

Program



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ACTUATOR 24

International Conference and Exhibition on
New Actuator Systems and Applications

Kurhaus Wiesbaden
Wiesbaden, Germany
June 13–14, 2024

www.actuator.de

Organized by:

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

VDE **VDI** GMM

Welcome to the new ACTUATOR Conference 2024

The ACTUATOR Conference 2024 – 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 2024 – 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 on New Actuator Systems and Applications 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 2024 Steering Committee

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

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The ACTUATOR 2024 Programme Committee

We appreciate the support of the following experts:

Steering Committee Members

Kohl, Manfred | Karlsruher Institut für Technologie, Germany
Maas, Jürgen | Technische Universität Berlin, Germany
Pané i Vidal, Salvador | Swiss Federal Institute of Technology (ETH) Zurich, Switzerland
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Overview

Time	Zais Saal	Dostojewski Saal	Salon Schuricht
Thursday, June 13			
08:00–08:45	Foyer Registration		
08:45–09:00	Opening		
09:00–09:30	Keynote p.6		
09:30–10:00	Keynote p.6		
10:00–10:30	Keynote p.6		
10:30–11:00	Foyer Coffee Break		
11:00–12:20	A1: SMA / MSM (1) p.6	B1: Medical Devices / Medical Engineering p.7	C1: Piezoelectric Actuators p.7
12:20–13:50	Foyer Lunch Break		
13:50–15:10	A2: SMA / MSM (2) p.8	B2: Medical Devices / Engineering Actuators based on ER/MR Fluids p.8	C2: Electromagnetic Actuators p.9
15:10–16:00	Foyer Coffee Break		
16:00–17:00	A3: Aerospace p.10	B3: Active Vibration p.10	C3: Automation p.11
Friday, June 14			
09:00–09:30	Keynote p.12		
09:30–10:00	Keynote p.12		
10:00–10:30	Keynote p.12		
10:30–11:00	Foyer Coffee Break		
11:00–12:40	A4: Robotics / Micro Robotics / Soft Robotics p.12	B4: Polymer Actuators p.13	C4: KOMMMA Cooperative Multistage Multistable Microactuator Systems (1) p.13
12:40–13:40	Foyer Lunch Break		
13:40–15:10	Foyer Poster Session p.14		
15:10–15:30	Foyer Coffee Break		
15:30–17:10	A5: Pneumatics / Robotics / Medical Devices p.16	B5: Polymer Actuators / Piezoelectric Actuators p.16	C5: KOMMMA Cooperative Multistage Multistable Microactuator Systems (2) p.17

Foyer

08:00 **Registration**

08:45 **Opening**

Zais Saal

09:00 **Harnessing nonlinearities to create functional soft robots**

Prof. Benjamin Gorissen (Katholieke Universiteit Leuven, BE)

09:30 **Electrohydraulic and Biohybrid Actuators for Musculoskeletal Robots**

Prof. Robert Katzschmann (ETH Zürich, CH)

10:00 **Soft microfinger for active tactile sensing**

Prof. Satoshi Konishi (Ritsumeikan University, JP)

10:30 - 11:00 Coffee Break

Zais Saal

A1 SMA/MSM (1)

Chairs: Emmanouel Pagounis (ETO MAGNETIIC GmbH, DE); Manfred Kohl (Karlsruher Institut für Technologie, DE)

11:00 **Audio Frequency Actuation of SMA Wires**

Arif Kazi, Lukas Buser, Maximilian Schmitt, Max Karch (Aalen University of Applied Sciences, DE); Markus Koepfer (Actuator Solutions GmbH, DE)

11:20 **Investigation of the localized twinning behavior of magnetic shape memory alloys using digital image correlation**

Robert Courant, Jürgen Maas (Technische Universität Berlin, DE)

11:40 **Actuation properties of a magnetic shape memory element prepared by laser ablation**

Andrey Saren, Aditya Kumthekar, Ville Laitinen, Kari Ullakko (Lappeenranta-Lahti University of Technology, FI)

12:00 **Micro magnetomechanical systems (MAMS)**

Kari Ullakko, Ville Laitinen, Andrey Saren (Lappeenranta-Lahti University of Technology, FI)

12:20 - 13:50 Lunch Break

Dostojewski Saal**B1 Medical Devices / Medical Engineering**

Chairs: Yoko Yamanishi (Kyushu University, JP); Emmanuel Vander Poorten, Katholieke Universiteit Leuven, BE)

- 11:00 **Functional test of a training device for moving fingers and wrist joints using soft pneumatic actuator**
Masaki Todo, Hironari Taniguchi, Daigo Ishii (Osaka Institute of Technology, JP)
-
- 11:20 **Control of a Medical Ergometer based on a Magnetorheological Fluid Brake and Bicycle Model**
Bela Schulte Westhoff (Technische Universität Berlin, DE); Valentin Schreiner (Technical University Berlin, DE); Jürgen Maas (Technische Universität Berlin, DE)
-
- 11:40 **Design, manufacturing and control of a non-magnetic pneumatic linear stepper actuator with inchworm kinematics**
Timothee Portha, Laurent Barbé, François Geiskopf, Jonathan Vappou (University of Strasbourg, FR); Paolo Cabras (University of Strasbourg-Image Guided Therapy, FR); Pierre Renaud (University of Strasbourg, FR)
-
- 12:00 **An electrokinetic lab-on-CMOS DNA detection system for sample-to-result diagnostic applications**
Lewis Keeble, Arthur Jaccottet, Daryl Ma (Imperial College London, UK (Great Britain)); Jesus Rodriguez-Manzano (Imperial College, UK (Great Britain)); Pantelis Georgiou (Imperial College London, UK (Great Britain))

Salon Schuricht**C1 Piezoelectric Actuators**

Chairs: Patrick Pertsch (PI Ceramic GmbH, Lederhose, DE); Takefumi Kanda (Okayama University, JP)

- 11:00 **Characteristics of Resonance Type Piezoelectric Motors Made with Textured Piezoceramics Material**
Burhanettin Koc, Buelent Delibas (Physik Instrumente (PI) GmbH & Co. KG, DE); Safakcan Tuncdemir, Ahmet Erkan Gürdal (QorTek, USA); Franz Schubert (PI Ceramic GmbH, DE)
-
- 11:20 **Study on Miniaturization of a Pump Using Ultrasonic Transducer and Opposing Surface**
Masaya Takasaki, Yuki Nakasuji, Yuji Ishino, Takeshi Mizuno (Saitama University, JP)
-
- 11:40 **Low voltage (Bi, Sc)(Pb, Ti)O₃ based piezoelectric multilayer actuators for high temperature applications**
Runjiang Guo (Thorlabs, CN); Renlong Gao (Thorlabs Optical Electronic Technology (Shanghai) Co., Ltd. & Thorlabs Inc., CN); Qingbin Meng, Cary Zhang (Thorlabs, CN)
-
- 12:00 **High-Accuracy Alignment of integrated Optical Components utilizing Ferroelectric Shape Memory Actuators**
Zijian Chen (Leibniz University Hannover, DE); Jens Twiefel (IHP, DE); Jörg Wallaschek (Leibniz University of Hannover, DE)

12:20 - 13:50 Lunch Break

Zais Saal**A2 SMA/MSM (2)**

Chairs: Takeshi Morita (University of Tokyo, JP), Marco Citro (SAES Getters S.p.A., IT)

-
- 13:50 **Innovative Fin Ray gripper with integrated SMA actuator wires**
Shivaani Anitha Sivakumar, Yannik Goergen and Tom Gorges (ZeMA – Center for Mechatronics and Automation Technology, Depart. Smart Material Systems, Saarbruecken, DE); Gianluca Rizzello and Paul Motzki (Saarland University, Depart. Systems Engineering, Saarbruecken, DE)
-
- 14:10 **Development of an integrated foil-based sensor for position sensing of magnetic shape memory alloy actuators**
Patrick Fleishmann (University of Stuttgart, DE); Julius Happel (ETO MAGNETIC GmbH, DE); Bernd Gundelsweiler (University of Stuttgart, DE)
-
- 14:30 **Flux control in magnetic circuits using variable reluctance of magnetic shape memory alloys**
Marco Hutter and Bernd Gundelsweiler (University of Stuttgart, DE)
-
- 14:50 **Investigation of the influencing factors in the production of Shape Memory alloy wire bending actuators for integration in micro-electro-mechanical systems**
Andreas Erben, Kenny Pagel, Welf-Guntram Drossel (Fraunhofer Institute for Machine Tools and Forming Technology IWU, Dresden, DE); Daniel Hoffmann, (Hahn-Schickard Gesellschaft, Villingen-Schwenningen, DE)
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15:10 - 16:00 Coffee Break

Dostojewski Saal**B2 Medical Devices / Engineering Actuators based on ER/MR Fluids**

Chairs: Ulrike Wallrabe (University of Freiburg, Department of Microsystems Engineering – IMTEK, DE); Joost Lötters (Bronkhorst High-Tech B.V., Ruurlo, Netherlands)

- 13:50 **Development of microbubble shock wave reflection needle-free injection**
Yibo Ma (Kyushu University, JP); Wenjing Huang (Kindai University, JP); Naotomo Tottori and Yoko Yamanishi (Kyushu University, JP)
-
- 14:10 **Computational Study of Fluid Flow in Multi-Stage Pinch Mode MR Valves**
Janusz Goldasz (Cracow University of Technology, Krakow, PL); Bogdan Sapiński (AGH University of Science and Technology, PL); Michal Kubík (Brno University of Technology, CZ)
-
- 14:30 **Rheological properties of abrasive magnetorheological fluids for immersed tumbling processes**
Fabian Sordon and Jürgen Maas (Technische Universität Berlin, DE)
-
- 14:50 **Utilization of Sedimentation in Magnetorheological Fluids for Online Rotor Balancing**
Valentin Schreiner (Technical University Berlin, DE); Jürgen Maas (Technische Universität Berlin, DE)

Salon Schuricht**C2 Electromagnetic Actuators**

Chairs: Masaya Takasaki (Saitama University, JP); Jérôme Perret (Haption GmbH Aachen, DE)

- 13:50 **Optimization and Investigation of Radial-flux Permanent Magnet Micromotor Utilizing MEMS 3D Solenoid Coils with Iron Core**
Lei Kaibo, Li Haiwang, Xu Tiantong, Wu Yuying, Zhu Kaiyun and Zhai Yanxin (Beihang University, CN)
-
- 14:10 **Directional Anisotropy in Smart Magnetic Actuation**
Dharmi Chand (Indian Institute of Technology Madras, IN); Sivakumar Srinivasan (Indian Institute of Technology, IN)
-
- 14:30 **Optimized high-efficiency MICA actuators for space compressors**
Xavier De Lepine, Patrick Meneroud, Aurore Loubet, Timotéo Payre, Nicolas Bourgeot, Olivia Stadler, David Ferris, Jocelyn Rebufa and Hélène Rouxel (Cedrat Technologies, France); Frank Claeyssen (CEDRAT Technologies S.A., France); Gérald Aigouy (Cedrat Technologies, FR)
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- 14:50 **Push, Push, Push-Direct writing of magnetic micro actuators**
Nicolas Geid, Eleonora Galli, Jürgen Rühle (University of Freiburg, DE)

15:10 - 16:00 Coffee Break

Zais Saal**A3 Aerospace**

Chairs: Hans Peter Monner (German Aerospace Center (DLR), Braunschweig, DE); Frank Claeysen (CEDRAT Technologies S.A., FR)

- 16:00 **Development of a compact jumping lunar rover driven by shape memory alloy actuators**
Yuki Oka, Hironari Taniguchi, Taichi Izumi and Koki Yura (Osaka Institute of Technology, JP)
-
- 16:20 **Performance Optimization of an SMA-Actuated Camera Gimbal**
Alexander Schwegler, Dennis Niklas (Aalen University of Applied Sciences, DE); Tobias Schumm (Actuator Solutions GmbH, DE); Arif Kazi (Aalen University of Applied Sciences, DE)
-
- 16:40 **Magnetic Fast Steering Mirror for Inter-satellites and Feeder Link Optical Communication**
Frank Claeysen (CEDRAT Technologies S.A., FR); Etienne Betsch, Patrick Meneroud, Pierre Personnat, Augustin Bedek, Théo Simon, Marc Fournier, Gérald Aigouy, Nicolas Bourgeot, Arnaud Barnique, Hugo Grardel and Sylvain Chardon (Cedrat Technologies, FR)

Dostojewski Saal**B3 Active Vibration**

Chairs: Barkan Ugurlu (Ozyegin University, Çekmeköy - Istanbul, TR); Markus Henke (Technische Universität Dresden, DE)

- 16:00 **Dynamics of Vibrotactile Actuators – a Systematic Approach for Modeling and Verification**
Maximilian Becker (Research Assistant, DE); Thorsten A Kern (Hamburg University of Technology, DE)
-
- 16:20 **Analysis of the controller and damping behavior of an electrodynamic actuator system for an 11 kW two-pole induction motor on an elastic steel frame foundation**
Raimund Wachter, Ulrich Werner (Nuremberg Institute of Technology, DE); Hans-Georg Herzog (Technical University of Munich (TUM), DE); Christian Bauer (Innomotics GmbH, DE)
-
- 16:40 **Design of a range of attachable Lorentz force actuators adapted to different active damping applications**
Alexander Pena-Sevillano, Iker Mancisidor, Jokin Munoa (Ideko - Member of BRTA, ES); Rafa Barcena (UPV-EHU, ES); Inaki Laka (Ideko - Member of BRTA, ES)

18:30-21:00 Get Together

Salon Schuricht**C3 Automation**

Chairs: Jürgen Maas (Technische Universität Berlin, DE); Peter Marienfeld (Contitech Vibration Control GmbH, Hannover, DE)

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- 16:00 **Self-sensing in spring-loaded SMA actuators using artificial neural networks**
Krunal Jagdishbhai Koshiya, Vladimir Naumov, Tom Gorges (ZeMA – Center for Mechatronics and Automation Technology, Depart. Smart Material Systems, Saarbruecken, DE); Gianluca Rizzello, Paul Motzki (Saarland University, Depart. Systems Engineering, Saarbruecken, DE)
-
- 16:20 **The Effects of Training on Actuation and Sensing Characteristics of NiTi Actuator Wires**
Joshua Mayer, Dominik Scholtes, Tom Gorges (ZeMA - Center for Mechatronics and Automation Technology, Depart. Smart Material Systems, Saarbruecken, DE); Gianluca Rizzello, Paul Motzki (Saarland University, Depart. Systems Engineering, Saarbruecken, DE)
-
- 16:40 **Precision Atmospheric Pressure Driven Actuator controlled by Self-Sensing Electro-Magnetic Valve**
Yahui Zhang, Bintang Yang (Shanghai Jiao Tong University, CN)
-

18:30-21:00 Get Together

Zais Saal

- 09:00 **Silicon integrated electro static drives**
Prof. Harald Schenk (Fraunhofer IPMS, DE)
- 09:30 **Shape memory alloy actuators based on flat material for microfluidics and space applications**
Dr. Christof Megnin (memetis GmbH, DE)
- 10:00 **Push, Push, Push – New Pathways for the Generation of Soft Actuators**
Prof. Jürgen Rühle (University of Freiburg, DE)

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

- A4 Robotics / Micro Robotics / Soft Robotics**
Chairs: Bert Müller (University of Basel, CH); Janusz Goldasz (BWI Beijing West Industries Technical Center Kraków, PL)
- 11:00 **Design and Fabrication of a smart Five-Fingered Soft Robotic Hand with Embedded SMA Actuator and Piezoresistive Flexible Sensor**
Racha Benarrait, M. Sc (Technische Universität Braunschweig Institut Für Mikrotechnik & Institut Für Mikrotechnik, DE)
- 11:20 **Fabrication of pneumatic soft fingers considering material/process/design interaction**
Baptiste Kraehn (ICube, FR); Thibauld Delrieu (Pprime, FR); Laurence Meylheuc (ICube, FR); Pascal Seguin and Jean-Pierre Gazeau (Pprime, FR); Olivier Piccin (ICube, FR)
- 11:40 **Soft aquatic robot using shape memory actuators based on an octopus jellyfish to improve water quality in aquariums**
Yoshiaki Fujiwara, Hironari Taniguchi and Teppei Ueda (Osaka Institute of Technology, JP)
- 12:00 **Development of a soft avatar robot using soft pneumatic actuators for an exhibition hall**
Yuki Hirano, Hironari Taniguchi and Hideaki Kokubu (Osaka Institute of Technology, JP)
- 12:20 **Integrated Force Sensing Technology for Twisted String Actuation Using Conductive Yarns**
Giuliano Antonio Giacoppo and Sina Öztürk (University of Stuttgart, DE); Peter P. Pott (Universität Stuttgart, DE)

12:40 - 13:40 Lunch Break

Dostojewski Saal**B4 Polymer Actuators**

Chairs: Herbert Shea (Ecole Polytechnique Fédérale de Lausanne (EPFL), CH); André Preumont (Université libre de Bruxelles, BE)

- 11:00 **Natural Rubber Foil-Based Elastocaloric Cooling**
Carina Ludwig (Karlsruher Institut für Technologie, DE); Jan Leutner (Albert-Ludwigs-Universität Freiburg, DE); Oswald Prucker (Universität Freiburg, DE); Jürgen Rühle (University of Freiburg, DE); Manfred Kohl (Karlsruher Institut für Technologie (KIT), DE)
- 11:20 **A Dielectric Elastomer based Miniaturized Soft Planar Microactuator**
Simon Holzer Bhawnath Tiwari (Ecole Polytechnique Fédérale de Lausanne, CH); Yoan Civet (École Polytechnique Fédérale de Lausanne, CH); Yves Perriard (Laboratory director, CH)
- 11:40 **Investigation of the influence of fiber reinforcement onto electro-active strain and force in uniaxial DEAs**
Stefania Konstantinidi (Ecole Polytechnique Fédérale de Lausanne (EPFL) & Integrated Actuators Laboratory (IAI), CH); Markus Koenigsdorff (Technische Universität Dresden, DE); Simon Holzer (Ecole Polytechnique Fédérale de Lausanne, CH); Johannes Mersch (Johannes Kepler University Linz, Austria); Thomas Martinez (École Polytechnique Fédérale de Lausanne (EPFL), CH); Yoan Civet (École Polytechnique Fédérale de Lausanne, CH); Gerald Gerlach (Technische Universität Dresden, DE); Yves Perriard (Laboratory director, CH)
- 12:00 **Multi-stimuli responsive biopolymer based controlled soft actuator**
Vipin Kumar (Indian Institute of Technology, Madras, India)
- 12:20 **Coreless Rolled Dielectric Elastomer Transducer for Push-Pull Application Based on Multilayer Dielectric Elastomer Laminates**
Tim Simon Krüger (Technische Universität Berlin & Institute of Machine Design and Systems Technology, DE); Ozan Çabuk, Jürgen Maas (Technische Universität Berlin, DE)

Salon Schuricht**C4 KOMMMA Cooperative Multistage Multistable Microactuator Systems (1)**

Chair: Manfred Kohl (Karlsruher Institut für Technologie, DE)

- 11:00 **Adaptive Hydrogel Microactuators**
Hoang Bao Duc Tran (Institute of Organic Chemistry Heidelberg, DE)
- 11:20 **In-Plane Bistable Microdevice in Silicon Technology**
Gowtham Arivanandhan and Maximilien Kiegerl (Karlsruhe Institute of Technology, DE); Elaheh Akbarnejad (Ruhr University Bochum, DE); Zixiong Li (Karlsruhe Institute of Technology, DE); Alfred Ludwig (Ruhr University Bochum, DE); Manfred Kohl (Karlsruher Institut für Technologie (KIT), DE)
- 11:40 **Multistable Magnetic Lift Actuation under Variable Loads**
Pascal Weber (University Freiburg, DE), Yannik Rüde (University Freiburg, DE), Ulrike Wallrabe (University Freiburg, DE)
- 12:00 **Model Order Reduction Augmented by a Neural Network for a Nonlinear Electrostatic Micro-Actuator**
Arwed Schütz and Tamara Bechtold (Jade University of Applied Sciences, DE)
- 12:20 **Optimized Feedforward Control of a Multistable Magnetic Actuator**
Michael Olbrich (University of Augsburg, DE), Pascal Weber (University Freiburg, DE), Ulrike Wallrabe (University Freiburg, DE), Christoph Ament (University of Augsburg, DE)

12:40 - 13:40 Lunch Break

Foyer

P1 Poster Session	
P1	Direct writing of multilayer multistimuli micro actuators <i>Eleonora Galli (University of Freiburg, DE)</i>
P2	Rate Dependent Prandtl-Ishlinskii (RDPI) model based motion compensation of Mitraclip® Delivery System <i>Syed Zain Mehdi (KU Leuven,BE); Mouloud Ourak (KU Leuven,BE); Emmanuel Benjamin Vander Poorten (KU Leuven,BE)</i>
P3	Light-controlled mechanisms based on photomobile polymers for seamless integration in demanding environments <i>Mathieu Thomachot, Jolan Gauthier, Patrick Meneroud, Sylvain Duc and Guillaume Mansuy (Cedrat Technologies, FR); Frank Claeysen (CEDRAT Technologies S.A., FR)</i>
P4	Miniaturized Arbitrary Waveform Generator for Micropumps with Piezoelectric Actuators <i>Oliver Zett, Agnes Bußmann and Sebastian Kibler (Fraunhofer EMFT, DE)</i>
P5	An inchworm using piezoelectric actuators and electromagnets with MR fluid <i>Takeshi Inoue, Akihiro Torii and Hayata Takashima (Aichi Institute of Technology, JP); Suguru Mototani (1247 Yachiguza, Yakusa-cho, Toyota, Aichi & Aichi Institute of Technology, JP); Kae Doki (Aichi Institute of Technology, JP)</i>
P6	A Flow Control Valve using Piezoelectric Vibrator for Hydraulic Soft Actuators <i>Takefumi Kanda, Kou Hashimoto, Yuma Mizokuchi, Yusuke Ota, Daisuke Yamaguchi and Shuichi Wakimoto (Okayama University, JP); Koichi Suzumori and Hiroyuki Nabae (Tokyo Institute of Technology, JP)</i>
P7	The Application of Piezoelectric-Driven Actuators in Bone Conduction Devices <i>Julia Friederike Lieber (MED-EL, Innsbruck, Austria); Alexander Reininger (Linz Center of Mechatronics GmbH, Austria)</i>
P8	3-DOF small size piezoelectric actuator for optical systems <i>Andrius Ceponis, Dalius Mazeika and Regimantas Bareikis (Vilnius Gediminas Technical University, Lithuania)</i>
P9	Piezoelectric Spindel Drives <i>Alexej Wischnewski (Physik Instrumente (PI) & GmbH & Co KG, DE)</i>
P10	A wideband vibration energy harvester with integrated energy management designed for harsh environment <i>Timotéo Payre, Nabil Bencheikh, Alexandre Pagès, Guillaume Mansuy and Clément-Joseph Galteau (Cedrat Technologies, FR)Julius Harms, Thorsten A Kern (Hamburg University of Technology, DE)</i>
P11	Material Properties of Hard and Soft Piezoelectric Ceramics at Cryogenic Temperatures <i>Burhanettin Koc (Physik Instrumente (PI) GmbH & Co. KG, DE); Jan Homberg (Physik Instrumente GmbH, DE); Sebastian Schlack (PI Ceramic GmbH, DE)</i>
P12	HASEL-Actuated Pneumatic Valve for Image Guided Robotic Systems <i>Fabian Sadi (University of Heidelberg, DE); Jan Holthausen (Deutsch, DE)</i>
P13	Improving dynamic accuracy of closed loop bandwidth of piezo mechanisms with-advanced control laws and embedded eddy current position sensors <i>Clément Cote, Olivier Sosnicki, Timotéo Payre, Guillaume Mansuy, Mathieu Castruccio and Alexandre Pagès (Cedrat Technologies, FR)</i>

15:10 - 15:30 Coffee Break

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- P14 **Measurement of the High-Power Mechanical Quality Factor for Piezoelectric Transducers Based on the Electrical Harmonic Steady-State Response**
Alexej Wischnewski (Physik Instrumente (PI) & GmbH & Co KG, DE)
-
- P15 **Inchworm vs Inertial piezoelectric motor trade-off**
Nabil Bencheikh, Nicolas Bourgeot, Jocelyn Rebufa, Etienne Betsch, Jolan Gauthier and Alexandre Pagès (Cedrat Technologies, FR)
-
- P16 **Targeted acoustic positioning of various objects**
Alexander Backer, Sandro Krempel and Klaus Drese (Coburg University of Applied Sciences and Arts, DE)
-
- P17 **Investigations of additively manufactured SMA high-load actuator elements**
Andrea Böhm (Fraunhofer-Institut für Werkzeugmaschinen und Umformtechnik, DE); Christian Weck (Fraunhofer IFAM, DE); Andreas Hofer (Fraunhofer Institute for Machine Tools and Forming Technology IWU, DE); Kenny Pagel (Fraunhofer IWU, DE); Welf-Guntram Drossel (Fraunhofer Institute for Machine Tools and Forming Technology IWU, DE)
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- P18 **Modular Gripping Mechanism for Collaborative Robotic Endoscopic Lumbar Decompression (ELD) surgery**
Giovanni Battista Regazzo (KU Leuven,BE); Ayoob Davoodi (KU Leuven & Robotica, Automatisering En Mechatronica (RAM),BE); Yuyu Cai (KU Leuven,BE); Fabio Carrillo (University of Zurich,BE); Christoph J. Laux and Philipp Fürnstahl (University of Zurich, CH); Emmanuel Benjamin Vander Poorten (KU Leuven,BE)
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- P19 **Custom Voice Coil Actuator for flexure-based electromechanical RF switch**
Daniel Grivon (& CSEM SA, CH)
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- P20 **Chemofluidics – an autonomous Lab-on-Chip concept based on smart material components**
Andreas Richter (TU Dresden, DE)
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- P21 **Modelling of an ice protection system based on icephobic and piezoelectric technologies, for WT demonstration**
Luigi Mangiacrapa (Centro Italiano Ricerche Aerospaziali, IT); Nadine Rehfeld (Fraunhofer IFAM, DE); Filomena Piscitelli (Centro Italiano Ricerche Aerospaziali, IT); Salvatore Ameduri (CIRA, IT); Antonio Concilio and Giuseppe Mingione (Centro Italiano Ricerche Aerospaziali, IT)
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- P22 **Digital approach to smart materials data and models using an ontology-based data and model access**
Robert Courant (Technische Universität Berlin, DE); Mena Leemhuis (University of Lübeck, DE); Jana Mertens (Technische Universität Berlin, DE); Martin Dahlmann (TU Ilmenau, DE); Sebastian Stark (Fraunhofer Institute for Ceramic Technologies and Systems IKTS, DE); Andrea Böhm (Fraunhofer-Institut für Werkzeugmaschinen und Umformtechnik, DE); Kenny Pagel (Fraunhofer IWU, DE); Daniel Pinkal (Fraunhofer Institute for Applied Polymer Research IAP, DE); Michael Wegener (Fraunhofer IAP, DE); Martin Wagner (Technische Universität Chemnitz, DE); Thomas Sattel (Ilmenau University of Technology, DE); Özgür L. Özcep (University of Lübeck, DE); Jürgen Maas (Technische Universität Berlin, DE)
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- P23 **Industrial-scale stacked dielectric elastomer actuators designs, interfaces and electronic control unit topologies**
Omar Raita, Fabio Beco Albuquerque, Yassine Ahaggach, Anette Wiesmath (Dätwyler Schweiz AG, CH)
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Zais Saal**A5 Pneumatics / Robotics / Medical Devices***Chairs: M. Taha Chikhaoui (Université Grenoble-Alpes, FR); Pierre Renaud (University of Strasbourg, FR)***15:30 A bistable pneumatic actuator based on flexible metamaterials***Anagha Navale, Edoardo Milana (University of Freiburg, DE)***15:50 Axially Distributed Fluidic Actuators for Steerable Minimally Invasive Surgical Device Applications***Bob Lathrop (KU Leuven, BE); Mouloud Ourak (KU Leuven, BE); Emmanuel Benjamin Vander Poorten (KU Leuven, BE)***16:10 Planning and deployment of concentric tube robot actuation systems for use in stereotactic neurosurgery clinical researches***Julian Mühlenhoff, Fabian Rabel, Thorben Körbner (Technische Universität Ilmenau, DE); Thomas Sattel (Ilmenau University of Technology, DE)***16:30 Inverse pneumatic artificial muscles with implantable vascular graft***Laura Galassi, Lucrezia Lorenzon, Matteo Cianchetti (Scuola Superiore Sant'Anna, IT)***16:50 An origami-based fluidic actuator for Minimally Invasive Surgery***Alexia Le Gall, Théo Dangel (Scuola Superiore Sant'Anna, IT); Lorenzo Mocellin (Scuola Superiore Sant'Anna, IT); Zixi Chen, Matteo Bernabei, Matteo Cianchetti (Scuola Superiore Sant'Anna, IT)***Dostojewski Saal****B5 Polymer Actuators / Piezoelectric Actuators***Chair: Miriam Biedermann (Bürkert Werke GmbH & Co. KG, Karlsruhe, DE)***15:30 Biomimetic Hygromorphic Actuator Systems***Jürgen Rühle (University of Freiburg, DE)***15:50 Development of a 3D-Bendable Soft Robotic Segment Driven by Rolled Dielectric Elastomer Actuators***Julian Kunze (ZeMA – Center for Mechatronics and Automation Technology, Depart. Smart Material Systems, Saarbruecken, DE); Giovanni Soletti, Daniel Bruch, Paul Motzki, Gianluca Rizzello (Saarland University, Depart. Systems Engineering, Saarbruecken, DE)***16:10 Integrated manufacturing of small-scale dielectric elastomer transducers with rigid structures***Andreas Hubracht (Technische Universität Berlin, DE); Chen Jiao, Ashwani Sharan Tripathi (Technische Universität Dresden, DE); Andreas Richter (TU Dresden, Germany); Markus Henke, Uwe Marschner (Technische Universität Dresden, DE); Jürgen Maas (Technische Universität Berlin, DE)***16:30 Miniature Piezo Fast Steering Mirror for Optical Communication in NanoSats and CubeSats***Frank Claeysen (CEDRAT Technologies S.A., FR); Gérald Aigouy, Mathieu Thomachot, Sylvain Chardon, Timotéo Payre, Hugo Gardel, Yann Quentel (Cedrat Technologies, FR)***16:50 Transient response control of the ultrasonic motor with adaptive frequency sweep***Tatsuki Sasamura (The University of Tokyo, JP); Norio Sashida (Shinsei Corporation, JP); Takeshi Morita (The University of Tokyo, JP)*

Salon Schuricht

C5	KOMMMA Cooperative Multistage Multistable Microactuator Systems (2) <i>Chair: Ulrike Wallrabe (University of Freiburg, Department of Microsystems Engineering – IMTEK, DE)</i>
15:30	Design and Simulation of Negative-stiffness Thermoplastic Biasing Mechanisms for Dielectric Elastomer Actuator <i>Saverio Addario, Alberto Priuli (University of Saarland, DE); Jonas Hubertus (University of Applied Sciences of Saarland, DE); Günter Schultes (HTW Saar, ZeMA gGmbH, DE); Stefan Seelecke, Gianluca Rizzello (University of Saarland, DE)</i>
15:50	Development of a Re-Programmable Micro Origami Device <i>Vincent Gottwald, Lena Seigner, Manfred Kohl (Karlsruher Institut für Technologie (KIT), DE)</i>
16:10	Hold it together- Micro-actuator latching mechanism <i>Martin Heyer (University of Freiburg, DE)</i>
16:30	Miniaturization of HASEL Actuators for Next-Generation Applications <i>Ashwani Sharan Tripathi, Chen Jiao (Technische Universität Dresden, DE); Andreas Hubracht (Technische Universität Berlin, DE); Markus Henke (Technische Universität Dresden, DE); Jürgen Maas (Technische Universität Berlin, DE); Andreas Richter (TU Dresden, DE)</i>
16:50	Miniaturized Dielectric Elastomer Switch with the Potential as Bricks of Cooperative Multi-Actuator System <i>Chen Jiao, Ashwani Sharan Tripathi (Technische Universität Dresden, DE); Andreas Hubracht (Technische Universität Berlin, DE); Andreas Richter (Technische Universität Dresden, DE); Jürgen Maas (Technische Universität Berlin, DE); Markus Henke (Technische Universität Dresden, DE)</i>

General Information

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Conference Fees

(The conference fee includes admission to all sessions as well as to the Conference Proceedings)

	Early Bird Registration by May 16, 2024	Registration after May 16, 2024
Full Ticket	990,- €	1080,- €
VDE/VDI Members	870,- €	960,- €
Authors	570,- €	660,- €
Committee Members	570,- €	660,- €
Students *	150,- €	230,- €

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Cancellation

In case of cancellation, provided that written notice has been given to VDE-Conference Services 4 weeks before conference start, the registration fee will be fully refunded less a handling fee of EURO 80.00. After this deadline no refund will be made. Proceedings will then be sent to the registrant after the conference.

Conference Venue

Kurhaus Wiesbaden
Kurhausplatz 1
65189 Wiesbaden, Germany



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Training Sessions CEDRAT TECHNOLOGIES Attend the 1-day training performed on June 12th by Cedrat Technologies (CTEC), as joint event to ACTUATOR 2024

The courses are opened to engineers, PhD students and technicians willing to have a first knowledge either on piezo OR on linear actuators. As these training courses are not part of the conference ACTUATOR 2024, a separate registration is required (550 €).

Should you be interested in attending one session feel free to contact CTEC at training.ct@cedrat-tec.com or by phone +33 (0)4 56 58 04 14 (asking for Ms Hugi Sandrine).



Conference Information

Exhibition

The **13th International Exhibition on Smart Actuators and Drive Systems** 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.

Within the online exhibition area, we will again have application oriented presentations on a product level, besides the in-depth conference programme. This Exhibition Forum provides additional information about the exhibition topics on the product level especially to visitors of the exhibition. Exhibitors and other parties are therefore invited to show contributions and demonstrate their products.

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