

# 59<sup>TH</sup> IWK

Ilmenau Scientific Colloquium  
Technische Universität Ilmenau



September 11 - 15, 2017

## »Engineering for a Changing World«



Department of  
Mechanical Engineering

## IMPRESSUM

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## PREFACE

Dear Conference Participants!

We are proud to welcome you to Technische Universität Ilmenau for the 59th Ilmenau Scientific Colloquium (59. Ilmenauer Wissenschaftliches Kolloquium, IWK). As the first IWK was held in 1956, this colloquium is one of the longest continuing conferences in bridging disciplines of and around engineering.

In 2017, the Ilmenau Scientific Colloquium is again organised by the Department of Mechanical Engineering. The title of this year's conference

The title of this year's conference:

### »Engineering for a Changing World«

refers to limited natural resources of our planet, to massive changes in cooperation between continents, countries, institutions and people – enabled by the increased implementation of information technology as the probably most dominant driver in many fields. The Colloquium, complemented by workshops, is characterised by the following topics, but not limited to them:

- Precision Engineering and Metrology
- Industry 4.0 and Digitalisation in Mechanical Engineering
- Mechatronics, Biomechatronics and Mechanism Technology
- Systems Engineering
- Metallic and Hybrid Materials and Simulation

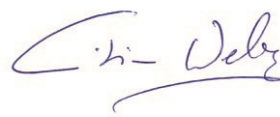
The topics are oriented on key strategic aspects of research and teaching in Mechanical Engineering at our university. As always in the long series of IWK conferences, we have invited and encouraged contributions from both academia and industry. We are very much pleased with the response. After careful international reviewing, more than 160 contributions remain for presentation, representing 13 contributing countries. The range of subjects certainly reflects the interdisciplinary nature of the conference topics and will fruitfully bring together experts from industry and academia.

We are confident that the IWK will be the perfect platform for discussion, establishing new contacts and for the beginning or continuation of cooperative projects. No matter whether you are an experienced professional or a novice in mechanical engineering – we are convinced that the 59th Ilmenau Scientific Colloquium will be of benefit to you.

Besides an enriching and interesting conference, we wish you an enjoyable stay in the town of Ilmenau and its surroundings. The region is the home of the Bach family, and its most prominent member Johann Sebastian Bach in specific, who collected his first professional experiences in this region 300 years ago. Still Thuringia is one of the richest landscapes of classical music worldwide. Perhaps the 59th IWK will inspire you to follow the traces of Bach!



Professor Peter Scharff  
President of the Technische  
Universität Ilmenau



Professor Christian Weber  
Dean of the Department of  
Mechanical Engineering

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## Plenary Lecture

[PL] **A new V-Model for interdisciplinary product engineering**

*Graessler, Iris*

URN: [urn:nbn:de:gbv:ilm1-2017iwk-063:6](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-063:6)

## Topic 1: Precision Engineering and Metrology

### Session 1.1 Precision Measurement Technology

- [1.1.01] **Fast and accurate: high-speed metrological large range AFM for surface and nanometrology**  
*Dai, Gaoliang; Liu, Pei; Koenders, Ludger; Flügge, Jens; Hemmleb, Matthias*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-039:2](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-039:2)
- [1.1.02] **Using artificial neural networks to study the dynamics of positioning systems**  
*Hirniak, Yurii B.; Ivakhiv, Orest; Nakonechnyi, Markiyan*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-120:0](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-120:0)
- [1.1.03] **A contribution to the implementation of ultraprecision rotations for multiaxial nanopositioning machines**  
*Schienbein, Ralf; Theska, René; Weigert, Florian*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-003:0](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-003:0)
- [1.1.04] **Combination of a fast white light interferometer with a phase-shifting interferometric line sensor for form measurements of precision components**  
*Riebeling, Jörg; Lehmann, Peter; Laubach, Sören; Ehret, Gerd*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-059:7](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-059:7)
- [1.1.05] **Development of an integrated guiding and actuation element for high dynamic nanopositioning systems**  
*Gorges, Stephan; Leistritz, Bianca; Hesse, Steffen; Ortlepp, Ingo; Slotta, Georg; Schäffel, Christoph*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-077:4](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-077:4)
- [1.1.06] **A straightness measuring interferometer characterized with different wedge prisms**  
*Weichert, Christoph; Köchert, Paul; Schötka, Eugen; Flügge, Jens; Manske, Eberhard*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-002:2](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-002:2)
- [1.1.07] **On the characterization of ultra-precise VUV-focusing mirrors by means of slope measuring deflectometry**  
*Siewert, Frank; Buchheim, Jana; Gwalt, Grzegorz; Viefhaus, Jens*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-058:7](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-058:7)
- [1.1.08] **Evaluation of a focused laser spot diameter for an optical angle sensor**  
*Shimizu, Yuki; Maruyama, Taiji; Nakagawa, Shota; Chen, Yuan-Liu; Gao, Wei*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-071:8](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-071:8)
- [1.1.09] **Automatic calibration system for micro-displacement devices**  
*Shih, Hung-Ta; Wang, Yung-Cheng; Shyu, Lih-Horng; Tung, Pi-Cheng; Jywe, Wen-Yuh; Chen, Jia-Hong*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-103:8](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-103:8)

- [1.1.10] **3D reconstruction and characterization of the porous microstructure of Al<sub>2</sub>O<sub>3</sub>-coatings based on surface data**  
*Lofftfield, Nina; Kästner, Markus; Reithmeier, Eduard*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-101:2](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-101:2)
- [1.1.11] **Pattern sequences for fast absolute phase retrieval with application in the handheld operation of structured light sensors**  
*Matthias, Steffen; Kästner, Markus; Reithmeier, Eduard*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-079:2](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-079:2)
- [1.1.12] **A new approach for holistic thread profile determination supported by optical focus variation measurements**  
*Ullmann, Vinzenz; Meß, Torsten; Wenzel, Kay; Machleidt, Torsten; Manske, Eberhard*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-040:7](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-040:7)
- [1.1.13] **Low-frequency micro/nano-vibration generator using a piezoelectric actuator**  
*Li, Rui-Jun; Lei, Ying-Jun; Zhang, Lian-Sheng; Fan, Kuang-Chao; Cheng, Zhen-Ying; Hu, Peng-Hao*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-009:9](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-009:9)
- [1.1.14] **Dynamic alignment and calibration of linear axes**  
*Rahneberg, Ilko; Dontsov, Denis; Langlotz, Enrico; Schott, Walter*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-132:3](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-132:3)
- [1.1.15] **Traceable measurement of large gears with micron accuracy : a mandatory basis for reliable wind energy systems**  
*Balzer, Felix; Steffens, Norbert; Stein, Martin; Kniel, Karin*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-139:9](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-139:9)
- [1.1.16] **Using Monte Carlo simulation for estimation of uncertainty of four point roundness measurements of large rotors**  
*Widmaier, Thomas; Hemming, Björn; Juhanko, Jari; Kuosmanen, Petri; Esala, Veli-Pekka; Lassila, Antti; Laukkanen, Pasi*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-128:1](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-128:1)

### Poster Presentation

- [1.1.P1] **Alternative evaluation methods for roundness measurements**  
*Imkamp,, Dietrich; Gabbia,, Alessandro; Seewi, Jörg*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-108:6](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-108:6)
- [1.1.P2] **FPGA-based signal processing of a heterodyne interferometer**  
*Dannberg, Oliver; Ortlepp, Ingo; Manske, Eberhard*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-117:6](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-117:6)



- [1.1.P3] **Optimization of the optical parameters in Fabry-Perot interferometer for displacement measurements**  
*Wang, Yung-Cheng; Shyu, Lih-Horng; Tung, Pi-Cheng; Shih, Hung-Ta; Lin, Jui-Cheng; Lee, Bean-Yin; Li, Jhe-Sian*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-104:5](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-104:5)

## **Session 1.2 Measurement and Sensor Technology**

- [1.2.01] **The Planck-Balance – a self-calibrating precision balance for industrial applications**  
*Rothleitner, Christian; Schleichert, Jan; Günther, Ludwig; Vasilyan, Suren; Rogge, Norbert; Knopf, Dorothea; Fröhlich, Thomas; Härtig, Frank*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-026:8](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-026:8)
- [1.2.02] **Magnet system for the Planck-balance**  
*Schleichert, Jan; Vasilyan, Suren; Günther, Ludwig*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-076:6](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-076:6)
- [1.2.03] **Dissemination of the « Planck-Kilogram »**  
*Knopf, Dorothea; Wiedenhöfer, Thomas; Bauer, Katharina; Härtig, Frank*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-118:4](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-118:4)
- [1.2.04] **The virtual weight**  
*Günther, Ludwig; Rothleitner, Christian; Schleichert, Jan; Härtig, Frank*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-062:8](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-062:8)
- [1.2.05] **Investigations on motion deviations of an EMFC balance**  
*Rogge, Norbert; Schleichert, Jan; Rothleitner, Christian*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-068:4](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-068:4)
- [1.2.06] **Calibration of the torsion force measurement system for the Lorentz force velocimetry application**  
*Yan, Na; Kühnel, Michael; Vasilyan, Suren; Fröhlich, Thomas*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-082:3](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-082:3)
- [1.2.07] **A self-calibrating multicomponent force/torque measuring system**  
*Marangoni, Rafael Ramos; Schleichert, Jan; Rahneberg, Ilko; Hilbrunner, Falk; Fröhlich, Thomas*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-081:5](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-081:5)
- [1.2.08] **Enhanced measurement routine for optical 3D geometry measurement of hot specimen by reduction of ambient pressure**  
*Quentin, Lorenz; Beermann, Rüdiger; Pösch, Andreas; Reithmeier, Eduard; Kästner, Markus*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-065:1](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-065:1)
- [1.2.09] **High accuracy temperature measurement and monitoring of flow parameters using a multifunctional temperature probe**  
*Lippmann, Lutz; Irrgang, Klaus; Hohmann, Michael; Pufke, Michael*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-019:7](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-019:7)

## Poster Presentation

- [1.2.P1] **Impedance analyser error correction using artificial neural networks**  
*Stadnyk, Bohdan; Fröhlich, Thomas; Khoma, Yuriy; Herasymenko, Veronika; Chaban, Olesia*  
URN: <urn:nbn:de:gbv:ilm1-2017iwk-051:3>
- [1.2.P2] **I-T converting element of quantum temperature standard**  
*Bobalo, Yuriy; Mykyychuk, Mykola; Stadnyk, Bohdan; Yatsyshyn, Svyatoslav*  
URN: <urn:nbn:de:gbv:ilm1-2017iwk-087:2>
- [1.2.P3] **Extending the HSRI tyre model for large inflation pressure changes**  
*Höpping, Kristian; Augsburg, Klaus; Büchner, Florian*  
URN: <urn:nbn:de:gbv:ilm1-2017iwk-085:6>
- [1.2.P4] **Problems of metrological verification of software for modern measuring instruments**  
*Fröhlich, Thomas; Oleskiv, Olha; Mykytyn, I.*  
URN: <urn:nbn:de:gbv:ilm1-2017iwk-136:3>

## Session 1.3 Precision Engineering and Optics

- [1.3.01] **Design of high-precision weighing cells based on static analysis**  
*Darnieder, Maximilian; Theska, René; Fröhlich, Thomas; Pabst, Markus; Wenig, Ronny; Hilbrunner, Falk*  
URN: <urn:nbn:de:gbv:ilm1-2017iwk-067:6>
- [1.3.02] **Motorized measurement device for automatic registration of cutting edges**  
*Behrens, Bernd-Arno; Krimm, Richard; Nguyen, Quoc Thang*  
URN: <urn:nbn:de:gbv:ilm1-2017iwk-010:5>
- [1.3.03] **Qualification of silane coatings for the strength enhancement of concrete parts**  
*Hahm, Christoph; Theska, René; Raab, Dagmar; Fehringer, Andreas; Kästner, Anett*  
URN: <urn:nbn:de:gbv:ilm1-2017iwk-023:5>
- [1.3.04] **Optical scheme of small-size curved detector spectrofluorometer**  
*Pavlycheva, Nadezhda K.; Akhmetgaleeva, Railia R.; Muslimov, Eduard R.*  
URN: <urn:nbn:de:gbv:ilm1-2017iwk-014:5>
- [1.3.05] **Evaluation strategy of spheroidal distortion for micro-sphere based on Whispering Gallery Mode resonance**  
*Hayashi, Kohei; Chu, Bohuai; Zhao, Zheng; Michihata, Masaki; Takamasu, Kiyoshi; Takahashi, Satoru*  
URN: <urn:nbn:de:gbv:ilm1-2017iwk-102:0>

- [1.3.06] **Accuracy improvement in diameter measurement of micro-sphere based on whispering gallery mode**  
*Michihata, Masaki; Chu, Bohuai; Zheng, Zhao; Hayashi, Kohei; Takamasu, Kiyoshi; Takahashi, Satoru*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-114:3](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-114:3)
- [1.3.07] **On the influence of the flexure hinge orientation in planar compliant mechanisms for ultra-precision applications**  
*Gräser, Philipp; Linß, Sebastian; Zentner, Lena; Theska, René*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-090:9](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-090:9)
- [1.3.08] **See-through near to eye displays: challenges and solution paths**  
*Hillenbrand, Matthias; Singer, Wolfgang; Münz, Holger; Kerwien, Norbert*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-141:2](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-141:2)
- [1.3.09] **High precision electron-beam-lithography for optical high performance applications**  
*Heusinger, Martin; Banasch, Michael; Zeitner, Uwe Detlef; Kley, Ernst-Bernhard*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-116:8](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-116:8)
- [1.3.10] **Nano-optical quarter-wave plates for applications in the visible wavelength regime: fabrication, tolerances and in-situ process control**  
*Stock, Carsten; Siefke, Thomas; Zeitner, Uwe Detlef; Kley, Ernst-Bernhard*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-021:0](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-021:0)
- [1.3.11] **Innovative freeform measurement method using two dimensional binary diffractive grating based on nanostructured silicon**  
*Bichra, Mohamed; Meinecke, Thomas; Müller, Lutz; Feßer, Patrick; Hoffmann, Martin; Sinzinger, Stefan*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-088:9](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-088:9)
- [1.3.12] **Features of assembly and adjustment of lens objectives**  
*Beloivan, P. A.; Latyev, Svjatoslav M.; Theska, René*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-135:6](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-135:6)

## **Session 1.4 Optics for Illumination, Imaging and Metrology**

- [1.4.01] **Removal of optical aberrations caused by illumination system in Fourier ptychography**  
*Cao, Xinrui; Sinzinger, Stefan*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-078:2](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-078:2)
- [1.4.02] **Introduction to Fourier ptychographic imaging for 3D ToF cameras**  
*Lietz, Henrik; Eberhardt, Jörg*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-119:4](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-119:4)
- [1.4.03] **Transmission volume holograms for LED illumination**  
*Karthus, Daniela; Sandfuchs, Oliver; Sinzinger, Stefan*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-070:0](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-070:0)

**[1.4.04] Photometric data for the development of lighting components**

*Bredemeier, Knut*

URN: [urn:nbn:de:gbv:ilm1-2017iwk-138:9](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-138:9)

*Poster Presentation*

**[1.4.P1] Flank wear measurement: a procedure proposal using computer vision techniques**

*Costa, Pedro Bastos; Silveira, Gustavo Fonseca da; Barros, Wellington Santos*

URN: [urn:nbn:de:gbv:ilm1-2017iwk-123:3](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-123:3)

## Topic 2: Industry 4.0 and Digitalisation in Mechanical Engineering

### **Session 2.1    *Production Technology, Machinery, Digitalisation – State of the Art and Perspectives***

- [2.1.01]    **Development of a robot-human-interface using an RGBD camera**  
*Bothe, Kathrin; Winkler, Alexander; Goldhahn, Leif*  
URN:    [urn:nbn:de:gbv:ilm1-2017iwk-066:9](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-066:9)
- [2.1.02]    **Vibration analysis of a large rotor over industrial internet**  
*Koene, I.; Viitala, R.; Kuosmanen, P.*  
URN:    [urn:nbn:de:gbv:ilm1-2017iwk-061:0](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-061:0)
- [2.1.03]    **Single item production within collaborative networks**  
*Reimche, Maxim; Bergmann, Jean Pierre*  
URN:    [urn:nbn:de:gbv:ilm1-2017iwk-106:1](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-106:1)
- [2.1.04]    **Wire- and powder laser cladding of Inconel® 625**  
*Laschkow, Alexander; Lauffs, Alexander; Weingaertner, Walter Lindolfo; Pereira, Milton; Gutjahr, Jhonattan; Souza Pinto Pereira, Adriano de*  
URN:    [urn:nbn:de:gbv:ilm1-2017iwk-045:6](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-045:6)

### *Poster Presentation*

- [2.1.P1]    **An investigation for process capability in additive manufacturing**  
*Preißler, Marc; Rosenberger, Maik; Notni, Gunther*  
URN:    [urn:nbn:de:gbv:ilm1-2017iwk-011:2](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-011:2)

### **Session 2.2    *Image Processing Based Process and Quality Control***

- [2.2.01]    **Using FPGA Block-RAM for fast white light interferometry**  
*Scholz, Tobias; Rosenberger, Maik; Notni, Gunther*  
URN:    [urn:nbn:de:gbv:ilm1-2017iwk-013:8](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-013:8)
- [2.2.02]    **Efficient description of the boundary of the object under observation**  
*Mitsiukhin, Anatol*  
URN:    [urn:nbn:de:gbv:ilm1-2017iwk-018:6](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-018:6)
- [2.2.03]    **3D image acquisition and processing with high continuous data throughput for human-machine-interaction and adaptive manufacturing**  
*Winkler, Susann; Rosenberger, Maik; Höhne, Daniel; Munkelt, Christoph; Liu, Chang; Notni, Gunther*  
URN:    [urn:nbn:de:gbv:ilm1-2017iwk-036:6](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-036:6)
- [2.2.04]    **FPGA implementation of a multi-view stereo approach for depth estimation and image reconstruction for plenoptic cameras**  
*Hänsel, Michael; Rosenberger, Maik; Notni, Gunther*  
URN:    [urn:nbn:de:gbv:ilm1-2017iwk-054:6](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-054:6)

## **Session 2.3     *Plastics Technology – Interfaces in Materials, Processing and Manufacturing***

- [2.3.01]     **Influence of flowability and MAH-content of maleated polyolefines on rheological and mechanical interaction effects of wood fillers in polyolefines**  
*Laufer, Nico; Hansmann, Harald; Ofe, Stefan; Boss, Christian; Koch, Michael*  
URN:     [urn:nbn:de:gbv:ilm1-2017iwk-093:2](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-093:2)
- [2.3.02]     **Processing and quality of continuous fiber reinforced thermoplastic by direct extrusion**  
*Feustel, Stefan; Caba, Stefan; Koch, Michael*  
URN:     [urn:nbn:de:gbv:ilm1-2017iwk-017:9](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-017:9)
- [2.3.03]     **Influence of fiber undulation on the mechanical properties of fiber reinforced plastics**  
*Neitzel, Benedikt; Fiebig, Christian; Koch, Michael*  
URN:     [urn:nbn:de:gbv:ilm1-2017iwk-030:0](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-030:0)
- [2.3.04]     **Influence of fiber length in basalt fiber filled thermoplastics on mechanical properties**  
*Geis, Julius; Koch, Michael; Bruchmüller, Matthias*  
URN:     [urn:nbn:de:gbv:ilm1-2017iwk-032:5](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-032:5)

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- [2.3.P1]     **Analysis and simulation of the melting behavior of polymer materials in co-kneaders**  
*Rudloff, Johannes; Wilhelm, Matthias; Lang, Marieluise; Heidemeyer, Peter; Bastian, Martin*  
URN:     [urn:nbn:de:gbv:ilm1-2017iwk-016:1](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-016:1)

## Topic 3: Mechatronics, Biomechatronics and Mechanism Technology

### Session 3.1 Mechatronics – Integrated Actuators

- [3.1.01] **Theoretical and experimental investigations of micro robots based on piezoelectric triangular plates**  
*Chigarev, Vitalij; Zimmermann, Klaus; Becker, Felix; Minchenya, Vladimir*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-004:8](http://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-004:8)
- [3.1.02] **Approaches to the application of magnetic fluids in electromechanical drive systems**  
*Steinmeier, René; Becker, Felix; Günther, Lars; Lysenko, Victor; Minchenya, Vladimir; Zeidis, Igor; Zimmermann, Klaus*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-057:9](http://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-057:9)
- [3.1.03] **Development of a shape memory based air conditioning system**  
*Kirsch, Susanne-Marie; Schmidt, Marvin; Welsch, Felix; Michaelis, Nicolas; Schütze, Andreas; Seelecke, Stefan*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-046:4](http://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-046:4)
- [3.1.04] **Electromagnetic actuator of a gentle pump mechanism for blood transport**  
*Pech, Sebastian; Rathmann, Heiko; Richter, René; Nagel, Thomas; Lienig, Jens*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-020:2](http://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-020:2)
- [3.1.05] **Miniaturized Push-Button Rotational Energy Harvesting Generator**  
*Dinulovic, Dragan; Shousha, Mahmoud; Brooks, Michael; Haug, Martin; Petrovic, Tomislav*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-008:9](http://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-008:9)
- [3.1.06] **Screw-driven robot for locomotion into sand**  
*Lichtenheldt, Roy; Becker, Felix; Zimmermann, Klaus*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-005:6](http://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-005:6)
- [3.1.07] **Control of a tower crane by means of algorithmic differentiation**  
*Franke, Mirko; Röbenack, Klaus; Weiß, Robert; Palis, Stefan*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-064:3](http://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-064:3)

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- [3.1.P1] **A parallel robot with three translational degrees of freedom for machining operations**  
*Cruz, Daniel Fontan Maia da; Lepikson, Herman Augusto; Weingaertner, Walter Lindolfo*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-024:3](http://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-024:3)
- [3.1.P2] **Development of inspection system for tool presetter**  
*Chen, Jenn-Yih; Lin, Yi-Ling; Lin, Chung-Chih; Lee, Bean-Yin*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-096:6](http://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-096:6)

## Session 3.2 Biomechatronics

- [3.2.01] **Kinetics of jumping regarding agility dogs**  
*Söhnel, Katja; Andrada, Emanuel; de Lussanet, Marc H. E. de; Wagner, Heiko; Fischer, Martin-S.*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-041:5](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-041:5)
- [3.2.02] **Kinematics of catching arms in insects: towards optimal design of robotic manipulators**  
*Pushenko, Vladyslav; Kizilova, Natalya; Ustimenko, Eugen*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-142:0](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-142:0)
- [3.2.03] **Control of compliant robotic systems with muscle-like actuators and saturated feedback**  
*Siedler, Konrad; Behn, Carsten*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-048:9](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-048:9)
- [3.2.04] **Multi-segmented artificial locomotion systems with adaptively controlled gait transitions**  
*Kräml, Jonas; Behn, Carsten*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-047:1](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-047:1)
- [3.2.05] **Requirements and potentials of human kinetic energy harvesting technologies with focus on electromagnetic conversion methods**  
*Kröning, Oliver; Rothe, Hendrik*  
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- [3.2.06] **Characterizing the outer ear transfer function in dependence of interindividual differences of outer ear geometry**  
*Helbig, Thomas; Schmidt, Artjom; Roland, Sophia; Giese, Alexander; Finke, Tara Tanita; Schmidt, Tobias; Witte, Hartmut*  
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- [3.2.07] **Object contour sensing using artificial rotatable vibrissae**  
*Merker, Lukas; Will, Christoph; Steigenberger, Joachim; Behn, Carsten*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-049:9](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-049:9)
- [3.2.08] **System for automated cell cultivation and analysis**  
*Fischer, Robert; Stubenrauch, Mike; Straube, Anja; Wedrich, Karin; Goj, Boris; Bartsch, Heike; Bichra, Mohamed; Rothe, Holger; Witte, Hartmut*  
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- [3.2.09] **Identify pointing and waving in gesture based Human-Machine-Interaction**  
*Nowack, Tobias; Dutschmann, Christoph*  
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- [3.2.10] **Wireless system for breathing analysis during free-running locomotion in mammals**  
*Bances, Enrique; Bahena, Diego; Witte, Hartmut*  
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- [3.2.11] **Aspects of functional electro-chemical biocompatibility in microsystems**  
*Schilling, Cornelius; Stubenrauch, Mike; Köhring, Sebastian; Voges, Danja; Witte, Hartmut*  
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- [3.2.P1] **Vibrissa-based design of tapered tactile sensors for object sensing**  
*Behn, Carsten; Ackermann, Lisa; Will, Christoph; Helbig, Thomas; Steigenberger, Joachim*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-050:5](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-050:5)
- [3.2.P2] **Automated cell cultivation and analysis: an approach for a user interface design**  
*Wenzel, Sabine; Fischer, Robert; Nowack, Tobias; Stubenrauch, Mike; Witte, Hartmut*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-056:1](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-056:1)
- [3.2.P3] **Investigations on the mechanical relevance of prominent vibrissa features for surface texture detection**  
*Scharff, Moritz; Alencastre, Jorge H.; Witte, Hartmut; Zimmermann, Klaus; Steigenberger, Joachim; Behn, Carsten*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-094:0](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-094:0)
- [3.2.P4] **Construction of a cilia inspired carriage system**  
*Kneip, Theresa; Heubach, Josephine; Seitelmann, Sebastian; Wagner, Philipp; Witte, Hartmut; Helbig, Thomas; Voges, Danja*  
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- [3.3.01] **Optimizing a biopsy needle using a simulation model**  
*Speicher, Thorsten; Berger, Maik; Hauschild, Katharina; Fricke, Andreas; Heske, Thomas*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-038:1](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-038:1)
- [3.3.02] **Analysis of the customized implantation process of a compliant mechanism with fluidic actuation used for cochlear implant electrode carriers**  
*Hügl, Silke; Zentner, Lena; Griebel, Stefan; Majdani, Omid; Rau, Thomas S.*  
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- [3.3.03] **Stability bounds for systems and mechanisms in linear descriptor form**  
*Voßwinkel, Rick; Tong, Jiancheng; Röbenack, Klaus; Bajcinca, Naim*  
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- [3.3.04] **Analytical model of conductive graphite foam based sensors characteristics**  
*Tomić, Miša; Milojević, Andrija; Milošević, Miloš; Linß, Sebastian; Pavlović, Nenad T.; Pavlović, Nenad D.; Handroos, Heikki*  
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- [3.3.05] **Stiffness investigation of pneumatic cylinders**  
*Czmerk, András; Bojtos, Attila*  
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- [3.3.06] **Model-based development of a compliant locomotion system for a small scout rover**  
*Stubbig, Leon; Lichtenheldt, Roy; Becker, Felix; Zimmermann, Klaus*  
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- [3.3.P1] **Contour-independent design equations for the calculation of the rotational properties of commonly used and polynomial flexure hinges**  
*Linß, Sebastian; Schorr, Philipp; Henning, Stefan; Zentner, Lena*  
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## Topic 4: Systems Engineering

### **Session 4.1: Components and Systems**

[4.1.01] **Material selection method for composite springs**  
*Petrich, Martin; Schrodin, Benedikt; Kletzin, Ulf*  
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[4.1.02] **Creep and relaxation behavior of spring steel wires**  
*Schleichert, Johannes; Kletzin, Ulf*  
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### **Session 4.2: Processes and Methods**

[4.2.01] **Experimental investigation of an efficient method for measuring turbocharger maps**  
*Pfeffer, Kathleen; Eißler, Werner*  
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[4.2.02] **Automatic optimization of load angles for a linear hybrid stepper motor**  
*Weiß, Heiko; Bauer, Thomas; Eichhorn, Mike*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-073:3](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-073:3)

[4.2.03] **Design methodology for application-specific electromagnetic energy harvesters**  
*Leistriz, Bianca; Kattanek, Wolfram*  
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[4.2.04] **Endless diamond wire saw for monocrystalline silicon cutting**  
*Knoblauch, Ricardo; Costa, João V. M. R.; Weingaertner, Walter Lindolfo; Xavier, Fabio A.; Wegener, Konrad*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-044:8](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-044:8)

[4.2.05] **Product data management in the context of Industry 4.0**  
*Scheidel, Wieben; Mozgova, Iryna; Lachmayer, Roland*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-092:4](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-092:4)

## Topic 5: Metallic and Hybrid Materials and Simulation

- [5.01] **HFRR test method with stainless steel specimens for gasoline fuels**  
*Gevorgyan, Gevorg; Paukner, R.; Erichsen, Jörn; Weisse, Manfred; Dawah, Patrick*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-144:6](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-144:6)
- [5.02] **Design catalogue in a CAE environment for the illustration of tailored forming**  
*Brockmüller, Tim; Gembarski, Paul Christoph; Mozgova, Iryna; Lachmayer, Roland*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-110:2](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-110:2)
- [5.03] **A multiscale rheological model of superelastic metal alloys: from nano to macro scale**  
*Pushenko, Vladyslav; Klepikov, Vyacheslav; Brjukhovetski, Vasyli; Kizilova, Natalya; Litvinenko, Volodymyr*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-143:8](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-143:8)
- [5.04] **High temperature particle jet erosion of nickel- and cobalt-based alloys**  
*Wesling, Volker; Reiter, Rolf; Hamje, Jens; Müller, Thomas*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-034:1](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-034:1)
- [5.05] **Development of an acceleration sensor incorporating a magneto-sensitive elastomer**  
*Günther, Lars; Becker, Felix; Becker, Tatiana I.; Stepanov, Gennady V.; Zimmermann, Klaus*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-055:3](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-055:3)

## Workshops

### **Workshop 1: *Living Glass Surfaces IX***

### **Workshop 2: *Virtual Reality in Product Engineering***

[WS.2.01] Human capture system for virtual reality applications

*Drumm, Helge*

URN: [urn:nbn:de:gbv:ilm1-2017iwk-089:0](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-089:0)

[WS.2.02] A method for efficient and task oriented configuration of Virtual Reality (VR) models for the analysis of technical systems

*Mahboob, Atif; Liebal, Andreas; Husung, Stephan; Weber, Christian; Krömker, Heidi*

URN: [urn:nbn:de:gbv:ilm1-2017iwk-022:8](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-022:8)

[WS.2.03] Application of artificial neural networks for editing measured acoustical data for simulations in virtual environments

*Siegel, Antje; Weber, Christian; Albers, Albert; Landes, David; Behrendt, Matthias*

URN: [urn:nbn:de:gbv:ilm1-2017iwk-083:1](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-083:1)

### **Workshop 3: *Digitale Mehrkanalbildverarbeitung und –erfassung***

[WS.3.01] Smart parallel spectral imager based on heterogeneous FPGA system on chip

*Schellhorn, Mathias; Fütterer, Richard; Rosenberger, Maik; Notni, Gunther*

URN: [urn:nbn:de:gbv:ilm1-2017iwk-042:3](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-042:3)

[WS.3.02] SoC-based real-time passive stereo image processing implementation and optimization

*Fütterer, Richard; Schellhorn, Mathias; Hänsel, Michael*

URN: [urn:nbn:de:gbv:ilm1-2017iwk-151:0](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-151:0)

### **Workshop 4: *Neuartige Anwendungen in der Präzisionskraftmess- und Wägetechnik***

[WS.4.01] Neues hochauflösendes, miniaturisiertes und monolithisches Tiltmeter der TU Ilmenau

*Kühnel, Michael; Fröhlich, Thomas*

URN: [urn:nbn:de:gbv:ilm1-2017iwk-091:7](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-091:7)

[WS.4.02] Große Ringlaser zur Vermessung der Erde

*Gebauer, André*

URN: [urn:nbn:de:gbv:ilm1-2017iwk-152:8](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-152:8)

- [WS.4.03] **Kalibrierung der Biegesteifigkeit von AFM-Cantilevern mit Kompensationswaagen**  
*Brand, Uwe; Popadic, Radovan; Li, Zhi; Gao, Sai*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-072:5](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-072:5)
- [WS.4.04] **Konstruktive Gestaltung des optimierten Positionier- und Kraftmesssystems der TU Ilmenau zur Kalibrierung von Federkonstanten von Mikrokräftensensoren**  
*Wenig, Ronny; Kühnel, Michael; Fröhlich, Thomas*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-095:8](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-095:8)
- [WS.4.05] **Unsicherheitsbeiträge der Krafteinleitung bei der Kalibrierung der Federkonstanten von AFM Cantilevern**  
*Dannberg, Oliver; Kühnel, Michael; Fröhlich, Thomas*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-097:4](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-097:4)
- [WS.4.06] **Modulare Elektronik zur digitalen Regelung von EMK-Systemen - Eigenschaften, Anwendungen und Potenzial**  
*Krapf, Gunter*  
URN: [urn:nbn:de:gbv:ilm1-2017iwk-098:2](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2017iwk-098:2)

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