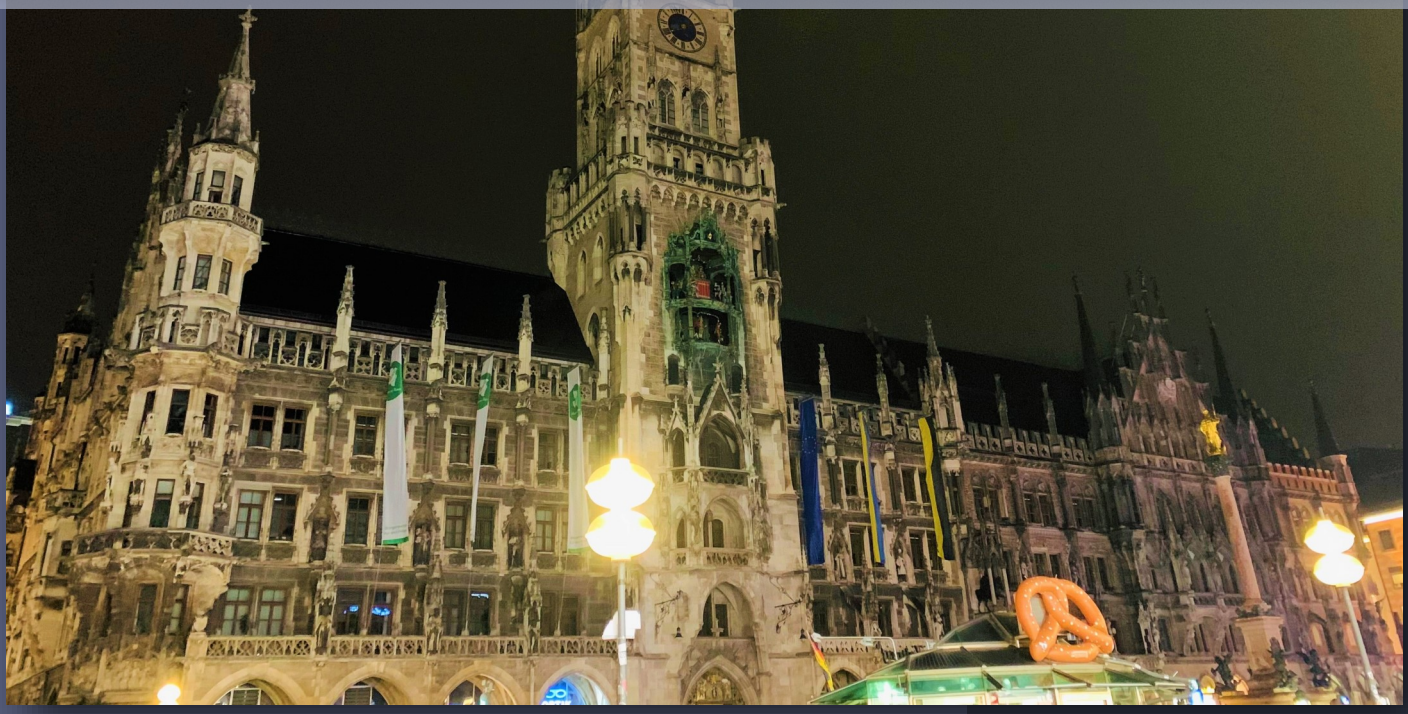
The 5th Conference On Microfluidic Handling Systems

µHS 2024

smartvillage Bogenhausen
Munich, Germany

21-23 February 2024

CONFERENCE GUIDE

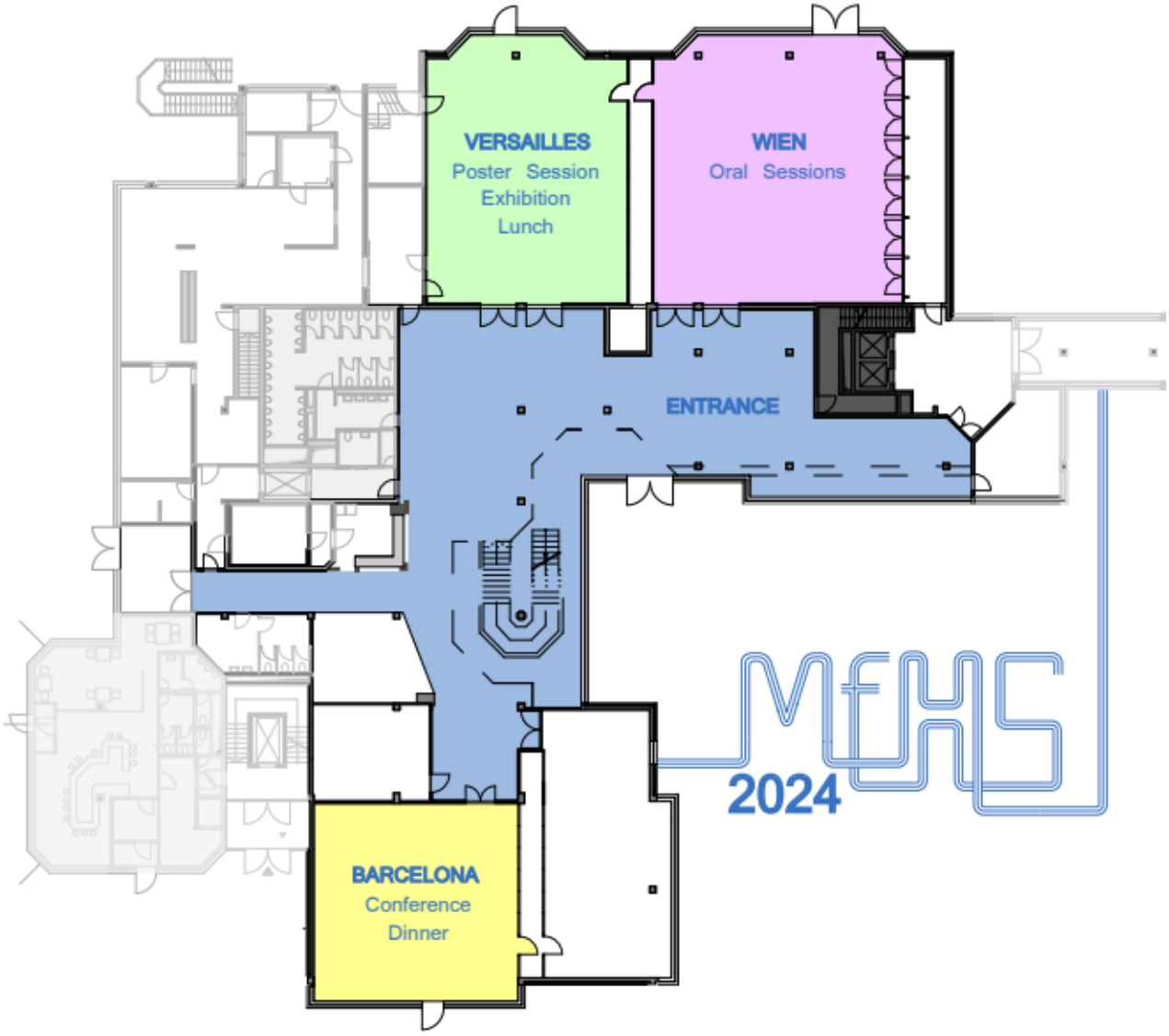


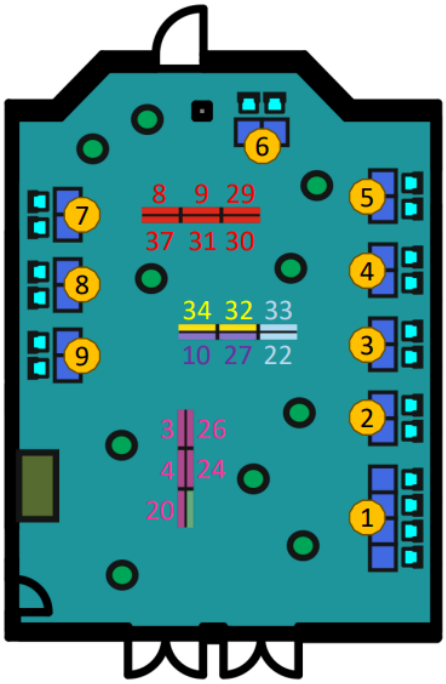
CHAIRS

Prof. dr. Joost Lötters
University of Twente, The Netherlands

Dr. Martin Richter
Fraunhofer EMFT, Germany

VENUE MAP





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Posters:

Sensors – 8, 9, 29, 30, 31, 37
Actuators – 32, 34
Applications – 10, 27
Machine Learning – 22, 33
Fluidic Systems – 3, 4, 20, 24, 26

Wednesday, 21st of February

17:00—19:00	Registration and welcome reception	Versailles

Thursday, 22nd of February

8:00—8:45	Registration	Versailles
8:45—9:00	Welcome and announcements	Wien
9:00—9:30	**Invited talk 1: "Postoperative pain control system: COOPDECH AmyP-CA, based on the technology of piezoelectric-actuated metal micro-pump"** Dr. Yamada Keiichi, Daiken Medical Co., Ltd., Osaka, Japan	Wien
9:30—10:50	**Session 1: Actuators** Chairs: Martin Richter (Fraunhofer EMFT) and Roland Zengerle (IMTEK)	Wien
10:50—11:20	Coffee break & exhibition	Versailles
11:20—12:40	**Session 2: Sensors** Chairs: Joost Lötters (UTwente) and Klaus Drese (ISAT Coburg)	Wien
12:40—13:40	Lunch & exhibition	Versailles
13:40—14:10	**Invited talk 2: "Perspectives for fully-electric organs-on-chip"** Dr. Massimo Mastrangeli, Delft University of Technology, The Netherlands	Wien
14:10—15:30	**Session 3: Fluidic systems** Chairs: Mathieu Odijk (UTwente) and Urs Staufer (TU Delft)	Wien
15:30—16:00	Coffee break & exhibition	Versailles
16:00—17:45	**Poster session & exhibition** Chairs: Gabrielle Schrag (TU Munich) and Agnes Bussmann (Fraunhofer EMFT)	Wien
18:00—21:00	Conference dinner	Barcelona

Friday, 23rd of February

8:00—8:45	Registration	Versailles
8:45—9:00	Opening and announcements	Wien
9:00—9:30	**Invited talk 3: "Unlocking the Potential of Machine Learning and Small Data in Microfluidics"** Dr. Daniela Blanco, CEO and co-founder of Sunthetics	Wien
9:30—10:30	**Session 4: Machine learning** Chairs: Dennis Alveringh (UTwente) and Sabrina Kartmann (Hahn-Schickard)	Wien
10:30—11:00	Coffee break & exhibition	Versailles
11:00—11:30	**Invited talk 4: "Microfluidics ballistics and its commercialization potential for biomedical and chemical engineering"** Prof. dr. David Fernandez Rivas, University of Twente, The Netherlands	Wien
11:30—12:30	**Session 5: Applications** Chairs: Loes Segerink (UTwente) and Karin Bauer (Fraunhofer EMFT)	Wien
12:30—13:00	Closing session & Awards ceremony	Wien
13:00—14:00	Lunch & exhibition	Versailles
14:30—16:00	Optional lab tour	Fraunhofer EMFT

INVITED SPEAKERS

Thursday, 22nd of February

DR. YAMADA KEIICHI, CEO
Daiken Medical Co. Ltd.

''POSTOPERATIVE PAIN CONTROL SYSTEM: COOPDECH AMYPCA, BASED ON THE TECHNOLOGY OF PIEZOELECTRIC-ACTUATED METAL MICROPUMP''

DR. MASSIMO MASTRANGELI
Delft University of Technology

''PERSPECTIVES FOR FULLY-ELECTRIC ORGANS-ON-CHIP''

Friday, 23rd of February

DR. DANIELA BLANCO, CEO AND CO-FOUNDER
Sunthetics

''UNLOCKING THE POTENTIAL OF MACHINE LEARNING AND SMALL DATA IN MICROFLUIDICS''

PROF. DR. DAVID FERNANDEZ RIVAS
Mesoscale Chemical Systems, University of Twente

''MICROFLUIDICS BALLISTICS AND ITS COMMERCIALIZATION POTENTIAL FOR BIOMEDICAL AND CHEMICAL ENGINEERING''

Thursday, 22nd of February

Actuators

Chairs: Martin Richter and Roland Zengerle

9:30—9:50	**Fully integrated micropump and mass flow sensor based on a standard MEMS technology platform** M. Seidl, G. Schrag
9:50—10:10	**Flow ripple reduction in reciprocating micropumps – an electrical circuit simulation study** Z. Wang, J. C. Lötters, M. K. Ghatkesar
10:10—10:30	**Investigation of metal jet printing for homogeneous lines with starjet technology** D. Straubinger, Z. Khan, P. Koltay, R. Zengerle, S. Kartmann, Z. Shu
10:30—10:50	**Highly parallel droplet dispensing approach to fabricate homogeneous, functional layers for diagnostic test manufacturing** O. Rajabnia, A. Ernst, N. Lass, L. Riegger

Sensors

Chairs: Joost Lötters and Klaus Drese

11:20–11:40	**Non-invasive ultrasonic flow measurement method for the detection of flow rates in the microliter range** A. Backer, P. Arneth, P. Linke, K. S. Drese
11:40–12:00	**Thermal flow sensor with liquid characterisation feature by combining 3omega method and constant temperature anemometry** C. J. Hepp, K. Gajo, R. E. Bernhardsgrütter, K. Schmitt, J. Wöllenstein
12:00–12:20	**Velocity-independent thermal conductivity and volumetric heat capacity measurement of binary gas mixtures** S. Azadi Kenari, R. J. Wiegerink, R. G. P. Sanders, J. C. Lötters
12:20–12:40	**Particle detection in free falling nanoliter droplets** F. Sturm, V. Zieger, P. Koltay, D. Frejek, S. Kartmann

Fluidic systems

Chairs: Mathieu Odijk and Urs Staufer

14:10–14:30	**Compact multi-parameters sensing system for in-line density and viscosity measurements** J. Groenesteijn, T. S. J. Lammerink, J. C. Lötters
14:30–14:50	**Calibration of flow devices under actual flow conditions with inline measurement of the viscosity of the liquid** H. Bissig, M. de Huu
14:50–15:10	**Microfabrication technology for isolated silicon sidewall electrodes and heaters** M. J. S. Bonnema, H.-W. Veltkamp, R. J. Wiegerink, J. C. Lötters
15:10–15:30	**Fluid-independent thermal gas flow sensor** C. Huber, S. Schwab, F. Lütolf, D. Dienemann, R. Bernhardsgrütter, C. J. Hepp

Friday, 23rd of February

Machine learning

Chairs: Dennis Alveringh and Sabrina Kartmann

09:30–09:50	**Camera-based jet volume estimation using deep learning** R. Völckner, G. Miotto, R. Zengerle, S. Kartmann
09:50–10:10	**Machine learning-enhanced mass flow measurements using a Coriolis mass flow sensor** R. Zubavicius, D. Alveringh, M. Poel, J. Groenesteijn, R. G. P. Sanders, R. J. Wiegerink, J. C. Lötters
10:10–10:30	**Theory of self-monitoring of piezoelectrically driven micropumps** M. Richter, K. Axelsson, J. Häfner

Applications

Chairs: Loes Segerink and Karin Bauer

11:30—11:50	**Microdroplets platform for biomolecules engineering** E. Tanumihardja, A. Tekath, A. Heidari, T. Segers, A. Rentmeister
11:50—12:10	**Transfer volume modeling for feedback-free, automated single spheroid deposition using droplet-generated microfluidic flow** V. Zieger, D. Frejek, S. Zimmermann, P. Koltay, R. Zengerle, S. Kartmann
12:10—12:30	**Innovations in gas flow control applications: surface channel technology, presence and future** D. A. P. Oudejans, V. Hengeveld, J. C. Lötters

Thursday, 22nd of February
Chairs: Gabrielle Schrag and Agnes Bussmann

Actuators

Poster 32	**Towards a fully integrated fluid handling system for an intravaginal wearable device** J. J. A. Lozeman, J. Kaptein and M. Odijk
Poster 34	**Flat integration of piezoelectric micro diaphragm pump in flexible carrier** E. Ahmed, A. Bussmann

Sensors

Poster 8	**Monolithic integration of a calorimetric microfluidic flow sensor using flat panel display technology** B. de Wagenaar, F. Bens, A. Mameli, A. Kronemeijer, A. Bussmann, B. Firtat, M. Mastrangeli, A. van Breemen
Poster 9	**A readout method of a micro-Coriolis mass flow sensor using integrated optical components** A. Sundararajan, R. J. Wiegerink, R. G. P. Sanders, J. C. Lötters
Poster 29	**Miniaturized thermal flow sensor for modular organ-on-chip applications** A. Paul, W. Sparreboom, J. C. Lötters, M. Odijk
Poster 30	**Miniaturized on-chip optical gas sensor** D. Manalili, A. Khodabakhsh, A. Everhardt, D. Geskus, W. Tsong, D. van Duinen, J. C. Lötters, S. te Lintel Hekkert, S. Cristescu
Poster 31	**Predicting medium in low flow thermal gas sensors** V. Winnen, W. Sparreboom, J. Groenesteijn
Poster 37	**A portable nuclear magnetic resonance (NMR) device for microfluidic flow measurement and sample detection** E. Aydin, D. M. Polishchuk, J. G. E. Gardeniers, K. A. A. Makinwa

Fluidic systems

Poster 3	**Pressure decay testbench for air leakage characterization of micropumps or microvalves** D. Anheuer, P. Debera, M. Richter, C. Kutter
Poster 4	**Silicon-based piezo micropumps enable fully flexible drug delivery patterns** D. Plano, S. Kibler, N. Rudolph, J. Dressman
Poster 20	**Construction and characterization of microfluidic platform for highly parallel single cell isolation** M. Kümmerle, V. Zieger, S. Kartmann, P. Koltay
Poster 24	**Consistent experimental evaluation methods for microfluidic mixers** O. Blaschke, J. Kluitmann, X. Xie, J. Elsner, K. S. Drese
Poster 26	**Point-of-care microfluidic chip for protein analysis using electrochemical cells** J. Vírostko, P. Fecko, R. Hrdý

Machine learning

Poster 22	**A multi-parameter measurement system for mems anemometers for data collection with machine learning outcomes** T. L. Hackett, D. Alveringh, R. G. P. Sanders, T. E. van den Berg, J. Schmitz
Poster 33	**Deep learning based microfluidic sensing device for viscosity measurement** M. Ullah, X. Yang, N. Zhao, S. Dai

Applications

Poster 10	**Towards hybrid printing of intelligent devices: conductive traces from bulk metal for digital signals** Z. Khan, A. Saphala, D. Straubinger, S. Kartmann, P. Koltay, R. Zengerle, O. Amft, Z. Shu
Poster 27	**Automatic design of open microfluidic channels using a one-dimensional model** T. Mitteramskogler, R. Ecker, A. Fuchsluger, R. Wille, B. Jakoby

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