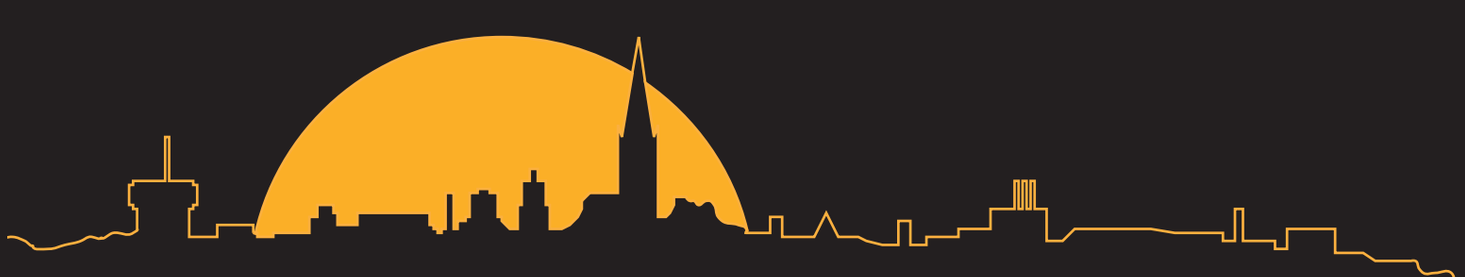
# GFPS
# PhD Symposium 2024

## Hudiksvall, Sweden
## 17 - 20 juni, 2024

## Program



**SUNDAY 16th of JUNE, 2024**

Monitor ERP

17:30

**WELCOME RECEPTION ARRANGED BY MONITOR**

Drinks and appetizers will be served

**MONDAY 17th of JUNE, 2024**

# The day is sponsored by

HIAB

09:00

**REGISTRATION WITH COFFEE**

10:00

**OPENING CEREMONY OF GFPS 2024**

**Per Bill**

Governor of Gävleborg County, Sweden

10:30

**WELCOME AND KEYNOTE**

*Welcome, Linköping University*

**Prof. Petter Krus**, Linköping University, Sweden

*Welcome, Hudiksvalls Hydraulics Cluster*

**Paul Bogatir**, HHK, Hudiksvall Hydraulics Cluster Sweden

*Hydromechatronic Integration for Improved Efficiency and Performance*

**Prof. Andrew Plummer**,

Centre for Power Transmission and Motion Control

University of Bath, UK

11:30

**SESSION 1 - PNEUMATICS**

*Downstream Throttled Pneumatic Drives with Time-Controlled Pneumatic-Mechanical Quick-Exhaust Valve*

**Christian Reese**,

RWTH Aachen University, Germany

*Analysis of the Operating Point Method for Dimensioning of Pneumatic Drives Under Variable Loading Conditions*

**Vinícius Vigolo**,

Federal University of Santa Catarina, Brazil

12:15

**LUNCH**

13:30

## SESSION 2 - CONTROL

*Design of Hydraulic Power Take-Offs for Wave-Powered Reverse Osmosis Desalination: Meeting Constraints on Pressure Variation*
**Jeremy Simmons**
University of Minnesota, USA

*Design of a Cartesian Hybrid Force-Position Controller for a Hydraulic Manipulator*
**Lukas Bachmann**
TUD Dresden University of Technology, Germany

*Subsystem-based Learning Control of Hydraulically Driven Nonlinear Rotary Actuators with Unknown Input Backlash*
**Mahdi Hejrati**
Tampere University, Finland

*Parameter Identification for Optimized Simulation Models in Mobile Hydraulic Applications*
**Bernhard Sender**
RWTH Aachen University, Germany

15:00

## COFFEE BREAK

15:30

## SESSION 3 - MOBILE APPLICATIONS

*Improvement of Mobile Crusher Energy Efficiency Through Hybridization and Electrification*
**Jesse Backman**
Tampere University, Finland

*Digital Twin-Based Classification of Hydraulic Excavator Duty Cycles in Road Construction*
**Johannes Sprink**
RWTH Aachen University, Germany

*Optimization Based Energy Efficient Power Transmission Design Methodology Applied to a Compact Excavator*
**Grégory Tardy**
INSA Lyon, France

*Analysis of Opportunities for Integrated Thermal Management on Battery Powered Mobile Machines*
**Fabian Lagerstedt**
Huddig AB/Linköping University, Sweden

*A Hydraulic Architecture Based on Multi-Common Pressure Rail Principle Using Multi-Chamber Cylinders for Excavators*
**Zihao Xu**
Purdue University, USA

ENDS 17:20

17:30-19:00

## VISIT TO HIAB CUSTOMER INNOVATION CENTER
**(Sandwiches and beverages will be served)**

**TUESDAY 18th of JUNE, 2024**

# The morning is sponsored by

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08:30

## KEYNOTE

*Electric powered Hydraulics in Construction Equipment - Opportunities and Challenges*
**Dr. Kim Heybroek**,
Volvo Construction Equipment
Volvo Group, Sweden

09:20

## SESSION 4 - SAFETY AND RELIABILITY

*Safety Function-Failure Mode and Effect Analysis*
*A Novel Approach of FMEA for Safety Application in Mobile Working Machinery*
**Christa Düsing**
XCMG European Research Center GmbH, Germany

*Intelligent Approach to Enhance Redundancy in Novel Steer-by-Wire for Heavy Earth Moving Machinery*
**Vinay Partap Singh**
Tampere University, Finland

10:00

## COFFEE BREAK

10:30

## SESSION 5 - EFFICIENT SYSTEMS

*Experimental Analysis of Friction Forces of Hydraulic Rod Seals –*
*Effect of Pressure, Sliding Speed, Sealing Type and Different Rod Coatings*
**Kivi Knuuti**
Aalto University, Finland

*Power Analysis of an E-Pump Applied to the Linear Functions of an Agricultural Planter*
**Jacob Lengacher**
Purdue University, USA

*Effect of Electrification on the Energy Efficiency of Boom Trajectories of Semi-autonomous Mobile Cranes*
**Timofei Komarov**
LUT University, Finland

*Evaluating the Performance of Semi-Autonomous Kinematically Redundant Loader Crane Operation*
**Amy Rankka**
Linköping University/Hiab AB, Sweden

12:00

**LUNCH**

13:00

**BUSES LEAVE FOR EXCURSION**

13:30-21:30

**FOREST EXCURSION with HOLMEN**

Discover and experience a true example of sustainable innovation on this excursion with the forest company Holmen. We will showcase historical forestry and modern hydraulic equipment, and you will learn about sustainability and biodiversity. All framed by the Hälsingland forests, local food specialties, and the magic Swedish midsummer tradition.

HOLMEN

**WEDNESDAY 19th of JUNE, 2024**

8:30

**KEYNOTE**

*Energy Saving Potentials of New Electro-hydraulic System Solutions for Loading Machines*
**Dr. Pascal Kiwitz**
Head of Innovation
Bucher Hydraulics, Switzerland

*LASHIP-Bosch Rexroth Research Collaboration: Development of Subsea Automation Systems*
**Prof. Victor J. De Negri**
Federal University of Santa Catarina, Brazil

HHK
Hudiksvalls Hydraulikkluster

LINKÖPING UNIVERSITY

09:40

**COFFEE BREAK**

10:10

**SESSION 4 - PUMPS AND MOTORS**

*Investigation of the Heat Conduction in Axial Piston Pumps by Measurement and Simulation*
**Roman Ivantysyn**
TUD Dresden University of Technology, Germany

*CFD Simulation of the Slipper Dynamics During Variable Displacement Operations in a Swash-plate Type Axial Piston Pump*
**Gabriele Muzzioli**
University of Modena and Reggio Emilia, Italy

*Harmonic Characterisation of Electrically Driven Pumps*
**Thomas Heeger**
Linköping University, Sweden

*A Simple Method to Estimate the Shaft Torque in a Gerotor Pump*
**Giuseppe Totaro**
University of Modena and Reggio Emilia, Italy

11:40

**LUNCH**

13:00

**INDUSTRY SESSION - PRESENTATIONS BY OUR SPONSORS**

HIAB
HUDDIG
OILQUICK®

14:30

**COFFEE BREAK**

15:00

**DEMO AT THE EXHIBTION HALL**

17:00

**END DEMO**

19:00

**CONFERENCE DINNER AT THE CONFERENCE VENUE FABRIKEN**

**THURSDAY 20th of JUNE, 2024**

# The morning is sponsored by

OILQUICK®

8:30

## SESSION 7 - NOISE AND VIBRATION

*Study of Cavitation Conditions Inside a Proportional Spool Valve by Means of Modal Analysis on Sound Pressure Level*
**Luca Romagnuolo**
University of Sannio, Italy

*Simulation Analysis of Vibration Suppression with an Orifice Damper for EHA under Impact Loads*
**Yunzhi Liu**
Harbin Institute of Technology, China

*Experimental Bladder Accumulator Based Passive Resonator*
**Ville Närvänen**
Aalto University, Finland

10:00

## COFFEE BREAK

10:30

## SESSION 8 - SIMULATION

*Numerical Analysis of a High-Power Piezoelectric Pump using Computational Fluid Dynamics (CFD) Simulations*
**Francesco Sciatti**
Polytechnic University of Bari, Italy

*A Comprehensive CFD Approach of a Thermal Analysis of a Braking Discs System Under Different Design Conditions*
**Francesco Orlandi**
University of Modena and Reggio Emilia, Italy

11:10

## KEYNOTE

*Power in Partnership: The Stealth Project and the Future of Networking*
**Dr Marcus Rösth**
HHK, Hudiksvall Hydraulics Cluster, Sweden

11:55

## END NOTE

12:00

## LUNCH

## Partners

HOLMEN

Hudiksvalls kommun

FABRIKEN
MAT & MÖTEN

## Organizers

LINKÖPINGS UNIVERSITET

HHK
Hudiksvalls Hydraulikkluster