

Program

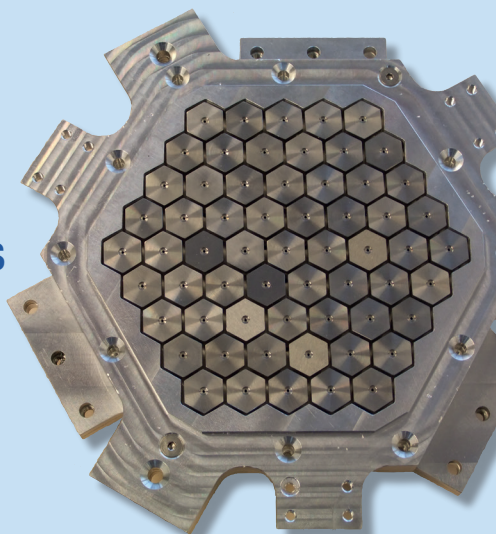
www.gas-bearing-workshop.com

6TH GAS BEARING WORKSHOP

March 31, 2025

Courtyard Hotel
Düsseldorf

- › LECTURES
- › POSTERS
- › TABLE TOPS



ORGANIZING INSTITUTIONS

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Phuc Vuong

VDE **VDI**¹ GMM



Bond voor Materialenkennis

DSPE
YOUR PRECISION PORTAL

ORGANIZER

For detailed information please contact:

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Precision Engineering (GMM)
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During the workshop:
Phone: +49 171 4695 118

IN COOPERATION WITH

Dutch Society for Precision Engineering (DSPE)
High Tech Campus 1
5656 AE Eindhoven
PO Box 80036
5600 JW Eindhoven
info@dspe.nl

POSTERS AND EXHIBITION

All attendees are invited to show a poster representing their field of competence.

We invite companies to join the workshop with a table top exhibition. The fee of 500 Euro (plus VAT) for the table top exhibition includes one ticket for workshop admittance.

For further information please contact the organizer.

PROGRAM COMMITTEE AND CHAIRMEN

Wolfram Runge (General Chair)
Berliner Hochschule für Technik

Jos Gunsing (Chairman Program Committee)
MaromeTech/Dutch Society for Precision Engineering

Farid Al-Bender
KU Leuven

Ron A.J. van Ostayen
Delft University of Technology

Ronald Schnabel
VDE/VDI GMM, Offenbach am Main

FOREWORD

6th Gas Bearing Workshop in Düsseldorf on March 31, 2025

For 10 years the Gas Bearing Workshop has been the most specific forum for the gas bearing community in the western world. Scientists, research engineers, users and manufacturers/vendors in this field will be encouraged to take part in the workshop. Experts in gas bearing design and manufacturing are going to present new applications and leading edge R&D. There will be plenty of room for discussion and personal contacts.

We are glad to extend the geographical scope of the GBW to the north and Far East. In the keynote presentation an overview of gas bearings in Japan will be given and research activities will be presented. In addition, for the first time we will welcome contributions from Denmark and Finland.

Most of the papers relate to bearings for high-speed rotors in turbo machinery. The analysis and prediction of design stability are a major challenge. In line with the manufacturing of foil bearings, other important topics are addressed, such as the use of gas bearings as seals, the use of gas bearings with natural refrigerants or additional air injection to ensure stability.

I look forward to meeting you at the 6th GBW 2025 in Düsseldorf. We hope that this workshop will generate impulses and inspiration for scientists and engineers. In addition to that, the program committee hopes that new personal, scientific and business contacts will be established.

*Wolfram Runge
Chairman of the 2025 Gas Bearing Workshop*

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- 09.30 **Welcome Reception / Poster Session;
Table Top Exhibition**
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- 10.00 **Opening Word**
Wolfram Runge, Chairman, Berliner Hochschule für Technik, Germany
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- 10.15 **KEYNOTE**
Research on Gas Bearings at Tokyo University of Science (Precision Engineering Lab)
Masaaki Miyatake, Tokyo University of Science, Japan
- This presentation will provide an overview of recent research and development on gas bearings in Japan and introduce our laboratory's studies on aerostatic bearings, gas foil bearings, and squeeze film gas bearings utilizing ultrasonic vibrations.
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- 11:00 Coffee Break / Poster Session / Table Top Exhibition
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- 11:30 **High-Quality Innovative Series Production of Foil Bearings**
Bram Spijkers, Bosch, Tilburg, The Netherlands
- Research, strategies, and challenges of high-volume production from both design and manufacturing perspectives.
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- 12.00 **Experimental and Theoretical Investigations of Annular Aerostatic Seals**
Mikael Miettinen, Aalto University, Finland
- This presentation highlights results of mathematical modelling and experiments of static performance of aerostatic porous annular seals. Effect of seal design and operational parameters are discussed.
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- 12.30 Lunch Break / Poster Session / Table Top Exhibition
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- 14.00 **Development of Aerodynamic Bearings for High Speed Centrifugal Compressors**
Fabrizio Pauri¹, Federico Colombo²
¹ *Carbomech, Burolo, Italy*
² *Politecnico di Torino, Turin, Italy*
- The talk will be focused on the development of spiral grooved and herringbone aerodynamic bearings for high-speed compressors to be used in mobile applications. The data from the first experimental activities will be compared with the numerical models available in literature to evaluate the load carrying capacity of such bearings.
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- 14.30 **From Passive to Hybrid and Controllable Gas Bearings – Theory & Experiments**
Ilmar Santos, DTU, Copenhagen, Denmark
- The use of air – clean and abundant in nature – as a lubricant reduces friction losses and is an excellent green solution. Nevertheless, this solution imposes serious technological challenges: i) even tighter manufacturing tolerances to cope with rotor-bearing assembling, ii) significant reduction of load capacity due to air compressibility, and iii) rotor lateral vibration instabilities due to the lack of damping. The originality of the research activities carried out at DTU Construct lies in the use of piezoelectrically-controlled air injection with compliant foil bearings to overcome these three drawback.
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- 15.00 Coffee / Tea Break
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- 15.30 **Alternative Air Bearing Concepts for the Robust and Reliable Bearing Support of High-Speed Turbines**
Myra Bianca Mehlhose, J. Triebwasser, J. Jäckel, P. Zeise, B. Schweizer, TU Darmstadt, Germany
 Two novel air bearing concepts for high-speed rotor systems are discussed. The first is based on a rigid three-lobe bearing design, while the second is based on a single-foil design without a supporting structure.
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- 16.00 **Rigid Gas Bearings and Low-Viscosity Gases: Case Study**
Mihai Dobrica, Elliott Guenat, ebm-papst Mulfingen GmbH & Co. KG, Germany
 The case study of a high-speed, gas-bearing supported turbo-compressor for propane in a heat pump cycle is presented. Critical constraints on the bearings design are discussed, as well as experimental results showing the viability of the concept for natural refrigerants.
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- 16:30 **Wrap up/Closure**
Wolfram Runge, Berliner Hochschule für Technik, Germany
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- 16:45 **Informal Discussion and Networking**
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WORKSHOP REGISTRATION

To register for the Gas Bearing Workshop 2025, please visit the homepage under www.gas-bearing-workshop.com.

REGISTRATION FEE

workshop attendance	370 €
table top exhibition (Including one ticket)	500 € + VAT

Payment for registration, including bank charges and processing fees, must be made in Euro. The workshop fee has to be fully paid in advance by credit card. Your registration can only be confirmed if VDE-Conference Services has recorded receipt of your full payment.

In case of cancellation, provided that written notice has been given to VDE-Conference Services before February 27, 2025, the registration fee will be refunded less a handling fee of € 80.00. After February 27, 2025, no refund will be made.

WORKSHOP VENUE

Courtyard Duesseldorf Seestern
 Am Seestern 16
 40547 Düsseldorf
 Phone: +49 211/595 959
 Fax : +49 211/593 569

TRANSPORT SERVICES CLOSE TO THE HOTEL

Parking on-site
 21 € daily

Subway Station
 Seestern or Prinzenallee

SPEAKERS LIST

- *Masaaki Miyatake, Tokyo University of Science, Japan*
- *Bram Spijkers, Bosch, Tilburg, The Netherlands*
- *Mikael Miettinen, Aalto University, Finland*
- *Fabrizio Pauri¹, Federico Colombo²*
¹ Carbomech, Burolo, Italy
² Politecnico di Torino, Turin, Italy
- *Ilmar Santos, DTU, Copenhagen, Denmark*
- *Myra Bianca Mehlhose, J. Triebwasser, J. Jäckel, P. Zeise, B. Schweizer, TU Darmstadt, Germany*
- *Mihai Dobrica, Elliott Guenat, ebm-papst Mulfingen GmbH & Co. KG, Germany*

