Program



# ACTUATOR 26

International Conference and Exhibition on
New Actuator Systems and Applications

**Kurhaus Wiesbaden**
**Wiesbaden, Germany**
**June 30 – July 01, 2026**

**www.actuator.de**

*Organized by:*

Society of Microelectronics,
Microsystems and Precision
Engineering (VDE/VDI GMM)

VDE VDI GMM

ACTUATOR 26

# Welcome to the new ACTUATOR Conference 2026

**The ACTUATOR Conference 2026 – may we inform you ...**
ACTUATOR is a major biennial event bringing together leading experts, suppliers and users in the field of new actuators from all over the world. The invitation to attend ACTUATOR is aimed at executives and researchers from industrial companies as well as institutes, colleges and universities who are interested in the transfer of R&D results into innovative actuator applications and drive technologies.

**ACTUATOR 2026 – together with you on an international stage**
With about 200 participants from more than 20 countries, the International Conference on New Actuator Systems and Applications has been the most important place to meet leading international specialists, to share their expertise and to start business co-operations in the field of new actuator technologies.

**ACTUATOR – the key forum for actuators**
based on smart materials and micro technologies as well as their applications in all areas of engineering for thirty years now. Over the years, a huge variety of excellent ideas and results have been reported. A lot of them have been raised from vision to mass product. Among the success stories you will find established applications of new actuators, in their use in fuel injection, adaptive shock absorbers, nanopositioning, precision engineering like camera lenses and other applications of miniaturized drives.

**New product generations**
In this way, ACTUATOR has launched the realization of new product generations with outstanding compactness and high performance properties which so far have not been achieved in conventional technologies.

**The Exhibition**
The exhibition will present components, system approaches and applications of smart actuators and low-power electromagnetic drives based on conventional (electromagnetic) and innovative working principles (new actuators), and associated subjects. The range of topics also includes measurement techniques, control concepts and circuits, driver components and units, system integration, layout and simulation tools etc.

ACTUATOR 2026 Steering Committee

*Manfred Kohl, Jürgen Maas, Salvador Pané i Vidal, Emmanuel Vander Poorten, Ulrike Wallrabe, Yoko Yamanishi*

# List of contents

# The ACTUATOR 2026 Programme Committee

We appreciate the support of the following experts:

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**Wallrabe, Ulrike** | University of Freiburg, Department of Microsystems Engineering – IMTEK, Germany
**Yamanishi, Yoko** | Kyushu University, Japan

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**Yamanishi, Yoko** | Kyushu University, Japan

# Organizer

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# Program Overview

| Time | Room 1 | Room 2 | Room 3 |
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| **Tuesday, June 30** | | | |
| 08:00 – 08:45 | **Foyer** | Registration | |
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| 09:30 – 10:00 | Keynote p. 9 | | |
| 10:00 – 10:30 | Keynote p. 9 | | |
| 10:30 – 11:00 | **Foyer** | *Coffee Break* | |
| 11:00 – 12:40 | **A1:** KOMMMA (1) Dielectrics p. 10 | **B1:** Electromagnetics p. 11 | **C1:** Thermal Shape Memory p. 12 |
| 12:40 – 13:50 | **Foyer** | *Lunch Break* | |
| 13:50 – 15:30 | **A2:** KOMMMA (2) Shape Memory & Electrostatics p. 13 | **B2:** Aerospace & Civil Engineering p. 14 | **C2:** Polymers p. 15 |
| 15:30 – 16:15 | **Foyer** | *Coffee Break* | |
| 16:15 – 17:55 | **A3:** KOMMMA (3) Polymers p. 16 | **B3:** Novel Magnetics and Dielectrics p. 17 | **C3:** Optics & Photonics p. 18 |
| 18:00 – 21:00 | **Exhibition of ACTUATOR , Kurhaus Wiesbaden** | *Get Together* | |
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| 09:30 – 10:00 | Keynote p. 20 | | |
| 10:00 – 10:30 | Keynote p. 20 | | |
| 10:30 – 11:00 | **Foyer** | *Coffee Break* | |
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| 13:30 – 14:30 | | *Lunch Break* | |
| 14:30 – 16:10 | **A5:** Medical Devices p. 24 | **B5:** Piezoelectrics p. 25 | |

# ACTUATOR 2026 – Keynote Speaker

**Nanometer-precise actuators and sensors for the key technologies of our world**

*Dr. Rainer Gloess (Physik Instrumente (PI) SE & Co. KG, Karlsruhe, Germany)*

Rainer Gloess is Head of Advanced Mechatronics at Physik Instrumente (PI) SE & Co.KG Karlsruhe in the department Global Innovation & Scouting.

In 1970, he began his studies at the Technical University Dresden in “Electrical Technology and Fine Mechanics”, and received his PhD in the field of “Optoelectronic metrology in high dynamic motion processes.

From 1976 to 1991, he held a position at the Academy of Science, Berlin, Central Institute of Cybernetics and Information Processes, where he developed data recorder for near earth and deep space satellite missions.

Since 1991 he has been working in different R&D positions at Physik Instrumente, Karlsruhe. He developed piezo positioners, 6-DOF nano-positioning systems for semiconductor and photonics industry as well as for astronomy. Newest developments involve magnetic levitation with sub-nanometer resolution.

He is sustainable member of the American Society for Precision Engineering (ASPE) and member of two VDI/VDE technical committees.

**The Multiplicity of Electrostatic Microactuation**

*Prof. Martin Hoffmann (Ruhr University Bochum, Germany)*

Martin Hoffmann has been a full professor at the Ruhr University Bochum for Microsystems Technology since 2017.

After his work at the TU Dortmund, he joined MEMS companies and returned to academia in 2006 as a full professor for Micromechanical Systems at the TU Ilmenau.

Microactuators have always been a key area of interest in combination with sensors and optical waveguides from visible to THz. The application-specific MEMS are mainly based on thermal and electrostatic effects and demonstrators have been realized in an own cleanroom.

**Piezoelectric and Piezoelectret Actuators and Microsystems**

*Prof. Liwei Lin (University of California/USA)*

Professor Liwei Lin is the James Marshall Wells Academic Chair in Mechanical Engineering, and Co-Director at Berkeley Sensor and Actuator Center (BSAC) at UC Berkeley.
His research interests are in design, modeling, and fabrication of micro/nano structures; sensors and actuators; as well as mechanical issues in micro/nano systems including heat transfer, solid/fluid mechanics, and dynamics.
Dr. Lin is the recipient of the 1998 NSF CAREER Award for research in MEMS Packaging and the 1999 ASME Journal of Heat Transfer best paper award for his work on micro scale bubble formation. He led the effort to establish the MEMS division in ASME and served as the founding Chairman of the Executive Committee from 2004~2005. He is an ASME Fellow and has 23 issued US patents in MEMS. He was the general co-chair of the 24th IEEE international conference on Micro Electro Mechanical Systems at Cancun, Mexico in 2011.
He is currently serving as a subject editor of Microsystems & Nanoengineering published by the Nature group.

# ACTUATOR 2026 – Keynote Speaker

**Actuation Challenges and Options in Medical Robotics**

*Prof. Arianna Menciassi (Scuola Superiore Sant'Anna, Pisa, Italy)*

Arianna Menciassi (Fellow, IEEE) received the M.Sc. degree in physics from the University of Pisa, Pisa, Italy, in 1995, and the Ph.D. degree in bioengineering from Scuola Superiore Sant'Anna (SSSA), Pisa, Italy, in 1999. She is currently a Professor of bioengineering and biomedical robotics with SSSA, where she is the Team Leader of Surgical Robotics & Allied Technologies within The BioRobotics Institute. She served as Coordinator of the Ph.D. in BioRobotics in the period Feb. 2019-Feb. 2025, and in April 2019 she was appointed as the Vice-Rector of the SSSA for 6 years. Her research interests include surgical robotics, microrobotics for biomedical applications, biomechatronic artificial organs, and smart and soft solutions for biomedical devices.

She pays special attention to the combination of traditional robotics, targeted therapy, and wireless solutions for therapy (e.g., ultrasound- and magnetic-based solutions). She has served for many years as the Co-Chair of the IEEE Technical Committee on Surgical Robotics. Prof. Menciassi is an Editor for the IEEE Transactions of Robotics and APL Bioengineering and she is an Associate Editor for Soft Robotics. She received the Well-tech Award (Milan, Italy) for her research on endoscopic capsules, and she was awarded by the Tuscany Region with the Gonfalone D'Argento, in 2007, as one of the best 10 young talents of the region. In 2020, she has been awarded with the KUKA Innovation Award, for her activities on robotic assisted focused ultrasound.

**Life from Technology – From Micro-Actuator Modules to Non-Biological Organisms**

*Prof. Oliver Schmidt (Chemnitz University of Technology, Germany)*

Professor Oliver G. Schmidt is the Scientific Director of the Research Center for Materials, Architectures and Integration of Nanomembranes (MAIN) and holds the Chair of Material Systems for Nanoelectronics at the Chemnitz University of Technology, Germany.
He is an elected member of the German Academy of Science and Engineering and has received several international prizes and awards, among them the Leibniz-Prize of the German Research Foundation in 2018, and an Advanced Grant of the European Research Council (ERC) in 2019. He is a pioneer in microrobotics, its biomedical applications and its potential for creating artificial life. He achieved several Guinness World Records (e.g. smallest man-made jet engine and smallest microelectronic robot) and has made major scientific contributions to small scale energy storage devices, flexible electronics and integrated multi-functional microsystems. He has been an ISI highly cited researcher in 2018, 2019, 2022, 2024, 2025 and has authored and co-authored > 900 papers with a citation index > 68.000 and an H-index of 134.

**Living Muscle Actuators: A New Frontier in Biohybrid Robotics**

*Prof. Shoji Takeuchi (University of Tokyo, Japan)*

Shoji Takeuchi is Professor in the Department of Mechano-Informatics, Graduate School of Information Science and Technology, The University of Tokyo, Japan.

He has received numerous honors, including the JSPS Prize, TIME Best Inventions 2025, and the Springer Nature Test of Time Award 2025. His research focuses on cultivated meat, 3D tissue fabrication, bioMEMS, implantable devices, and biohybrid robotics.

# TWO TRAINING SESSIONS
## ON JUNE 29TH AT ACTUATOR 2026

## PIEZOELECTRIC ACTUATORS

Introductory course

Dr. Frank CLAEYSSEN

### Basic knowledges

- Basics on piezoelectric materials bulk and MLA
- Piezo materials for actuators
- Constitutive laws / Equivalent electric circuit

### Review of piezoelectric actuators

- Review of direct and amplified piezoelectric actuators
- Piezo mechanisms
- Exercises

### Review of piezoelectric motors

- Piezoelectric motors
- Resonant structure
- Tribology of piezoelectric motors

### Practises

## LINEAR MAGNETIC ACTUATORS

Introductory course

Dr. Xavier DE LÉPINE

### Basics of magnetism for actuators

- Magnetic effects and laws
- Magnetic forces
- Magnetic materials

### Linear magnetic actuators

- The different kinds of linear actuators
- Design and performance of:
  - Moving coil actuators,
  - Moving magnet actuators,
  - Moving iron actuators.
- Introduction to other magnetic actuators:
  - MRF,
  - ...

### Practises

ACTUATOR 26

International Conference and Exhibition on New Actuator Systems and Applications

CEDRAT TECHNOLOGIES
Innovation in Mechatronics

**Contact and registration**

CEDRAT TECHNOLOGIES: Mrs. Sandrine HUGI
training.ct@cedrat-tec.com
+33 (0)4 56 58 04 00
www.cedrat-technologies.com

**Venue**

June 29th, 2026, from 9 am to 5 pm
Kurhaus Wiesbaden
Kurhausplatz 1
65189 Wiesbaden

**Who should attend**

Engineers in a research department
Electronics and mechanical engineers

**Participation fee**

650€ for participants from industry
550€ for participants from university
Including documentation, coffee and lunch breaks

# Tuesday, June 30 08:00 - 10:30

**Foyer**

| | |
|---|---|
| 08:00 | **Registration** |

| | |
|---|---|
| 08:45 | **Opening**<br>*Prof. Manfred Kohl (Karlsruher Institut für Technologie, Germany)* |

**Room 1**

| | |
|---|---|
| 09:00 | **Living Muscle Actuators: A New Frontier in Biohybrid Robotics**<br>*Prof. Shoji Takeuchi (University of Tokyo, Japan)* |
| 09:30 | **The Multiplicity of Electrostatic Microactuation**<br>*Prof. Martin Hoffmann (Ruhr University Bochum, Germany)* |
| 10:00 | **Piezoelectric and Piezoelectret Actuators and Microsystems**<br>*Prof. Liwei Lin (University of California/USA)* |

**10:30 - 11:00 Coffee Break**

**Room 1**

**A1** **KOMMMA (1) – Dielectrics**

*Chairs:*

11:00 **Closed-loop cooperative control of dielectric elastomer actuator arrays**

*Alberto Priuli [1], Saverio Addario[1], Benjamin Zemlin[2], John Heppe[2], Gianluca Rizzello[1]*

*[1] Saarland University, Department of Systems Engineering, Saarbrücken, Germany*

*[2] University of Applied Sciences, Department of Sensors and Thin Films, Saarbrücken, Germany.*

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11:20 **Towards Downscaling of Cooperative Dielectric Elastomer Actuator Systems**

*Saverio Addario[1], Alberto Priuli[1], , Benjamin Zemlin[2], John Heppe[2], Stefan Seelecke[1],Gianluca Rizzello[1]*

*[1] Saarland University, Department of Systems Engineering, Saarbrücken, Germany*

*[2] University of Applied Sciences, Department of Sensors and Thin Films, Saarbrücken, Germany.*

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11:40 **Modelling and control of a multi-actuator array based on balloon-shaped dielectric elastomer actuators**

*Bingzhi Wang[1], Andreas Hubracht [1], Chen Jiao[2], Ashwani Sharan Tripathi [2], Uwe Marschner[2], Andreas Richter[2], E. F. Markus Vorrath[2], Jürgen Maas[1]*

*[1] Mechatronic Systems Lab, Technische Universität Berlin, Germany*

*[2] Institute of Semiconductors and Microsystems, Technische Universität Dresden, Germany*

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12:00 **Integrated Pneumatic Dielectric Elastomer Switches for Soft Dielectric Elastomer Transducers**

*Chen Jiao[1], Ashwani Sharan Tripathi[1], Andreas Lars Peter Hubracht[2], Bingzhi Wang[2], Uwe Marschner[1], Andreas Richter[1], Jürgen Maas[2], E.-F. Markus Vorrath[1, 3]*

*[1] Institute of Semiconductors and Microsystems, Technische Universität Dresden, Germany*

*[2] Mechatronic Systems Lab, Technische Universität Berlin, Germany*

*[3] Biomimetics Lab, Auckland Bioengineering Institute, The University of Auckland, New Zealand*

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12:20 **3D printing of multilayer dielectric elastomer transducers with adapted layer thickness for multi-actuator configurations**

*Andreas Hubracht[1], Bingzhi Wang[1], Chen Jiao[2], Ashwani Sharan Tripathi[2], Uwe Marschner[2], Andreas Richter[2], E.-F. Markus Vorrath[2], Jürgen Maas[1]*

*[1] Mechatronic Systems Lab, Technische Universität Berlin, Germany*

*[2] Institute of Semiconductors and Microsystems, Technische Universität Dresden, Germany*

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**12:40 - 13:50 Lunch Break**

**Room 2**

**B1 Electromagnetics**
*Chairs:*

11:00 **Conceptual desi gn of a Tunable Magnet-based Reluctance Actuator**
*Endre Peder Ronaes, Andres Hunt, Ron van Ostayen, Hassan Hossein Nia (Delft Univeristy of Technology, The Netherlands)*

11:20 **Design and control of motion stage driven by nonlinear reluctance actuator**
*Mohammad Saaideh[1], Natheer Alatawneh[1], Mohammad Al Janaideh[2]*
*[1] University of Guelph*
*[2] Fraunhofer Institute for Applied Optics and Precision Engineering, Germany and University of Toronto*

11:40 **Theoretical and experimental investigations regarding small electric drive systems overload potentials in short-term operation**
*Ulrike Kurz[1], Andreas Wagener[2], Bernd Gundelsweiler[1]*
*[1] Institute of Design and Production in Precision Engineering, University of Stuttgart, Germany*
*[2] Dr. Fritz Faulhaber GmbH & Co. KG, Germany*

12:00 **Magnetic fast steering mirrors for tracking and optical communication for defense and aerospace industries**
*Xavier De Lépine, Timotéo Payre, Clément-Joseph Galteau, Nabil Bencheikh, Patrick Meneroud, Florian Bonnet, Hugo Grardel, Pierre Personnat, Sylvain Chardon, Guillaume Mansuy, Arnaud Gilson, Frank Claeyssen (CEDRAT TECHNOLOGIES S.A.S, France)*

12:20 **Development of a highly dynamic and precise actuator with magnetic weight compensation for 3D-wafer scanning**
*Maik Kadias[1], Heiko Knoll[1], Matthias Böhle[2], Dr. Rolf Slatter[1]*
*[1] ITK Precisioning GmbH, Germany*
*[2] ELSOMA GmbH, Germany*

**12:40 - 13:50 Lunch Break**

**Room 3**

**C1** **Thermal Shape Memory**
*Chairs:*

11:00 **Investigation of bistable mechanisms for energy-free holding using shape memory alloys for 3D-printed valves**
*Andreas Erben, Kenny Pagel, Christoph Nitschke, Niklas Brömme, Welf-Guntram Drossel (Fraunhofer Institut für Werkzeugmaschinen und Umformtechnik IWU, Germany)*

11:20 **An inverted bistable Actuator based on Shape Memory Alloy Beams**
*Yasmina Frey, Zeliha Arabul, Ulrike Wallrabe (University of Freiburg, Germany)*

11:40 **Modeling of bistable out-of-plane SMA-based microactuators**
*Stephan Wulfinghoff [1], Muhammad Shamim[2]*
*[1] Kiel University, Germany*
*[2] Kiel University, Germany (former)*

12:00 **Assembly-oriented redesign of a shape memory alloy driven bistable gripper**
*Tom Gorges[1,2], Fabian Adler[3], Sarah Zimmer[3], Sophie Nalbach[1], Paul Motzki[1,2]*
*[1] Depart. Smart Material Systems, ZeMA – Center for Mechatronics and Automation Technology, Saarbruecken, Germany*
*[2] Depart. Systems Engineering, Saarland University, Saarbruecken, Germany*
*[3] Depart. Assembly Systems, ZeMA – Center for Mechatronics and Automation Technology, Saarbruecken, Germany*

12:20 **Shape Memory Alloy drives for micro-electronical actuator systems**
*Andreas Erben[1], Daniel Hoffmann[2], Kenny Pagel[1], Sven Spieth[2], Alexander Jähnigen[2], Welf-Guntram Drossel[1], Alfons Dehè[2]*
*[1] Fraunhofer Institut für Werkzeugmaschinen und Umformtechnik IWU, Germany*
*[2] Hahn-Schickard Gesellschaft, Villingen-Schwenningen, Germany*

**12:40 - 13:50 Lunch Break**

**Room 1**

## A2 KOMMMA (2) – Shape Memory & Electrostatics

*Chairs:*

13:50 **A Multi-Tile Origami-Inspired Microsystem**

*Vincent Gottwald[1], Marlon Rupp[1], Lars Bumke[2], Yizheng Liu[3], Eckardt Quandt[2], Jürgen Rühe[3], Manfred Koh[l1]*

*[1] Institute of Microstructure Technology, Karlsruhe Institute of Technology (KIT), Germany*

*[2] Department of Materials Science, Kiel University, Germany*

*[3] Department of Microsystems Engineering, University of Freiburg, Germany*

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14:10 **Simulation of shape memory alloy folding actuators fo programmable origami microsystems**

*Frank Wendler[1], Rundong Jia[1], Ning Zhang[1], Shajin Thankaswamy[1], Vaibhav Gavate[1], Vincent Gottwald[2], Manfred Kohl[2]*

*[1] Institute of Materials Simulation (WW8), Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany*

*[2] Institut für Mikrostrukturtechnik (IMT), Karlsruhe Institute of Technology (KIT), Germany*

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14:30 **Shape Memory Microactuator for Large In-plane Displacements**

*Akis Rachoutis[1], Gowtham Arivanandhan[1], Elaheh Akbarnejad[2], Alfred Ludwig[2], Manfred Kohl[1]*

*[1] Institute of Microstructure Technology, Karlsruhe Institute of Technology (KIT), Germany*

*[2] Institute for Materials, Ruhr University Bochum (RUB), Germany*

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14:50 **Electrostatically Actuated Liquid Lenses for an Anamorphotic Zoom**

*Debatri Das, Martin Hoffmann (Microsystems Technology, Ruhr University Bochum, Germany)*

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15:10 **Robust and Efficient Finite Element Modeling of an Electrostatic Microactuator Relying on the Pull-In Effect**

*Arwed Schütz[1], Dwarakesh Sudhahar[2], Martin Hoffmann[2], Tamara Bechtold[1]*

*[1] Jade University of Applied Sciences, Wilhelmshaven, Germany*

*[2] Microsystems Technology, Ruhr University Bochum, Germany*

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15:30 **Electrostatic MEMS actuator for controlled Quasi-Static spherical Rotation**

*Dwarakesh Sudhahar[1], Arwed Schütz[2], Tamara Bechtold[2], Martin Hoffmann[1]*

*[1] Lehrstuhl für Mikrosystemtechnik, RUHR University Bochum, Germany*

*[2] Jade University of Applied Sciences, Wilhelmshaven, Germany*

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**15:50 - 16:15 Coffee Break**

**Room 2**

**B2** **Aerospace & Civil Engineering**
*Chairs:*

13:50 **Development and experimental Validation of a lightweight Shape Memory Wire Actuator for UAV Battery Sled Locking**
*Benjamin John[1], Jannik Stanke[2], Peter Henning[2], Welf-Guntram Drossel[1]*
*[1] Fraunhofer-IWU, Germany*
*[2] Vectorbirds airborne systems GmbH & Co. KG*

14:10 **Compact piezo-driven inchworm rotary mechanism with high rotational accuracy for LISA Space mission**
*Narendra Mahavar[1,2], Shashwat Kushwaha[1,2], Dominiek Reynaerts[1,2]*
*[1] KU Leuven, Belgium*
*[2] Member Flanders Make, Belgium*

14:30 **High-resolution rotating piezo motors for LISA large interferometer space antenna**
*Nicolas Bourgeot, Jocelyn Rebufa, Alexis Gierczak, Clément Cote, Olivia Stadler, François Barillot, Frank Claeyssen (CEDRAT TECHNOLOGIES S.A.S, France)*

14:50 **Energy efficient electro-mechanical wing ice protection system for future aircrafts**
*Denis Becker[1], Thorsten Koch[1], Christopher Davies[2], Valerian Palanque[3], Matthias Schmidt[1], Valentin Mees[1], Michael Matthias[1]*
*[1] Fraunhofer LBF, Darmstadt, Germany*
*[2] Parker Meggitt, Shepshed, Loughborough, United Kingdom*
*[3] Airbus, Toulouse, France*

15:10 **Mechanisms of hygromorphic actuation: from analysis to tuning of biomimetic actuators for adaptive facades**
*Eleonora Galli, Mohamed Abdelrasoul, Jürgen Rühe (University of Freiburg, Germany)*

15:30 **Piezoelectric Fine Steering Mirrors and electronics for Optical Inter-Satellite Links**
*Xavier De Lépine[1], Jocelyn Rebufa[1], David Ferris[1], Aurore Loubet[1], Frank Claeyssen[1], Sylvain Chardon[1], Arnaud Gilson[1], Thomas Maillard[1], Pascal Mexe[2], Francis Bortolaso[2]*
*[1] CEDRAT TECHNOLOGIES S.A.S, France*
*[2] MICROTEC S.A.S, France*

**15:50 - 16:15 Coffee Break**

**Room 3**

**C2** **Polymers**

*Chairs:*

13:50 **4D printing of bioinspired multistimuli-responsive polymer actuators for adaptive façade systems**

*Mohamed Abdelrasoul [1,2], Jürgen Rühe[1,2]*

*[1] Laboratory for Chemistry and Physics of Interfaces, Department of Microsystems Engineering (IMTEK), University of Freiburg, Germany*

*[2] Cluster of Excellence livMatS @ FIT – Freiburg Center for Interactive Materials and Bioinspired Technologies, University of Freiburg, Germany*

14:10 **Optimizing laser-induced graphene microstructure to enhance ion diffusion and actuation performance in PI-LIG-Ppy ionic actuators**

*David Morales, Alejandro Vega, Sergio Gabriel Flores (CIMAV, Mexico)*

14:30 **Multilayered electrohydraulic soft actuators for safe-to-touch wearables and underwater systems**

*Chinmay Gupta[1], Krishnaprasad Rajagopalan[1], Gaurav Khandelwal [1,2], Ajay Giri Prakash Kottapalli [1]*

*[1] Department of Bioinspired MEMS and Biomedical Devices (BMBD), Engineering and Technology Institute (ENTEG), University of Groningen, Netherlands*

*[2] Department of Engineering Science, University of Oxford, United Kingdom Motivation*

14:50 **Adaptive surface actuation via magnetoactive elastomer membranes**

*Ina Bregu, Jürgen Maas (TU Berlin, Germany)*

15:10 **Asymmetric inflatable snapping actuator**

*Xin Li, Edoardo Milana (livMatS@FIT, University of Freiburg, Germany)*

**15:50 - 16:15 Coffee Break**

**Room 1I**

## A3 KOMMMA (2) – Polymers

*Chairs:*

16:15 **Multi-State pH-responsive Hydrogel Microactuators**
*H.B. Duc Tran[1,2], Christoph A. Spiege[1,2], Eva Blasco[1,2]*
*[1] Institute of Organic Chemistry (OCI), Heidelberg University, Germany*
*[2] Institute for Molecular Systems Engineering and Advanced Materials (IMSEAM), Heidelberg University, Germany*

16:35 **Stimuli-responsive microactuators for dynamic microfluidics**
*Chantal Barwig, Annabelle Sonn, Tobias Spratte, Sadaf Pashapour, Christine Selhuber-Unkel (Institute for Molecular Systems Engineering and Advanced Materials (IMSEAM), Heidelberg University, Germany)*

16:55 **Highly Conductive Metallic Thin Films on Flexible Substrates**
*Benjamin R. Zemlin[1], Jonas Hubertus[1], Dirk Göttel[1], Alberto Priuli[2], Saveria Addario[2], Gianluca Rizzelo[2], Stefan Seelecke[2], Günter Schultes[1], John Heppe[1]*
*[1] University of Applied Sciences of Saarland, Saarbruecken, Germany*
*[2] Saarland University, Saarbruecken, Germany*

17:15 **Energy-Free Micro-Latching Mechanisms for Bidirectional SMA Actuators**
*Yizheng Liu[1], Vincent Gottwald[2], Eleonore Stier[1], Manfred Kohl[2], Jürgen Rühe[1]*
*1 Department of Microsystems Engineering, University of Freiburg, Germany*
*2 Institute of Microstructure Technology, Karlsruhe Institute of Technology (KIT), Germany*

17:35 **A Gym for cells – Direct laser writing of magnetic multilayered micro actuators for mechanical stimulation of cells**
*Nicolas Geid[1,2], Ayman Husari[3], Eleonore Galli[1,2], Lukas Leffler[1], Pascal Tomakidi[3], Jürgen Rühe[1,2]*
*[1] Department of Microsystems Engineering University of Freiburg (IMTEK), Germany*
*[2] Cluster of Excellence livMatS @ FIT – Freiburg Center for Interactive Materials*
*[3] Division of Oral Biotechnology University Medical Center Freiburg Faculty of Medicine, University of Freiburg, Germany*

**18:00-21:00 Get Together - Exhibition of ACTUATOR , Kurhaus Wiesbaden**

**Room 2**

**B3** **Novel Magnetics and Dielectrics**
*Chairs:*

16:15 **A miniature-scale thermomagnetic actuator driven by low-grade heat**
*Athira Kattiparambil Sivaprasad[1], Joel Joseph[1], Amir-Abbas Haghighirad[2], Manfred Kohl[1], Jingyuan Xu[1]*
*[1] Institute of Microstructure Technology (IMT), Karlsruhe Institute of Technology (KIT), Germany*
*[2] Institute for Quantum Materials and Technologies (IQMT), Karlsruhe Institute of Technology (KIT), Germany*

16:35 **An AlN piezoelectric thermomagnetic generator for waste heat recovery**
*Maxim Wischnewski [1], Erik Mackensen[2], Dirk Meyners[2], Manfred Kohl [1]*
*[1] Karlsuhe Institute of Technology (KIT), Germany*
*[2] Christian-Albrechts-Universität (CAU), Kiel, Germany*

16:55 **Change in stress-strain-characteristics of MSM-alloys in weak magnetic fields for adaptive interfaces**
*Marco Hutter[1], Lukas Fuchs[2], Peter Schmid [2], Thomas Maier[2], Bernd Gundelsweiler[1]*
*[1] Institute of Design and Production in Precision Engineering, University of Stuttgart, Germany*
*[2] Institute for Technical Design and Industrial Design, University of Stuttgart, Germany*

17:15 **Investigation of the influence of dynamic magnetic excitation during drag finishing using abrasive magnetorheological fluids**
*Fabian Sordon, Jürgen Maas (Mechatronic Systems Lab, Technische Universität Berlin, Germany)*

17:35 **Pellicle dielectric actuators (PDA) based on CNT ultra-thin Films**
*Marcio Dias Lima (lintec of america, United States of America)*

**18:00-21:00 Get Together - Exhibition of ACTUATOR , Kurhaus Wiesbaden**

**Room 3**

| | |
|---|---|
| **C3** | **Optics & Photonics**<br>*Chairs:* |
| 16:15 | **Prototype of a camera focusing mechanism driven by a polyimide bimorph thin-film actuator**<br>*Daisuke Yamaguchi, Saki Takamura, Shuichi Wakimoto, Takefumi Kanda*<br>*(Okayama University, Japan)* |
| 16:35 | **Giving voice to flat plastic panels with piezoceramic actuators: vibrational analyses with feedback interferometry**<br>*Elisabetta Bodo[1], Carlo Anelli[2], Valentina Bello[2], Sabina Merlo[2]*<br>*[1] Eindhoven University of Technology, The Netherlands*<br>*[2] University of Pavia, Italy* |
| 16:55 | **3D nano-printed optical MEMS with closed-loop control**<br>*Florian Lux, Elijah Ditchendorf, Çağlar Ataman (University of Freiburg, Germany)* |
| 17:15 | **Displacement control for Piezo-based Deformable Mirrors with Unmodelled Hysteresis and Actuator Coupling**<br>*Mohammad Saaideh[1], Matthias Goy[2], Mohammad Al Janaideh[3]*<br>*[1] University of Guelph*<br>*[2] Fraunhofer Institute for Applied Optics and Precision Engineering, Germany*<br>*[3] Fraunhofer Institute for Applied Optics and Precision Engineering, Germany & University of Toronto* |
| 17:35 | **Dual-chevron optothermal rotary microactuator for high force and large displacement actuation**<br>*Yanze Li[1], Alex J Thompson[1], Alfredo Fantetti[2], Belal Ahmad[1]*<br>*[1] Department of Surgery and Cancer, Imperial College London, United Kingdom*<br>*[2] Department of Mechanical Engineering, Imperial College London, United Kingdom* |

**18:00-21:00 Get Together - Exhibition of ACTUATOR , Kurhaus Wiesbaden**

**Room 1**

09:00 **Actuation Challenges and Options in Medical Robotics**
*Prof. Arianna Menciassi (Scuola Superiore Sant'Anna, Pisa, Italy)*

09:30 **Life from Technology – From Micro-Actuator Modules to Non-Biological Organisms**
*Prof. Oliver Schmidt (Chemnitz University of Technology, Germany)*

10:00 **Nanometer-precise actuators and sensors for the key technologies of our world**
*Dr. Rainer Gloess (Physik Instrumente (PI) SE & Co. KG, Karlsruhe, Germany)*

**10:30 - 11:00 Coffee Break**

**Foyer**

11:00 **Poster Pitches**

**Foyer**

12:00 **Poster Session**

P1 **Engineering liquid crystal elastomer fibers for the next generation of soft robotics: A comparative analysis of fabrication techniques**
*Manuel Reis Carneiro[1,2,3], Rafael Molter[2], Aníbal T. de Almeida[2], Mahmoud Tavakoli[2]*
*[1] Soft Machines Lab, Department of Mechanical Engineering, Carnegie Mellon University, Pittsburgh, USA*
*[2] Institute of Systems and Robotics, Department of Electrical and Computer Engineering, University of Coimbra, Portugal;*
*[3] Biomedical and Mobile Health Technology Lab, Department of Health Sciences and Technology, ETH Zürich, Switzerland*

P2 **Advanced interfaces through reversible adhesion**
*Eleonore Stier[1,2], Jürgen Rühe[1,2]*
*[1] Cluster of Excellence livMatS, University of Freiburg, Freiburg im Breisgau, Germany*
*[2] Laboratory for Chemistry and Physics of Interfaces, Department of Microsystems Engineering (IMTEK), University of Freiburg, Germany*

P3 **Reliability and drift behaviour of CNT-modified grippers for soft robotics applications**
*Ivica Kolaric[1], Rolf Nothelfer-Richter[1], Takushi Sugino[2], Hirosato Monobe[2]*
*[1] Fraunhofer IPA, Germany*
*[2] National Institute of Advanced Industrial Science and Technology (AIST), Japan*

P4 **Thermal Impact on the Dynamic Model of a Magnetorheological Elastomer: Analysis and Experiments**
*Paweł Orkisz[1], Janusz Goldasz[2], Bogdan Sapiński[1]*
*[1] AGH University of Science and Technology, Poland*
*[2] Cracow University of Technology, Poland*

**13:30 - 14:30 Lunch Break**

**Foyer**

**Poster Session** *(Continuation)*

P5 **Lead free 4-layered piezoelectric motor**
*Bülent Delibas, Burhanettin Koc*
*Physik Instrumente GmbH & Co. KG, Germany*

P6 **Lumped modelling of loss mechanisms in piezoelectric transducers**
*Jan Holterman[1], Bas Jansen[2], Henry Schmidt[2]*
*[1] VIRO, The Netherlands*
*[2] ASML, The Netherlands*

P7 **Coupled resonance dynamics when designing with vibrotactile actuators**
*Thorsten A. Kern, Ali El-Nwegy El-Nwegy, Maximilian Becker, Ornella Tortorici, Juliana Lüer*
*Hamburg University of Technology, Germany*

P8 **Dual-Joint Cable-Driven Soft actuator for Miniaturized Flexible Endoscopy**
*Zijian Liu, Luigi Manfredi*
*University of Dundee, United Kingdom*

P9 **Piezoelectric ultrasonic mirror tip tilt stage**
*Jan Homberg, Alexej Wischnewski, Bülent Delibas*
*Physik Instrumente GmbH & Co. KG, Germany*

P10 **Soft and monolithic variable Stiffness Clutches to enhance Serial Elastic Actuators**
*Johannes Frey, Mohsen Jafarpour, Hugo Oliveira, Edoardo Milana*
*Department of Microsystems Engineering - IMTEK, Cluster of Excellence livMatS, University of Freiburg, Germany*

P11 **Interlocking-based multistable actuators as fluidic memristors**
*Ayberk Yüksek[1,2], Mohsen Jafarpour[1,2], Edoardo Milana[1,2]*
*[1] Freiburg Center for Interactive Materials and Bioinspired Technologies, Germany*
*[2] Department of Microsystems Engineering (IMTEK), University of Freiburg, Germany*

P12 **Experimental setup for piezo relations validation**
*Bas Jansen[1], Ivan Staykov[2], Paul Vrancken[2], Hans Butler[1,2], Siep Weiland[1]*
*[1] ASML, The Netherlands*
*[2] TU/e, Eindhoven, The Netherlands,*

P13 **Piezoelectric transducer for high intensity reversible acoustic rotational field generation**
*Dalius Mažeika[1], Piotr Vasiljev[2], Andrius Čeponis[1], Regimantas Bareikis[2], Sergejus Borodinas[2]*
*[1] Vilnius Gediminas Technical University, Lithuania*
*[2] Vytautas Magnus University, Lithuania*

P14 **Design methodology for electromechanical functional interfaces**
*Tom Migliaccio, François Pigache, Thomas Huguet*
*Laplace, France*

**13:30 - 14:30 Lunch Break**

**Foyer**

**Poster Session** *(Continuation)*

P15 **Pneumatic cylinder speed control system using particle-excitation flow control valve**
*Daisueke Hirooka, Naomichi Furushiro, Tomomi Yamaguti*
*Kansai University, Japan*

P16 **Design and characterization of a tactile multi-element dielectric elastomer actuator**
*Lukas Moritz Roth[1], Sebastian Gratz-Kelly[1], Daniel Bruch[1], Sophie Nalbach[2], Paul Motzki[1,2]*
*[1] Saarland University, Germany*
*[2] Center for Mechatronics and Automation Technology – ZeMA gGmbH, Germany*

P17 **A steerable concentric push–pull suction device for single-port surgery**
*Finn Hoffmann[2], Bob Lathrop[1], Mouloud Ourak[1], Wouter Everaerts[3], Emmanuel Vander Poorten[1], Paul Breedveld[2]*
*[1] Department of Mechanical Engineering, KU Leuven, Belgium*
*[2] Department of Mechanical Engineering, TU Delft, The Netherlands*
*[3] Department of Urology, University Hospitals Gasthuisberg, Katholieke Universiteit Leuven, Belgium*

P18 **Cascaded membrane transducer based on multilayer dielectric elastomers**
*Tim Krüger, Jürgen Maas*
*Technical University Berlin, Mechatronic Systems Lab*

P19 **Amplified Piezo Actuators with embedded Eddy Current Sensor for cryo space De-SPIN mechanism**
*Olivia Stadler, Jocelyn Rebufa, Alexis Gierczak, Clément Cote, David Ferris, François Barillot, Frank Claeyssen, Boris Laluc*
*CEDRAT TECHNOLOGIES S.A.S, France*

P20 **Piezo actuated jet for stealth aircraft applications**
*David Ferris[1], Guillaume Mansuy[1], Boris Laluc[1], Jan Rohac[2]*
*[1] CEDRAT TECHNOLOGIES S.A.S, France*
*[2] ESC Defence, Czech Republic*

P21 **Bistable Piezoelectric Energy harvester with embedded power management electronics for railway monitoring**
*Timoteo Payre[1], Boris Laluc[1], Nicolas Decroix[2], Quentin Demouron[2], Celestin Metral[3], Romane Anseaume[1]*
*[1] CEDRAT TECHNOLOGIES S.A.S, France*
*[2] USMB, France*
*[3] VOSSLOH, France*

P22 **Improving the reliability of piezoelectric actuators and motors subjected to significant self-heating and several billion actuation cycles or severe environments**
*Nicolas Bourgeot [1], Frank Claeyssen[1], Boris Laluc[1], Rasmus Lou-Møller[2], François Barrot [3], Iman Mehdipour[2], Yves Ruffieux[3]*
*[1] CEDRAT TECHNOLOGIES S.A.S, France*
*[2] CTS Corporation, Denmark*
*[3] CSEM, Switzerland*

**13:30 - 14:30 Lunch Break**

**Foyer**

**Poster Session** *(Continuation)*

P23 **Three-phase SMA model with optimized fit for both strain and resistance**
*Max Hauber, Arif Kazi*
*Hochschule Aalen, Germany*

P24 **Electromagnetic characterization of Magnetorheological Dampers**
*Gabriel Dias Mendes*
*Cracow University of Technology, Poland*

P25 **Enhancing the reliability of piezoelectric actuators and motors under severe self-Heating, high-cycle operation, and harsh environmental conditions**
*Rasmus Lou-Møller[1], Iman Mehdipour[1], Charles Mangeot[1], Nicolas Bourgeot[2], Frank Claeyssen[2], Boris Laluc[2]*
*[1] CTS Denmark, Denmark*
*[2] Cedrat Technologies, France*

P26 **Magnetoelectric fluxguide with reduced bending mitigates power nulls in WPT systems**
*Hidelberto Macedo Zamudio, Ulrike Wallrabe*
*University of Freiburg, Germany*

P27 **Amplification of piezoelectric ac-tuator for elevated performance**
*Shubhangini Awasthi, Wolfgang Zoels, Georg Bachmaier*
*Metismotion GmbH, Germany*

P28 **Thermal deformations in linear motors under extreme motion profiles**
*Stefan Geelen, Mitrofan Curti, Elena Lomonova*
*Eindhoven University of Technology, The Netherlands*

P29 **Engineered shape memory behavior in Nb-doped lead zirconate titanate piezoelectric actuators**
*M. Ugalde-Reygadas, M. Acuautla*
*Engineering and Technology Institute Groningen, University of Groningen, The Netherlands*

**13:30 - 14:30 Lunch Break**

**Room 1**

| | |
|---|---|
| **A5** | **Medical Devices**<br>*Chairs:* |
| 14:30 | **Dual-mode electrosurgical device for selective tissue perforation via electrically-induced bubbles and discharge**<br>*Shigeaki Miura, Yuudai Aokusa, Mayu Nakahigashi, Nobutoshi Ota, Yoko Yamanishi*<br>*Kyushu University, Japan* |
| 14:50 | **Soft robotic artificial muscles for end-stage heart failure management**<br>*Javad Foroughi [1,2], Arjang Ruhparwar[2]*<br>*[1] School of Mechanical and Manufacturing Engineering, University of New South Wales, Sydney, Australia;*<br>*[2] Department of Cardiothoracic Transplantation and Vascular Surgery Hannover Medical School, Germany* |
| 15:10 | **Multi-DOF steerable endoscope for robot-surgeon collaborative control**<br>*Robert Lathrop, Mouloud Ourak, Emmanuel Poorten*<br>*KU Leuven, Belgium* |
| 15:30 | **Handling of micropumps to minimize surface-related disturbances**<br>*Martin Richter, Mohammadhossein Sheikhsarraf*<br>*Fraunhofer EMFT, Germany* |
| 15:50 | **Plasmid delivery to suspension cells through electromechanical poration induced by a microbubble generator**<br>*Nobutoshi Ota, Kei Tateishi, Yoko Yamanishi*<br>*Kyushu University, Japan* |

**Room 2**

**B5** **Piezoelectrics**
*Chairs:*

14:30 **Compact piezoelectrically driven inchworm motor with large forces and strokes using advanced control**
*Ulrich Mescheder[1], Sonja Müller[1,2]*
*[1] Hochschule Furtwangen, Germany*
*[2] Universität Freiburg, Germany*

14:50 **Creep modeling and stability of PNZT shape memory piezoelectric actuators**
*Jurrien Keulen, Mireny Ugalde Reygadas, Bayu Jayawardhana, Monica Acuautla Meneses*
*University of Groningen, The Netherlands*

15:10 **Effect of long-term operation on Actuator Pretension of Silicon Micropumps**
*Nora Weigel, Daniel Anheuer, Martin Richter*
*Fraunhofer EMFT, Germany*

15:30 **Miniature robots with piezoelectric actuators: Autonomous locomotion and embedded trajectory Control**
*Jose Luis Sanchez-Rojas[2], Byron Ricardo Zapata Chancusig[1], Jaime Rolando Heredia Velastegui[1], Víctor Ruiz-Díez[2]*
*[1] Universidad Politécnica Salesiana, Quito, Ecuador*
*[2] INAMOL-Universidad de Castilla la Mancha*

15:50 **Non-contact micro-mechanical stimulation of Arabidopsis root cap using ultrasonic standing waves for mechanotransduction analysis**
*Keisuke Morishima, Koki Ogawa*
*The University of Osaka, Japan*

# General Information

### ACTUATOR 2026 Office

For detailed information please contact:
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### ACTUATOR Project Management

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Merianstraße 28
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Nicolas Parisel
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E-Mail: nicolas.parisel@vde.com

### Conference Fees

(The conference fee includes admission to all sessions as well as to the daily coffee-breaks, lunches and conference banquet dinner as well as the Conference Proceedings)

| | Early Bird Registration by May 29, 2026 | Registration after May 29, 2026 |
|---|---|---|
| Non-Member | 1040,- € | 1140,- € |
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| Authors, Program Committee Members, Session Chairs | 630,- € | 730,- € |
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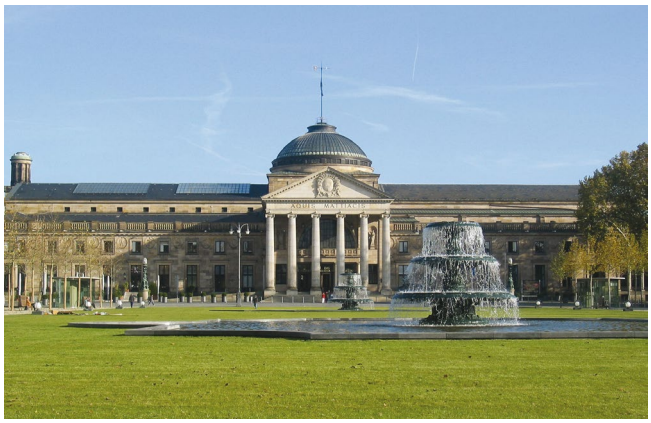
### Cancellation

In case of cancellation, provided that written notice has been given to VDE-Conference Services before May 29, 2026, the registration fee will be fully refunded less a handling fee of EURO 80.00. After May 29, 2026, no refund will be made.

### Conference Venue

Kurhaus Wiesbaden
Kurhausplatz 1
65189 Wiesbaden, Germany



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### Get Together

June 30, 2026 from 18:00

Exhibition of ACTUATOR,
Kurhaus Wiesbaden.

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