

ACTUATOR 18

International Conference and Exhibition
on New Actuators and Drive Systems

Bremen, Germany
25 – 27 June 2018



1988 – 2018

**Conference
Programme**



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Monday 25 June		
Hanse Saal	Borgward Saal	Focke Wulf Saal
Session A	Session B	Session C
8:45 Opening		
9:00 Review A1		
9:30 Review B1		
10:00 Review C1		
10:30 Coffee Break in the Exhibition Area (Hall 4.1)		
11:00 A1 Low-Power Electro-magnetic Actuators	11:00 B1 (Bio-)Medical Applications	11:00 C1 Haptic/Tactile Applications
12:20 Lunch Break in the Exhibition Area (Hall 4.1)		
14:20 Review A2		
14:50 Review B2		
15:20 Review C2		
15:50 A2 Piezoelectric Actuators	15:50 B2 Polymer Actuators	15:50 C2 Microactuators / Microfluid Handling Devices
16:50 Coffee Break in the Exhibition Area (Hall 4.1)		
17:20 A2 Piezoelectric Actuators	17:20 B2 Polymer Actuators	17:20 C2 Microactuators / Microfluid Handling Devices

Tuesday 26 June		
Hanse Saal	Borgward Saal	Focke Wulf Saal
Session A	Session B	Session C
9:00 Review A3		
9:30 Review B3		
10:00 Review C3		
10:30 Coffee Break in the Exhibition Area (Hall 4.1)		
11:00 A3 Piezoelectric Actuator Applications	11:00 B3 Magnetostrictive / MSM Actuators	11:00 C3 Actuator Control
12:20 Lunch Break in the Exhibition Area (Hall 4.1)		
14:20 Review C4		
14:50 A3 Piezoelectric Actuator Applications	14:50 B3 Magnetostrictive / MSM Actuators	14:50 C4 ERF/MRF Actuators
16:40–18:45 Poster Session (Hall 4.1)		
19:30–22:30 Welcome Reception/Get-together (Foyer Congress Center Bremen)		

Wednesday 27 June		
Hanse Saal	Borgward Saal	Focke Wulf Saal
Session A	Session B	Session C
9:00 Review A5		
9:30 Review B5		
10:00 Review C5		
10:30 Coffee Break in the Exhibition Area (Hall 4.1)		
11:00 A5 Active Vibration / Noise Control	11:00 B5 Aerospace Applications	11:00 C5 Shape Memory Actuators
12:50 Closing Remarks		
13:00 Lunch Break in the Exhibition Area (Hall 4.1)		
15:00 End of Conference		

Monday 25 June 2018

A1 Low-Power Electromagnetic Actuators		Hansesaal
09:00 – 09:30	A1.0	Electromagnetic Actuators in Context of Industrial and Social Development from Today and Tomorrow (Invited Review) G. Puchner, N. Richmond
10:30		Coffee Break (Hall 4.1)
11:00 – 11:20	A1.1	Active Gravity Compensation Actuator Using the Multistability of Magnetic Shape Memory M. Raab*, W. Schinköthe
11:20 – 11:40	A1.2	Smart Realisation of Energy Savings During Switching Operation at Bi-stable Process Valves T. Kramer*, J. Weber, G. Pflug, B. Harnisch
11:40 – 12:00	A1.3	Sensor Properties of Electromagnetic Actuators A. Gadyuchko
12:00 – 12:20	A1.4	Accurate Combustion Engine Actuator Simulation in Industrial Strength Coupled Electromagnetic-thermal-flow Multi-physics Modeling Environment G. Damblanc, P. Hilscher, S. Holst, P. Lammers
12:20		Lunch Break (Hall 4.1)

B1 (Bio-) Medical Applications		Borgward Saal
09:30 – 10:00	B1.0	Control of Continuum Robots for Medical Applications: State of the Art (Review Hanse Saal) M.T. Chikhaoui*, J. Burgner-Kahrs
10:30		Coffee Break (Hall 4.1)
11:00 – 11:20	B1.1	An Experimental Study on the Insertion of Neural-interfaces into Peripheral Nerve Using a Piezoelectric Vibrator B.K. Lim, Y.S. Ich, S. Yim, J. Jeong, J. Jeong, S.-R. Oh, K. Kim, D. Hwang
11:20 – 11:40	B1.2	A 3 DOFs Mini Variable Stiffness Soft Pneumatic Actuator L. Manfredi, L. Yue, A. Cuschieri
11:40 – 12:00	B1.3	Controllable Multibending Soft Actuator for Surgical Applications H. Abidi, A. Tonazzini, D. Floreano, A. Menciassi, M. Cianchetti
12:00 – 12:20	B1.4	Polymer Actuated Patient-specific Artery Phantoms for Simulating Stenosis and Dilation F.B. Holness*, T. Poepping, A.D. Price
12:20		Lunch Break (Hall 4.1)

09:00 – 12:20

C1 Haptic/Tactile Applications		Focke Wulf Saal
10:00 – 10:30	C1.0	Touching Virtual Reality: A Review of Haptic Gloves (Review Hanse Saal) J. Perret, E. Vander Poorten
10:30		Coffee Break (Hall 4.1)
11:00 – 11:20	C1.1	Development of a Thumb-Index Hand Interface for Application in Tele-robotics and Virtual Reality M. Folgheraiter, A. Zhilisbayev, N. Kuandyk
11:20 – 11:40	C1.2	Design and Experimental Validation of an MR-Fluid Based Brake for Use in Haptics M.G. Karabulut*, M.I. Dede
11:40 – 12:00	C1.3	Solid State Joint Actuator for a Vibro Tactile Line Display A.S. Schmelt*, E.C. Fischer, M.C. Wurz, J. Twiefel
12:00 – 12:20	C1.4	Highly Perceivable Tactile Feedback by Magnetic Shape Memory Technology A. Saren, D. Musiienko, T. Nukarinen, A. Saghi, A. Sozinov, J. Tellinen, A. Hippula, R. Raisamo, K. Ullakko
12:20		Lunch Break (Hall 4.1)

A2 Piezoelectric Actuators		B2 Polymer Actuators		C2 Microactuators / Microfluid Handling Devices	
Hanse Saal		Borgward Saal		Focke Wulf Saal	
14:20 – 14:50 A2.0	Global Crisis Technologies – In Actuator/Piezoelectric Devices (Review, IEEE DL Lecture) K. Uchino	14:50 – 15:20 B2.0	Dielectric Elastomer Actuator-/Sensorsystems – From Basic Science to Application Ideas (Invited Review Hanse Saal) S. Seelecke	15:20 – 15:50 C2.0	MEMS in Nanopositioning (Invited Review Hanse Saal) M. Maroufi*, A.G. Fowler, S.O.R. Moheimani
15:50 – 16:10 A2.1	High Temperature Piezoelectric Actuators T. Comyn, P. Cowin, A. Bell	15:50 – 16:10 B2.1	Polymer Materials for Cost-efficient Manufacturing of Electrothermal Actuators C. Nakic, A. Stuckert, A. Stuckert, H.F. Schlaak, T. Beyrich, D. Nickel, M. Oechsner	15:50 – 16:10 C2.1	Multi-Layer, Thin-Film Repulsive-Force Electrostatic Actuators for a 2-DoF Micro-Mirror E.W. Schaler*, L. Jiang, R.S. Fearing
16:10 – 16:30 A2.2	Changes in Mechanical Quality Factors with Canted Polarization for Piezoelectric Actuators M. Choi, T. Scholehwar, E. Hennig, A. Bell	16:10 – 16:30 B2.2	Large Arrays of Microfabricated Shape Memory Polymer Actuators for Haptics and Microfluidics N. Besse, B. Aksoy, H. Shea	16:10 – 16:30 C2.2	VO2: A Material for High-performance Micro/nanoactuators N. Manca, L. Pellegrino, T. Kanki, Y. Higuchi, W. J. Venstra, G. Mattoni, A.D. Caviglia, H. Tanaka, D. Marré
16:30 – 16:50 A2.3	Do We Really Understand of Field Induced Strain Phenomena in PZT Ceramics? Y. Akiyama	16:30 – 16:50 B2.3	Characterization of Enhanced Silicone Materials for Dielectric Elastomer Transducers T. Hoffstadt, A. Köllnberger, J. Maas	16:30 – 16:50 C2.3	Technology to Avoid Leaching in a Microfluidic Water Sample Treatment System R. Lopes, H. Schuette, M.L. Miranda, S. Gassmann, O. Zielinski
16:50	Coffee Break (Hall 4.1)	16:50	Coffee Break (Hall 4.1)	16:50	Coffee Break (Hall 4.1)
17:20 – 17:40 A2.4	PIRest Technology – How to Keep the Last Position of PZT- actuators Without Electrical Power J. Reiser*, H. Marth	17:20 – 17:40 B2.4	Development of a High Voltage Source for Dielectric Elastomer Actuators (DEA) S. Lenz*, B. Holz, S. Hau, P. Motzki, S. Seelecke	17:20 – 17:40 C2.4	Macro-Micro-Interface for a Microfluidic Nitrite Sensor S. Gassmann*, H. Schuette, C. Thoma
17:40 – 18:00 A2.5	Piezoelectric Driven Carbon Fiber Cilia Based Linear Actuators A. Carrasco, D.B. Thiem, P.P. Pott, H.F. Schlaak	17:40 – 18:00 B2.5	Solid State Actuators Based on Helical Fibers: Structure, Properties and Applications M. Dias Lima	17:40 – 18:00 C2.5	Magnetically Driven Pump for Solid-State Microfluidic Flow Control A.R. Smith, D. Fologea, P. Müllner
18:00 – 18:20 A2.6	On the Design of a Novel Actuation Principle for a Piezo Rotary Stage S. Cappa, J. Peirs*, B. Kererschot	18:00 – 18:20 B2.6	Smart Soft Environment Monitoring System Based on Self-sensing Actuator (Haptic Artificial Muscle) J. Schumacher, T. F. Otero, V.H. Pascual	18:00 – 18:20 C2.6	Observation of Pump Effect Using Ultrasonic Transducer and Opposing Surface M. Takasaki*, H. Shinada, Y. Ishino, D. Yamaguchi, M. Hara, T. Mizuno

A3 Piezoelectric Actuator Applications		Hanse Saal		B3 Magnetostrictive / MSM Actuators		Borgward Saal		C3 Actuator Control		Focke Wulf Saal	
09:00 – 09:30	A3.0	Piezoelectric Actuator Applications – Status 2018 (Review) P. Pertsch		09:30 – 10:00	B3.0	Materials and Actuator Solutions for Advanced Magnetic Shape Memory Devices (Review Hanse Saal) E. Pagounis, P. Müllner		10:00 – 10:30	C3.0	Actuator Control – Self-Sensing and Control of Actuators (Review Hanse Saal) J. Maas, T. Hoffstadt	
10:30	Coffee Break (Hall 4.1)			10:30	Coffee Break (Hall 4.1)			10:30	Coffee Break (Hall 4.1)		
11:00 – 11:20	A3.1	Vibration Mode Dependence of the High-power Piezoelectric Properties in of Hard Pb(Zr,Ti)O ₃ M. Slabki, M. Weber, P. Breckner, P. Breckner, D. Isaia, J. Koruza		11:00 – 11:20	B3.1	Self-sensing Actuators Based on Ferromagnetic Shape Memory Alloys F. Ehle, U. Keitel, P. Neumeister, H. Neubert		11:00 – 11:20	C3.1	A Direct Flux Observer Based on a Fast Resettable Integrator Circuitry for Sensorless Control of PMSMs D. Merl, E. Grasso, R. Schwartz, M. Nienhaus	
11:20 – 11:40	A3.2	Mesh Robot Developed by Micro Ultrasonic Motor S. Toyama, U. Nishizawa		11:20 – 11:40	B3.2	Discrete Twin-boundary Dynamics: Experimental Characterization and Modeling of Actuator Performance N. Zreihan, E. Faran, L. Riccardi, D. Shilo		11:20 – 11:40	C3.2	A New Absolute X, Y, Theta Encoder with Flexible Implementation and Standoff Reading Distance O. Acher*, M. Leroy, T.-L. Nguyen	
11:40 – 12:00	A3.3	L1B2 Piezo Motor Using D33 Effect B. Delibas*, B. Koc		11:40 – 12:00	B3.3	Velocity-dependent Twinning Stress in Magnetic Shape Memory Alloy Ni-Mn-Ga 5M Martensite A. Saren, K. Ullakko		11:40 – 12:00	C3.3	Yaw Control Torque Generation for a Hovering Flapping Wing MAV A. Roshanbin, A. Preumont	
12:00 – 12:20	A3.4	A Tracked Mobile System Driven by a Sandwiched Traveling Wave Piezoelectric Transducer L. Wang*, V. Hofmann, F. Bai, J. Jin, W. Ye, J. Twiefel		12:00 – 12:20	B3.4	Magnetostrictive Actuators with 1D and 2D Magnetic Field H.G. Lee, Y.W. Park, M. Noh		12:00 – 12:20	C3.4	Positioning Control for Flexible Steel Plate Using Facing Electromagnetic Actuator: Fundamental Consideration on Support Characteristic of Electromagnetic Actuator T. Narita*, Y. Oda, Y. Ito, K. Okuno, H. Kato	
12:20	Lunch Break (Hall 4.1)			12:20	Lunch Break (Hall 4.1)			12:20	Lunch Break (Hall 4.1)		

14:50 – 15:10	A3.5	A Two-stage Piezohydraulic Linear Actuator as Artificial Muscle in Robotic Applications W. Zoels, G. Bachmaier		14:50 – 15:10	B3.5	Combined Thermal and Magnetic Tripping of MSM S. Breisch, A. Tueysuez, M. Schautzgy, M. Laufenberg		14:20 – 14:50	C4.0	C4 ERF / MRF Actuators Controllable Actuators Utilizing Smart MR Materials and ER Suspensions (Review Hanse Saal) S.-B. Choi, J. Goldasz	
15:10 – 15:30	A3.6	Self-sensing Grasping with Piezoelectric Manipulator K. Suzuki, S.K. Chee, T. Morita		15:10 – 15:30	B3.6	Magnetic-field-induced Actuation of Ni-Mn-Ga Micro-pillars D. Musiienko*, L. Straka, L. Klimša, A. Saren, A. Sozinov, O. Heczko, K. Ullakko		15:10 – 15:30	C4.1	An Internal Bypass Magnetorheological Energy Absorber X. Bai, S. Shen, S. Yang, L. Qian	
15:30 – 15:50	A3.7	Design and Testing of a Novel Piezoelectric Rotary Motor Based on Improved Deformation Wave Precession Mechanism N.L. Cau, F. Buonanno LI, A.F. Sette*, P. Roberto		15:30 – 15:50	B3.7	Effects of Magnetron Sputtering on Oblique Deposition of Magnetostrictive Thin Films K. Yamaguchi, Y. Tsukagoshi, K. Yatagai, H.T. Uchida, Y. Matsumura		15:30 – 15:50	C4.2	A New Concept of an Electrorheological Planar Damper for Independent Damping Adjustment in Planar Movement A.S. Tan*, T. Sattel	
15:50 – 16:10	A3.8	Improvement of MSPA Module of Stepping Piezo Actuator F. Barillot*, A. Pagès, A. Guignabert, O. Freychet, C. Belly, T. Maillard, F. Claeysen		15:50 – 16:10	B3.8	Performance of an MSM Micropump A. Armstrong*, A. Smith, J. Freilich, B. Johnston, P. Lindquist, P. Müllner		15:50 – 16:10	C4.3	An Effect of the Time Response of MR Damper to the Vehicle Suspension Performances S.-B. Choi, Inha University, Incheon, South Korea	
16:10 – 16:30	A3.9	Redefining Valves in Volume Pump J. Zhang, J. Fu, F. Zhang, Y. Zhou, J. Huang, W. Huang, K. Bian, K. Bian, P. Liu*		16:10 – 16:30	B3.9	Mechanical Switching Behavior of a Ni-Mn-Ga Single Crystal in Magnetic Fields with Different Directions C. Titsch*, W.-G. Drossel, P. Müllner		15:50 – 16:10	C4.4	CFD Simulation of a Smart Magnetorheological Fluid Actuator H.C. Wang, A. El Wahed	
16:40 – 18:45	Poster Session (Hall 4.1)			16:40 – 18:45	Poster Session (Hall 4.1)			16:10 – 16:30	C4.5	Advantages of a Novel MRF-based Coupling Element in Hybrid Powertrains C. Hegger, J. Maas	
19:30 – 22:30	Welcome Reception / Get-together (Foyer Congress Center Bremen)										

Invitation

to

ACTUATOR 18

16th international Conference & Exhibition on New Actuators

Bremen, Germany, 25–27 June 2018

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MESSE BREMEN, Bremen, Germany

We would like to welcome you to ACTUATOR 2018, the 16th International Conference on New Actuators. As it is a series of biennial events, we are going to celebrate its 30th anniversary in June this year. Establishing the top event of the international actuator community for networking and international technology transfer of scientific results into industrial products for 30 years now – nobody would have had expected this at the moment, when this event was launched here in Bremen in 1988. Most of the original initiators have already retired or are at least preparing their retirement from business. Thus, this is the perfect moment to say “thank you” to all those, who have contributed to this successful event series during all these years as speakers, authors, exhibitors and – last but not least – as members of the organisation teams.

Not to forget the members of the programme committees, who ensured the high quality standard maintained during these years in compiling an attractive conference programme on the basis of the submissions received in response to the Call for Papers. These programmes – well-balanced between scientific and industrial approaches – have always been a claim to fame of ACTUATOR and always attracted 50 per cent of the delegates from industry. An event, perfect for technology transfer as well as well as for a career start in industry! We, the organisers, are proud having served you this important forum during all these years.

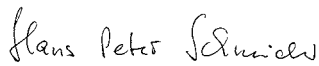
The response to the current Call for Papers was even a little bit higher than in 2016. That's indeed a promising signal after years of slight decrease. In total 150 conference contributions, 84 oral presentations and 66 posters will be portraying the state of the art technologies and indicating future trends. As usual, the conference will close with a common lunch on Wednesday.

For the first time, we will publish the digital version of the proceedings in close cooperation with the VDE Verlag GmbH (VDE Publishing House). Hereby, the 2018 manuscripts will be included in the IEEE Xplore Digital Library to ensure an international visibility and a high value for the citation index.

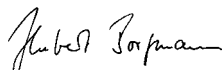
Including all reviews, a 2018 conference participant has the chance to listen to as many as 38 well selected oral contributions. As usual, all the other contributions, including the posters, will be properly documented in the proceedings. We hope that the remaining conflicts of interest will have been minimised by a well-selected placement of the sessions in the general schedule.

We are sure that besides the presentations this schedule offers sufficient time for visiting the accompanying exhibition, for networking within the community as well as for the accompanying programme.

The Programme Committee, the exhibitors and the organiser will be pleased to welcome you to the 16th International Conference on New Actuators and its accompanying exhibition in June 2018.



Hans Peter Schneider
MESSE BREMEN
General Manager



Hubert Borgmann
MESSE BREMEN
Organiser ACTUATOR 2018



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Session A

Monday 25 June 2018, 09:00–12:20, Hanse Saal

Please note that all reviews will be given in the plenum in the Hanse Saal!

Session A1 Low–Power Electromagnetic Actuators

Session Chair R. Keller / W. Amrhein

09:00 – A1.0 **Electromagnetic Actuators in Context of Industrial and Social Development from Today and Tomorrow** (Invited Review)

G. Puchner, Kendrion (Donaueschingen/Engelswies) GmbH, Donaueschingen, Germany
N. Richmond, Kendrion (Villingen) GmbH, Villingen-Schwenningen, Germany

10:30 **Coffee Break (Hall 4.1)**

11:00 – A1.1 **Active Gravity Compensation Actuator Using the Multistability of Magnetic Shape Memory**

M. Raab*, Universität Stuttgart, Stuttgart, Germany
W. Schinköthe, Universität Stuttgart, Stuttgart, Germany

11:20 – A1.2 **Smart Realisation of Energy Savings During Switching Operation at Bi-stable Process Valves**

T. Kramer*, Technische Universität Dresden, Dresden, Germany
J. Weber, Technische Universität Dresden, Dresden, Germany
G. Pflug, Thüringisches Institut für Textil- und Kunststoff-Forschung e. V., Rudolstadt, Germany
B. Harnisch, PSK Ingenieurgesellschaft mbH, Erfurt, Germany

11:40 – A1.3 **Sensor Properties of Electromagnetic Actuators**

A. Gadyuchko, Kendrion Mechatronics Center GmbH, Ilmenau, Germany

12:00 – A1.4 **Accurate Combustion Engine Actuator Simulation in Industrial Strength Coupled Electromagnetic-thermal-flow Multi-physics Modeling Environment**

G. Damblanc, Siemens PLM Software, Lyon, France
P. Hilscher, Siemens PLM Software, Yokohama, Japan
S. Holst, Siemens PLM Software, London, United Kingdom
P. Lammers, Siemens PLM Software, Nünrberg, Germany

12:20 – **Lunch Break (Hall 4.1)**

14:20

Session A

Monday 25 June 2018, 14:20–18:20, Hanse Saal

Please note that all reviews will be given in the plenum in the Hanse Saal!

Session A2 Piezoelectric Actuators

Session Chair A. Ando / K. Uchino

14:20 – A2.0 **Global Crisis Technologies – In Actuator / Piezoelectric Devices** (Review, IEEE DL Lecture)

K. Uchino, The Pennsylvania State University, University Park, USA

15:50 – A2.1 **High Temperature Piezoelectric Actuators**

T. Comyn, Ionix Advanced Technologies, Huddersfield, United Kingdom
P. Cowin, Ionix Advanced Technologies, Huddersfield, United Kingdom
A. Bell, Ionix Advanced Technologies, Huddersfield, United Kingdom

16:10 – A2.2 **Changes in Mechanical Quality Factors with Canted Polarization for Piezoelectric Actuators**

M. Choi, The Pennsylvania State University, University Park, USA
T. Scholehwar, PI Ceramic GmbH, Lederhose, Germany
E. Hennig, PI Ceramic GmbH, Lederhose, Germany
K. Uchino, The Pennsylvania State University, University Park, USA

16:30 – A2.3 **Do We Really Understand of Field Induced Strain Phenomena in PZT Ceramics?**

Y. Akiyama, RICOH COMAPNY Ltd., Atsugi, Japan

16:50 **Coffee Break (Hall 4.1)**

17:20 – A2.4 **PIRest Technology – How to Keep the Last Position of PZT- actuators Without Electrical Power**

J. Reiser*, Physik Instrumente (PI) GmbH & Co. KG, Karlsruhe, Germany
H. Marth, Physik Instrumente (PI) GmbH & Co. KG, Karlsruhe, Germany

17:40 – A2.5 **Piezoelectric Driven Carbon Fiber Cilia Based Linear Actuators**

A. Carrasco, Technische Universität Darmstadt, Darmstadt, Germany
D.B. Thiem, Technische Universität Darmstadt, Darmstadt, Germany
P.P. Pott, Universität Stuttgart, Stuttgart, Germany
H.F. Schlaak, Technische Universität Darmstadt, Darmstadt, Germany

18:00 – A2.6 **On the Design of a Novel Actuation Principle for a Piezo Rotary Stage**

S. Cappa, Xeryon bvba, Leuven, Belgium
J. Peirs*, Xeryon bvba, Leuven, Belgium
B. Kersschot, Xeryon bvba, Leuven, Belgium

Tuesday 26 June 2018, 09:00–12:20, Hanse Saal

Please note that all reviews will be given in the plenum in the Hanse Saal!

Session A3 Piezoelectric Actuator Applications

Session Chair P. Pertsch / A.W. Groen

09:00 – 09:30 A3.0 Piezoelectric Actuator Applications – Status 2018 (Review)

P. Pertsch, PI Ceramic GmbH, Lederhose, Germany

10:30 Coffee Break (Hall 4.1)

11:00 – 11:20 A3.1 Vibration Mode Dependence of the High-power Piezoelectric Properties of Hard Pb(Zr,Ti)O₃

M. Slabki*, Technische Universität Darmstadt, Darmstadt, Germany

M. Weber, Technische Universität Darmstadt, Darmstadt, Germany

P. Breckner, Technische Universität Darmstadt, Darmstadt, Germany

D. Isaia, Technische Universität Darmstadt, Darmstadt, Germany

J. Koruza, Technische Universität Darmstadt, Darmstadt, Germany

11:20 – 11:40 A3.2 Mesh Robot Developed by Micro Ultrasonic Motor

S. Toyama, Tokyo A&T University, Koganei, Japan

U. Nishizawa, Tokyo A&T University, Koganei, Japan

11:40 – 12:00 A3.3 L1B2 Piezo Motor Using D33 Effect

B. Delibas*, Physik Instrumente (PI) GmbH & Co. KG, Karlsruhe, Germany

B. Koc, Physik Instrumente (PI) GmbH & Co. KG, Karlsruhe, Germany

12:00 – 12:20 A3.4 A Tracked Mobile System Driven by a Sandwiched Traveling Wave Piezoelectric Transducer

L. Wang*, Leibniz Universität Hannover, Hannover, Germany, and Nanjing University of Aeronautics and Astronautics, Nanjing, China

V. Hofmann, Leibniz Universität Hannover, Hannover, Germany

F. Bai, Leibniz Universität Hannover, Hannover, Germany

J. Jin, Nanjing University of Aeronautics and Astronautics, Nanjing, China

W. Ye, Leibniz Universität Hannover, Hannover, Germany

J. Twiefel, Leibniz Universität Hannover, Hannover, Germany

12:20 – 14:20 Lunch Break (Hall 4.1)

Tuesday 26 June 2018, 09:00–16:30, Hanse Saal

Please note that all reviews will be given in the plenum in the Hanse Saal!

14:50 – 15:10 A3.5 A Two-stage Piezohydraulic Linear Actuator as Artificial Muscle in Robotic Applications

W. Zoels, Siemens AG, München, Germany

G. Bachmaier, Siemens AG, München, Germany

15:10 – 15:30 A3.6 Self-sensing Grasping with Piezoelectric Manipulator

K. Suzuki, The University of Tokyo, Kashiwa, Japan

S.K. Chee, Mechano Transformer Corporation, Chiyoda-ku, Japan

T. Morita, The University of Tokyo, Kashiwa, Japan

15:30 – 15:50 A3.7 Design and Testing of a Novel Piezoelectric Rotary Motor Based on Improved Deformation Wave Precession Mechanism

N.L. Cau, Phi Drive S.r.l., Vimercate, Italy

F. Buonanno Ll., Phi Drive S.r.l., Vimercate, Italy

A.F. Sette*, Phi Drive S.r.l., Vimercate, Italy

P. Roberto, Phi Drive S.r.l., Vimercate, Italy

15:50 – 16:10 A3.8 Improvement of MSPA Module of Stepping Piezo Actuator

F. Barillot*, CEDRAT TECHNOLOGIES S.A., Meylan, France

A. Pagès, CEDRAT TECHNOLOGIES S.A., Meylan, France

A. Guignabert, CEDRAT TECHNOLOGIES S.A., Meylan, France

O. Freychet, CEDRAT TECHNOLOGIES S.A., Meylan, France

C. Belly, CEDRAT TECHNOLOGIES S.A., Meylan, France

T. Maillard, CEDRAT TECHNOLOGIES S.A., Meylan, France

F. Claeysen, CEDRAT TECHNOLOGIES S.A., Meylan, France

16:10 – 16:30 A3.9 Redefining Valves in Volume Pump

J. Zhang, Guangzhou University, Guangzhou, China,

and Nanjing University of Aeronautics and Astronautics, Nanjing, China

J. Fu, Nanjing University of Aeronautics and Astronautics, Nanjing, China

F. Zhang, Guangzhou University, Guangzhou, China

Y. Zhou, Guangzhou University, Guangzhou, China

J. Huang, Jiangsu University, Zhenjiang, China

K. Bian, Guangzhou University, Guangzhou, China

P. Liu*, Guangzhou University, Guangzhou, China

16:40 – 18:45 Poster Session (Hall 4.1)

19:30 – 22:30 Welcome Reception/Get-together (Foyer Congress Center Bremen)

Wednesday 27 June 2018, 09:00–12:40, Hanse Saal

Please note that all reviews will be given in the plenum in the Hanse Saal!

Session A5 Active Vibration/Noise Control

Session Chair H.-J. Karkosch / A. Preumont

09:00 – 09:30	A5.0	COLIBRI: A Robotic Hummingbird (Review) A. Preumont, Université Libre de Bruxelles, Brussels, Belgium H. Altartouri, Université Libre de Bruxelles, Brussels, Belgium A. Roshanbin, Université Libre de Bruxelles, Brussels, Belgium
10:30		Coffee Break (Hall 4.1)
11:00 – 11:20	A5.1	Electromagnetic Shunt Based Inerter for High Precision Isolation Platforms B. Mokrani, University of Liverpool, Liverpool, United Kingdom
11:20 – 11:40	A5.2	Active Vibration Control in Truck Seats M. Werhahn, ContiTech Vibration Control GmbH, Hannover, Germany H.-J. Karkosch, ContiTech Vibration Control GmbH, Hannover, Germany P.M. Marienfeld, ContiTech Vibration Control GmbH, Hannover, Germany
11:40 – 12:00	A5.3	Vibration Assisted Dosing, Mixing and Transport of Dry Fine Powders P. Dunst, Universität Paderborn, Paderborn, Germany T. Hemsel, Universität Paderborn, Paderborn, Germany P. Bornmann, ATHENA Technologie Beratung GmbH, Paderborn, Germany W. Littmann, ATHENA Technologie Beratung GmbH, Paderborn, Germany W. Sextro, Universität Paderborn, Paderborn, Germany
12:00 – 12:20	A5.4	Active Primary Spring for the Next Generation Train R. Keimer, DLR e.V., Braunschweig, Germany
12:20 – 12:40	A5.5	Development of the Plain Bearing & Flexure Bearing MICA300CM Actuator G. Aigouy, CEDRAT TECHNOLOGIES S.A., Meylan, France S. Rowe, CEDRAT TECHNOLOGIES S.A., Meylan, France A. Pieton, CEDRAT TECHNOLOGIES S.A., Meylan, France K. Benoit, CEDRAT TECHNOLOGIES S.A., Meylan, France P. Meneroud, CEDRAT TECHNOLOGIES S.A., Meylan, France F. Claeysen, CEDRAT TECHNOLOGIES S.A., Meylan, France
12:50		Closing Remarks (Hanse Saal)
13:00		Lunch Break (Hall 4.1)
15:00		End of Conference

Monday 25 June 2018, 9:30 – 12:20, Borgward Saal

Please note that all reviews will be given in the plenum in the Hanse Saal!

Session B1 (Bio-) Medical Applications

Session Chair G. Kullik / L.A. Kahrs

09:30 – 10:00	B1.0	Control of Continuum Robots for Medical Applications: State of the Art (Review Hanse Saal) M.T. Chikhaoui*, Leibniz Universität Hannover, Hannover, Germany J. Burgner-Kahrs, Leibniz Universität Hannover, Hannover, Germany
10:30		Coffee Break (Hall 4.1)
11:00 – 11:20	B1.1	An Experimental Study on the Insertion of Neural-interfaces into Peripheral Nerve Using a Piezoelectric Vibrator B.K. Lim, Korea Institute of Science and Technology, Seoul, South Korea Y.S. Ihn, Korea Institute of Science and Technology, Seoul, South Korea S. Yim, Korea Institute of Science and Technology, Seoul, South Korea J. Jeong, Korea Institute of Science and Technology, Seoul, South Korea S.-R. Oh, Korea Institute of Science and Technology, Seoul, South Korea K. Kim, Korea Institute of Science and Technology, Seoul, South Korea
11:20 – 11:40	B1.2	A 3 DOFs Mini Variable Stiffness Soft Pneumatic Actuator L. Manfredi, University of Dundee, Dundee, United Kingdom L. Yue, University of Dundee, Dundee, United Kingdom A. Cuschieri, University of Dundee, Dundee, United Kingdom
11:40 – 12:00	B1.3	Controllable Multibending Soft Actuator for Surgical Applications H. Abidi, Scuola Superiore Sant'Anna, Pontedera, Italy A. Tonazzini, Ecole Polytechnique Fédérale de Lausanne, Lausanne, Switzerland D. Floreano, Ecole Polytechnique Fédérale de Lausanne, Lausanne, Switzerland A. Menciasci, Scuola Superiore Sant'Anna, Pontedera, Italy M. Cianchetti, Scuola Superiore Sant'Anna, Pontedera, Italy
12:00 – 12:20	B1.4	Polymer Actuated Patient-specific Artery Phantoms for Simulating Stenosis and Dilatation F.B. Holness*, The University of Western Ontario, London, Canada T. Poepping, The University of Western Ontario, London, Canada A.D. Price, The University of Western Ontario, London, Canada
12:20 – 14:20		Lunch Break (Hall 4.1)

Monday 25 June 2018, 14:50–18:20, Borgward Saal

Please note that all reviews will be given in the plenum in the Hanse Saal!

Session B2 Polymer Actuators

Session Chair P. Krippner / H. Schlaack

14:50 – 15:20 B2.0 Dielectric Elastomer Actuator-/Sensorsystems – From Basic Science to Application Ideas

(Invited Review Hanse Saal)

Hanse Saal

S. Seelecke, Universität des Saarlandes, Saarbrücken, Germany

15:50 – 16:10 B2.1 Polymer Materials for Cost-efficient Manufacturing of Electrothermal Actuators

C. Nacic, Technische Universität Darmstadt, Darmstadt, Germany

A. Stuckert, Technische Universität Darmstadt, Darmstadt, Germany

H.F. Schlaack, Technische Universität Darmstadt, Darmstadt, Germany

T. Beyrich, Technische Universität Darmstadt, Darmstadt, Germany

D. Nickel, Technische Universität Darmstadt, Darmstadt, Germany

M. Oechsner, Technische Universität Darmstadt, Darmstadt, Germany

16:10 – 16:30 B2.2 Large Arrays of Microfabricated Shape Memory Polymer Actuators for Haptics and Microfluidics

N. Besse, Ecole Polytechnique Fédérale de Lausanne, Neuchâtel, Switzerland

B. Aksoy, Ecole Polytechnique Fédérale de Lausanne, Neuchâtel, Switzerland

H. Shea, Ecole Polytechnique Fédérale de Lausanne, Neuchâtel, Switzerland

16:30 – 16:50 B2.3 Characterization of Enhanced Silicone Materials for Dielectric Elastomer Transducers

T. Hoffstadt, Technische Universität Berlin, Berlin, Germany

A. Köllnberger, Wacker Chemie AG, Burghausen, Germany

J. Maas, Technische Universität Berlin, Berlin, Germany

16:50 Coffee Break (Hall 4.1)

Monday 25 June 2018, 14:50–18:20, Borgward Saal

Please note that all reviews will be given in the plenum in the Hanse Saal!

17:20 – 17:40 B2.4 Development of a High Voltage Source for Dielectric Elastomer Actuators (DEA)

S. Lenz*, Zentrum für Mechatronik und Automatisierungstechnik gGmbH, Saarbrücken, Germany

B. Holz, Universität des Saarlandes, Saarbrücken, Germany

S. Hau, Zentrum für Mechatronik und Automatisierungstechnik gGmbH, Saarbrücken, Germany

P. Motzki, Zentrum für Mechatronik und Automatisierungstechnik gGmbH, Saarbrücken, Germany

S. Seelecke, Universität des Saarlandes, Saarbrücken, Germany, and Zentrum für Mechatronik und Automatisierungstechnik gGmbH, Saarbrücken, Germany

17:40 – 18:00 B2.5 Solid State Actuators Based on Helical Fibers: Structure, Properties and Applications

M. Dias Lima, LINTEC OF AMERICA, Richardson, USA

18:00 – 18:20 B2.6 Smart Soft Environment Monitoring System Based on Self-sensing Actuator (Haptic Artificial Muscle)

J. Schumacher, Arquimea Ingeniería, Leganés, Spain, and Technical University of Cartagena, Cartagena, Spain

T. F. Otero, Technical University of Cartagena, Cartagena, Spain

V.H. Pascual, Technical University of Cartagena, Cartagena, Spain

Tuesday 26 June 2018, 09:30–16:30, Borgward Saal

Please note that all reviews will be given in the plenum in the Hanse Saal!

Session B3 Magnetostrictive / MSM Actuators

Session Chair E. Pagounis / P. Müllner

09:30 – 10:00 B3.0 Materials and Actuator Solutions for Advanced Magnetic Shape Memory Devices (Review Hanse Saal)

E. Pagounis, ETO MAGNETIC GmbH, Stockach, Germany
P. Müllner, Boise State University, Boise, USA

10:30 Coffee Break (Hall 4.1)

11:00 – 11:20 B3.1 Self-sensing Actuators Based on Ferromagnetic Shape Memory Alloys

F. Ehle, Fraunhofer IKTS, Dresden, Germany
U. Keitel, Fraunhofer IKTS, Dresden, Germany
P. Neumeister, Fraunhofer IKTS, Dresden, Germany
H. Neubert, Fraunhofer IKTS, Dresden, Germany

11:20 – 11:40 B3.2 Discrete Twin-boundary Dynamics: Experimental Characterization and Modeling of Actuator Performance

N. Zreihan, Technion, Haifa, Israel
E. Faran, Technion, Haifa, Israel
L. Riccardi, ETO MAGNETIC GmbH, Stockach, Germany
D. Shilo, Technion, Haifa, Israel

11:40 – 12:00 B3.3 Velocity-dependent Twinning Stress in Magnetic Shape Memory Alloy Ni-Mn-Ga 5M Martensite

A. Saren, Lappeenranta University of Technology, Savonlinna, Finland
K. Ullakko, Lappeenranta University of Technology, Savonlinna, Finland

12:00 – 12:20 B3.4 Magnetostrictive Actuators with 1D and 2D Magnetic Field

H.G. Lee, Chungnam National University, Daejeon, South Korea
Y.W. Park, Chungnam National University, Daejeon, South Korea
M. Noh, Chungnam National University, Daejeon, South Korea

12:20 – 14:20 Lunch Break (Hall 4.1)

Tuesday 26 June 2018, 09:30–16:30, Borgward Saal

Please note that all reviews will be given in the plenum in the Hanse Saal!

14:50 – 15:10 B3.5 Combined Thermal and Magnetic Tripping of MSM

S. Breisch, ABB AG Forschungszentrum, Ladenburg, Germany
A. Tueysuez, ABB AG Forschungszentrum, Ladenburg, Germany
M. Schautzgy, ETO MAGNETIC GmbH, Stockach, Germany
M. Laufenberg, ETO MAGNETIC GmbH, Stockach, Germany

15:10 – 15:30 B3.6 Magnetic-field-induced Actuation of Ni-Mn-Ga Micro-pillars

D. Musiienko*, Lappeenranta University of Technology, Savonlinna, Finland
L. Straka, Institute of Physics of the Czech Academy of Sciences, Prague, Czech Republic
L. Klimša, Institute of Physics of the Czech Academy of Sciences, Prague, Czech Republic
A. Saren, Lappeenranta University of Technology, Savonlinna, Finland
A. Sozinov, Lappeenranta University of Technology, Savonlinna, Finland
O. Heczko, Institute of Physics of the Czech Academy of Sciences, Prague, Czech Republic
K. Ullakko, Lappeenranta University of Technology, Savonlinna, Finland

15:30 – 15:50 B3.7 Effects of Magnetron Sputtering on Oblique Deposition of Magnetostrictive Thin Films

K. Yamaguchi, Tokai University, Hiratsuka, Japan
Y. Tsukagoshi, Tokai University, Hiratsuka, Japan
K. Yatagai, Tokai University, Hiratsuka, Japan
H.T. Uchida, Tokai University, Hiratsuka, Japan
Y. Matsumura, Tokai University, Hiratsuka, Japan

15:50 – 16:10 B3.8 Performance of an MSM Micropump

A. Armstrong, Boise State University, Boise, USA
A. Smith, Shaw Mountain Technology, Nampa, USA
J. Freilich, Boise State University, Boise, USA
B. Johnston, Boise State University, Boise, USA
P. Lindquist, Boise State University, Boise, USA
P. Müllner, Boise State University, Boise, USA

16:10 – 16:30 B3.9 Mechanical Switching Behavior of a Ni-Mn-Ga Single Crystal in Magnetic Fields with Different Directions

C. Titsch*, Technische Universität Chemnitz, Chemnitz, Germany
W.-G. Drossel, Technische Universität Chemnitz, Chemnitz, Germany, and Fraunhofer IWU, Chemnitz, Germany
P. Müllner, Boise State University, Boise, USA

16:40 – 18:45 Poster Session (Hall 4.1)

19:30 – 22:30 Welcome Reception/Get-together (Foyer Congress Center Bremen)

Wednesday June 2018, 09:30–12:40, Borgward Saal

Please note that all reviews will be given in the plenum in the Hanse Saal!

Session B5 Aerospace Applications

Session Chair F. Claeysen / H.P. Monner

09:30 – 10:00 **B5.0 Overview of ONERA Fluidic Actuators in Aerodynamics** (Invited Review Hanse Saal)

F. Ternoy*, ONERA, Lille, France
 J. Dandois, ONERA, Meudon, France
 E. Eglinger, ONERA, Lille, France
 J. Delva, ONERA, Lille, France

10:30 Coffee Break (Hall 4.1)

11:00 – 11:20 **B5.1 Active Hybrid Composite Actuators – A Comparison of Different Design Approaches**

M. Gurka, Institut für Verbundwerkstoffe GmbH, Kaiserslautern, Germany
 M. Hübler, Institut für Verbundwerkstoffe GmbH, Kaiserslautern, Germany
 M. Kaiser, Institut für Verbundwerkstoffe GmbH, Kaiserslautern, Germany
 S. Nissle, Institut für Verbundwerkstoffe GmbH, Kaiserslautern, Germany

11:20 – 11:40 **B5.2 High Performance Synthetic Jet Actuator for Aerodynamic Flow Improvement Over Airplane Wings**

F. Ternoy, ONERA, Lille, France
 E. Eglinger*, ONERA, Lille, France
 J. Dandois, ONERA, Meudon, France
 G. Aigouy, CEDRAT TECHNOLOGIES S.A., Meylan, France
 E. Betsch, CEDRAT TECHNOLOGIES S.A., Meylan, France
 G. Jaussaud, CEDRAT TECHNOLOGIES S.A., Meylan, France
 M. Fournier, CEDRAT TECHNOLOGIES S.A., Meylan, France
 F. Claeysen, CEDRAT TECHNOLOGIES S.A., Meylan, France

11:40 – 12:00 **B5.3 Innovative Flow Servo Valve with Redundant Stack Actuator for Pitch Actuation Application**

C. Mailhan*, Zodiac Hydraulics, Châteaudun, France
 J.-L. Bertrand, Zodiac Hydraulics, Châteaudun, France
 E. Doyen, Zodiac Hydraulics, Châteaudun, France
 O. De Bailliencourt, Zodiac Hydraulics, Châteaudun, France
 M. Papoin, Zodiac Hydraulics, Châteaudun, France
 F. Soubras, Zodiac Hydraulics, Châteaudun, France
 R. Lebeau, Zodiac Hydraulics, Châteaudun, France

Wednesday June 2018, 09:30–12:40, Borgward Saal

Please note that all reviews will be given in the plenum in the Hanse Saal!

12:00 – 12:20 **B5.4 Piezoelectric Adaptive Shell Reflectors for Future Space Telescopes**

K. Wang, Université Libre de Bruxelles, Brussels, Belgium
 D. Alaluf, European Space Agency – ESA/ESTEC, Noordwijk, The Netherlands
 M. Michiels, Materia Nova Research Center, Mons, Belgium
 J.-M. Raquez, Materia Nova Research Center, Mons, Belgium
 G. Rodrigues, European Space Agency – ESA/ESTEC, Noordwijk, The Netherlands
 A. Preumont, Université Libre de Bruxelles, Brussels, Belgium

12:20 – 12:40 **B5.5 Fine Stepping Piezoelectric Actuator (FSPA) for IASI-NG**

F. Barillot*, CEDRAT TECHNOLOGIES S.A., Meylan, France
 K. Benoit, CEDRAT TECHNOLOGIES S.A., Meylan, France
 C. Belly, CEDRAT TECHNOLOGIES S.A., Meylan, France
 A. Guignabert, CEDRAT TECHNOLOGIES S.A., Meylan, France
 O. Freychet, CEDRAT TECHNOLOGIES S.A., Meylan, France

12:50 **Closing Remarks (Hanse Saal)**

13:00 **Lunch Break (Hall 4.1)**

15:00 **End of Conference**



AIR & SPACE

- Optical mechanisms flight hardware
- Scan mechanisms for Earth observation
- Hold-down release mechanisms (HDRM)
- Fast steering mirrors



MANUFACTURING

- Chatter cancellation
- Vibration assistance for machining
- Active clamping fixtures



MEDETEC

- Micro actuation
- Miniaturised motorisation
- Microfluidic control device



OPTRONICS

- Micro-scanning & pixel shifting
- Optical image stabilisation
- Auto focus
- Embedded mechatronic functions



INSTRUMENTATION

- Telescope mirror motorisation
- Synchrotron fast shutters
- Environmental & material testing
- Beam shaping

TWO TRAINING SESSIONS ON JUNE 28TH AT ACTUATOR 2018

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

Mr. Gérald AIGOUY

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 18

Bremen, 25 - 27 June 2018



Contact & registration

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www.cedrat-technologies.com

Venue

June 28, 2018, from 9 am to 5 pm
Maritim Hotel & Congress Centrum Bremen
Hollerallee 99 - 28215, Bremen, Germany

Who should attend

Engineers in a research department
Electronics and mechanical engineers

Participation fee

500 € for participants from industry
425 € for participants from university
Including documentation,
coffee and lunch breaks

Monday 25 June 2018, 10:00–12:20, Focke Wulf Saal

Please note that all reviews will be given in the plenum in the Hanse Saal!

Session C1 Haptic / Tactile Applications

Session Chair

J. Perret / E. Vander Porten

10:00 – 10:30 C1.0 Touching Virtual Reality: A Review of Haptic Gloves
(Review Hanse Saal)

Hanse Saal
J. Perret, Haption GmbH, Aachen, Germany
E. Vander Poorten, Katholieke Universiteit Leuven, Heverlee, Belgium

10:30 Coffee Break (Hall 4.1)

11:00 – 11:20 C1.1 Development of a Thumb-Index Hand Interface for Application in Tele-robotics and Virtual Reality

M. Folgheraiter, Nazarbayev University, Astana, Kazakhstan
A. Zhilisbayev, Nazarbayev University, Astana, Kazakhstan
N. Kuandyk, Nazarbayev University, Astana, Kazakhstan

11:20 – 11:40 C1.2 Design and Experimental Validation of an MR-Fluid Based Brake for Use in Haptics

M.G. Karabulut*, İzmir Institute of Technology, İzmir, Turkey
M.I. Dede, İzmir Institute of Technology, İzmir, Turkey

11:40 – 12:00 C1.3 Solid State Joint Actuator for a Vibro Tactile Line Display

A.S. Schmelt*, Leibniz Universität Hannover, Hannover, Germany
E.C. Fischer, Leibniz Universität Hannover, Garbsen, Germany
M.C. Wurz, Leibniz Universität Hannover, Garbsen, Germany
J. Twiefel, Leibniz Universität Hannover, Hannover, Germany

12:00 – 12:20 C1.4 Highly Perceivable Tactile Feedback by Magnetic Shape Memory Technology

A. Saren, Lappeenranta University of Technology, Savonlinna, Finland
D. Musiienko, Lappeenranta University of Technology, Savonlinna, Finland
T. Nukarinen, University of Tampere, Tampere, Finland
A. Saghi, Lappeenranta University of Technology, Savonlinna, Finland
A. Sozinov, Lappeenranta University of Technology, Savonlinna, Finland
J. Tellinen, Lappeenranta University of Technology, Savonlinna, Finland
A. Hippula, University of Tampere, Tampere, Finland
R. Raisamo, University of Tampere, Tampere, Finland
K. Ullakko, Lappeenranta University of Technology, Savonlinna, Finland

12:20 – 14:20 Lunch Break (Hall 4.1)

Monday 25 June 2018, 15:20–18:20, Focke Wulf Saal

Please note that all reviews will be given in the plenum in the Hanse Saal!

Session C2 Microactuators / Microfluid Handling Devices

Session Chair

J.C. Lötters / U. Wallrabe

15:20 – 15:50 C2.0 MEMS in Nanopositioning

(Invited Review Hanse Saal)
Hanse Saal
M. Maroufi*, University of Texas at Dallas, Richardson, USA
A.G. Fowler, RMIT University, Melbourne, Australia
S.O.R. Moheimani, University of Texas at Dallas, Richardson, USA

15:50 – 16:10 C2.1 Multi-Layer, Thin-Film Repulsive-Force Electrostatic Actuators for a 2-DoF Micro-Mirror

E.W. Schaler*, University of California at Berkeley, Berkeley, USA
L. Jiang, University of California at Berkeley, Berkeley, USA
R.S. Fearing, University of California at Berkeley, Berkeley, USA

16:10 – 16:30 C2.2 VO2: A Material for High-performance Micro/nanoactuators

N. Manca, University of Genova and CNR-SPIN, Genova, Italy
L. Pellegrino*, CNR-SPIN, Genova, Italy
T. Kanki, ISIR-Osaka University, Ibaraki, Japan
Y. Higuchi, ISIR-Osaka University, Ibaraki, Japan
W. J. Venstra, Delft University of Technology, Delft, The Netherlands
G. Mattoni, Delft University of Technology, Delft, The Netherlands
A.D. Caviglia, Delft University of Technology, Delft, The Netherlands
H. Tanaka, ISIR-Osaka University, Ibaraki, Japan
D. Marré, University of Genova and CNR-SPIN, Genova, Italy

16:30 – 16:50 C2.3 Technology to Avoid Leaching in a Microfluidic Water Sample Treatment System

R. Lopes, Jade Hochschule, Wilhelmshaven, Germany, and Carl-von-Ossietzky Universität Oldenburg, Wilhelmshaven, Germany
H. Schuette, Jade Hochschule, Wilhelmshaven, Germany
M.L. Miranda, Carl-von-Ossietzky Universität Oldenburg, Oldenburg, Germany
S. Gassmann, Jade Hochschule, Wilhelmshaven, Germany
O. Zielinski, Carl-von-Ossietzky Universität Oldenburg, Oldenburg, Germany

16:50 Coffee Break (Hall 4.1)

Session C

Monday 25 June 2018, 15:20–18:20, Focke Wulf Saal

Please note that all reviews will be given in the plenum in the Hanse Saal!

17:20 – 17:40	C2.4	Macro-Micro-Interface for a Microfluidic Nitrite Sensor S. Gassmann*, Jade Hochschule, Wilhelmshaven, Germany H. Schuette, Jade Hochschule, Wilhelmshaven, Germany C. Thoma, Jade Hochschule, Wilhelmshaven, Germany
17:40 – 18:00	C2.5	Magnetically Driven Pump for Solid-State Microfluidic Flow Control A.R. Smith, Shaw Mountain Technology, Nampa, USA D. Fologea, Boise State University, Boise, USA P. Müllner, Boise State University, Boise, USA, and Shaw Mountain Technology, Nampa, USA
18:00 – 18:20	C2.6	Observation of Pump Effect Using Ultrasonic Transducer and Opposing Surface M. Takasaki*, Saitama University, Saitama, Japan H. Shinada, Saitama University, Saitama, Japan Y. Ishino, Saitama University, Saitama, Japan D. Yamaguchi, Saitama University, Saitama, Japan M. Hara, Saitama University, Saitama, Japan T. Mizuno, Saitama University, Saitama, Japan

Session C

Tuesday 26 June 2018, 10:00–12:20, Focke Wulf Saal

Please note that all reviews will be given in the plenum in the Hanse Saal!

Session C3 Actuator Control

Session Chair J. Maas / N.N.

10:00 – 10:30	C3.0	Actuator Control – Self-Sensing and Control of Actuators (Review Hanse Saal) J. Maas, Technische Universität Berlin, Berlin, Germany T. Hoffstadt, Technische Universität Berlin, Berlin, Germany
10:30	Coffee Break (Hall 4.1)	
11:00 – 11:20	C3.1	A Direct Flux Observer Based on a Fast Resettable Integrator Circuitry for Sensorless Control of PMSMs D. Merl, Universität des Saarlandes, Saarbrücken, Germany E. Grasso, Universität des Saarlandes, Saarbrücken, Germany R. Schwartz, Universität des Saarlandes, Saarbrücken, Germany M. Nienhaus, Universität des Saarlandes, Saarbrücken, Germany
11:20 – 11:40	C3.2	A New Absolute X, Y, Theta Encoder with Flexible Implementation and Standoff Reading Distance O. Acher*, HORIBA France, Palaiseau, France M. Leroy, Institut Photovoltaïque Francilien, Palaiseau, France T.-L. Nguyen, HORIBA France, Palaiseau, France
11:40 – 12:00	C3.3	Yaw Control Torque Generation for a Hovering Flapping Wing MAV A. Roshanbin, Université Libre de Bruxelles, Brussels, Belgium A. Preumont, Université Libre de Bruxelles, Brussels, Belgium
12:00 – 12:20	C3.4	Positioning Control for Flexible Steel Plate Using Facing Electromagnetic Actuator: Fundamental Consideration on Support Characteristic of Electromagnetic Actuator T. Narita*, Tokai University, Hiratsuka, Japan Y. Oda, Tokai University, Hiratsuka, Japan Y. Ito, Tokai University, Hiratsuka, Japan K. Okuno, Tokai University, Hiratsuka, Japan H. Kato, Tokai University, Hiratsuka, Japan
12:20 – 14:20	Lunch Break (Hall 4.1)	

Session C

Tuesday 26 June 2018, 14:20–16:30, Focke Wulf Saal

Please note that all reviews will be given in the plenum in the Hanse Saal!

Session C4 ERF / MRF Actuators

Session Chair J. Goldasz / S.-B. Choi

14:20 – 14:50 C4.0 Controllable Actuators Utilizing Smart MR Materials and ER Suspensions (Review Hanse Saal)

S.-B. Choi, Inha University, Incheon, South Korea
J. Goldasz, BWI Group, Kraków, Poland

14:50 – 15:10 C4.1 An Internal Bypass Magnetorheological Energy Absorber

X. Bai, Hefei University of Technology, Hefei, China
S. Shen, Hefei University of Technology, Hefei, China
S. YANG, Hefei University of Technology, Hefei, China
L. Qian, Hefei University of Technology, Hefei, China

15:10 – 15:30 C4.2 A New Concept of an Electrorheological Planar Damper for Independent Damping Adjustment in Planar Movement

A.S. Tan, Technische Universität Ilmenau, Ilmenau, Germany
T. Sattel, Technische Universität Ilmenau, Ilmenau, Germany

15:30 – 15:50 C4.3 An Effect of the Time Response of MR Damper to the Vehicle Suspension Performances

S.-B. Choi, Inha University, Incheon, South Korea

15:50 – 16:10 C4.4 CFD Simulation of a Smart Magnetorheological Fluid Actuator

H.C. Wang, University of Dundee, Dundee, United Kingdom
A. El Wahed, University of Dundee, Dundee, United Kingdom

16:10 – 16:30 C4.5 Advantages of a Novel MRF-based Coupling Element in Hybrid Powertrains

C. Hegger, Technische Universität Berlin, Berlin, Germany
J. Maas, Technische Universität Berlin, Berlin, Germany

16:40 – 18:45 Poster Session (Hall 4.1)

19:30 – 22:30 Welcome Reception/Get-together (Foyer Congress Center Bremen)

Session C

Wednesday 27 June 2018, 10:20–12:40, Focke Wulf Saal

Please note that all reviews will be given in the plenum in the Hanse Saal!

Session C5 Shape Memory Actuators

Session Chair G. Vergani / S. Seelecke

10:00 – 10:30 C5.0 Miniaturization of SMA Actuators (Invited Review Hanse Saal)

M. Kohl, Karlsruher Institut für Technologie (KIT), Karlsruhe, Germany

10:30 Coffee Break (Hall 4.1)

11:00 – 11:20 C5.1 SMA Actuator for Optical Image Stabilization

A. Kazi*, Hochschule Aalen, Aalen, Germany
M. Honold, Hochschule Aalen, Aalen, Germany
W. Rimkus, Hochschule Aalen, Aalen, Germany
T. Lokner, Hochschule Aalen, Aalen, Germany
M. Bäuml, Actuator Solutions GmbH, Gunzenhausen, Germany
M. Köpfer, Actuator Solutions GmbH, Gunzenhausen, Germany

11:20 – 11:40 C5.2 An SMA Sealing System for Enhanced Door Sound-proof Performance: Design, Prototyping and Testing

S. Ameduri, Centro Italiano Ricerche Aerospaziali, Capua, Italy
A. Brindisi, Centro Italiano Ricerche Aerospaziali, Capua, Italy
M. Ciminello, Centro Italiano Ricerche Aerospaziali, Capua, Italy
A. Concilio, Centro Italiano Ricerche Aerospaziali, Capua, Italy
V. Quaranta, Centro Italiano Ricerche Aerospaziali, Capua, Italy
M. Brandizzi, Centro Ricerche FIAT, Pomigliano d'Arco, Italy

11:40 – 12:00 C5.3 Bistable SMA Vacuum Suction Cup

S.-M. Kirsch, Universität des Saarlandes, Saarbrücken, Germany
F. Welsch, Universität des Saarlandes, Saarbrücken, Germany
M. Schmidt, Zentrum für Mechatronik und Automatisierungstechnik gGmbH, Saarbrücken, Germany
P. Motzki, Zentrum für Mechatronik und Automatisierungstechnik gGmbH, Saarbrücken, Germany
S. Seelecke, Universität des Saarlandes, Saarbrücken, Germany

Wednesday 27 June 2018, 10:20–12:40, Focke Wulf Saal

Please note that all reviews will be given in the plenum in the Hanse Saal!

12:00 – 12:20 C5.4 Adaptive Control for a Lightweight Robotic Arm Actuated by a Shape Memory Alloy Wire

S. Quintanar-Guzmán, University of Luxembourg, Luxembourg, Luxembourg
 S. Kannan, University of Luxembourg, Luxembourg, Luxembourg
 H. Voos, University of Luxembourg, Luxembourg, Luxembourg
 M. Darouach, Université de Lorraine, Longwy, France
 M. Alma, Université de Lorraine, Longwy, France

12:20 – 12:40 C5.5 Vibration Damping of Portable Devices by Pseudoelastic SMA Foils

K. Jacob, Karlsruher Institut für Technologie, Karlsruhe, Germany
 S. Ahmadi Seyed, Karlsruher Institut für Technologie, Karlsruhe, Germany
 F. Wendler, Friedrich-Alexander Universität Erlangen-Nürnberg, Fürth, Germany
 S. Miyazaki, University of Tsukuba, Ibaraki, Japan
 M. Kohl, Karlsruher Institut für Technologie, Karlsruhe, Germany

12:50 Closing Remarks (HanseSaal)

13:00 Lunch Break (Hall 4.1)

15:00 End of Conference

Tuesday 26 June 2018, 16:40–18:45, Hall 4.1

Piezoelectric Actuators

P 1 Small Size Disc Type Piezoelectric Actuator for Rotary Ultrasonic Motor

P. Vasiljev, Nanjing University of Aeronautics and Astronautics, Nanjing, China, and Lithuanian University of Educational Sciences, Vilnius, Lithuania

D. Mazeika, Nanjing University of Aeronautics and Astronautics, Nanjing, China, and Vilnius Gediminas Technical University, Vilnius, Lithuania

S. Borodinas, Nanjing University of Aeronautics and Astronautics, Nanjing, China, and Vilnius Gediminas Technical University, Vilnius, Lithuania

Y. Yang, Nanjing University of Aeronautics and Astronautics, Nanjing, China

P 2 Design Analysis of a Large Displacement and High Force Piezoelectric Inchworm Motor

S. Ghenna, Génie électrique et électronique de Paris (GeePs), Gif-sur-Yvette, France

L. Daniel, Génie électrique et électronique de Paris (GeePs), Gif-sur-Yvette, France

Y. Bernard, Génie électrique et électronique de Paris (GeePs), Gif-sur-Yvette, France

P 3 Design of a Compact and Position Self-sensing Long-stroke Piezoelectric Actuator

Y.-B. Jiang, National Sun Yat-sen University, Kaohsiung City, Taiwan

Y.-J. Wang, National Sun Yat-sen University, Kaohsiung City, Taiwan

P 4 Miniature Ultrasonic Linear Motor Capable of Applying Opposing Preload

Y. Tanoue, The University of Tokyo, Kashiwa, Japan

T. Morita, The University of Tokyo, Kashiwa, Japan

P 5 Rotary Piezoelectric Actuator with Differential Motion

Y. Wang, Huaqiao University, Xiamen, China

P 6 Characterizing Piezoceramic Materials in High Electric Field Actuator Applications

B. Poyyathuruthy Bruno, Albert-Ludwigs-Universität Freiburg, Freiburg, Germany

A. Raouf Fahmy, Albert-Ludwigs-Universität Freiburg, Freiburg, Germany

M. Stürmer, Albert-Ludwigs-Universität Freiburg, Freiburg, Germany

M.C. Wapler, Albert-Ludwigs-Universität Freiburg, Freiburg, Germany

U. Wallrabe, Albert-Ludwigs-Universität Freiburg, Freiburg, Germany

P 7 Partial Electrode Configurations for Piezoelectric Physical Parameter Determination

Y. Zhang, The Pennsylvania State University, University Park, USA

M. Majzoubi, New York University, New York, USA

T. Scholehwar, PI Ceramic GmbH, Lederhose, Germany

E. Hennig, PI Ceramic GmbH, Lederhose, Germany

M. Choi, The Pennsylvania State University, University Park, USA

K. Uchino, The Pennsylvania State University, University Park, USA

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- P 8 Step Size Measurement of Carbon Fiber Cilia Driven Actuator Systems**
 D.B. Thiem, Technische Universität Darmstadt, Darmstadt, Germany
 A. Carrasco, Technische Universität Darmstadt, Darmstadt, Germany
 H.F. Schlaak, Technische Universität Darmstadt, Darmstadt, Germany

Piezoelectric Actuator Applications

- P 9 Electro spray Position Control Using a Smart Material**
 L. Mossi, Virginia Commonwealth University, Richmond, USA
 B. Dodd, Virginia Commonwealth University, Richmond, USA
 K. Mossi, Virginia Commonwealth University, Richmond, USA
 G. Tepper, Virginia Commonwealth University, Richmond, USA
- P 10 Design, Simulation and Experimental Validation of a New Concept of Ultrasonic Piezoelectric Moto-reducer with Embedded Strain Wave Reducer**
 Q. Guilleus*, CEA - LIST, Gif-sur-Yvette, France
 L. Eck, CEA - LIST, Gif-sur-Yvette, France
 C. Bolzmacher, CEA - LIST, Gif-sur-Yvette, France
 E. Leroy, CEA - LIST, Gif-sur-Yvette, France
 M. Hafez, CEA - LIST, Gif-sur-Yvette, France
- P 11 Miniature High Resolution Laser Beam Deflectors with Multi DOF Piezoelectric Kinematic Pairs**
 R. Bansevicius, Kaunas University of Technology, Kaunas, Lithuania
 V. Jurenas, Kaunas University of Technology, Kaunas, Lithuania
 G. Kulvietis, Vilnius Gediminas Technical University, Vilnius, Lithuania
 D. Mazeika, Vilnius Gediminas Technical University, Vilnius, Lithuania
 P. Vasiljev, Lithuanian University of Educational Sciences, Vilnius, Lithuania
- P 12 Dynamic Contact Modelling for Resonant Piezoelectric Motors**
 K. Harmouch, Génie électrique et électronique de Paris (GeePs), Gif-sur-Yvette, France
 Y. Bernard, Génie électrique et électronique de Paris (GeePs), Gif-sur-Yvette, France
 L. Daniel, Génie électrique et électronique de Paris (GeePs), Gif-sur-Yvette, France
- P 13 Resonant Frequency Control of the Ultrasonic Transducer Using Simulated Inductor**
 H. Yokozawa, The University of Tokyo, Kashiwa, Japan
 J. Twiefel, Leibniz Universität Hannover, Hannover, Germany
 M. Weinstein, Leibniz Universität Hannover, Hannover, Germany
 T. Morita, The University of Tokyo, Kashiwa, Japan
- P 14 Micro Linear Motor with a Cuboid Stator with Length 2.2 mm**
 S. Izuhara*, Toyohashi University of Technology, Toyohashi, Japan
 T. Mashimo, Toyohashi University of Technology, Toyohashi, Japan

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- P 15 A Small Three-way Hydraulic Valve Using Particle Excitation Controlled by One Piezoelectric Transducer**
 T. Kanda, Okayama University, Okayama, Japan
 H. Osaki, Okayama University, Okayama, Japan
 N. Seno, Okayama University, Okayama, Japan
 S. Wakimoto, Okayama University, Okayama, Japan
 T. Ukida, Tokyo Institute of Technology, Tokyo, Japan
 K. Suzumori, Tokyo Institute of Technology, Tokyo, Japan
 H. Nabae, Tokyo Institute of Technology, Tokyo, Japan
- P 16 Design of Small Scale Ambulatory Robots Using Piezoelectric Benders**
 M. Park, Defense Agency for Technology and Quality, Jinju, South Korea
 T. Park*, Changwon University, Changwon, South Korea
- P 17 Pre-stressed Piezo Bending-buckling Actuators for Adaptive Lenses**
 F. Lemke, Albert-Ludwigs-Universität Freiburg, Freiburg, Germany
 Q. Frey, Albert-Ludwigs-Universität Freiburg, Freiburg, Germany
 U. Wallrabe, Albert-Ludwigs-Universität, Freiburg, Germany
 M.C. Wapler, Albert-Ludwigs-Universität Freiburg, Freiburg, Germany

Microactuators / Microfluid Handling Devices

- P 18 Development of Large-format Microshutter Arrays**
 M. Li, NASA Goddard Space Flight Center, Greenbelt, USA
 A.D. Brown, NASA Goddard Space Flight Center, Greenbelt, USA
 D.E. Burns, NASA Langley Research Center, Hampton, USA
 D.P. Kelly, NASA Goddard Space Flight Center, Greenbelt, USA
 K. Kim, NASA Goddard Space Flight Center, Greenbelt, USA
 A.S. Kuttyrev, University of Maryland, College Park, USA
 S.R. McCandliss, Johns Hopkins University, Baltimore, USA
 S.H. Moseley, NASA Goddard Space Flight Center, Greenbelt, USA
 V. Mikula, NASA Goddard Space Flight Center, Greenbelt, USA
 L. Oh, University of Maryland, College Park, USA
 P. Taheri, SGT Inc., Greenbelt, USA

ERF / MRF Actuators

- P 19 Design and Control of Integrated Isolator Featuring MR Damper for Ultra-precision Stage**
 J.W. Sohn, Kumoh National Institute of Technology, Gumi, Korea
 J.-S. Oh, Kongju National University, Cheonan, South Korea
- P 20 On the Application of Bouc-Wen Hysteresis Approach for Modeling of MR Actuators**
 J. Goldasz, Technical Center Kraków, BWI Group, Kraków, Poland, and Krakow University of Technology, Kraków, Poland
 B. Sapiński, AGH University of Science and Technology, Kraków, Poland
 Ł. Jastrzębski, AGH University of Science and Technology, Kraków, Poland

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- P 21 A High Response Electrorheological Servo Valve for Active Vibration Decoupling**
H. Heinken*, Helmut-Schmidt-Universität, Hamburg, Germany
S. Ulrich, Helmut-Schmidt-Universität, Hamburg, Germany
R. Bruns, Helmut-Schmidt-Universität, Hamburg, Germany
- P 22 Hydraulic Miniature Actuators Controlled by Electrorheological Fluid**
M. Siegfarth, Fraunhofer IPA/PAMB, Mannheim, Germany
- P 23 The Impact of Vibrations on Magnetorheological Fluids in Cylindrical Brakes**
P.-A. Novikoff*, CEA-LIST, Gif-sur-Yvette, France
L. Eck, CEA-LIST, Gif-sur-Yvette, France
M. Hafez, CEA-LIST, Gif-sur-Yvette, France
- P 24 A New Vehicle Hydraulic Lifter Activated by a Magneto-rheological Valve System**
T.-H. Lee, Inha University, Incheon, South Korea
S.-U. Shin, Inha University, Incheon, South Korea
S.-B. Choi, Inha University, Incheon, South Korea
S.-W. Cha, Inha University, Incheon, South Korea

Low-Power Electromagnetic Actuators

- P 25 Study of an Electromagnetic Damping Actuator**
M. Parekh, KTH Royal Institute of Technology, Stockholm, Sweden
J. Magnusson, ABB AB Corporate Research, Västerås, Sweden
G. Engdahl, KTH Royal Institute of Technology, Stockholm, Sweden
- P 26 Highly Dynamic Moving Coil Frame Actuator for Automotive Laser Beam Deviation**
G. Loussert, MMT Moving Magnet Technologies, Besançon, France
- P 27 Active Vibration Cancellation for Handheld Linear Oscillating Actuator**
O. Mönnich, Technische Universität Berlin, Berlin, Germany
H. Lehr, Technische Universität Berlin, Berlin, Germany
J. Maas, Technische Universität Berlin, Berlin, Germany

Polymer Actuators

- P 28 Stroke Magnification in Dielectric Elastomer Actuators with Dynamic Excitation**
P. Linnebach, Zentrum für Mechatronik und Automatisierungstechnik gGmbH, Saarbrücken, Germany
S. Hau, Universität des Saarlandes, Saarbrücken, Germany
G. Rizello, Universität des Saarlandes, Saarbrücken, Germany
P. Motzki, Zentrum für Mechatronik und Automatisierungstechnik gGmbH, Saarbrücken, Germany
S. Seelecke, Zentrum für Mechatronik und Automatisierungstechnik gGmbH, Saarbrücken, Germany, and Universität des Saarlandes, Saarbrücken, Germany

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- P 29 Influence of Humidity on Torsional Actuation in Highly Twisted Nylon Fibers**
T. Yamauchi, DENSO CORPORATION, Kariya, Japan
S. Washino, DENSO CORPORATION, Kariya, Japan
T. Irisawa, Nagoya University, Nagoya, Japan
K. Takagi, Nagoya University, Nagoya, Japan
M. Shioya, Tokyo Institute of Technology, Meguro-ku, Japan
E. Tanaka, DENSO CORPORATION, Kariya, Japan
- P 31 Electromechanical Fatigue Testing Device for Dielectric Elastomers under Controllable Environmental Conditions**
D. Bruch, Zentrum für Mechatronik und Automatisierungstechnik gGmbH, Saarbrücken, Germany
M. Hill, Zentrum für Mechatronik und Automatisierungstechnik gGmbH, Saarbrücken, Germany
S. Hau, Universität des Saarlandes, Saarbrücken, Germany
P. Motzki, Zentrum für Mechatronik und Automatisierungstechnik gGmbH, Saarbrücken, Germany
S. Seelecke, Universität des Saarlandes, Saarbrücken, Germany, and Zentrum für Mechatronik und Automatisierungstechnik gGmbH, Saarbrücken, Germany
- P 32 Temperature and Concentration Sensing of (PPy-DBS) Films for Dual Sensing-actuators**
V.H. Pascual, Technical University of Cartagena, Cartagena, Spain
T. F. Otero, Technical University of Cartagena, Cartagena, Spain
J. Schumacher, Arquimea Ingenieria, Leganes, Spain

Shape Memory Actuators

- P 33 Design of Two-stage Actuator Using Shape Memory Alloy Wires with Different Transformation Temperatures**
G.-W. Kim, Inha University, Incheon, South Korea
S.-B. Choi, Inha University, Incheon, South Korea
G.-Y. Jung, Inha University, Incheon, South Korea
- P 34 Resistance Welding of NiTi Actuator Wires**
D. Scholtes, Universität des Saarlandes, Saarbrücken, Germany
R.-K. Zäh, Zentrum für Mechatronik und Automatisierungstechnik gGmbH, Saarbrücken, Germany
M. Schmidt, Zentrum für Mechatronik und Automatisierungstechnik gGmbH, Saarbrücken, Germany
P. Motzki, Zentrum für Mechatronik und Automatisierungstechnik gGmbH, Saarbrücken, Germany
B. Faupel, Hochschule für Technik und Wirtschaft Saarbrücken, Saarbrücken, Germany
S. Seelecke, Universität des Saarlandes, Saarbrücken, Germany, and Zentrum für Mechatronik und Automatisierungstechnik gGmbH, Saarbrücken, Germany

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- P 35 Development and Control of a 2-DOF Reconfigurable SMA End-effector**
 L. Zimmer, Zentrum für Mechatronik und Automatisierungstechnik gGmbH, Saarbrücken, Germany
 Y. Goergen, Zentrum für Mechatronik und Automatisierungstechnik gGmbH, Saarbrücken, Germany
 F. Khelifa, Zentrum für Mechatronik und Automatisierungstechnik gGmbH, Saarbrücken, Germany
 M. Schmidt, Zentrum für Mechatronik und Automatisierungstechnik gGmbH, Saarbrücken, Germany
 P. Motzki, Zentrum für Mechatronik und Automatisierungstechnik gGmbH, Saarbrücken, Germany
 S. Seelecke, Universität des Saarlandes, Saarbrücken, Germany, and Zentrum für Mechatronik und Automatisierungstechnik gGmbH, Saarbrücken, Germany
- P 36 Bidirectional Smart Linear Actuator with Synergistic Bias**
 N. Duraisamy, National Institute of Technology Tiruchirappalli, Tiruchirappalli, India
 D. Kaliaperumal, National Institute of Technology Tiruchirappalli, Tiruchirappalli, India
- P 37 SMA Wires Bundles – Mechanical and Electrical Concepts**
 R. Britz, Universität des Saarlandes, Saarbrücken, Germany
 F. Welsch, Universität des Saarlandes, Saarbrücken, Germany
 S.-M. Kirsch, Universität des Saarlandes, Saarbrücken, Germany
 F. Simone, Zentrum für Mechatronik und Automatisierungstechnik gGmbH, Saarbrücken, Germany
 M. Schmidt, Zentrum für Mechatronik und Automatisierungstechnik gGmbH, Saarbrücken, Germany
 P. Motzki, Zentrum für Mechatronik und Automatisierungstechnik gGmbH, Saarbrücken, Germany
 S. Seelecke, Universität des Saarlandes, Saarbrücken, Germany, and Zentrum für Mechatronik und Automatisierungstechnik gGmbH, Saarbrücken, Germany
- P 38 Electro-mechanical Logic Gates Using Shape Memory Alloy Actuator**
 G. Muthuveeran, National Institute of Technology Tiruchirappalli, Tiruchirappalli, India
 V. Velusamy, National Institute of Technology Tiruchirappalli, Tiruchirappalli, India
 D. Kaliaperumal, National Institute of Technology Tiruchirappalli, Tiruchirappalli, India
- P 39 Self-regulating Solar Shading System for the Building Envelope Based on Thermal Shape Memory effect**
 I. Navarro de Sosa*, Technische Universität Chemnitz, Chemnitz, Germany
 W.-G. Drossel, Technische Universität Chemnitz, Chemnitz, Germany

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- P 42 Characterization of Binary Nitinol Actuators with Various Transformation Temperatures Employing Uniaxial Isobaric Loading**
 W. Buchan, Fort Wayne Metals Research Products Corp., Fort Wayne, USA
 M. Rider*, Fort Wayne Metals Research Products Corp., Fort Wayne, USA
 J. Davis, Fort Wayne Metals Research Products Corp., Fort Wayne, USA

Active Vibration / Noise Control

- P 43 Amplified Piezo Actuators (APA®) Enhancement for Active Vibration Control (AVC)**
 F. Barillot, CEDRAT TECHNOLOGIES S.A., Meylan, France
 A. Pagès, CEDRAT TECHNOLOGIES S.A., Meylan, France
 S. Rowe, CEDRAT TECHNOLOGIES S.A., Meylan, France
 S. Duc, CEDRAT TECHNOLOGIES S.A., Meylan, France
 O. Sosnicki, CEDRAT TECHNOLOGIES S.A., Meylan, France
- P 44 Damping Augmentation of Large Deformable Mirrors for Adaptive Optics**
 K. Wang, Université Libre de Bruxelles, Brussels, Belgium
 D. Alaluf, European Space Agency - ESA / ESTEC, Noordwijk, The Netherlands
 B. Mokrani, University of Liverpool, Liverpool, United Kingdom
 A. Preumont, Université Libre de Bruxelles, Brussels, Belgium

Actuator Control

- P 45 Sensor Array and Algorithms for Current Control in a 6-DOF Magnetic Levitation Actuator**
 A. Goos*, Physik Instrumente (PI) GmbH & Co. KG, Karlsruhe, Germany
 R. Gloess, Physik Instrumente (PI) GmbH & Co. KG, Karlsruhe, Germany
- P 46 Non-contact Suspension System for Flexible Steel Plate Using Electromagnetic Actuator: Experimental Consideration on Levitation Supporting Performance of Permanent Magnet**
 Y. Oda, Tokai University, Hiratsuka, Japan
 Y. Ito, Tokai University, Hiratsuka, Japan
 K. Okuno, Tokai University, Hiratsuka, Japan
 T. Suzuki, Tokai University, Hiratsuka, Japan
 M. Kida, Tokai University, Hiratsuka, Japan
 T. Narita*, Tokai University, Hiratsuka, Japan
 H. Kato, Tokai University, Hiratsuka, Japan
 H. Moriyama, Tokai University, Hiratsuka, Japan

Aerospace Applications

- P 48 Conceptual Models of SMA Actuators for Blade Twist**
 S. Ameduri, Centro Italiano Ricerche Aerospaziali, Capua, Italy
 G. Amendola, Centro Italiano Ricerche Aerospaziali, Capua, Italy
 A. Concilio, Centro Italiano Ricerche Aerospaziali, Capua, Italy

Tuesday 26 June 2018, 16:40–18:45, Hall 4.1

- P 49 PZT Beamforming for De-icing Purposes**
S. Ameduri, Centro Italiano Ricerche Aerospaziali, Capua, Italy
A. Concilio, Centro Italiano Ricerche Aerospaziali, Capua, Italy
- P 50 Operating Performance Evaluation of Actuator System for Sub-sonic GA Wind Tunnel Testing**
N. Kobiki, JAXA, Mitaka, Japan
K. Saitoh, JAXA, Mitaka, Japan
Y. Hamada, JAXA, Mitaka, Japan
- P 51 A Jam-tolerant Electromechanical System**
Z. Yu*, Beijing Research Institute of Precise Mechatronics and Controls, Beijing, China
T. Niu, Beijing Research Institute of Precise Mechatronics and Controls, Beijing, China
H. Dong, Beijing Research Institute of Precise Mechatronics and Controls, Beijing, China
- P 52 Miniaturized Magnetic Gear as Part of Satellite Components Driving Mechanisms**
G. Puchhammer, Karl Rejlek GmbH, Wien, Austria
- P 53 Development of Magnetic Fast Steering Mirror Prototype for Optical Pointing Applications**
G. Aigouy, CEDRAT TECHNOLOGIES S.A., Meylan, France
K. Benoit, CEDRAT TECHNOLOGIES S.A., Meylan, France
E. Betsch, CEDRAT TECHNOLOGIES S.A., Meylan, France
T. Maillard, CEDRAT TECHNOLOGIES S.A., Meylan, France
F. Claeysen, CEDRAT TECHNOLOGIES S.A., Meylan, France

Fluidic / Pneumatic Applications

- P 54 Development of a Thin Pneumatic Rubber Actuator Generating 3DOF Motion - Design Using FEM Analysis and Fabrication of the Actuator**
M. Yuzaki, Okayama University, Okayama, Japan
K. Iwata, Industrial Technology Center of Okayama Prefecture, Okayama, Japan
S. Wakimoto, Okayama University, Okayama, Japan
T. Kanda, Okayama University, Okayama, Japan
- P 55 Development of Pneumatic Valves and a Fiber Sensor for a Smart Artificial Muscle**
K. Omura, Okayama University, Okayama, Japan
K. Goto, Okayama University, Okayama, Japan
S. Wakimoto, Okayama University, Okayama, Japan
T. Kanda, Okayama University, Okayama, Japan

Haptic / Tactile Applications

- P 56 About the Use of Magnetically Hard Flexible Membranes for Tactile Interfaces**
S. Hermann, MMT Moving Magnet Technologies, Besançon, France
L. Arbenz, MMT Moving Magnet Technologies, Besançon, France
C. Espanet, MMT Moving Magnet Technologies, Besançon, France

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Magnetostrictive / MSM Actuators

- P 57 Influence of Surface State on Properties of Ni-Mn-Ga Single Crystalline Actuator Elements**
A. Böhm, Fraunhofer IWU, Dresden, Germany
W.-G. Drossel, Fraunhofer IWU, Chemnitz, Germany
E. Pagounis, ETO MAGNETIC GmbH, Stockach, Germany
M. Laufenberg, ETO MAGNETIC GmbH, Stockach, Germany
- P 58 Application of Electrochemical Hydrogen Loading Technique for Internal Stress Control in Magnetostrictive Thin Films**
M. Inoue, Tokai University, Hiratsuka, Japan
Y. Tsukagoshi, Tokai University, Hiratsuka, Japan
S. Takase, Tokai University, Hiratsuka, Japan
Y. Matsumura, Tokai University, Hiratsuka, Japan
H.T. Uchida, Tokai University, Hiratsuka, Japan
- P 59 Preparation of Ni-Mn-Ga Micropillars Using Xe-ion Beam Milling for Magnetic Actuation on Microscale**
L. Straka, Institute of Physics of the Czech Academy of Sciences, Prague, Czech Republic
L. Klimsa, Institute of Physics of the Czech Academy of Sciences, Prague, Czech Republic
D. Musiienko, Lappeenranta University of Technology, Savonlinna, Finland
K. Ullakko, Lappeenranta University of Technology, Savonlinna, Finland
O. Heczko, Institute of Physics of the Czech Academy of Sciences, Prague, Czech Republic
- P 60 An Innovative Electromagnetic Actuator Based on Magnetic Shape Memory Alloys**
M. Schropp, HTWG Konstanz, Konstanz, Germany
L. Riccardi, ETO MAGNETIC GmbH, Stockach, Germany
R. Schnetzler, ETO MAGNETIC GmbH, Stockach, Germany
R. Nägele, HTWG Konstanz, Konstanz, Germany
- P 61 Ultrafast Actuators with Magnetic Shape Memory Alloys**
M. Schautzgy, ETO MAGNETIC GmbH, Stockach, Germany
R. Schnetzler, ETO MAGNETIC GmbH, Stockach, Germany
M. Laufenberg, ETO MAGNETIC GmbH, Stockach, Germany
- P 63 The Effect of Substrate Temperature for Thermal and True Stress on Magnetostrictive Thin Films**
K. Yamaguchi, Tokai University, Hiratsuka, Japan
Y. Tsukagoshi, Tokai University, Hiratsuka, Japan
K. Yatagai, Tokai University, Hiratsuka, Japan
H.T. Uchida, Tokai University, Hiratsuka, Japan
R. Gemma, Tokai University, Hiratsuka, Japan
Y. Matsumura, Tokai University, Hiratsuka, Japan

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P 64 Effects of Hot-filament Emitter on Magnetostrictive Thin Film Formation by Ion-plating Process

N. Arai, Tokai University, Hiratsuka, Japan
 M. Shinooka, Tokai University, Hiratsuka, Japan
 K. Yatagai, Tokai University, Hiratsuka, Japan
 R. Gemma, Tokai University, Hiratsuka, Japan
 H.T. Uchida, Tokai University, Hiratsuka, Japan
 Y. Matsumura, Tokai University, Hiratsuka, Japan

(Bio-)Medical Applications**P 65 Micro-grippers for Biomedical and Biomechanical Studies**

M. Leester-Schädel, Technische Universität Braunschweig, Braunschweig, Germany
 B. Gursky, Technische Universität Braunschweig, Braunschweig, Germany
 M. Garcés-Schröder, Technische Universität Braunschweig, Braunschweig, Germany
 S. Bütetfisch, Physikalisch Technische Bundesanstalt, Braunschweig, Germany
 I. Rustenbeck, Technische Universität Braunschweig, Braunschweig, Germany
 M. Böhl, Technische Universität Braunschweig, Braunschweig, Germany
 A. Dietzel, Technische Universität Braunschweig, Braunschweig, Germany

P 66 A Proposal for ROM Device to Prevent Contractures of the Thumb Joint Using Pneumatic Soft Actuators

R. Aoyama, Osaka Institute of Technology, Osaka, Japan
 H. Taniguchi, Osaka Institute of Technology, Osaka, Japan

P 67 Development of a Pneumatic Rehabilitation Device for Ankle Joints

S. Ohe, Osaka Institute of Technology, Osaka, Japan
 H. Taniguchi, Osaka Institute of Technology, Osaka, Japan

P 68 Design and Evaluation of Miniaturized Solenoid Actuators for Providing Sensory Feedback for Upper Limb Amputees

H. Huang*, Ecole Polytechnique Fédérale de Lausanne, Neuchâtel, Switzerland, and Berner Fachhochschule, Biel, Switzerland
 C. Enz, Ecole Polytechnique Fédérale de Lausanne, Neuchâtel, Switzerland
 V.M. Koch, Berner Fachhochschule, Biel, Switzerland

P69 Improving the 3-D Force Measurement of a Single Port Parallel Kinematics Surgical Manipulator Using Friction Reduction by Vibration

D. Bilz, Technische Universität Darmstadt, Darmstadt, Germany
 S. Matich, Technische Universität Darmstadt, Darmstadt, Germany
 S. Knaut, Technische Universität Darmstadt, Darmstadt, Germany
 H.F. Schlaak, Technische Universität Darmstadt, Darmstadt, Germany

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 Ahmadi Seyed, S., Karlsruher Institut für Technologie, Karlsruhe, Germany C5.5
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Folgheraiter, M., Nazarbayev University, Astana, Kazakhstan	C1.1
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Fowler, A.G., RMIT University, Melbourne, Australia	C2.0
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Kramer, T., Technische Universität Dresden, Dresden, Germany	A1.2
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Maroufi, M., University of Texas at Dallas, Richardson, USA	C2.0
Marré, D., University of Genova, Genova, IT, and CNR-SPIN, Genova, Italy	C2.2
Marth, H., Physik Instrumente (PI) GmbH & Co. KG, Karlsruhe, Germany	A2.4
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The accompanying exhibition on smart actuators and drive systems will take place simultaneously with the conference in Hall 4.1 adjacent to the Congress Center. 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.

Exhibitors can use their own stand equipment or make use of the complete stand service offered by the organiser.

By 15 March 2018, 15 exhibitors have already registered.

Charges

► Exhibition space (raw space)

Row stand	Corner stand	Head stand
EUR 190/m ²	EUR 210/m ²	EUR 230/m ²

► System stands (excluding area)

System stands can be offered starting from EUR 120/m².

All prices quoted plus VAT (19 percent at present).

A detailed information package will be mailed on request.

A regularly updated list of exhibitors will be available on the event homepage.

There will be no entrance fee for the exhibition. Visitors are welcome.

Registration for the exhibition is requested until 11 April 2018. A list of exhibitors including detailed information about every exhibitor will be published in the conference proceedings.

A separate updated catalogue will be available in the exhibition.

The exhibition will take place at the

Bremen Exhibition Center

Hall 4.1

Bürgerweide
28209 Bremen
Germany

The Exhibition Center is directly connected to the Congress Center.

Opening Hours of the Exhibition

Monday 25 June 2018	09:00–18:00
Tuesday 26 June 2018	09:00–18:45
Wednesday 27 June 2018	09:00–15:00

(updated 15 March 2018)

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Conference Venue

The conference will be held in the Hanse Saal, the Borgward Saal and the Focke Wulf Saal of the Congress Center Bremen (CCB) on

Monday 25 June 2018 09:00–19:00
Tuesday 26 June 2018 09:00–17:00
Wednesday 27 June 2018 09:00–15:00

The Poster Session will be held in hall 4.1 on

Tuesday 26 June 2018 16:40–18:45

Exhibition

Parallel to the conference the accompanying Exhibition on Smart Actuators and Drive Systems will take place in hall 4.1 of the Exhibition Center Bremen, directly linked to the Congress Center Bremen.

Conference Language

The conference language is English; there will be no simultaneous translation.

Lunch and Refreshments

Lunch and refreshments are included in the conference fee. Opening times for lunch are as follows

Monday 25 June 2018 12:20–14:20
Tuesday 26 June 2018 12:20–14:20
Wednesday 27 June 2018 13:00–15:00

Welcome Reception

Conference participants and exhibitors are invited to a Welcome Reception and Get-together in the Foyer of the Congress Center Bremen on Tuesday 26 June 2018 at 19:30.

Conference Documents

Upon registration you will receive

- ▶ Name Badge
- ▶ Conference Proceedings on CD Rom/USB Card
- ▶ List of Participants
- ▶ Exhibition Catalogue
- ▶ Programme Changes

A printed version of the Conference Proceedings is available at a subscription price of EUR 50 (plus 7 per cent VAT) **if ordered by 30 April 2018** together with a conference registration.

Registration

Registration is requested before 15 June 2018.
Please use the Online Registration Service.

Registration fees

For registration until 13 April 2018	EUR 750.00
For registration from 14 April 2018	EUR 850.00
One-day ticket	EUR 425.00

Reduced fee (Students, one author per paper or poster, one representative per exhibition stand)	EUR 425.00
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Reduced fee for members of the endorsers' group (registration to be accompanied by proof of membership) All prices plus additional VAT (19% at present).	EUR 750.00
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The reduced fee for students is only available if the registration is accompanied by a copy/scan of the corresponding student ID sent by e-mail to actuator@messe-bremen.de.

Conference fees include conference proceedings (digital version), entry to the exhibition, lunches, and refreshments. Technical visits and Welcome Reception are included, if having registered for the respective day.

Special Note for Authors

Authors intending to make use of the "reduced fee for authors" are kindly asked to register online stating the conference contribution. The validity will be verified. Deadline: 31 March 2018.

We expect at least one of the authors to participate in the conference. In case that none of the scheduled authors is present during the event, one of them will be charged the reduced conference fee. The Conference Proceedings will be sent by mail on request after the event.

Payment/Cancellation

Payment for registration is required in advance to the conference. Please make use of our Online Registration Service starting in February 2018. For this service, a valid credit card or a bank account is required. After 20 May 2018, we only accept payment by credit card.

Those who select payment on account are kindly asked to remit the conference fee after receipt of invoice. Payment may be made by bank transfer always stating "ACTUATOR 2018", the name of the participant and the invoice no. If we have not received the payment at the moment of the registration we will charge you on-site. Credit cards are accepted on-site also.

In case of cancellation received before or on 13 May 2018, the paid fee minus a service charge of EUR 40 (+VAT) will be refunded. There will be no refund in case of cancellation after 13 May 2018. In this case, the Conference Proceedings will be sent by mail after the event. Of course, substitutes are welcome, even on-site.

Personal Data

All data given will be kept confidential. MESSE BREMEN hereby notifies that contact details given during acceptance of submissions or registration will be stored and used for the organisation of ACTUATOR events only. Providing the data is optional in general, but mandatory for the acceptance of submissions / registrations. Authors' and delegates' addresses will not be published in full detail or passed to third parties for other purposes. After the expiry of the retention period the personal data will be deleted.

At any time, all authors and delegates may contradict the storage and further use of their data by the organiser for future activities. Parties who want to do so are kindly asked to send an e-mail to actuator@messe-bremen.de.

Photos and Video Clips

During the event MESSE BREMEN will take photos and video clips showing the event activities, participants, trade show visitors, exhibition stands, and exhibits. The team will ask for your written agreement. This material may be used free of charge for publication purposes in media and in public relation material related to ACTUATOR events edited by the organiser in consideration of the Law on Copyright and Neighbouring Rights in Arts. In case you do not accept this code of practise, please contact the photographer / film team or the organisation team at the entries and exits. You may also send an e-mail to actuator@messe-bremen.de.

Please note: Participants are not allowed to take photos of the presented slides or posters without the authors' permission. We intend to offer the presentation slides approved for download by the speakers about three weeks after the event. Please respect the authors' copyright!

Conference Information



MESSE BREMEN
M3B GmbH
Findorffstraße 101
28215 Bremen
Germany

Phone: +49 (0) 421 35 05 -464
Fax: +49 (0) 421 35 05 -15464
E-mail: actuator@messe-bremen.de
Homepage: www.actuator.de



Conference Office

The conference office will only be reachable during ACTUATOR 2018 as follows

Sunday 24 June 2018	14:00–20:00
Monday 25 June 2018	07:00–19:00
Tuesday 26 June 2018	08:00–19:00
Wednesday 27 June 2018	08:00–18:00

Salon Scharoun

Phone: +49 (0) 421 37 89-706
Fax: +49 (0) 421 35 05 -387
E-mail: actuator@messe-bremen.de

Accommodation

We have arranged a limited contingent of rooms at special rates with various hotels in Bremen. Therefore an early booking by 25 May 2018 at the latest is recommended.

For reservation purposes please use the Hotel Booking form at www.actuator.de or contact the Bremen Tourism Board directly:

Bremer Touristik Zentrale

Contact: Ms Karen Rink
Phone: +49 (0) 421 30 8 00 - 19
Fax: +49 (0) 421 30 8 00 - 3819
E-Mail: rink@bremen-tourism.de

25 June 2018

► Drop Tower Bremen

A Drop Tower tour consists of a generally understandable presentation of the institute and its work. Afterwards you can have a look at our facilities especially the integration hall and the control centre. Visitors groups are not allowed to go to the top of the Drop Tower for internal reasons until further notice.

**The visit will take place on Monday, 25 June 2018
from 16:00–17:15 Meeting point is the check-in desk
at 15:30, departure is at 15:40**

The costs of all visits are included in the registration fee. Transport to all locations will be organised. Registration is only possible on-site at the conference check-in.

Accompanying Events

We would like to draw your attention to events accompanying ACTUATOR 2018 held in the Congress Center Bremen (CCB) at the same time, organised by external organisers:

► Training Sessions “Piezoelectric Actuators” and “Magnetic Linear Actuators”

9:00–17:00, on 28 June 2018

For details please see p. 26ff.

Please note: These Training Sessions are organised by CEDRAT TECHNOLOGIES SA., Meylan, France, on their own account.*

*MESSE BREMEN does not take any responsibility for these events.

Exhibition and Congress Center Bremen

Bürgerweide
28209 Bremen
Germany

or (for navigation systems)

Theodor-Heuss-Allee 21–23
28215 Bremen
Germany

During the event: 24–27 June 2018
Phone: +49 (0) 421 37 89-706
Fax: +49 (0) 421 35 05-387

Public Transport to the Exhibition and Congress Center Bremen**From Airport Bremen**

Take tram no. 6 direction University and leave at station Messe Centrum/ Blumenthalstraße. Walk along the small park in front of you and you will see the Exhibition and Congress Center Bremen.

From Hauptbahnhof (main station)

A 5 minute walk takes you from the main station to the venue. Use the north exit to Bürgerweide/MESSE CENTRUM. You will see the venue just beyond the parking area.

By car

Follow the signs ÖVB Arena/MESSE/CCB. Parking space is available at the Bürgerweide, just between the main station and the Exhibition and Congress Center Bremen. Maps can be downloaded from www.messe-bremen.de

