciences and Arts Northwestern Switzerland<br>School of Engineering<br>Institute of Thermal and Fluid Engineering ITFE | Prof. Dr. Kai Herrmann |
| Z | Zurich | ETH Zurich<br>Mechanical and Process Engineering MAVT<br>Institute for Dynamic Systems and Control IDSC | Prof. Dr. Christopher Onder |
| | Zurich | ETH Zurich<br>Mechanical and Process Engineering MAVT<br>Institute of Energy and Process Engineering IEPE<br>Combustion and Acoustics for Power and Propulsion Systems CAPS<br>Institut für Energie- und Verfahrenstechnik IEPE<br>Labor für Verbrennung und Akustik für Energiesysteme CAPS | Prof. Dr. Nicolas Noiray |

# Scientific coordination

Together we develop ideas for the future. Experts from member companies meet in the groups to identify common research needs and design projects accordingly. The Scientific Advisory Committee of the FVV appoints chairpersons for each group to lead the scientific work.




SYSTEM

## Energy Infrastructure and Storage

NN

## Sustainable Powertrain Systems

Thorsten Oberpenning, Rolls-Royce Solutions

SUBSYSTEMS

## Energy Conversion Systems

→ **Engines** | Dr. Christian Weiskirch, MAN Truck & Bus

→ **Electric Motors** | Carsten Weber, Ford-Werke

→ **Fuel Cells** | Dr. Volker Formanski, BMW Group

→ **Turbo Machines** | Dr. Dirk Hilberg, Rolls-Royce Germany
Heinz Knittel, MTU Aero Engines*

→ **Zero-impact Emissions** | Dr. Volker Schmeißer, Daimler Truck
Dr. Frank Bunar, IAV*

COMPONENTS

## Materials Science and Recycling

Dr. Dieter Eppinger, SEG Automotive Germany

See also:
»Make it new – Science for a moving society« (ToR)
→ www.fvv-net.de/en

** by election on 06.10.2023*

# THEMIS Database

Members of the FVV innovation network can find a list of all planned and ongoing projects in the FVV research programme and dates for the discussion groups, workshops and project user committees in THEMIS.

## Project list

Status: 03.07.2023


## Research programme

Status: always up-to-date

## Meeting dates

Status: always up-to-date

# Energy Infrastructure and Storage

SYSTEM

## Research priorities

Interaction of energy sources and system components,
energy infrastructure and external storage

→ Chemical energy carriers and alternative fuels beyond application
→ Standardisation → Life cycle analyses

### Terms of References (ToR)

+ General issues related to demand and availability of energy sources / carriers
+ Production, quality, distribution and availability of hydrogen, electricity-based and alternative fuels
+ Standardisation topics on future energy carriers and related issues such as infrastructure and storage
+ Life cycle assessment (LCA)
+ Development of collaboration projects with other institutions to serve the interests of FVV members (e. g. workshop with the fuel / energy industry, ...)

## Research projects

Coordinator: N.N.
Project management: Martin Nitsche, FVV

| NO. | TITLE // FUNDING ORGANISATION // DURATION | PROJECT COORDINATOR |
|---|---|---|
| | **Planned projects** | |
| **M2723** | GHG-neutral European Energy System | **Dr. Ulrich Kramer,** Ford-Werke |
| **M3623** | PEM-EL-DegrAST<br>⤮ EG Fuel Cells<br>⤮ EG Materials Science and Recycling | **Stefan Neugebauer,** IAV |

# Sustainable Powertrain Systems

SYSTEM

## Research priorities

Road / rail vehicles: classic powertrains (ICEV), hybrid / electrified powertrains (PHEV, BEV, FCEV), aircraft engines, marine propulsion, mobile machinery, power systems

→ Energy storage within the application → System efficiency → Air pollution, global warming, noise, sound, radiation → E-machine combined with battery

### Terms of References (ToR)

+ Questions on energy storage in the aforementioned applications
+ System efficiency of energy conversion processes e. g. charging, system control / regulation, sensor technologies, ...
+ Thermal management
+ Zero-impact emissions, greenhouse gas emissions (e. g. $CO_2$), noise, sound, electromagnetic compatibility (EMC)
+ E-machine combined with battery / ICE [interface to E-MOTIVE platform]
+ Impact of legal, social and political requirements onto powertrain systems, circularity
+ Development / engineering of tools for i. e. the system architecture and interaction of powertrain assemblies

## Research projects

Coordinator: Thorsten Oberpenning, Rolls-Royce Solutions
Project management: Ralf Thee, FVV

| NO. | TITLE // FUNDING ORGANISATION // DURATION | PROJECT COORDINATOR |
|---|---|---|
| | **Planned projects** | |
| **M4119** | MExTol // BMWK | **Hans Johannesson,** Aurobay Powertrain Engineering Sweden |
| **M0620** | Dissonance (Part-)Electric Powertrains // BMWK | **Dr. Julian Becker,** HEAD acoustics |
| **M1521** | Distributed Thermal Hybrid Powertrain Testing // FVV-EM | **Dr. Marcus Gohl,** APL Automobil-Prüftechnik Landau |
| **M2921** | NVH Optimized E-motor Types for HEV Power Unit | **Hans Johannesson,** Aurobay Powertrain Engineering Sweden |

↓ Continue on the next page

# Sustainable Powertrain Systems

SYSTEM

| NO. | TITLE // FUNDING ORGANISATION // DURATION | PROJECT COORDINATOR |
|---|---|---|
| **M0522** | Lubrication Large Bore Engines III | **Hans-Peter Böhm,** ELGAN Diamantwerkzeuge |
| **M2822** | AIDA AI Integration in the Development Toolchain // FVV-EM, CORNET, BMWK | **Markus Wenig,** Winterthur Gas & Diesel |
| **M1723** | Robust NVH-Design of EDUs // FVV-EM | **Hans Johannesson,** Aurobay Powertrain Engineering Sweden |
| **M1823** | E Motor Inverter for NVH and Efficiency // BMWK<br>⤮ EG Electric Motors | **Hans Johannesson,** Aurobay Powertrain Engineering Sweden |
| **M1923** | Fuel Cell Powertrain System Optimization<br>⤮ EG Fuel Cells | **Remy Fontaine,** Stellantis Opel Automobile |
| **M3023** | Sustainable Mobile Propulsion 2035+ // FVV-EM | **Marc Sens,** IAV |
| **M3523** | PEMFC AST $H_2$ Depletion<br>⤮ EG Fuel Cells<br>⤮ EG Materials Science and Recycling | **Stefan Neugebauer,** IAV |
| **M3823** | AD/ADAS Virtual Validation & Transfer to Powertrain | **Dr. Reza Rezaei,** IAV |

## Ongoing projects

| | | |
|---|---|---|
| **1382** | Lubrication Large Bore Engines II // FVV-EM // 01-05-2020 to 31-03-2023 | **Dr. Tobias C. Wesnigk,** M. JÜRGENSEN<br>**Dr. Udo Schlemmer-Kelling,** FEV Europe |
| **1428** | Modular Hybrid Powertrain // FVV-EM // 01-01-2021 to 31-03-2023 | **Dr. Veit Held,** Stellantis Opel Automobile<br>**Dr. Thomas Opitz,** Stellantis Opel Automobile |
| **1450** | Ejector-bypass TC // BMWK // 01-10-2021 to 31-03-2024 | **Dr. Tom Steglich,** IAV |
| **1457** | Acoustics of Hydrogen Piston Engines // FVV-EM // 01-06-2022 to 31-05-2023 | **Dr. Stefan Heuer,** MAN Truck & Bus |
| **1460** | On-board Emission Conformity Monitoring (OBECOM) // FVV-EM, CORNET, BMWK // 01-01-2022 to 31-12-2023 | **Dr. Heike Többen,** Purem |
| **1463** | Future Mobility Dialogue // FVV-EM // 01-07-2022 to 30-11-2023 | **Prof. Dr. Thomas Garbe,** Volkswagen |
| **1470** | NVH Optimization of Elastomer Engine Mounts // BMWK // 01-07-2022 bis 30-06-2024 | **Hans Johannesson,** Aurobay Powertrain Engineering Sweden |
| **1472** | Hybrid Powertrains for Alternative Fuels // BMWK // 01-04-2022 to 30-09-2024 | **Dr. Udo Schlemmer-Kelling,** FEV Europe<br>**Christoph Thielen,** Rolls-Royce Solutions |
| **1473** | Maneuvering with Hybrid Ships // BMWK // 01-04-2022 to 30-09-2024 | **Dr. Udo Schlemmer-Kelling,** FEV Europe<br>**Christoph Thielen,** Rolls-Royce Solutions |

↓ Continue on the next page

# Sustainable Powertrain Systems

SYSTEM

| NO. | TITLE // FUNDING ORGANISATION // DURATION | PROJECT COORDINATOR |
|---|---|---|
| **1474** | Axial Turbine T/C for Lean Burn Concepts // FVV-EM, BMWK // 01-04-2022 to 31-03-2024 | **Marc Sens,** IAV |
| **1483** | PIFPGE Pre-ignited Flame Propagation Gas Engines // FVV-EM, CORNET, BMWK // 01-10-2022 to 30-09-2024 | **Dr. Markus Wenig,** Winterthur Gas & Diesel |
| **1488** | Real Driving Data for Automotive Application // FVV-EM // 01-02-2023 to 31-07-2025 | **Stefan Gottlieb,** Robert Bosch |
| **1489** | Pass-by Noise Simulation // FVV-EM // 01-02-2023 to 31-01-2024 | **Dr. Stefan Heuer,** MAN Truck & Bus |
| **1494** | Condensate Formation in Exhaust Systems // BMWK // 01-05-2023 to 30-04-2025 | **Thorsten Reimers,** Rheinmetall |
| **1497** | NVH-Behaviour of Fuel Cell Vehicles // FVV-EM / / 01-09-2023 to 31-08-2024<br>⤮ EG Fuel Cells | **Dr. Stefan Heuer,** MAN Truck & Bus |
| **1503** | Predictive Powertrain Health Care // FVV-EM // 01-11-2023 to 31-10-2025 | **Dr. Christian Jörg,** Hitachi Automotive Systems Europe |
| **1507** | LDCI2027 Light-duty CI-ICE 2027 // FVV-EM, CORNET, BMWK // 01-09-2023 to 31-08-2025 | **Dr. Frank Bunar,** IAV |

## Completed projects

| | | |
|---|---|---|
| **1394** | Modelling of Pre-ignition in Gas Engines // FVV-EM, CORNET, BMWK // 01-04-2020 to 30-09-2022 | **Dr. Markus Wenig,** Winterthur Gas & Diesel |
| **1429** | $CO_2$-neutral Long-haul Heavy-duty Powertrains 2050 II // FVV-EM // 01-04-2021 to 31-03-2023 | **Herbert Schneider,** ISUZU MOTORS Germany |
| **1433** | HyFlex ICE // FVV-EM // 01-03-2021 to 28-02-2023 | **Marc Sens,** IAV |

# Energy Conversion Systems // Engines

SUBSYSTEMS

## Research priorities

Innovative and / or optimised energy conversion systems minimising environmental impact and maximising process efficiency and engine performance

→ **Engines**

### Terms of References (ToR)

+ All conventional engine development topics
+ Optimisation and development of new energy conversion processes focusing on e. g. increasing process efficiency of future varieties of fuels (including use of hydrogen)
+ Reducing the environmental impact
+ Process-focused adaptation of related components and (sub-) assemblies
+ Effects of increasing electrification to the ›engine‹ subsystem and its aggregates
+ Digitalisation
+ Development and improvement of related development / engineering tools based on changing and adopting application / subsystem requirements

## Research projects

Coordinator: Dr. Christian Weiskirch, MAN Truck & Bus
Project management: Ralf Thee, FVV

| NO.. | TITLE // FUNDING ORGANISATION // DURATION | PROJECT COORDINATOR |
|---|---|---|
| | **Planned projects** | |
| **M0120** | Oil Input into Combustion II // BMWK | **Dr. Eike Stitterich,** Hengst |
| **M0922** | AI-based, Fast Knock Control // BMWK | **Dr. Michael Fischer,** Tenneco |
| **M2622** | Influence of Methanol Fuels on Tribology // BMWK | **Prof. Dr. Thomas Garbe,** Volkswagen |
| **M2922** | $H_2$ Combustion with Particularly Small Swept Volume // FVV-EM | **Marc Sens,** IAV |

↓ Continue on the next page

# Energy Conversion Systems // Engines

## SUBSYSTEMS

| NO. | TITLE // FUNDING ORGANISATION // DURATION | PROJECT COORDINATOR |
|---|---|---|
| **M0523** | HT-Tribosystems of $H_2$ Internal Combustion Engines // BMWK<br>⤮ EG Materials Science and Recycling | **Dr. Heiko Haase,** Rolls-Royce Solutions |
| **M2423** | Alcohol Fuels - Cavitation and Spray Formation | **Dr. Johann Wloka,** MAN Energy Solutions |
| **M2523** | $H_2$DIJet: $H_2$-HPDI-Jet HDV | **Dr. Stephan Liebsch,** IAV |
| **M2623** | Development of Parameterised LCA BEV Models<br>⤮ EG Electric Motors<br>⤮ EG Materials Science and Recycling | **Ilias Papadimitriou,** GF Casting Solutions |
| **M3923** | Methanol Compatibility // FVV-EM | **Dr. Johann Wloka,** MAN Energy Solutions |

### Ongoing projects

| | | |
|---|---|---|
| **1408** | Cold Start Emission Reduction // FVV-EM<br>// 01-09-2020 to 31-08-2024 | **Dr. Maximilian Brauer,** IAV |
| **1426** | Heuristic Search and Deep Learning // BMWK // 01-11-2020 to 31-10-2023 | **Dr. Christian Schnapp,** TOYOTA GAZOO Racing Europe<br>**Simone Mirco,** TOYOTA GAZOO Racing Europe |
| **1431** | SACI Combustion System with Active Pre-Chamber // FVV-EM<br>// 01-01-2021 to 30-06-2023 | **Dr. Jonas Villforth,** Dr. Ing. h.c. F. Porsche |
| **1434** | ICE2030 // FVV-EM // 01-02-2021 to 30-04-2023 | **Arndt Döhler,** Stellantis Opel Automobile |
| **1442** | Hydrogen Combustion and Comparison PFI/DI concepts // FVV-EM<br>// 01-04-2021 to 30-06-2023 | **Dr. Reza Rezaei,** IAV |
| **1446** | DI$H_2$jet (DI Hydrogen Combustion Process) // FVV-EM, CORNET, BMWK<br>// 01-07-2021 to 31-12-2023 | **Dr. Stephan Liebsch,** IAV |
| **1449** | Near-zero Emission Concept for $H_2$ DI Otto Engines // FVV-EM /<br>/ 01-10-2021 to 30-09-2024 | **Claus Wundling,** Bosch Engineering |
| **1454** | Prediction of Inhomogeneous $H_2$-SI Combustion // FVV-EM<br>// 01-06-2022 to 30-06-2024 | **Michael Rieß,** IAV |
| **1456** | EmiRed Innovative RDE Engine-out Emission Reduction // FVV-EM<br>// 01-02-2022 to 31-03-2024 | **Christine Burkhardt,** EnginOS<br>**Dr. Jonas Villforth,** Dr. Ing. h.c. F. Porsche |
| **1459** | GIHPCO Gas Injection High-pressure Combustion<br>// FVV-EM, CORNET, BMWK // 01-01-2022 to 31-03-2024 | **Dr. Enrico Bärow,** Woodward L'Orange<br>**Dr. Ilona Ruoff,** Woodward L'Orange |
| **1478** | EKIM Engine Knock Model for Future Fuels // FVV-EM, CORNET, BMWK<br>// 01-05-2022 to 30-11-2024 | **Dr. Jonas Villforth,** Dr. Ing. h.c. F. Porsche |

↓ Continue on the next page

# Energy Conversion Systems // Engines

## SUBSYSTEMS

| NO. | TITLE // FUNDING ORGANISATION // DURATION | PROJECT COORDINATOR |
|---|---|---|
| **1481** | $CO_2$ Reduction by Shorter Burn Duration // FVV-EM // 01-10-2022 to 31-03-2025 | **Dr. Patrick Gastaldi**, Aramco Fuel Research Center (AFRC) |
| **1491** | $H_2$-DeNOx-Model // BMWK // 01-07-2023 to 31-12-2025 | **Dr. Reza Rezaei,** IAV<br>**Dr. Jelto Frerichs,** IAV |
| **1492** | Cold Start Optimisation for M-100 Methanol Engine // FVV-EM, BMWK // 01-04-2023 to 31-03-2025 | **Dr. Helmut Ruhland,** Ford Werke<br>**Prof. Dr. Thomas Garbe,** Volkswagen |
| **1495** | PCTM: Potential SI Pre-Chamber Thermal Management // FVV-EM, CORNET, BMWK // 01-05-2023 to 30-04-2025 | **Marc Sens,** IAV |
| **1501** | Test Method Fuel Quality // FVV-EM // 01-08-2023 to 31-07-2025 | **Simon Eiden,** TEC4FUELS<br>**Dr. Klaus Lucka,** TEC4FUELS<br>**Denny Wenzel,** Volkswagen |
| **1502** | Investigation of Wall Heat Transfer in $H_2$ Engines // FVV-EM // 01-01-2024 to 30-06-2026 | **Claus Wundling,** Bosch Engineering |

### Completed projects

| | | |
|---|---|---|
| **1318** | Air Insulation Diesel Engine // FVV-EM // 01-07-2018 to 31-12-2022 | **Dr. Patrick Gastaldi,** Aramco Fuel Research Center (AFRC) |
| **1343** | Spray Modelling for DI Gasoline Engines // FVV-EM // 01-01-2019 to 31-03-2022 | **Dr. Christian Jörg,** Hitachi Automotive Systems Europe |
| **1348** | Fuel Composition for $CO_2$ Reduction // FVV-EM // 01-03-2019 to 28-02-2022 | **Terutoshi Tomoda,** Toyota Motor Corporation<br>**Koji Kitano,** Toyota Motor Corporation |
| **1352** | PremixedDiesel // FVV-EM, CORNET, BMWK // 01-01-2019 to 30-06-2022 | **Dr. Simon Schneider,** MAHLE International |
| **1357** | Homogenisation Model SI Engines II // BMWK // 01-07-2019 to 31-03-2022 | **Marc Sens,** IAV |
| **1368** | Innovative HD Combustion System Design // FVV-EM // 01-07-2019 to 30-06-2022 | **Dr. Reza Rezaei,** IAV |
| **1403** | eSpray // FVV-EM, CORNET, BMWK // 01-06-2020 to 30-11-2022 | **Dr. Uwe Leuteritz,** Liebherr-Components |

# Energy Conversion Systems // Electric Motors

SUBSYSTEMS

## Research priorities

Innovative and / or optimised energy conversion systems minimising environmental impact and maximising process efficiency and engine performance

→ **Electric Motors** [in cooperation with E-MOTIVE/FVA]

### Terms of References (ToR)

+ Improvement of electrical motor properties in mobile applications
+ Electrical energy storage systems (battery)
+ Power electronics of the electrical motor and electrical energy storage system
+ Application-focused adaptation of related components and (sub-) assemblies
+ Development and improvement of related development tools e. g. simulation tools, measurement and testing methods

## Research projects

Coordinator: Carsten Weber, Ford-Werke
Project management: Martin Nitsche, FVV

| NO. | TITLE // FUNDING ORGANISATION // DURATION | PROJECT COORDINATOR |
|---|---|---|
| | **Planned projects** | |
| **M0223** | Variable Pole Traction Machines for BEVs | **Dr. Alexandra Tokat,** Aurobay Powertrain Engineering Sweden |
| **M0423** | Winding Topology Comparison of BEVs | **Dr. Alexandra Tokat,** Aurobay Powertrain Engineering Sweden |
| **M1223** | Superior E-Drive Attributes & Tailored Complexity | **Dr. Rainer Lach,** Ford-Werke |
| **M1323** | Advanced System Damping Measures for E-Drivelines | **Dr. Rainer Lach,** Ford-Werke |
| **M1623** | Detection Quality of Traction Battery SoH | **Urban Morawitz,** Ford-Werke |
| **M1823** | E Motor Inverter for NVH and Efficiency // BMWK<br>⤮ EG Sustainable Powertrain Systems | **Hans Johannesson,** Aurobay Powertrain Engineering Sweden |
| **M2623** | Development of Parameterised LCA BEV Models<br>⤮ EG Engines<br>⤮ EG Materials Science and Recycling | **Ilias Papadimitriou,** GF Casting Solutions |
| **M2823** | Traction Battery Thermal Runaway | **Maziar Khosravi,** Ford-Werke |

# Energy Conversion Systems // Fuel Cells

SUBSYSTEMS

## Research priorities

Innovative and / or optimised energy conversion systems minimising environmental impact and maximising process efficiency and engine performance

→ **Fuel Cells** [interface to E-MOTIVE platform]

### Terms of References (ToR)

+ All conventional fuel cells development topics
+ Air and hydrogen system path, media conditioning and purification
+ Thermal management of the fuel cell stack
+ Optimisation of fuel cell specific components and (sub-) assemblies e. g. ion exchanger, compressors, ...
+ Research on materials at fuel cell specific conditions and effects, e. g. on bipolar plates, membranes, sealings concerning stack performance, loading characteristics, ageing (durability, degradation), humidification, ...
+ Stack performance / efficiency improvements e. g. performance effects of component and assembly tolerances
+ Safety requirements and definitions
+ Development of defined evaluation methods towards industry standards (generic, ›best practice‹)
+ Technology comparison PEM, High-temperature PEM, SOFC
+ Development and improvement of fuel cell specific development tools e. g. simulation tools, measurement methods (e. g. impedance analysis)

## Research projects

Coordinator: Dr. Volker Formanski, BMW Group
Project management: Martin Nitsche, FVV

| NO. | TITLE // FUNDING ORGANISATION // DURATION | PROJECT COORDINATOR |
|---|---|---|
| | **Planned projects** | |
| **M0921** | PEMPAR // BMWK | **Dr. Marius Zubel,** FEV Europe |
| **M2521** | Carbon Bipolar Plates for Heavy-duty Application // BMWK | **Uwe Griesmeier,** ZF Friedrichshafen |

↓ Continue on the next page

# Energy Conversion Systems // Fuel Cells

## SUBSYSTEMS

| NO. | TITLE // FUNDING ORGANISATION // DURATION | PROJECT COORDINATOR |
|---|---|---|
| **M2222** | Cathode Pressure Regulation for Fuel Cells // BMWK<br>⤮ EG Turbo Machines | **Dr. Dirk Jenssen,** Volkswagen |
| **M2422** | Reference System with Generic FC Stack | **Dirk Weberskirch,** MAN Truck & Bus |
| **M3022** | Technology Comparison Fuel Cell | **Dr. Susanne Lehner,** MAN Energy Solutions<br>**Christian Altenhofen,** Gamma Technologies |
| **M3122** | Impedance Analysis for Fuel Cells | **Tassilo Pflanz,** MAN Truck & Bus<br>**Dr. Volker Formanski,** BMW |
| **M1523** | Generic Thermal Cycle System | **Dr. Markus Kaiser,** nexiss |
| **M1923** | Fuel Cell Powertrain System Optimization<br>⤮ EG Sustainable Powertrain Systems | **Remy Fontaine,** Stellantis Opel Automobile |
| **M3323** | Superposition of Degrading FC Operation Conditions | **Monika Derflinger,** Ford-Werke |
| **M3523** | PEMFC AST $H_2$ Depletion<br>⤮ EG Sustainable Powertrain Systems<br>⤮ EG Materials Science and Recycling | **Stefan Neugebauer,** IAV |
| **M3623** | PEM-EL-DegrAST<br>⤮ Energy Infrastructure and Storage<br>⤮ EG Materials Science and Recycling | **Stefan Neugebauer,** IAV |

### Ongoing projects

| | | |
|---|---|---|
| **1439** | Fuel Cell Compressor Design // BMWK // 01-03-2021 to 31-08-2024<br>⤮ EG Turbo Machines | **Dr. Thomas Hildebrandt,** NUMECA Ingenieurbüro |
| **1455** | CFD Simulation of Droplet Separators // FVV-EM<br>// 01-06-2022 to 30-11-2024 | **Dr. Michael Harenbrock,** MANN+HUMMEL |
| **1471** | Cooling Fuel Cells II // BMWK // 01-04-2022 to 30-09-2024 | **Dr. Markus Kaiser,** nexiss |
| **1477** | Lifetime Simulation of Ion Exchange Filters // BMWK<br>// 01-06-2022 to 30-11-2024 | **Dr. Michael Harenbrock,** MANN+HUMMEL |
| **1490** | Component Dimensioning in Hydrogen Environment // BMWK<br>// 01-01-2023 to 31-12-2024<br>⤮ EG Turbo Machines<br>⤮ EG Materials Science and Recycling | **Dr. Stefan Averbeck,** MAN Energy Solutions |
| **1497** | NVH-Behaviour of Fuel Cell Vehicles // FVV-EM<br>// 01-09-2023 to 31-08-2024<br>⤮ EG Sustainable Powertrain Systems | **Dr. Stefan Heuer,** MAN Truck & Bus |

### Completed projects

| | | |
|---|---|---|
| **1406** | Energy Recovery in Fuel Cell Applications // FVV-EM<br>// 01-09-2020 to 31-03-2023 | **Dr. Dirk Jenssen,** Volkswagen |
| **1411** | FC Cold Start // FVV-EM // 01-09-2020 to 30-11-2022 | **Dr. Stefan Kaimer,** Ford-Werke |

# Energy Conversion Systems // Turbo Machines

SUBSYSTEMS

## Research priorities

Innovative and / or optimised energy conversion systems minimising environmental impact and maximising process efficiency and engine performance

**→Turbo Machines**

### Terms of References (ToR)

+ All conventional turbomachinery development topics
+ Optimisation of aerodynamics
+ Optimisation of turbomachinery specific components and (sub-) assemblies
+ Research on materials of turbomachinery specific conditions and effects; e. g. high-temperature, loading characteristics, ageing, resonances, use of hydrogen
+ Development and improvement of turbomachinery specific development tools

## Research projects

Coordinator: Dr. Dirk Hilberg, Rolls-Royce Deutschland | Heinz Knittel, MTU Aero Engines *(by election on 06.10.2023)*
Project management: Dirk Bösel, FVV

| NO. | TITLE // FUNDING ORGANISATION // DURATION | PROJECT COORDINATOR |
|---|---|---|
| | **Planned projects** | |
| **T1419** | Jet in Cross Flow Mixing Processes in Combustors // BMWK | **Dr. Marco Konle,** MTU Aero Engines |
| **T1619** | Established a Correlation Between Defects and NDE // BMWK | **Dr. Christian Amann,** Siemens Energy Global |
| **T0421** | Time Dependent Crack Closure // FVV-EM, DFG | **Henning Almstedt,** Siemens Energy Global |
| **T0521** | Simulation-Crack Behaviour Coarse Grain II // BMWK | **Markus Fried,** MTU Aero Engines |
| **T0921** | Experimental Validation of Higher Blade Modes // BMWK | **Dr. Thomas Klauke,** Rolls-Royce Deutschland |
| **T1021** | Integrated Creep-fatigue Assessment // BMWK | **Dr. Martin Reigl,** GE Power |

↓ Continue on the next page

# Energy Conversion Systems // Turbo Machines

## SUBSYSTEMS

| NO. | TITLE // FUNDING ORGANISATION // DURATION | PROJECT COORDINATOR |
|---|---|---|
| **T1521** | Suction Sided Noise Emission of Radial Compressors // BMWK | **Vera Kress,** MAN Energy Solutions |
| **T1821** | Influence of Water Vapour on TBC | **Dr. Susanne Schrüfer,** Rolls-Royce Deutschland |
| **T0122** | Centrifugal Compressor: AI-based Monitoring // BMWK | **Dr. Matthias Schleer,** Howden Turbo |
| **T0422** | Multiaxial Fatigue, Component & Operation-related // BMWK | **Dr. Michael Schurig,** Rolls-Royce Deutschland |
| **T0522** | Intentional Mistuning II // BMWK | **Thomas Winter,** MAN Energy Solutions |
| **T0622** | Air Bearings in Charging Systems // BMWK | **Dr. Oliver Alber,** MAN Energy Solutions |
| **T0722** | Blade Forces and System Damping II // BMWK | **Dr. Thomas Hildebrandt,** NUMECA Ingenieurbüro |
| **T0922** | Effect of $H_2$ Combustion on Capability of TBCs | **Dr. Arturo Flores Renteria,** Siemens Energy Global |
| **T1022** | BiDiKo 3-4 (Project Phase 1) | **Dr. Andreas Hartung,** MTU Aero Engines |
| **T1222** | Accelerated Creep Modelling | **Dr. Torsten-Ulf Kern,** Siemens Energy Global |
| **T1322** | HT-Threshold Calculation Methods II // BMWK | **Frank Vöse,** MTU Aero Engines |
| **T1422** | Cyclic HT R-curve | **Frank Vöse,** MTU Aero Engines |
| **T1522** | Thin-walled Structural Components Iron Aluminides | **Susanne Mosler,** Rolls-Royce Deutschland |
| **T1622** | Material Behaviour under the Influence of Hydrogen | **Dominique Zänker,** Rolls-Royce Deutschland |
| **T0123** | TMF Crack Path Calculation II | **Dr. Andreas Koch,** Rolls-Royce Solutions |
| **T0223** | Fatigue Scatter Reliablity | **Dominic Moisi,** Rolls-Royce Deutschland |
| **T0423** | Robust Fracture Deformation Characteristics II | **Dr. Torsten-Ulf Kern,** Siemens Energy Global |
| **T0623** | Fitness of 2618A for $H_2$ Energy Conversion Systems | **Dr. Reiner Böschen,** Rolls-Royce Solutions |
| **T0823** | Cyclic Relaxation | **Dr. Martin Reigl,** GE Power |
| **T0923** | Novel Type of Liners for Labyrinth Seals | **Oliver Munz,** MTU Aero Engines |
| **T1123** | LPBF Thin Wall Cree | **Dr. Christoph Haberland,** Siemens Energy Global |
| **T1223** | Laser Measurement in High Temperature Flows | **Dr. Stephan Behre,** MTU Aero Engines |
| **T1323** | TMCF Cracking Behavior of Component-like Samples | **Dr. Shilun Sheng,** Siemens Energy Global |
| **T1423** | Flexible HP Turbines II (Project completion) | **Christoph Lyko,** Rolls-Royce Deutschland |

↓ Continue on the next page

# Energy Conversion Systems // Turbo Machines

## SUBSYSTEMS

| NO. | TITLE // FUNDING ORGANISATION // DURATION | PROJECT COORDINATOR |
|---|---|---|
| **T1523** | Constraint Model for Engineering Applications | **Dr. Christian Amann,** Siemens Energy Global |
| **T1623** | LPBF Notch Embrittlement Creep Fatigue | **Dr. Roland Herzog,** MAN Energy Solutions |
| **T1723** | Hydrogen Flame Flashback | **Dr. Lukasz Panek,** Siemens Energy Global |

### Ongoing projects

| | | |
|---|---|---|
| **1360** | Unsteady Tandem Flow // FVV-EM, DFG // 01-10-2019 to 31-03-2022 | **Dr. Henner Schrapp,** Rolls-Royce Deutschland |
| **1375** | Brush Seals - Statistical Approach // FVV-EM // 01-12-2019 to 30-06-2023 | **Joris Versluis,** MTU Aero Engines |
| **1380** | Probabilistic Lifetime Model Comparison – Creep-Fatigue // AVIF // 01-01-2020 to 31-12-2023 | **Henning Almstedt,** Siemens Energy Global |
| **1386** | Turbo High Temperature Steel // BMWK // 01-02-2020 to 31-07-2024 | **Dr. Markus Dinkel,** Schaeffler Technologies |
| **1388** | Blade Forces and System Damping // BMWK // 01-01-2020 to 30-06-2023 | **Dr. Thomas Hildebrandt,** NUMECA Ingenieurbüro |
| **1389** | Intentional Mistuning // BMWK // 01-01-2020 to 30-06-2023 | **Thomas Winter,** MAN Energy Solutions |
| **1401** | LPBF High-Temperature Lifetime // BMWK // 01-05-2020 to 30-04-2024 | **Dr. Roland Herzog,** MAN Energy Solutions |
| **1421** | Dynamic of Swirl and Jet Flames II // FVV-EM, DFG // 01-12-2020 to 30-11-2023 | **Dr. Lukasz Panek,** Siemens Energy Global |
| **1422** | Extended Operation Range of YSZ // FVV-EM, DFG // 01-11-2020 to 31-12-2024 | **Dr. Arturo Flores Renteria,** Siemens Energy Global |
| **1423** | Combined Dynamical Analyses - Analytics // BMWK // 01-10-2020 to 31-03-2024 | **Dr. Andreas Hartung,** MTU Aero Engines |
| **1424** | Fill Factor Influence // BMWK // 01-10-2020 to 30-09-2023 | **Dr. Christoph Weißbacher,** GTW Gleitlagertechnik Weißbacher |
| **1427** | COMBROS-R/A Software Documentation in English // FVV-EM // 01-01-2021 to 30-04-2021 | **Klaus Steff,** Siemens Energy Global |
| **1432** | Particle Transport in Compressor Casing Channels // FVV-EM // 01-03-2021 to 28-02-2022 | **Prof. Dr. Marius Swoboda,** Rolls-Royce Deutschland |
| **1439** | Fuel Cell Compressor Design // BMWK // 01-03-2021 to 31-08-2024 ⤮ EG Fuel Cells | **Dr. Thomas Hildebrandt,** NUMECA Ingenieurbüro |
| **1440** | Constraint Effect in Component Design // BMWK // 01-03-2021 to 29-02-2024 | **Dr. Christian Amann,** Siemens Energy Global |

↓ Continue on the next page

# Energy Conversion Systems // Turbo Machines

## SUBSYSTEMS

| NO. | TITLE // FUNDING ORGANISATION // DURATION | PROJECT COORDINATOR |
|---|---|---|
| **1443** | Centrifugal Compressor in Flexible Operation // FVV-EM, BMWK/PtJ // 01-03-2021 to 29-02-2024 | **Dr. Matthias Schleer,** Howden Turbo |
| **1444** | Modelling of Metal-graphite Composites // BMWK // 01-06-2021 to 29-02-2024 | **Dr. Susanne Schrüfer,** Rolls-Royce Deutschland |
| **1447** | Flexible HP-Turbines // FVV-EM, DFG // 15-06-2021 to 14-06-2024 | **Christoph Lyko,** Rolls-Royce Deutschland |
| **1451** | Aeroelastic Cascade DELTA II // CORNET, BMWK // 01-09-2021 to 31-10-2023 | **Dr. Sabine Schneider,** Rolls-Royce Deutschland |
| **1453** | Modelling of Primary Atomisation Using SPH // FVV-EM // 01-01-2022 to 31-05-2023 | **Dr. Ruud L.G.M. Eggels,** Rolls-Royce Deutschland |
| **1458** | Creep-fatigue Crack Behavior of Welded Joints II // AVIF // 01-01-2022 to 31-12-2024 | **Dr. Shilun Sheng,** Siemens Energy Global |
| **1462** | Optimization with Frequency Domain Based Methods // FVV-EM, Verbund // 01-04-2022 to 30-09-2024 | **Dr. Stephan Behre,** MTU Aero Engines |
| **1465** | Cooling Flow Measurements Using MRI // BMWK // 01-07-2022 to 31-05-2025 | **Dr. Robert Krewinkel,** MAN Energy Solutions |
| **1467** | Hot Gas Ingestion into Wheel Cavities // BMWK// 01-01-2022 to 30-06-2024 | **Stephan Stotz,** MTU Aero Engines |
| **1485** | Inverse Dynamic Analysis // FVV-EM, DFG // 01-01-2023 to 31-12-2024 | **Dr. Andreas Hartung,** MTU Aero Engines |
| **1490** | Component Dimensioning in Hydrogen Environment // BMWK // 01-01-2023 to 31-12-2024<br>⤮ EG Fuel Cells<br>⤮ EG Materials Science and Recycling | **Dr. Stefan Averbeck,** MAN Energy Solutions |
| **1496** | Casing Treatment Centrifugal Compressor // FVV-EM, BMWK/PtJ // 01-07-2023 to 30-06-2026 | **Dr. Matthias Schleer,** Howden Turbo |
| **1498** | Dynamic of Jet Flames under Elevated Pressure // FVV-EM // 01-01-2023 to 31-12-2025 | **Dr. Lukasz Panek,** Siemens Energy Global |
| **1504** | Prediction of Gas Turbine Emissions II // FVV-EM, DFG // 01-08-2023 to 31-07-2025 | **Dr. Ruud L.G.M. Eggels,** Rolls-Royce Deutschland |
| **1505** | Crack Behaviour Multiaxial HT (ARIMA II) // BMWK // 01-08-2023 to 31-01-2026 | **Julian von Lautz,** MTU Aero Engines |

### Completed projects

| | | |
|---|---|---|
| **1351** | TMF Crack Path Calculation for Turbocharger Hot Parts // BMWK // 01-02-2019 to 30-09-2022 | **Dr. Andreas Koch,** Rolls-Royce Solutions |
| **1354** | Industrial Radial Compressor with Wide Operating Range // BMWK // 01-02-2019 to 31-07-2022 | **Dr. Matthias Schleer,** Howden Turbo |

↓ Continue on the next page

# Energy Conversion Systems // Turbo Machines

## SUBSYSTEMS

| NO. | TITLE // FUNDING ORGANISATION // DURATION | PROJECT COORDINATOR |
|---|---|---|
| **1358** | Dynamic of Swirl and Jet Flames // FVV-EM // 01-04-2019 to 31-08-2022 | **Dr. Lukasz Panek,** Siemens Energy Global |
| **1371** | Robust Fracture Deformation Parameters // FVV-EM, AVIF // 01-07-2019 to 31-12-2022 | **Dr. Torsten-Ulf Kern,** Siemens Energy Global |
| **1383** | Acoustic Emission into Discharge Pipes II // FVV-EM, DFG // 01-02-2020 to 30-09-2022 | **Dr. Irhad Buljina,** MAN Energy Solutions<br>**Vera Kress,** MAN Energy Solutions |
| **1390** | Aluminum High Temperature Fatigue // BMWK // 01-01-2020 to 31-03-2023 | **Dr. Reiner Böschen,** Rolls-Royce Solutions |
| **1392** | Material Applications FeAl (WAFEAL) // BMWK // 01-01-2020 to 30-09-2022 | **Susanne Mosler,** Rolls-Royce Deutschland |
| **1397** | Prediction of Gas Turbine Emissions // FVV-EM, DFG // 01-04-2020 to 31-12-2022 | **Dr. Ruud L.G.M. Eggels,** Rolls-Royce Deutschland |
| **1425** | Bidirectional Aeromechanical Coupling II // FVV-EM, DFG // 01-11-2020 to 31-12-2022 | **Dr. Andreas Hartung,** MTU Aero Engines |

## Research priorities

Innovative and / or optimised energy conversion systems minimising environmental impact and maximising process efficiency and engine performance

→ **Turbo Machines // Plain Bearings** [in cooperation with FVA]

| NO. | TITLE // FUNDING ORGANISATION // DURATION | PROJECT COORDINATOR |
|---|---|---|
| | **Planned projects** | |
| **T1621** | Damping Evaluation in Presence of Nonlinearities | **Dr. Andreas Hartung,** MTU Aero Engines |
| **T0322** | Improved Axial Plain Bearing Modelling // DFG | **Michael Bottenschein,** Voith Hydro Holding |
| **T0822** | Combined Dynamical Analyses (ComDynA): Validation | **Dr. Andreas Hartung,** MTU Aero Engines |
| **M2222** | Cathode Pressure Regulation for Fuel Cells // BMWK<br>⤮ EG Fuel Cells | **Dr. Dirk Jenssen,** Volkswagen |
| **T0323** | Upgrade High-performance Plain Bearing Test Rig<br>⤮ EG Materials Science and Recycling | **Klaus Steff,** Siemens Energy Global |
| **T0523** | ComDynA: Sensitivities and Probabilistic | **Dr. Lukas Bruder,** MTU Aero Engines |
| **T0723** | Contact Identification based on AI Methods | **Dr. Andreas Hartung,** MTU Aero Engines |
| | **Ongoing projects** | |
| **1437** | Squeeze Film Dampers II // BMWK // 01-01-2021 to 30-09-2023 | **Dr. Oliver Alber,** MAN Energy Solutions |
| **1469** | Tilting Pad Bearing Elastokinetics // BMWK // 01-07-2022 to 31-12-2024 | **Dr. Tobias Wiedemann,** MAN Energy Solutions |
| | **Completed projects** | |
| **1376** | Rotordynamic Casing Models and Model Update // BMWK // 01-11-2019 to 31-10-2022 | **Dr. Joachim Schmied,** Delta JS |

# Energy Conversion Systems // Zero-impact Emissions

SUBSYSTEMS

## Research priorities

Innovative and / or optimised energy conversion systems minimising environmental impact and maximising process efficiency and engine performance

**→ Zero-impact Emissions**

### Terms of References (ToR)

+ Exhaust aftertreatment concepts, systems and components
+ Alternative aftertreatment system technologies and approaches
+ Effects of the use of alternative fuels and operating liquids
+ Interactions of exhaust components, primary and secondary exhaust species
+ Non-exhaust emission evaluation of all mobile applications (incl. electrified), e. g. brake dust, tyre abrasion, ...
+ Interaction emission and immission / air quality
+ Carbon capture approaches and technologies
+ Development and improvement of related development tools, e. g. simulation tools, measurement and evaluation methods

## Research projects

Coordinator: Dr. Volker Schmeißer, Daimler Truck | Dr. Frank Bunar, IAV *(by election on 06.10.2023)*
Project management: Dirk Bösel, FVV

| NO. | TITLE // FUNDING ORGANISATION // DURATION | PROJECT COORDINATOR |
|---|---|---|
| | **Planned projects** | |
| **M2019** | Exhaust Gas Condensates of Future Fuels // BMWK | **Dr. Andreas Jäger,** IAVF Antriebstechnik |
| **M2720** | Oxygen Storage II // BMWK | **Jeremias Bickel,** Robert Bosch |
| **M2121** | Coldstart CNG Catalyst II // BMWK | **Dr. Michael Fischer,** Tenneco |
| **M0222** | Ash Structure under Influence of Condensation Water // BMWK | **Dr. Bernhard Lüers,** FEV Europe |
| **M0322** | Clarification and Modeling sDPF // BMWK | **Dr. Marcus Gohl,** APL Automobil-Prüftechnik Landau |

↓ Continue on the next page

# Energy Conversion Systems // Zero-impact Emissions

## SUBSYSTEMS

| NO. | TITLE // FUNDING ORGANISATION // DURATION | PROJECT COORDINATOR |
|---|---|---|
| **M0123** | Requirements for on Vehicle Brake Dust Measurement | **Dr. Eike Stitterich,** Hengst |
| **M0323** | Deterioration of Emission due to Repeated Test | **Ryo Nagai,** SUBARU Corporation |
| **M0823** | Secondary Emissions | **Dr. Michael Fischer,** Tenneco |
| **M1023** | Exhaust Analytics for Low GHG Impact Fuels | **Klaus Rusch,** Rolls-Royce Solutions |
| **M1423** | Vehicle as Air Cleaning Device | **Tobias Wörz,** MANN+HUMMEL |
| **M2023** | SCR-catalyst Aging Mechanisms | **Dr. Frank Bunar,** IAV |
| **M2123** | Modelling Tire and Brake PM/PN Emissions | **Dr. Frank Bunar,** IAV |
| **M2223** | PM/PN-emission Free Deceleration/Acceleration | **Dr. Frank Bunar,** IAV |
| **M2323** | Assessment of Vehicle Particle Emissions | **Dr. Thomas Raffius,** Robert Bosch |
| **M2923** | Exhaust Gas Aftertreatment for Methanol Engines | **Prof. Dr. Thomas Garbe,** Volkswagen |

### Ongoing projects

| | | |
|---|---|---|
| **1391** | Cleaning Mechanisms in the Exhaust Path // BMWK // 01-01-2020 bis 30-04-2023 | **Raimund Vedder,** Atlanting<br>**Dr. Bernhard Lüers,** FEV Europe |
| **1461** | N2O Exhaust Gas Treatment in Ammonia Engines // FVV-EM // 01-07-2022 bis 30-06-2024 | **Dr. Daniel Peitz,** HUG Engineering |
| **1464** | Formation of Particles with UWS Injection // FVV-EM // 01-08-2022 bis 31-07-2024 | **Philipp Weinmann,** Purem<br>**Manuel Werner,** Purem |
| **1466** | HT-$H_2$-DeNOx // BMWK // 01-07-2022 bis 30-06-2024 | **Dr. Frank Bunar,** IAV |
| **1468** | FaconSCR Model // BMWK // 01-02-2022 bis 31-07-2024 | **Dr. Irene Begsteiger,** CERAM Austria |
| **1475** | $H_2$-DeNOx II // BMWK // 01-02-2022 bis 31-07-2024 | **Dr. Frank Bunar,** IAV |
| **1480** | CCSonShips Decarbonisation of Marine Propulsion Systems // FVV-EM, CORNET, BMWK // 01-09-2022 bis 31-08-2024 | **Klaus Meyer,** Robert Bosch |
| **1482** | TWC Reaction under High-frequency Lambda Switching // CORNET, BMWK // 01-01-2022 bis 31-12-2023 | **Toshihiro Mori,** Toyota Motor Corporation Higashifuji Technical Center |
| **1499** | Modelling Approaches of Vehicle Induced PN/PM and Emission Reduction Strategies // FVV-EM // 01-07-2023 bis 30-06-2025 | **Dr. Frank Bunar,** IAV |

### Completed projects

| | | |
|---|---|---|
| **1398** | TWC Impact on Particulate Properties // BMWK // 01-03-2020 bis 28-02-2023 | **Dr. Julie Le Louvetel-Poilly,** Toyota Motor Europe |
| **1400** | Deposits from AdBlue II // FVV-EM, CORNET, BMWK // 01-04-2020 bis 30-09-2022 | **Raimund Vedder,** Atlanting |
| **1412** | Zero Impact Tailpipe Emission Powertrains // FVV-EM // 01-09-2020 bis 31-08-2022 | **Dr. Uwe Zink,** BASF Catalysts Germany<br>**Dr. Frank Bunar,** IAV |

# Materials Science and Recycling

COMPONENTS

## Research priorities

All conventional topics on materials research in connection with new energy sources, production methods and recycled materials

→ Strength → Tribology → Recycling

### Terms of References (ToR)

+ Tribology, strength, fatigue models and improvements
+ Properties, strength and fatigue characteristics of materials for electric powertrains (e. g. copper)
+ Durability and robustness of electrically isolating materials (e. g. aspect of partial discharge, ...)
+ Impacts and interactions on components and (sub-) assemblies caused by novel energy types (e. g. hydrogen, e-fuels, methanol, ...)
+ Components made by additive manufacturing, their properties and related method approaches
+ Material properties impact of recycled materials
+ Energy footprint of components and assemblies depending on material and manufacturing process, circularity
+ Development and improvement of group related development tools e. g. simulation tools, measurement and evaluation methods

## Research projects

Coordinator: Dr. Dieter Eppinger, SEG Automotive Germany
Project management: Max Decker, FVV

### Planned projects

| NO. | TITLE // FUNDING ORGANISATION // DURATION | PROJECT COORDINATOR |
|---|---|---|
| **M0419** | Corrosion Loads due to new Drive Concepts // BMWK | **Regina Franke-Hörth,** SEG Automotive Germany<br>**Dr. Steffen Seifritz,** Robert Bosch |
| **M0420** | Basic Components for $H_2$ Combustion Engines // BMWK | **Dr. Daniel Hrdina,** MAHLE International |
| **M3222** | Tribological Optimization for Hydrogen Engines // BMWK | **Dr. Mirko Plettenberg,** AVL List |

↓ Continue on the next page

# Materials Science and Recycling

## COMPONENTS

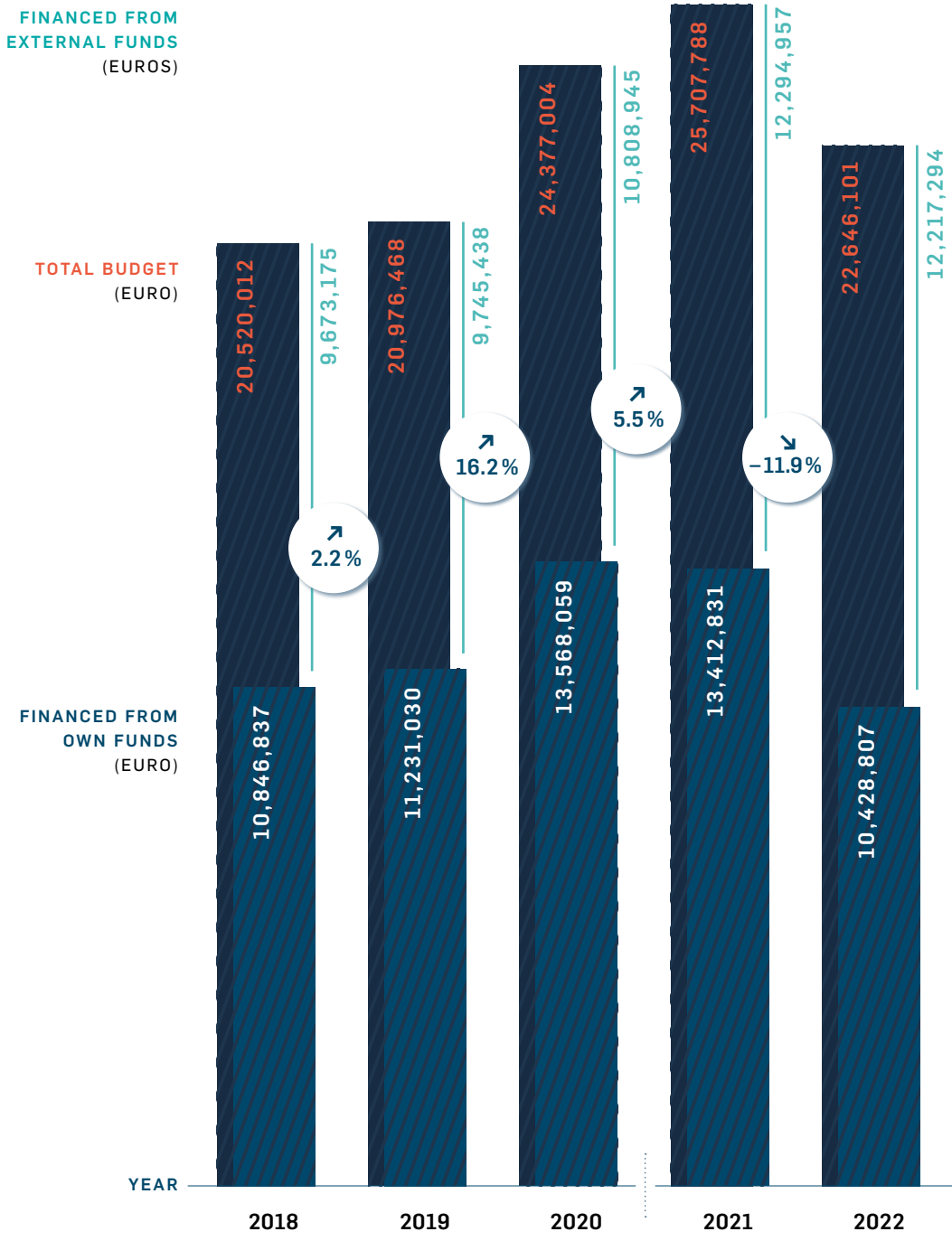
| NO.. | TITLE // FUNDING ORGANISATION // DURATION | PROJECT COORDINATOR |
|---|---|---|
| **T0323** | Upgrade High-performance Plain Bearing Test Rig<br>⤮ EG Turbo Machines // Plain Bearings | **Klaus Steff,** Siemens Energy Global |
| **M0523** | HT-Tribosystems of $H_2$ Internal Combustion Engines // BMWK<br>⤮ EG Engines | **Dr. Heiko Haase,** Rolls-Royce Solutions |
| **M2623** | Development of Parameterised LCA BEV Models<br>⤮ EG Engines<br>⤮ EG Electric Motors | **Ilias Papadimitriou,** GF Casting Solutions |
| **M3123** | Lifetime Model Winding Insulation II | **Dr. Zeljana Beslic,** SEG Automotive Germany |
| **M3223** | Determination of the Aging Condition of Insulation | **Stefan Bialas,** SEG Automotive Germany |
| **M3523** | PEMFC AST $H_2$ Depletion<br>⤮ EG Sustainable Powertrain Systems<br>⤮ EG Fuel Cells | **Stefan Neugebauer,** IAV |
| **M3623** | PEM-EL-DegrAST<br>⤮ EG Energy Infrastructure and Storage<br>⤮ EG Fuel Cells | **Stefan Neugebauer,** IAV |

### Ongoing projects

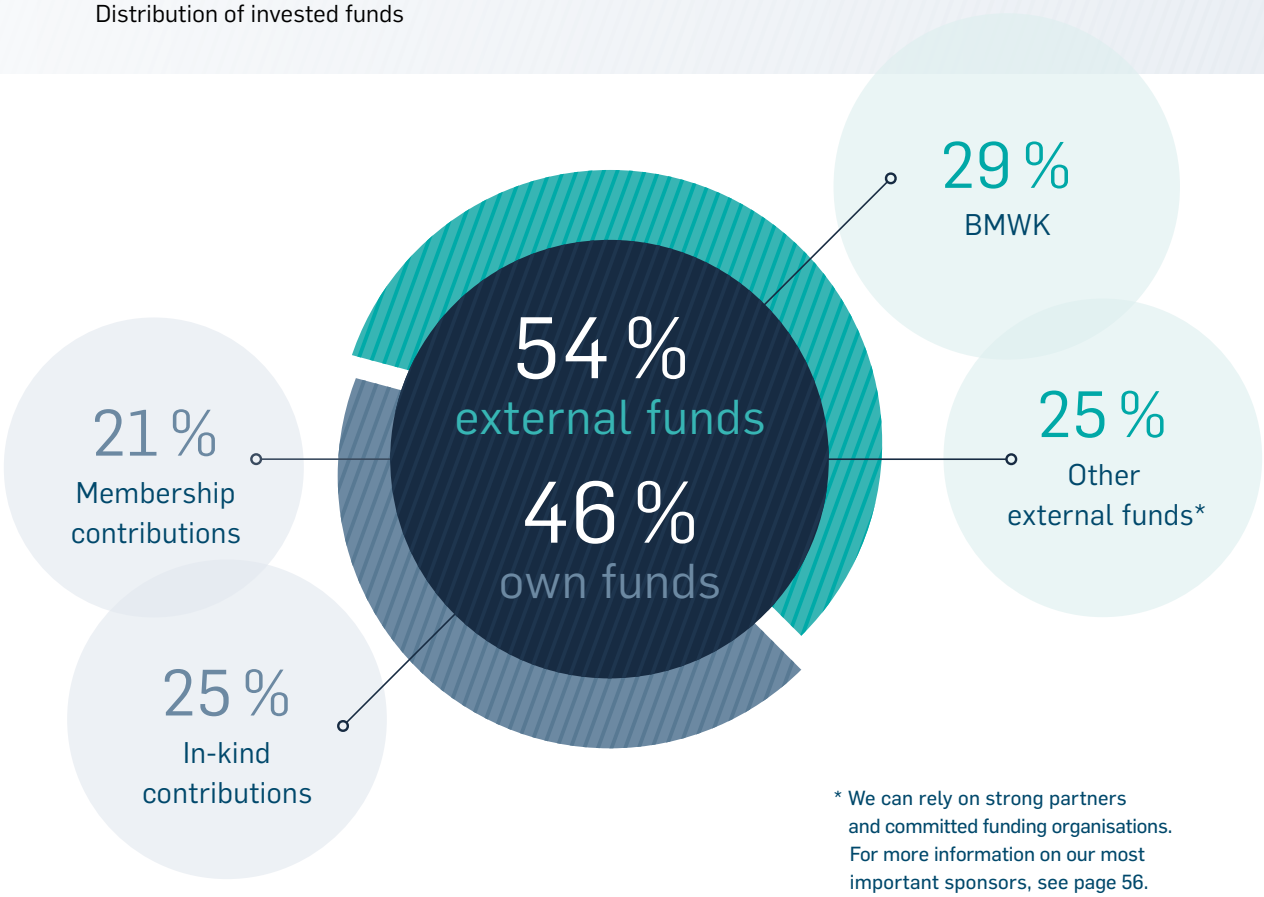
| | | |
|---|---|---|
| **1402** | Exhaust Gas Effected Tribosystems // BMWK // 01-06-2020 to 31-08-2023 | **Dr. Heiko Haase,** Rolls-Royce Solutions |
| **1441** | Lifetime Model Winding Insulation // BMWK // 01-03-2021 to 31-12-2023 | **Dr. Zeljana Beslic,** SEG Automotive Germany |
| **1445** | Flow Erosion II // BMWK // 01-06-2021 to 30-11-2023 | **Jens Strassmann,** Volkswagen |
| **1484** | Dedicated Piston Bore Interface Layout for $H_2$-ICEs // FVV-EM // 01-09-2022 to 31-08-2024 | **Dr. Mirko Plettenberg,** AVL List |
| **1490** | Component Dimensioning in Hydrogen Environment // BMWK // 01-01-2023 to 31-12-2024<br>⤮ EG Fuel Cells<br>⤮ EG Turbo Machines | **Dr. Stefan Averbeck,** MAN Energy Solutions |

# Research funding

Expenditure for research



## Distribution of invested funds




* We can rely on strong partners and committed funding organisations. For more information on our most important sponsors, see page 56.

## Year-Over-Year Analysis

| | 2021 | 2022 | Change |
|---|---|---|---|
| MEMBERSHIP CONTRIBUTIONS | 7,727,864 | 4,822,292 | ↘ −37.6% |
| IN-KIND CONTRIBUTIONS | 5,684,966 | 5,606,515 | ↘ −1.4% |
| **TOTAL OWN FUNDS** | **13,412,831** | **10,428,807** | ↘ −22.2% |
| BMWK | 8,148,353 | 6,484,631 | ↘ −20.4% |
| OTHER SPONSORS | 4,146,604 | 5,732,663 | ↗ 38.2% |
| **OTAL EXTERNAL FUNDS** | **12,294,957** | **12,217,294** | ↘ −0.6% |

# Research support

Sponsors

Innovative and sustainable research cooperations need a stable funding framework. Our projects are funded through contributions from member companies, cooperations (such as AICE, DVGW, FVA) and from public research funds. We would like to thank all of our research partners for their fantastic support!

**A SELECTION OF OUR SPONSORS**

## BMWK/AiF –

**Federal Ministry for Economic Affairs and Climate Action/German Federation of Industrial Research Associations**

The pre-competitive Industrial Collective Research (IGF) programme is conducted in close cooperation with the German Federal Ministry for Economic Affairs and Energy (BMWK). Within the scope of Industrial Collective Research, the BMWK currently provides around €180 million for outstanding research projects and networking between small and medium-sized enterprises and research institutions. As the agency in charge of Industrial Collective Research and other funding programmes of the federal government and the federal states, AiF is committed to the performance of small and medium-sized enterprises. It links business, science and state funding to form an innovation network and offers practical advice on innovation.

www.aif.de/english

## DFG –

**German Research Foundation**

The German Research Foundation is the central, self-governing research funding organisation for science that promotes research at universities and publicly financed research institutions in Germany.

www.dfg.de/en

## CORNET –

**COllective Research NETworking**

CORNET is an international network of ministries and funding agencies that combine their existing funding schemes to increase the competitiveness of small and medium-sized enterprises (SMEs). In this way, CORNET supports new funding organisations worldwide in introducing pilot actions and schemes for pre-competitive Industrial Collective Research.

www.cornet.online

## AVIF –

**Research Association of the Working Group of the Iron- and Metal-Processing Industry**

The objective of the AVIF is to fund research in the area of steel processing and application in Germany. Since its foundation, the AVIF has funded around 240 research projects with a funding volume of €55 million. It plays a significant role in raising knowledge of the possible applications of steel in the steel processing industry. This makes it easier to meet growing demands while also boosting competitiveness.

www.avif-forschung.de

# Realised projects

Breakdown


The pre-competitive project work of the FVV enables collaborative research to be performed on fundamental questions, thus allowing the ever stricter requirements regarding materials, fuel efficiency and environmental friendliness to be met. In doing so, the FVV research programme also contributes to enhancing the competitiveness of its member companies.

# Research partners Energy conversion systems

Distribution of funds | BMWK and own funds | (without Turbo Machines)

| LOCATION | EUROS | PERCENT |
|---|---|---|
| Aachen | 1,629,335 | 20.7 % |
| Stuttgart | 1,350,178 | 17.1 % |
| Karlsruhe | 929,070 | 11.8 % |
| Darmstadt | 688,089 | 8.7 % |
| Berlin | 310,506 | 3.9 % |
| Braunschweig | 295,892 | 3.8 % |
| Hanover | 275,727 | 3.5 % |
| Freiberg | 251,404 | 3.2 % |
| Chemnitz | 228,116 | 2.9 % |
| Hamburg | 193,338 | 2.5 % |
| Dresden | 152,280 | 1.9 % |
| Cottbus | 149,825 | 1.9 % |
| Duisburg | 141,172 | 1.8 % |
| Magdeburg | 138,923 | 1.8 % |
| Erlangen-Nuremberg | 137,342 | 1.7 % |
| Lemgo | 129,970 | 1.6 % |
| Mittweida | 80,878 | 1.0 % |
| Flensburg | 74,005 | 0.9 % |
| Freiburg | 69,310 | 0.9 % |
| Coburg | 67,736 | 0.9 % |
| Austria | 186,040 | 2.4 % |
| Switzerland | 172,239 | 2.2 % |
| Mexico | 99,926 | 1.3 % |
| Others < 60.000 € | 136,168 | 1.7 % |
| | **7,887,469** | |

*A detailed list of our research partners can be found at Page 16 to 31 and at* ➔ ***www.fvv-net.de | Network | RTD Performers***


FLENSBURG
HAMBURG
BERLIN
HANOVER
BRAUN-
SCHWEIG
LEMGO
MAGDEBURG
BMWK
COTTBUS
DUISBURG
CHEMNITZ
DRESDEN
MITTWEIDA
RTD performers,
that received
funding | BMWK
and own funds
AACHEN
FVV
FRANKFURT
FREIBERG
DARMSTADT
COBURG
ERLANGEN-
NUREMBERG
KARLSRUHE
STUTTGART
VIENNA
FREIBURG
GRAZ
WINDISCH
ZURICH

# Research partners Turbo Machines

Distribution of funds | BMWK and own funds

| LOCATION | EUROS | PERCENT |
|---|---|---|
| Aachen | 762,975 | 26.3 % |
| Darmstadt | 332,129 | 11.4 % |
| Berlin | 322,987 | 11.1 % |
| Stuttgart | 301,983 | 10.4 % |
| Freiburg | 172,165 | 5.9 % |
| Freiberg | 154,527 | 5.3 % |
| Clausthal | 128,675 | 4.4 % |
| Karlsruhe | 121,710 | 4.2 % |
| Bremen | 98,701 | 3.4 % |
| Magdeburg | 90,000 | 3.1 % |
| Bochum | 83,065 | 2.9 % |
| Dresden | 70,000 | 2.4 % |
| Jülich | 70,000 | 2.4 % |
| Hanover | 58,256 | 2.0 % |
| Cottbus | 53,207 | 1.8 % |
| Wuppertal | 31,037 | 1.1 % |
| Munich | 16,631 | 0.6 % |
| Cologne | 15,180 | 0.5 % |
| Duisburg / Essen | 11,800 | 0.4 % |
| Frankfurt / Main | 8,548 | 0.3 % |
| | **2,903,576** | |

*A detailed list of our research partners can be found at Page 16 to 31 and at* ➔ ***www.fvv-net.de | Network | RTD Performers***


BREMEN
HANOVER
BERLIN
MAGDEBURG
BMWK
CLAUSTHAL
COTTBUS
BOCHUM
DUISBURG / ESSEN
JÜLICH
DRESDEN
WUPPERTAL
COLOGNE
AACHEN
FRANKFURT
FVV
FREIBERG
DARMSTADT
KARLSRUHE
STUTTGART
FREIBURG
MUNICH
RTD performers,
that received
funding | BMWK
and own funds

# Annual statement of accounts

Balance sheet

| | 31 DECEMBER 2021 | | 31 DECEMBER 2022 | |
|---|---|---|---|---|
| **ASSETS SIDE** | EUROS | EUROS | EUROS | EUROS |
| A. Current assets | | | | |
| I. Forderungen und sonstige Vermögensgegenstände | | | | |
| 01. Advance payments | 1,361,846.70 | | 1,554,738.98 | |
| 02. Other assets | 7,766.66 | | 85,014.79 | |
| | | 1,369,613.36 | | 1,639,753.77 |
| II. Cash on hand and bank balances | | 4,937,297.13 | | 5,396,337.90 |
| B. Non-current assets | | | | |
| I. Securities | | 1,087,195.70 | | 1,092,224.43 |
| | | **7,394,106.19** | | 8,128,316.10 |

| | 31 DECEMBER 2021 | | 31 DECEMBER 2022 | |
|---|---|---|---|---|
| **LIABILITIES SIDE** | EUROS | EUROS | EUROS | EURO |
| A. Amount carried forward for research activities | | | | |
| 01.a Own funds | 3,912,538.65 | | 4,922,019.51 | |
| 01.b Reserves of own funds | 224,000.00 | | 224,000.00 | |
| 02. External funds | 38,331.19 | | 8,181.90 | |
| | | 4,174,869.84 | | 5,154,201.41 |
| B. Provisions | | | | |
| 01. Provisions for pensions and similar obligations | 423,603.00 | | 468,138.00 | |
| 02. Other provisions | 162,816.09 | | 169,231.11 | |
| | | 586,419.09 | | 637,369.11 |
| C. Liabilities | | | | |
| 01. Liabilities to research institutes | 2,596,324.18 | | 2,242,773.14 | |
| 02. Other liabilities | 36,493.08 | | 93,972.44 | |
| | | 2,632,817.26 | | 2,336,745.58 |
| | | **7,394,106.19** | | 8,128,316.10 |

Confirmation of Auditor

GGV

Wirtschaftsprüfungsgesellschaft
Steuerberatungsgesellschaft





**4. Schlussbemerkung und Bescheinigung**

Wir haben die Jahresrechnung unter Einbeziehung der Buchführung des Forschungsvereinigung Verbrennungskraftmaschinen e.V., Frankfurt am Main, bestehend aus der Vermögensübersicht zum 31. Dezember 2022 und der Ertrags- und Aufwandsrechnung für die Zeit vom 1. Januar bis 31. Dezember 2022, mit Ausnahme der zu statistischen Zwecken erfassten Sachleistungen der Mitglieder, geprüft.

Wir haben unsere Prüfung unter analoger Anwendung von §§ 317 ff. HGB und Beachtung der vom Institut der Wirtschaftsprüfer (IDW) festgestellten deutschen Grundsätze ordnungsmäßiger Abschlussprüfung sowie unter Beachtung des IDW Prüfungsstandards: Prüfung von Vereinen (IDW PS 750) durchgeführt.

Nach dem Ergebnis unserer Arbeiten erteilen wir der als Anlagen I und II beigefügten Jahresrechnung des Forschungsvereinigung Verbrennungskraftmaschinen e.V., Frankfurt am Main, für das Rechnungsjahr vom 1. Januar bis zum 31. Dezember 2022 die folgende Bescheinigung:

Die Buchführung und die Jahresrechnung entsprechen nach unserer pflichtgemäßen Prüfung den Grundsätzen einer ordnungsmäßigen Rechnungslegung. Die zu statistischen Zwecken erfassten Sachleistungen der Mitglieder haben wir nicht beurteilt.

Frankfurt am Main, den 3. Mai 2023

GGV GMBH WIRTSCHAFTSPRÜFUNGSGESELLSCHAFT STEUERBERATUNGSGESELLSCHAFT WIRTSCHAFTS-PRÜFUNGS-GESELLSCHAFT SIEGEL FRANKFURT AM MAIN

GGV GmbH
Wirtschaftsprüfungsgesellschaft
Steuerberatunggesellschaft

Gäßler
Wirtschaftsprüfer

Arndt Döhler, formerly Stellantis Opel Automobile GmbH, and Dirk Ragus, NEMAK Europe GmbH, conducted the voluntary internal audit for the 2022 business year on 10 July 2023. The audit did not lead to any objections: the auditors appointed by the Annual Meeting of Members agree with the auditor's report with regard to the use of funds.

The FVV Annual Report is included in the FVV membership fee.
All information is subject to change without notice.


Der FVV Annual Report is available online:

**→ www.fvv-net.de/en | Transfer | Download | Publications**

**Science** for a
moving society

PUBLISHER

FVV e V
Lyoner Strasse 18
60528 Frankfurt / M.
Germany
www.fvv-net.de/en

EDITION

10 | 2023

EDITORS

Petra Tutsch and
Dietmar Goericke, FVV

EDITORIAL AND
PRINT LAYOUT DESIGN

Lindner & Steffen GmbH, Nastätten

The FVV is globally networked to create science-based insights into forward technologies for climate neutrality and zero-impact emissions from sustainable energy conversion systems. As an industrial research association operating in the network of the Mechanical Engineering Research Federation (FKM) and the project management organisations (AiF / DLR-PT) of the Federal Ministry for Economic Affairs and Climate Action, it publishes an **annual report** in which facts and figures on the activities and projects of the research association are presented briefly and transparently.

Industrial research associations are **central hubs for implementing pre-competitive Industrial Collective Research (IGF)**. For innovative small and medium-sized enterprises, they are strong and skilled partners and serve as transfer + networking platforms for science, industry and society.

**FVV e.V.**

Lyoner Strasse 18 | 60528 Frankfurt / M. | Germany
+49 69 6603 1345 | info@fvv-net.de

**www.fvv-net.de/en**