



 International Conference on
SCREW MACHINES 2022
7-8 September **DORTMUND, GERMANY**

PROGRAMME

The International Conference on Screw Machines 2022 features presentations of research and technical papers on all kind of screw machines. This year's event will cover:

- » Design
- » Contact & loss mechanisms
- » Simulation
- » Operation
- » Energy efficiency
- » Novel applications

Learn about the latest developments and connect with scientists, manufacturers, service providers, and users from the screw machine community.

For registration, further information on the event, and past conference papers please visit:

WWW.ICSM.TU-DORTMUND.DE



CONFERENCE VENUE

TU Dortmund University
Seminar Building I
Friedrich-Wöhler-Weg 6
44227 Dortmund, Germany

GENERAL CHAIR

Andreas Brümmer
TU Dortmund University
Chair of Fluidics
icsm.ft.mb@tu-dortmund.de

WEDNESDAY 7 September 2022

09:00 CONFERENCE REGISTRATION

OPENING SESSION
Room H.001

10:00 **Welcome address**
M. Bayer, president TU Dortmund University, M. Rabe, representative for the Faculty of Mechanical Engineering & head of Department IT in Production and Logistics; A. Brümmer, general chair & head of Chair of Fluidics
TU Dortmund University, DE

10:30 **Hydrogen as multivalent energy carrier – also for mobility?**
T. von Unwerth, head of Department of Advanced Powertrains
Chemnitz University of Technology, DE

11:20 **Improving vapor compression system efficiency through advanced vapor compression technologies**
E. A. Groll, head of Mechanical Engineering
Purdue University, US

12:10 LUNCH BREAK

NEW DESIGNS Room 1.001	GAP FLOWS I Room 2.008
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13:30 Design and analysis of conical rotary compressor <u>Y. Lu</u> et al. Vert Rotors, UK	13:30 Laser-optical shear-flow analysis across the annular gap of a simplified displacement compressor model <u>R. Leister</u> ¹ , <u>A. Brümmer</u> ² and <u>J. Kriegseis</u> ¹ ¹ Karlsruhe Institute of Technology (KIT), DE ² TU Dortmund University, DE
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14:00 Systematic engineering design approach for improvement of oil-free twin-screw compressors <u>T. Plantegenet</u> ¹ et al. ^{1,2} ¹ City, University of London, UK ² Howden Compressors, UK	14:00 One-dimensional calculation approach for gaseous clearance flows <u>T. Jünemann</u> ¹ and <u>A. Brümmer</u> ² ¹ Flowserve Dortmund GmbH & Co. KG, DE ² TU Dortmund University, DE
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14:30 COFFEE BREAK & LABORATORY TOURS

ROTOR PROFILE AND CONTACT Room 1.001	GAP FLOWS II Room 2.008
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16:30 Numerical investigation of contact loads of unsynchronized, dry-running screw machines <u>D. Aurich</u> and <u>A. Brümmer</u> TU Dortmund University, DE	16:30 Investigation of radial gap size change under load and the impact on performance for a twin screw compressor using numerical simulation <u>R. Andres</u> , <u>J. Hesse</u> and <u>A. Spille</u> CFX Berlin Software GmbH, DE
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17:00 Contribution of modern rotor profiles to energy efficiency of screw compressors <u>S. Patil</u> ^{1,2} et al. ^{1,2} ¹ City, University of London, UK ² Kirloskar Pneumatic Company Limited, IN	17:00 Analysis of the flow through the blowhole of twin-screw machines with different rotor profiles using dimensionless numbers <u>M. Heselmann</u> and <u>A. Brümmer</u> TU Dortmund University, DE
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18:15 CONFERENCE DINNER – sponsored by PTG Holroyd Machine Tools & Components
Storckshof, Ostenbergstr. 111, 44227 Dortmund

THURSDAY 8 September 2022

SIMULATION & EXPERIMENT I Room 1.001		SCREW PUMPS Room 2.008	
08:30	Design parameter study to extend the capacity range of dry twin screw compressors J.-G. A. Persson ^{1,2} ¹ JGP Teknikkonsult, SE ² KTH-Royal Institute of Technology, SE	08:30	Simulating the dynamic behavior of a triple screw pump without CFD S. Kosmann ¹ et al. ^{1,2} ¹ Leistritz Pumpen GmbH, DE ² Siemens Industry Software GmbH, DE
09:00	Investigation of hydraulic losses in twin-screw machines M. Heselmann, H. Vasuthevan and A. Brümmer TU Dortmund University, DE	09:00	Experimental investigations and 3D simulations by the overset grid method on twin-screw machines in both pump and turbine mode A. H. Moghaddam ¹ et al. ^{1,2,3} ¹ Ruhr University Bochum, DE ² Klaus Union GmbH & Co. KG, DE ³ ITT Bornemann GmbH, DE
09:30	Validation of inhomogeneous chamber states in rotary positive displacement vacuum pumps H. Pleskun, T. Jünemann and A. Brümmer TU Dortmund University, DE	09:30	Rheological modelling of viscoelastic fluid in a generic gap of screw pump S. Mehrnia et al. Technische Universität Darmstadt, DE
10:00 COFFEE BREAK			
SIMULATION & EXERIMENT II Room 1.001		PULSATIONS & NVH Room 2.008	
10:30	Conjugate heat transfer analysis of a twin-screw compressor with 4-6 configuration and internal cooling channels E. A. Groll ¹ et al. ^{1,2} ¹ Purdue University, US ² Ingersoll Rand, US	10:30	Pulsating flow velocity profile measurement at an acoustically reflecting and non-reflecting open pipe end using Laser Doppler Anemometry (LDA) F. Nal and A. Brümmer TU Dortmund University, DE
11:00	Thermodynamic simulation and experimental investigation of an oil-free twin-screw expander M. Grieb and A. Brümmer TU Dortmund University, DE	11:00	Use of CFD to optimize the design of a shunt pulsation trap (SPT) used for noise and vibration mitigation in oil free screw compressors J. Willie ¹ et al. ^{1,2} ¹ CVS Engineering GmbH, DE ² Hi-Bar Blowers, Inc., US
11:30	Transient chamber filling in rotary positive displacement vacuum pumps H. Pleskun and A. Brümmer TU Dortmund University, DE	11:30	A novel screw compressor with a shunt enhanced compression and pulsation trap (SECAPT) J. Willie ¹ , P. X. Huang ² and S. W. Yonkers ³ ¹ CVS Engineering GmbH, DE ² Hi-Bar MC Tech LLC, US ³ Hi-Bar Blowers, Inc., US
12:00 LUNCH BREAK			
SCIENCE UPDATE (presentation only) Room 1.001		SIMULATION & EXPERIMENT III Room 2.008	
13:30	CERES – industrial consortium for Compressors and Expanders in futuRe Energy Systems A. Kovacevic, City, University of London, UK Impact of surface structures on rarefied clearance flows H. Pleskun, TU Dortmund University, DE Updates on development of internally geared screw machines M. Read, City, University of London, UK Experiments with see-through screw oil-injected compressor U. Dämgen, Boge Kompressoren, DE Challenges in measuring operational clearances in screw machines – project SECRET T. Tam, City, University of London, UK Thermodynamic modeling of conical R718 screw spindle compressors with liquid injection T. Mösch, Technische Universität Dresden	13:30	A two-phase approach for simulation of water-flooded twin-screw machines validated for expander applications A. Nikolov and A. Brümmer TU Dortmund University, DE
		14:00	On performance optimisation for oil-injected screw compressors using different evolutionary algorithms S. Patil ^{1,2} et al. ^{1,2} ¹ City, University of London, UK ² Kirloskar Pneumatic Company Limited, IN
		14:30	Experimental and numerical analyses of the thermodynamic and mechanical losses of an oil-injected and economized 4/6 twin-screw compressor E. A. Groll et al. Purdue University, US
		15:00	Experimental research on influence of interstage oil injection in a dual-motor-driven two-stage screw air compressor X. Liao et al. Xi'an Jiaotong University, CN
CLOSING SESSION ROOM H.001			
15:30	Closing remarks A. Brümmer, general chair & head of Chair of Fluidics TU Dortmund University, DE		
16:00	End of the conference		

PROGRAMME COMMITTEE

Andreas Brümmer (general chair), TU Dortmund University, DE

Thomas Dreifert, Leybold GmbH, DE

Hans-Ulrich Fleige, Aerzener Maschinenfabrik GmbH, DE

Eckhard A. Groll, Purdue University, US

Knut Kauder (retired), TU Dortmund University, DE

Ahmed Kovacevic, City, University of London, UK

Johann Lenz, KÖTTER Consulting Engineers, DE

Laurenz Rinder (retired), TU Wien, AT

Jack Sauls (retired), Trane, US

REGISTRATION & FEES

Visit the conference web page www.icsm.tu-dortmund.de and register via **ConfTool** for the International Conference on Screw Machines 2022 in Dortmund. If you have any questions regarding the registration process, please do not hesitate to contact us.

The conference fee including all events is **650 €** (VAT not included, discounts available).

CONTACT

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