

# TUESDAY, MARCH 19, 2024

9:10  
a.m.

## Efficiency

Thermal analysis of the cylinder block of an axial piston pump – the key to monitoring efficiency  
Roman Ivantysyn – TU Dresden, LFD, Germany

Comparison Study of Fully Individualized System Architectures for Electrified Mini-Excavators: Displacement Control (DC) vs Electro-Hydraulic Actuation (EHA)

Timir Patel – Purdue University, Maha Fluid Power Research Center, United States

Run-in behaviour and wear on hydraulic piston seals – evaluation of an endurance test for piston accumulators

Tobias Schulze – TU Dresden, LFD, Germany

Efficiency definitions of hydraulic transformers and first test results of the Floating Cup Transformer (FCT80)

Robin Mommers – INNAS BV, The Netherlands

## Fundamentals

Remaining Useful Life Estimation for Rubber O-Ring under Storage Conditions Considering Dependent Performance Indicators

Chao Zhang – School of Automation Science and Electrical Engineering, Beihang University, China

Development of a Hydraulic Artificial Muscle with High Force Density

Matthias Niebergall - TH Ulm, Germany

Hydraulic pile hammer surrogate model based on physics-informed neural network

Yajun Liu – South China University, China

Computational Thermofluid analysis of a refrigeration CO<sub>2</sub> ejector

Roosbeh Mousavi – Hilite Germany GmbH, Germany

## Water-Hydraulics

Holistic Efficiency Measurements of a Mobile Working Machine: Comparison of Conventional Mineral Oil and Sustainable Fluids

Sebastian Deuster – RWTH Aachen, ifas, Germany

Tribological properties of hydraulic cylinder piston sealings in water and oil hydraulics

Franc Majdič – University of Ljubljana, Slovenia

Numerical Model of Piston/Cylinder Interface with Consideration of Turbulence Effect for Water Hydraulics

Swarnava Mukherjee - Purdue University, Maha Fluid Power Research Center, United States

Development of digital type tap-water drive flow control valve

Hiroki Atogami – Okayama University of Science, Japan

10:30  
a.m.

COFFEE BREAK

10:55  
a.m.

## Valves

Characteristic and oscillation tendency study for different seat geometries of the pilot stage of a two-staged pressure control valve  
Martin Gerhard Kloetzer – Rapa Rausch & Pausch, Germany

Dedicated design of the flow angle of free jets for rotary slide valves  
Lennard Günther - TU Dresden, LFD, Germany

Simulation of Gas Leakage on Ball Seat Valves  
Felix Fischer - RWTH Aachen, ifas, Germany

Development and Tests of a Hydraulic Swivel Drive with Hydrostatic Bearings  
Lutz Müller – TU Dresden, LFD, Germany

## Tribology

Tribological design by Molecular Dynamics simulation – The influence of polar additives on wall slip and bulk shear  
Seyedmajid Mehrnia – TU Darmstadt, Institut für Fluidtechnik, Germany

Numerical Study on Abrasive Wear of Reciprocating Seals Under Mixed Lubrication Conditions  
Jiehao Wang – Tongji University, China

Tribological Properties of Different Slipper Designs of an Axial Piston Pump  
Svenja Horn – TU Dresden, LFD, Germany

Fast Computation of Lubricated Contacts: A Physics-Informed Deep Learning Approach  
Faras Brumand-Poor – RWTH Aachen, ifas, Germany

## Materials

Additive Manufacturing of Hydraulic Components – Simulation and Validation of Self-Supporting Channel Geometries  
Zita Kristin Tappeiner – RWTH Aachen, ifas, Germany

Bronze cladding on bimetal parts produced by laser deposition brazing  
Hannes Freisse – Kugler Bimetal SA, Switzerland

Polyoxymethylene composite for sustainable hydraulic valves  
Ana Trajkovski – University of Ljubljana, Slovenia

Sustainable productivity for machining key components in Fluid Power  
Jacek Kruszynski – MAPAL Fabrik für Präzisionswerkzeuge Dr. Kress KG, Germany

12:15  
p.m.

LUNCH

1:05  
p.m.

## Mobile Applications

Methodology of System Parameter Optimization for Parallel Electric Hydraulic Hybrid Mobile Machine via Convex Programming  
Zichang Lin – Zhejiang University, China

Control of rear-wheel steering for a four-wheel steered agricultural standard tractor  
Ruben Emanuel Hefele – TU München, Germany

Optimization of speed trajectory for electric wheel loaders: battery lifetime extension  
Haoxiang Zhang – Zhejiang University, China

Automated System Synthesis for Electrified Mobile Machinery  
Bernhard Sender – RWTH Aachen, ifas, Germany

## Pumps

Predictive Maintenance for Axial Piston Pumps: A Novel Method for Real-Time Health Monitoring and Remaining Useful Life Estimation  
Anik Kumar Samanta – Danfoss, India

Practical review of reliability methods combined with virtual validation techniques to shift limits of today's hydrostats  
Stefan Haug – Bosch Rexroth AG, Germany

A Study on the Effects of Body Deformation on the Performance of External Gear Machines  
Ajinkya Pawar - Purdue University, Maha Fluid Power Research Center, United States

A novel pulsation compensator for displacement machines  
Gudrun Mikota – Johannes Kepler University Linz, Austria

## New and Special Applications

Development of reciprocating air expander for micro-CAES technology  
Jan Markowski – AGH University of Science and Technology, Poland

Comparative Analysis of Performances of Non-metal Pressurized Reservoirs with Variable Volume  
Dingyu Wang – Yanshan University, China

Ship ballasting process time calculation with use of submerged ballast pumps with hydraulic drive supplied from constant pressure hydraulic central loading system on modern product and chemical tankers  
Andrzej Banaszek – West Pomeranian University of Technology Szczecin, Poland

2:25  
p.m.

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COFFEE BREAK

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2:50  
p.m.

## Independent Metering in Mobile Applications

Compact Fluid Power Control Unit with Independent Metering  
Mathias Niebergall – Technische Hochschule Ulm, Germany

Comparison of strategies for unnoticeable mode shifting for independent metering systems in mobile applications  
Jan Lübbert – TU Dresden, LFD, Germany

Fault localization for independent metering systems by model-based fault detection  
Eric Fischer – TU Dresden, LFD, Germany

## Sustainable Pneumatics

Control of a pneumatic system for material strength testing  
Zeljko Situm – University of Zagreb, Croatia

Product Carbon Footprint of Hydraulic and Pneumatic Components – Challenges in Accounting and Comparability  
Johannes Sprink – RWTH Aachen, ifas, Germany

Exergy analysis for the intermittent air supply in pneumatic machines  
Dominik Grybos – AGH University of Krakow, Poland

## New and Special Applications

Digital redundance for compact subsea electro-hydrostatic actuators using sensor fusion  
Ali Emad – Bosch Rexroth AG, Germany

Development of a generic test rig for the determination of the influence of non-Newtonian fluid properties on the leakage characteristic of rotating displacement pumps  
Pascal Moor – Technische Universität Darmstadt, Germany

Self-Sensing Micropump detecting air bubbles to improve dosing reliability  
Kristjan Axelsson – Fraunhofer EMFT, Germany

4:00  
p.m.

**EXHIBITION OPENING**

6:00  
p.m.

**GET TOGETHER**

# WEDNESDAY, MARCH 20, 2024

9:00  
a.m.

WELCOME AND KEYNOTES

10:45  
a.m.

BREAK

11:15  
a.m.

## Industrial Control Strategies

**General Lecture:** Software-defined industrial  
Mark Krieg – Bosch Rexroth AG, Germany

Seamless integration of device and field data into the system  
simulation of a hydraulic servo-press using AAS  
Raphael Alt - FLUIDON GmbH, Germany

Development of an open and modular Platform for Hydraulics  
to increase productivity and flexibility  
Marco Genise - Bosch Rexroth AG, Germany

Physical implementation of a distributed, agent-based control  
for fluid systems using OPC-UA  
Tobias Constantin Meck - TU Darmstadt, Germany

## Pneumatics

Sizing of pneumatic drives under energy efficiency aspects  
Matthias Doll – Festo SE & Co. KG, Germany

Feasibility Study and Experimental Validation of a Novel Com-  
bined Throttling Approach  
Christian Reese - RWTH Aachen, ifas, Germany

Reinforcement Learning based PID Controller Design for Mass  
Flow Controllers  
Moritz Allmendinger – Bürkert Fluid Control Systems, Germany

A Trajectory-Specific Approach for Calculating the Holding  
Force for Surface Grippers  
Tobias Eberhardt – J. Schmalz GmbH, Germany

12:45  
p.m.

LUNCH

1:45  
p.m.

## Control

Online Learning of Cylinder Velocity Controllers for Excavator Assistance Functions using Local Model Networks  
Ozan Demir – Robert Bosch GmbH, Germany

Validation of a Hydraulic Pulse Controller on an off-highway machine  
Marvin Schell – Andreas Lupold Hydrotechnik GmbH, Germany

Model Predictive Control of Electro-Hydraulic Systems with multiple degrees of freedom  
Thomas Sendelbach - Bosch Rexroth AG, Germany

Data-driven vibration control strategy for hypergravity centrifugal shaking table  
Zhu Yang – Zhejiang University, China

## System Design and Architecture

Thermal issues in mobile and industrial applications  
Eric Pohl – TU Dresden, LFD, Germany

A Hydro-Mechanical Vibration Absorber with Adjustable Operating Frequency  
Helmut Kogler – Linz Center of Mechatronics GmbH, Austria

Energetic optimization of an existing clamping powerpack by system and control concept analysis and adaptation of the hydraulic fluid viscosity  
Johannes Gattinger – WEBER-HYDRAULIK GmbH, Germany

Use of Broadband Silencers in hydraulic circuits to reduce pulsations  
Peter Kloft – HYDAC Technology GmbH, Germany

3:05  
p.m.

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**COFFEE BREAK**

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3:45  
p.m.

## Simulation

An approach to the evaluation of the energy efficiency of machines based on digital twins and simulation methods

Rüdiger Kampfmann – Bosch Rexroth AG, Germany

A novel SaaS development platform for fluid power standard drives

Heiko Baum – FLUIDON GmbH, Germany

Credible simulation: Evaluating the credibility of simulation models and simulation model libraries

Simon Leutz – Bosch Rexroth AG, Germany

Digital Twin Simulation of a Wheel Loader with Fail-Safe Steer-by-Wire

Vinay Partap Singh – Tampere University, Finland

5:00  
p.m.

7:30  
p.m.

3:35  
p.m.

## System Design and Architecture

**General Lecture:** Sustainable Fluid Power

Jeff Herrin – Danfoss Power Solutions, Danmark

Solutions for energy-efficient and easy implementable electrified variable-speed pump drives in mobile applications

Steffen Rose – Bosch Rexroth AG, Germany

Fundamentals of hydraulic transformers

Peter A.J. Achten – INNAS BV, The Netherlands

Dynamic valve plate design for an axial piston pump (servo-less pump)

Jaromir Tvaruzek – Danfoss Power Solutions, Germany

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KEYNOTE

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GALA DINNER

# THURSDAY, MARCH 21, 2024

9:00  
a.m.

WELCOME AND KEYNOTES

10:50  
a.m.

COFFEE BREAK

11:20  
a.m.

## System Layouts in Mobile Machines

Electro-hydraulic damping strategies for hydro-pneumatic suspensions

Steffen Antoni – ARGO-HYTOS GmbH, Germany

Energy Efficient Excavator Functions based on Electro-hydraulic Variable-speed Drive Network

Lasse Schmidt – Aalborg University, Danmark

A comprehensive review of electronically controlled implement architectures for mobile machinery using secondary control

Edwin Heemskerk – Bosch Rexroth AG, Germany

Potentials and limitations of increasing pressure limits in cylinders of mobile machine kinematics

Tobias Radermacher – TU Dresden, LFD, Germany

## Digitalization

Precise hydrostatic Cylinder Drive with increased Pressure Level for industrial Applications

Ralf Bonefeld – Bosch Rexroth AG, Germany

Novel Engineering and Product Solutions towards Digitalization and Sustainability in Vacuum Handling Automation

Maik Fiedler – J. Schmalz GmbH, Germany

Hands-on Approach on developing a Deep Learning Algorithm for State Classification of a Hydraulic Accumulator

Oliver Mehl – HYDAC Technology GmbH, Germany

Acoustic optimization of a servo-hydraulic pump unit and AI evaluation of the subjective sound perception

Stefan-Georg Backhaus – Bosch Rexroth AG, Germany

12:40  
p.m.

LUNCH



1:40  
p.m.

## Digital Construction

**General Lecture:** Digital assisted collision avoidance for mobile machinery

Simon Köhler – TU Dresden, LFD, Germany

Manuel Boes – Liebherr Werk Bischofshofen GmbH, Austria

Fast Lane to E-Mobility – Using pre-validated systems and software solutions for mobile machineries

Sasha Grund – HYDAC Software GmbH, Germany

Object Detection for Autonomous Forest Machinery: A Comparison of State-of-the-Art Instance Segmentation Architectures

Lukas Michiels – Karlsruhe Institute of Technology, Germany

Assisted driving Midi-Excavator for augmented performances and improved safety

Andrea Cervi – Walvoil spa, Italy

1:50  
p.m.

## Actuators and Sensors

Research on fault diagnosis method of aviation digital hydraulic valve based on energy dissipation characterization

Jiesi Ren – Taiyuan University of Technology China

Experimental analysis of energy consumption of piezo actuators used in hydraulic switching valve

Marko Simic – University of Ljubljana, Slovenia

Energy harvesting from hydraulic pressure fluctuations using an oscillating piston

Hauke Lerche – TU Dresden, LFD, Germany

Load holding valves with integrated flow sensors

Bernd Zaehe – Sunhydraulics, Germany

3:10  
p.m.

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COFFEE BREAK

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3:40  
p.m.

## Hydrogen

Hydrogen powered hydraulic Powerpack  
Lukas Trommler – TU Dresden, Germany

High-Pressure Shut-Off Valve suitable for Hydrogen Applications  
Peter Tappe – Magnet-Schultz GmbH & Co.KG, Germany

Holistic approach to electro-hydraulic drive solutions for hydrogen piston compressors  
Nicolas Englert – Bosch Rexroth AG, Germany

## Actuators and Sensors

Automation of pneumatic throttle check valves by using novel multi-stable solenoids  
Thomas Kramer – TU Dresden, LFD, Germany

Low energy consumption high flow control system using spool-in-spool design of proportional valve  
Jan Koudelka – Argo-Hytos s.r.o, Czech Republic

Real-Time Models of Valve Solenoids: An Evaluation of Measurement and Simulation-Based Parameter Identification  
Simon Hucko – RWTH Aachen, ifas, Germany

4:50  
p.m.

**FAREWELL AND BEST PAPER AWARD**

5:00  
p.m.

**LABORATORY PARTY**