

CONFERENCE ROOM 1

9:00

WELCOME & OPENING ADDRESS

9:10

Materials



- A-1 Challenges for novel lead free alloys in hydraulics
Björn Reetz, Otto Fuchs KG, Germany
- A-2 Researches on waterhydraulic motor
Franc Majdič, University of Ljubljana, Faculty of mechanical engineering, Slovenia
- A-3 Study of cavitation resistance of materials for surface recovery and protection from cavitation erosion
Vladimir Lomakin, Bauman Moscow State Technical University, Russian Federation

CONFERENCE ROOM 2

System design & integration



- B-1 Frequency based efficiency evaluation – From pattern recognition via backwards simulation to purposeful drive design
Martin Starke, TU Dresden, IMD, Germany
- B-2 Optimization of operation strategy for primary torque based hydrostatic drivetrain using artificial intelligence
Yusheng Xiang, Karlsruhe Institute of Technology, Germany
- B-3 Hardware-in-the-loop simulation of hybrid hydromechanical transmissions
Viktor Larsson, Linköping University, Sweden

CONFERENCE ROOM 3

Novel system solutions



- C-1 A closed circuit electro-hydraulic actuator with energy recuperation capability
Qu Shaoyang, Purdue University, USA
- C-2 Energy analysis of novel zonal two-cylinder actuation system for heavy loads
Tatiana Minav, Aalto University, Finland
- C-3 Experimental evaluation of an electro-hydrostatic actuator for subsea applications in a hyperbaric chamber
Amadeu Placido Neto, Federal University of Santa Catarina, Brazil

10:30

BREAK

11:00

Additive manufacturing



- D-1 Tribological investigations on additively manufactured surfaces using Extreme High-Speed Laser Material Deposition (EHLA) and Laser Powder Bed Fusion (LPBF)
Achill Holzer, RWTH Aachen, IFAS, Germany
- D-2 Assessment of frictional losses to horizontally oriented fluid passages fabricated using additive manufacturing
Yi Zhu, Zhejiang University, China
- D-3 Design and experimental investigation of an additive manufactured compact drive
Gunnar Matthiesen, RWTH Aachen, IFAS, Germany
- D-4 Additive manufacturing of hydraulic manifolds- An holistic approach across the entire value chain
Bastian Beckmann, Bosch Rexroth AG, Germany

Components



- E-1 Functional proof of a flat slide valve as a 4/3-way proportional valve
Stefan Aengenheister, RWTH Aachen, IFAS, Germany
- E-2 Control concept for a grease lubricated hydrostatic bearing
Igor Mass, Hochschule Niederrhein, Germany
- E-3 Foam accumulators: packaging and weight reduction for mobile applications
Manuel Rexer, TU Darmstadt, Germany
- E-4 One dimensional unsteady model of a hydro-pneumatic piston accumulator based on Finite Volume Method
Filipp Kratschun, RWTH Aachen, IFAS, Germany

Intelligent control



- F-1 Simulation of an interlocking hydraulic direct-drive system for a biped walking robot
Juri Shimizu, Waseda University, Japan
- F-2 Non-linear force control of hydraulic actuators submitted to motion disturbances
Tahereh Vaezi, Université de Lyon, INSA de Lyon, France
- F-3 Multidimensional flow mapping in proportional seat valves
André Sitte, TU Dresden, LFD, Germany
- F-4 Multi-objective control of a self-locking compact electro-hydraulic cylinder drive
Nikolaj Grønkjær, Aalborg University, Denmark

12:45

LUNCH

CONFERENCE ROOM 1

13:45

Fluids



- G-1 Numerical prediction and experimental investigation of cavitation erosion of hydraulic components using HFC
Atena Moosavi, TU Dresden, LFD, Germany
- G-2 Practical aspects when using ionic liquids as hydraulic fluid
Darko Lovrec, University of Maribor, Slovenia
- G-3 Method for the experimental determination of the diffusion coefficient of air in hydraulic fluids
Andris Rambaks, RWTH Aachen, IFAS, Germany
- G-4 Optimizing hydraulic reservoirs using Euler-Euler-Lagrange multiphase CFD simulation
Lukas Muttenthaler, Engel Austria GmbH, Austria

CONFERENCE ROOM 2

Pumps



- H-1 The influence of the swash plate oscillation on pressure ripple in variable displacement axial piston pump
Xiaochen Huang, Zhejiang University, China
- H-2 Investigation of the wear behavior of the slipper in an axial piston pump by means of simulation and measurement
Roman Ivantysyn, TU Dresden, LFD, Germany
- H-3 A fast approach for a coupled fluid-thermal modelling of the lubricating interfaces of axial piston machines
Swarnava Mukherjee, Purdue University, USA
- H-4 A CFD design of engineered surface for tribological performance improvements in hydraulic pumps
Fabio Scolari, Università di Parma, Italy

CONFERENCE ROOM 3

Mobile applications



- I-1 Optimization of hydrostatic-mechanical transmission control strategy by means of torque control
Yusheng Xiang, Karlsruhe Institute of Technology, Germany
- I-2 Reinforcement learning: A control approach for reducing component damage in mobile machines
Lars Brinkschulte, Karlsruhe Institute of Technology, Germany
- I-3 Intelligent Twin Steering System
Biagio Borretti, Dana Motion Systems Italia S.r.l., Italy
- I-4 Autonomous control of hydraulic mobile applications – a 21-ton excavator case study
Timothy John Opperwall, Husco International Inc., USA

15:30

BREAK

16:00

Fundamentals



- J-1 Pump and motor impedance measurement in a hydrostatic drive
Benedikt Müller, FLUIDON GmbH, Germany
- J-2 On the thermodynamic consistency of experimentally determined fluid properties
Enrico Gaspare Pasquini, FLUIDON GmbH, Germany
- J-3 Fluid-thermal co-simulation for a machine tool frame
Christoph Steiert, TU Dresden, LFD, Germany
- J-4 The applicability of the mass-flow-model according to ISO 6358 with the parameter critical conductance C and critical pressure ratio b for gases in high pressure range up to 300 bar
Lucian Pasiaka, Eugen Seitz AG, Switzerland

17:45

19:00

Pumps



- K-1 Damping strategies for energy efficient pressure controllers of variable displacement pumps
Florian Schoemacker, RWTH Aachen, IFAS, Germany
- K-2 Optimization of the tribological contact of valve plate and cylinder block within axial piston machines
Stefan Geffroy, RWTH Aachen, IFAS, Germany
- K-3 Numerical and experimental study on novel hydraulic pump concept
Seong-Ryeol Lee, RWTH Aachen, IFAS, Germany
- K-4 A numerical model for evaluation of gerotor torque considering multiple contact points and fluid-structure
Zubin Mistry, Purdue University, USA

Mobile applications



- L-1 Challenges and possibilities of the integration of electric drives in mobile machinery
Andreas Opgenoorth, RWTH Aachen, IFAS, Germany
- L-2 Research on efficient driving method of heavy hydraulic excavator boom
Lianpeng Xia, Taiyuan University of Science and Technology, China
- L-3 Optimal control of the hydraulic actuated boom system based on Port-Hamiltonian formulation
Lingchong Gao, TU München, Germany
- L-4 The use of a holistic machine simulation for the development of hydraulic hybrid modules to reduce transient raw emissions
Felix Pult, Karlsruhe Institute of Technology, Germany

GET TOGETHER & EXHIBITION OPENING

TUESDAY, MARCH 10, 2020

LARGE HALL

HALL 4

9:00

WELCOME & OPENING ADDRESS

9:45

Digital systems



1-0 General Lecture:
Digital mobile machines – From cloud down to earth
Jürgen Weber, TU Dresden, LFD, Germany

1-1 General Lecture:
Industrial hydraulics: Now – Next – Beyond
Steffen Haack and Mark Krieg, Bosch Rexroth AG, Germany

10:45

BREAK

11:15

Digital systems



- 2-0 General Lecture: Digitization of the hydraulics – uniform semantics only allows interoperability**
Martin Hankel, Bosch Rexroth AG, Germany
- 2-1 Interoperable information model of a pneumatic handling system for plug-and-produce
Raphael Alt, RWTH Aachen, IFAS, Germany
- 2-2 B2MML as an exchange format for asset administration shells as part of a Plug-and-Produce process for a fluid power engineering application
Hartmut Schweizer, TU Dresden, IAI, Germany
- 2-3 A reference architecture for cyber-physical fluid power systems: Towards a smart ecosystem
Johannes Kunze von Bischhoffshausen, Trelleborg Sealing Solutions Germany GmbH, Germany

12:45

Novel displacement machines



- 3-0 General Lecture: Displacement machines – key elements of future technology**
Robert Rahmfeld, Danfoss Power Solutions GmbH & Co. OHG, Germany
- 3-1 Applying a multi-service Digital Displacement® pump to an excavator to reduce valve loss
Matteo Pellegrini, Artemis Intelligent Power Ltd., UK
- 3-2 Digital pumps in speed-controlled systems – an energy study for a loader crane application
Samuel Kärnell, Linköping University, Sweden
- 3-3 Design and testing of pistons and cups for large hydrostatic pumps and motors
Peter Achten, INNAS, Netherlands

LUNCH

TUESDAY, MARCH 10, 2020

LARGE HALL

HALL 4

13:45

Industrial applications



- 4-0** **General Lecture: User-oriented systematic of control concepts for fluid-mechatronic servodrives**
Peter Anders, HS Furtwangen, Germany
- 4-1 **CytroConnect – A cloud-based IoT-service as connectivity solution for electrohydraulic systems**
Martin Laube, Bosch Rexroth AG, Germany
- 4-2 **“DuoCast” – A novelty on the world market of die casting**
Thomas Neubert, Hydrive Engineering GmbH, Germany
- 4-3 **Energy management systems for electro hydrostatic propulsion based forming presses**
Tim Reidl, Moog GmbH, Germany

Components



- 5-1 **State of the art digital on-board-electronics vs. potentially disruptive control architectures for hydraulic valves**
Achim Richartz, Bosch Rexroth AG, Germany
- 5-2 **Optimization of directional control valves through downstream compensation approach**
Davide Mesturini, Walvoil SpA, Italy
- 5-3 **Evolution mikro – Micro-dosing in the high-pressure range thanks to innovative drive technology**
Bernd Freissler, ProMinent GmbH, Germany
- 5-4 **CFD aided optimization of customer specific tank systems using an innovative labyrinth de-aerator**
Karl Wartlick, ARGO-HYTOS GmbH, Germany

15:15

BREAK

15:45

Predictive maintenance



- 6-1 Validation of a soft sensor network for condition monitoring in hydraulic systems
Jakob Hartig, TU Darmstadt, Germany
- 6-2 Predictive maintenance with a minimum of sensors using pneumatic clamps as an example
Wolfgang Gauchel, Festo AG & Co. KG, Germany
- 6-3 Development of a lumped parameter model of an aerospace pump for Condition Monitoring purposes
Geneviève Mkadara, Institut Clément Ader, France
- 6-4 Condition monitoring systems for hydraulic accumulators - Improvements in efficiency, productivity and quality
Christian Nisters, Hydac Technology GmbH, Germany

17:20

KEYNOTE SPEECH

19:00

CONFERENCE BANQUET

Electro-hydraulic actuators



- 7-0 **General Lecture: Electrohydrostatic actuation system – an (almost) complete system view**
Dirk Becher, Moog GmbH
- 7-1 Flexible and easy to engineer servo-hydraulic actuators using 3D printing manufacturing process
Stefan Thienen, Bosch Rexroth AG, Germany
- 7-2 Electro-hydrostatic compact drives with variable transmission ratio
Giacomo Kolks, TU Dresden, LFD, Germany
- 7-3 Robustness of the Liebherr-Aerospace EHA technology for future flight control application
Tobias Röben, Liebherr-Aerospace Lindenberg GmbH, Germany

WEDNESDAY, MARCH 11, 2020

LARGE HALL

09:00

Pneumatics



- 8-0 General Lecture: Pneumatics and Industry 4.0 – opportunity or contradiction**
Peter Post, Festo AG & Co. KG, Germany
- 8-1 Increase of energy efficiency in vacuum handling systems based on bionic principles
Harald Kuolt, J. Schmalz GmbH, Germany
- 8-2 Behaviour and impact of leakage in vacuum gripping systems
David Straub, J. Schmalz GmbH, Germany
- 8-3 Much does not help much: 3D pareto front of safety, comfort and energy consumption for an active pneumatic suspension strut
Manuel Rexer, TU Darmstadt, Germany
- 8-4 Combinations of energy saving measures in pneumatics
Vladimir Boyko, TU Dresden, LFD, Germany

11:00

HALL 4

Mobile applications



- 9-0 General Lecture: ZF view on future drivetrains for compact and medium size wheel loaders**
Jürgen Legner, ZF Friedrichshafen AG, Germany
- 9-1 Agrothermie – Design and testing of a novel hydraulically-actuated, locally vibrating plough
Jianbin Liu, TU Dresden, LFD, Germany
- 9-2 Assistance system for an automated log-quality and assortment estimation based on data-driven approaches using hydraulic signals of forestry machines
Chris Geiger, Karlsruhe Institute of Technology, Germany
- 9-3 Emission reduction by hydraulic fluids
Seppo Tikkanen/Kalevi Huhtala, Tampere University, Finland
- 9-4 Design and performance evaluation of next generation clutch control valve
Michael Erhard, Thomas Magnete GmbH, Germany

BREAK

11:30

Special domains



- 10-0 General Lecture: The roof wing opening system of the UAE pavilion at Expo 2020**
Paolo Leutenegger and Carlo Vergano, Duplomatic Motion Solutions SpA, Italy
- 10-1 Preliminary design and testing of an electro-hydraulic actuation system for an autonomous ankle exoskeleton
Emmanuel Viennet, School of Engineering and Architecture of Fribourg, Switzerland
- 10-2 Miniature hydraulics for a mechatronic lower limb prosthesis
Christian Stentzel, TU Dresden, IMD, Germany
- 10-3 Fully variable, simple, and efficient - electrohydraulic - valve train for reciprocating engines
Wolfgang Schneider, W. Schneider Ingenieurbüro, Switzerland

Mobile applications



- 11-1 Active automatic chassis actuation for an excavator
Christoph Boes, Moog GmbH, Germany
- 11-2 Integrated smart hydraulic displacement machine for closed systems
Rocco Kemnitz, RAPA GmbH, Germany
- 11-3 Hydropneumatic all-wheel suspensions, applications, challenges and special solutions
Wolfgang Bauer, ARGO-HYTOS GMBH, Germany
- 11-4 Fluid dynamic vibration absorber for cabin suspension
Nicolas Brötz, TU Darmstadt, Germany

13:00

LUNCH

WEDNESDAY, MARCH 11, 2020

LARGE HALL

14:00

Novel system architectures



12-0 General Lecture: Model based engineering for electro-hydraulic solutions

Matthias Wahler, Bosch Rexroth AG, Germany

12-1 Bootstrap reservoir concepts for electro-hydraulic compact cylinder drives

Søren Ketelsen, Aalborg University, Denmark

12-2 Efficiency that border on the impossible

Walter List, Weber Hydraulik GmbH, Germany

12-3 SWOT-analysis on electro-hydraulic drives in construction machinery

Martin Inderelst, XCMG European Research Center GmbH, Germany

12-4 Modular independent metering system for mobile applications providing smooth mode transition

Jan Lübbert, TU Dresden, LFD, Germany

15:50

HALL 4

Actuators & sensors



13-0 General Lecture: MEMS sensors in hydraulics, an opportunity to create smart components

Massimiliano Ruggerie, Imamoter, Italy

13-1 Self-sensing position determination of a sensor-designed proportional solenoid

Thomas Kramer, TU Dresden, LFD, Germany

13-2 On-off-solenoid with integrated sensorless position detection

Peter Tappe, Magnet-Schultz GmbH, Germany

13-3 Evaluation of a fast measuring ultrasonic flow meter

Lutz Müller, TU Dresden, LFD, Germany

13-4 Numerical optimisation of a novel servovalve architecture actuated by piezo-electric ring benders

Andrew Plummer, University of Bath, UK

BREAK

16:20

Safety & reliability



- 14-1 Lifetime impact prediction of component modification in axial piston units by the failure likelihood assessment
Ivan Baus, Danfoss Power Solutions GmbH & Co. OHG, Germany
- 14-2 Simulation-based system reliability analysis of electro-hydraulic actuator with dual modular redundancy
Maxim Andreev, ESI ITI GmbH, Germany
- 14-3 Enabling SIL2 safety certified applications for mobile machine OEMs
Peter Lauer, Eaton Corp., USA

17:30

FAREWELL ADDRESS + BEST PAPER AWARD

Jürgen Weber, TU Dresden, LFD, Germany

19:00

LABORATORY PARTY

Actuators & sensors



- 15-1 Development and control of smart pneumatic McKibben muscles for soft robots
Min Pan, University of Bath, UK
- 15-2 Multistable valve technology with magnetic shape memory alloy as superelastic element activated by a bidirectional solenoid actuator
Julius Happel, ETO Magnetic GmbH, Germany
- 15-3 Rotor swivel motor as actuator of an innovative control valve
Ingo Dietrich, TU Darmstadt, Germany