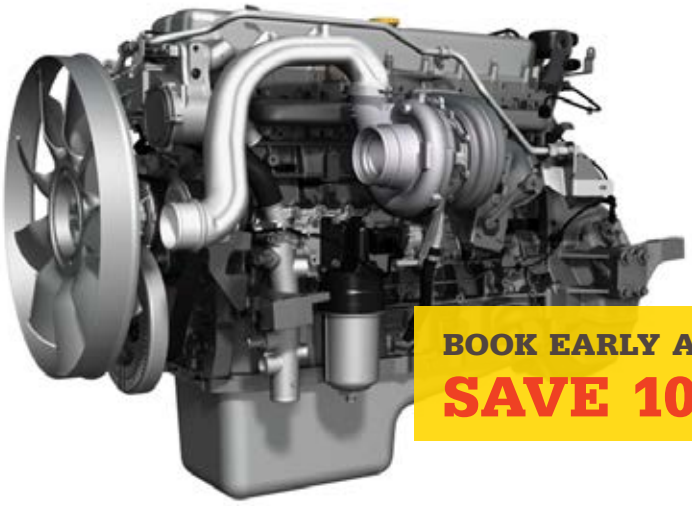
# THE 12TH INTERNATIONAL CONFERENCE ON TURBOCHARGERS AND TURBOCHARGING

Institution of MECHANICAL ENGINEERS

Combustion Engines and Fuels Group
**Conference**

17–18 May 2016
The Kia Oval,
Surrey County Cricket Club,
London

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# THE 12TH INTERNATIONAL CONFERENCE ON TURBOCHARGERS AND TURBOCHARGING

17-18 May 2016,
The Kia Oval, Surrey County Cricket Club, London

**THIS INTERNATIONAL CONFERENCE IS THE NEXT IN THE INSTITUTION'S HIGHLY SUCCESSFUL AND PRESTIGIOUS SERIES, HELD REGULARLY SINCE 1978, ADDRESSING CURRENT AND NOVEL ASPECTS OF TURBOCHARGING SYSTEMS DESIGN, BOOSTING SOLUTIONS FOR ENGINE DOWNSIZING AND IMPROVEMENTS IN EFFICIENCY.**

The current emission legislations and environmental trends for **reducing $CO_2$ and fuel consumption** are the major market forces in the land transport industry. The internal combustion engine is the key product and downsizing, efficiency and economy are the **driving forces in development** for both **spark ignition (SI) and compression ignition (CI)** engines in the passenger car and commercial vehicle applications.

**Over 250 experts will come together to:**

- Study advances in 1D simulation and validation
- Enhance systems' transient response
- Learn ways to reduce turbine fatigue
- Find out about new methods to improve turbine unsteady flow

**MEDIA PARTNERS**

**DON'T MISS**

**Exclusive drinks reception and three-course networking dinner after day one.**

Limited places available, book your ticket when registering.

**KEY TOPICS INCLUDE:**

- Novel applications
- Compressor design, matching, interaction, fuel cell applications, plus CFD
- Advanced simulation: 1D, heat transfer and multibody optimisation
- Transient response
- Supercharging, turbocompound, V/G and 2-Stage
- Novel applications: Euro 7, electric assist plus eBoosting and down speeding
- Turbocharger gas stand and novel testing methods
- Materials, housing, burst containment, EGR
- Turbine; unsteady flow
- Turbine design, plus CFD
- Fatigue life
- Bearings, seals and rotodynamic design
- Exhaust waste heat recovery

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# PROGRAMME

| DAY 1 | TUESDAY 17 MAY | |
|---|---|---|
| 08:30 | **REGISTRATION AND REFRESHMENTS** | |
| 09:00 | **CHAIR'S WELCOME & INTRODUCTION** | |
| 09:10 | **KEYNOTE ADDRESS**<br>Tomonori Niizato, Senior Chief Engineer, Technology Development Division 3, Automobile R&D Centre, Honda R&D | |
| | **SESSION 1A: COMPRESSOR: APPLICATIONS & MATCHING** | **SESSION 1B: GAS STAND & NOVEL TESTING METHODS** |
| 09:40 | **TURBOCHARGER COMPRESSOR MAP ENHANCEMENT FOR HIGHLY EFFICIENT COMBUSTION ENGINES**<br>Tobias Czapka, Dirk Hagelstein, Joerg Theobald, Wolfgang Demmelbauer-Ebner, Volkswagen AG, Germany; Joerg Seume, Leibniz Universitaet Hannover, Germany | **THE E-DRIVE: AN ISENTROPIC COMPRESSOR PERFORMANCE TEST RIG**<br>Phillip Parma, Marco Bergmann, BorgWarner Turbo Systems, Germany |
| 10:00 | **AERODYNAMIC DESIGN OF A HIGH FLOW AND HIGH PRESSURE RATIO CENTRIFUGAL COMPRESSOR FOR A MARINE-USE TURBOCHARGER**<br>Chihiro Mikami, Kiwamu Yamada, Tomoki Kawakubo, IHI Corporation, Japan | **DETERMINE THE ISENTROPIC TURBINE EFFICIENCY DUE TO ADIABATIC MEASUREMENTS, AND THE VALIDATION OF THE CONDITIONS VIA A NEW CRITERION**<br>Rainer Zimmermann, Clemens Biet, Roland Baar, Technische Universität Berlin, Germany |
| | **Q&A SESSION WITH MORNING SPEAKERS** | **Q&A SESSION WITH MORNING SPEAKERS** |
| 10:50 | **NETWORKING REFRESHMENT BREAK** | |
| | **SESSION 2A: COMPRESSOR: FLOW RANGE ENHANCEMENT DESIGN** | **SESSION 2B: GAS STAND & NOVEL TESTING METHODS** |
| 11:20 | **INVESTIGATION OF PERFORMANCE AND FLOW MECHANISM OF A NON-AXISYMMETRIC CASING TREATMENT IN CENTRIFUGAL COMPRESSOR FOR TURBOCHARGERS**<br>Baotong Wang, Ryuusuke Numakura, Vehicle Turbocharger Operation, IHI Corporation, Japan; Hideaki Tamaki, Corporate Research & Development, IHI Corporation, Japan | **AN APPROACH TO TURBINE HOUSING VALIDATION THROUGH THE MEASUREMENT OF RESIDUAL STRESS USING NEUTRON DIFFRACTION AND OPERATIONALLY INDUCED STRESSES USING HIGH TEMPERATURE STRAIN GAUGES**<br>Katy Gannon, Kiumars Shoghi, BorgWarner Turbo Systems, United Kingdom; Sue Kilcoyne, The University of Huddersfield, United Kingdom; Thilo Pirling, Institut Laue-Langevin, France; Shu-Yan Zhang, Rutherford Appleton Laboratory, United Kingdom |
| 11:40 | **GLOBAL OPTIMISATION OF RECIRCULATION FLOW TYPE CASING TREATMENT IN CENTRIFUGAL**<br>Daisaku Sakaguchi, Min Thaw Tun, Nagasaki University, Japan; Ryusuke Numakura, Baotong Wang, IHI Corporation, Japan | **BIDIRECTIONAL FLOW MEASUREMENT BASED ON THE DIFFERENTIAL PRESSURE METHOD FOR SURGE ANALYSIS ON A SMALL CENTRIFUGAL COMPRESSOR**<br>Moritz Werner, Roland Baar, Technische Universität Berlin, Germany; Peter Haluska, Ivo Sandor, Continental Automotive GmbH, Germany |
| 12:00 | **Q&A SESSION WITH MORNING SPEAKERS** | **COMPRESSOR INLET AND OUTLET PIPE LENGTH AND VOLUME, AND THE EFFECTS ON THE CHARACTERISTICS AND LOCATION OF SURGE**<br>Michael Whittlesea, Erling Roberts, Cummins Turbo Technologies, United Kingdom<br><br>**Q&A SESSION WITH MORNING SPEAKERS** |
| 12:40 | **NETWORKING LUNCH** | |

# PROGRAMME

| | SESSION 3A: SUPERCHARGING, TURBOCOMPOUND, V/G & 2-STAGE | SESSION 3B: COMPRESSOR: SURGE LINE MEASUREMENT AND INTERACTION |
|---|---|---|
| 13:50 | **AXIAL GROOVE CASING TREATMENT IN AN AUTOMOTIVE TURBOCHARGER CENTRIFUGAL COMPRESSOR**<br>Peter Harley, Andre Starke, Takahiro Bamba, Dietmar Filsinger, IHI Charging Systems International GmbH, Germany | **EXPERIMENTAL INVESTIGATION OF UPSTREAM INSTALLATION EFFECTS ON THE TURBOCHARGER COMPRESSOR MAP**<br>Bertrand Kerres, Andreas Cronhjort, Department of Machine Design, KTH Royal Institute of Technology, Sweden; Mihai Mihaescu, Department of Mechanics, KTH Royal Institute of Technology, Sweden |
| 14:10 | **ULTRA-HIGH EFFICIENCY SERIAL TWO STAGE TURBOCHARGING SYSTEM FOR MAXIMUM ENGINE EFFICIENCY**<br>Rob Cadle, Dietmar Giebert, Ashraf Mohamed, Ronren Gu, Matthew Oakes, Honeywell International, United States of America | **INFLUENCE OF THE PIPING SYSTEM ON THE SURGE LINE OF A SMALL CENTRIFUGAL COMPRESSOR FOR AUTOMOTIVE APPLICATIONS**<br>Christoph Schäfer, Ivo Sandor, Michael Klaus, Continental Automotive GmbH, Germany; Roland Baar, Technische Universität Berlin, Germany |
| 14:30 | **VTG TURBOCHARGER EVOLUTION OF BORGWARNER TURBO SYSTEMS**<br>Ralf Christmann, Ralf Kopietz, Nico Buhl, Hermann Breitbach, BorgWarner Turbo Systems, Germany | |
| | **Q&A SESSION WITH AFTERNOON SPEAKERS** | **Q&A SESSION WITH AFTERNOON SPEAKERS** |
| 15:10 | **NETWORKING REFRESHMENT BREAK** | |
| | **SESSION 4: ADVANCED SIMULATION** | |
| 15:40 | **OBTAINING BULK FLOW BASED HEAT TRANSFER COEFFICIENTS FOR THERMAL**<br>Aliihsan Karamavruc, Borg Warner, United States of America | |
| 16:00 | **THE EFFECT OF DIFFERENT NOZZLE CLEARANCE AT HUB AND SHROUD SIDE ON VARIABLE NOZZLE TURBINE PERFORMANCE**<br>Xin Shi, Sinan Guo, Ben Zhao, Ce Yang and Chaochen Ma, Beijing Institute of Technology, China (PRC) | |
| 16:20 | **Q&A SESSION WITH AFTERNOON SPEAKERS** | |
| 16:50 | **CHAIR'S CLOSING REMARKS** | |
| 17:00 | **CLOSE OF DAY 1** | |

| | |
|---|---|
| 19:00 | **CONFERENCE DRINKS RECEPTION AND NETWORKING DINNER**<br>**Join speakers and industry for an exclusive networking opportunity and a three course dinner with wine.**<br>• Booking required. See booking form or visit www.imeche.org/turbo.<br>• Places offered on a first-come first-serve basis. |

| DAY 2 | WEDNESDAY 18 MAY | |
|---|---|---|
| 08:30 | **REGISTRATION AND REFRESHMENTS** | |
| 09:00 | **CHAIR'S OPENING REMARKS** | |
| 09:10 | **KEYNOTE ADDRESS**<br>Heijo Ölschlegel, Daimler AG | |
| | **SESSION 5A: TURBINE; UNSTEADY FLOW** | **SESSION 5B: MATERIALS, HOUSING, BURST CONTAINMENT, EGR AND FATIGUE LIFE** |

# PROGRAMME

| | | |
|---|---|---|
| 09:50 | **THE DEVELOPMENT OF A NOVEL UNSTEADY FLOW CONTROL METHOD: CONTROLLING THE ROTATING NOZZLE RING**<br>Kun Cao, Peter Newton, Flora Harminder, Ricard Martinez-Botas, Mechanical Engineering, Imperial College London, United Kingdom | **EXPLICIT DYNAMIC FINITE ELEMENT SIMULATION OF TURBOCHARGER CONTAINMENT AND WHEEL BURST**<br>Lin Wang, Mike Eastwood, Cummins Turbo Technologies, United Kingdom |
| 10:10 | **DUAL VOLUTE TURBOCHARGER - THE NEXT GENERATION OF PULSE OPTIMISED TURBINES FOR AUTOMOTIVE APPLICATIONS**<br>Marc Gugau, Tom Heuer, Sascha Weiske, Rolf Sauerstein, Ferdinand Winkler, BorgWarner Turbo Systems Engineering GmbH, Germany | **AN IMPROVED APPROACH TO HCF DEVELOPMENT FOR VANELESS TURBINE STAGES**<br>Christopher Wilkins, William Smith, Durga Gouravaraju, Wagner Magalhaes, Zdenek Neterda, Honeywell Turbo Technologies, United States of America |
| 10:30 | **ANALYSES OF FLOW STRUCTURES OF A TWIN-ENTRY VOLUTE UNDER PULSATILE FLOWS CONDITIONS**<br>Cerdoun Mahfoudh, Ecole Militaire Polytechnique, Algeria; Ghenaiet Adel, Faculty of Mechanical and Process Engineering, University of Sciences and Technology, Algeria | **THE DEVELOPMENT OF A LONG ROUTE EGR TURBOCHARGER FOR COMMERCIAL ENGINE APPLICATIONS**<br>Michael Burkinshaw, Cummins Turbo Technologies, United Kingdom |
| | **Q&A SESSION WITH MORNING SPEAKERS** | **Q&A SESSION WITH MORNING SPEAKERS** |
| 11:10 | **NETWORKING REFRESHMENT BREAK** | |
| | **SESSION 6A - BEARINGS, SEALS & ROTORDYNAMIC DESIGN** | **SESSION 6B: MATERIALS, HOUSING, BURST CONTAINMENT, EGR AND FATIGUE LIFE** |
| 11:40 | **DESIGN OF A TURBINE-GENERATOR-UNIT FOR AUTOMOBILE ORC APPLICATION**<br>Harald Kunte, Joerg Seume, Leibniz Universitaet Hannover, Germany | **DEVELOPMENT OF A HIGH TEMPERATURE TURBOCHARGER FOR HEAVY DUTY APPLICATIONS**<br>Andrew Sullivan, Mike Eastwood, David Brown, Cummins Turbo Technologies, United Kingdom |
| | **Q&A SESSION WITH MORNING SPEAKERS** | **Q&A SESSION WITH MORNING SPEAKERS** |
| 12:30 | **NETWORKING LUNCH** | |
| | **SESSION 7A - BEARINGS, SEALS & ROTORDYNAMIC DESIGN** | **SESSION 7B: NOVEL APPLICATION: EURO 7 & ELECTRIC ASSIST PLUS EBOOSTING & DOWN SPEEDING** |
| 13:30 | **HEAT FLOW IN A TURBOCHARGER SHAFT AND ITS IMPACT ON THE BEARING SYSTEM**<br>Thorsten Kleine, Henning Rätz, Joerg Seume, Institute for Turbomachinery and Fluid-Dynamics, Leibniz Universitaet Hannover, Germany; Nils Lübbert, Aerzener Maschinenfabrik GmbH, Germany | **LOW INERTIA CENTRIFUGAL COMPRESSOR WHEELS: INFLUENCE OF BACKSIDE CAVITY ON AERODYNAMIC LOSSES AND AXIAL FORCES**<br>Tore Fischer, Henning Raetz, Melf Peters, Joerg Seume; Institute of Turbomachinery and Fluid Dynamics, Leibniz Universitaet Hannover, Germany |
| 13:50 | **EXPERIMENTAL AND NUMERICAL ANALYSIS OF SEALING RING OF A TURBOCHARGER**<br>Chaochen Ma, Zhi Huang, Jin Bo, Hong Zhang, Beijing Institute of Technology, China (PRC) | **ELECTRICALLY ASSISTED TURBOCHARGER OPTIMISATION FOR A HEAVY DUTY DIESEL ENGINE**<br>Ahmed Rezk, Martin Jupp, University of Huddersfield, United Kingdom; Jeff Carter, BorgWarner Turbo Systems, United Kingdom |
| 14:10 | **THE EFFECT OF OIL FILM INSTABILITY ON POWER LOSSES PREDICTION OF TURBOCHARGER ROTOR-FULLY FLOATING RING BEARING SYSTEM**<br>Liang Tian, Matthew Wakelin, Craig Lancaster, Martin Lindsay, Cummins Turbo Technologies, United Kingdom | **Q&A SESSION WITH AFTERNOON SPEAKERS** |

# PROGRAMME

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|---|---|---|
| 14:30 | **Q&A SESSION WITH AFTERNOON SPEAKERS** | |
| 14:50 | **NETWORKING REFRESHMENT BREAK** | |
| | **SESSION 8A: EXHAUST WASTE HEAT RECOVERY** | **SESSION 8B: NOVEL APPLICATION: EURO 7 & ELECTRIC ASSIST PLUS EBOOSTING & DOWN SPEEDING** |
| 15:20 | **A ROBUST AND VALID METHOD OF GAS FOIL BEARING PARAMETERS ESTIMATION: A MODEL ANCHORED ON EXPERIMENTAL DATA**<br>Robert Hoffmann, Oliver Munz, Enrico Barth, Tomasz Pronobis, Robert Liebich, Technische Universität Berlin | **DESIGN OF COMPRESSOR FOR ELECTRICALLY DECOUPLED TURBOCHARGER IN DOWNSIZED GASOLINE ENGINE BY 3D INVERSE DESIGN**<br>Irfan Ghazaly, Mehrdad Zangeneh, University College London, United Kingdom |
| 15:40 | **EVALUATION METHOD OF THE EXHAUST SYSTEM OF THE TURBOCHARGED DIESEL ENGINE BASED ON EXERGY AND ENTHALPY ANALYSES**<br>Chaochen Ma, School of Mechanical Engineering, Beijing Institute of Technology, China; Liwei Sun, School of Mechanical Engineering, Beijing Institute of Technology, China and Automotive Engineering Institute, China; Na Fang, Dongfeng Automotive Engineering Research Institute Technical Centre, China | **A COMPARISON OF DIFFERENT HIGH-SPEED ELECTRICAL MACHINE TOPOLOGIES DESIGNED FOR AN ELECTRICALLY ASSISTED TURBOCHARGER**<br>Mahir Al-Ani, Martin Jupp, University of Huddersfield, United Kingdom; Jeff Carter, BorgWarner Turbo Systems, Bradford, United Kingdom |
| 16:00 | **Q&A SESSION WITH AFTERNOON SPEAKERS** | **PERFORMANCE TESTING OF AN ELECTRICALLY ASSISTED TURBOCHARGER ON A HEAVY DUTY DIESEL ENGINE**<br>Edward Winward, Richard Stobart, Dezong Zhao, Zhijia Yang, Loughborough University, United Kingdom; John Rutledge, Caterpillar Inc, United Kingdom; Jeff Carter, BorgWarner Turbo Systems, United Kingdom; Aaron Costall, Imperial College London, United Kingdom |
| 16:20 | | **Q&A SESSION WITH AFTERNOON SPEAKERS** |
| 16:50 | **CLOSING REMARKS** | |
| 17:00 | **CLOSE OF CONFERENCE** | |

**For the most up-to-date and detailed programme for the event, please visit www.imeche.org/turbo**

- This programme is subject to change.
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EVENT CODE: C6231

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**THE 12TH INTERNATIONAL CONFERENCE ON TURBOCHARGERS AND TURBOCHARGING**

17-18 May 2016, The Kia Oval, London

**www.imeche.org/turbo**

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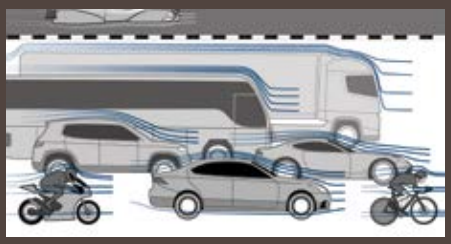


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