

# International Conference on Gears 2017

## Highlights



Panel discussion on  
"The Future of Gears – a high-tech product?"



Exchange of knowledge on parallel tracks with 38  
sessions and over 140 speakers



Two social evening events for excellent networking  
with colleagues

## Date and Venue

September 13-15, 2017

Technische Universität München (TUM)

Garching/Munich, Germany



## Associated Organisations



American Gear  
Manufacturers, USA



ARTEMA, France



British Gear  
Association



Chinese Mechanical Engineering  
Society



Canadian Society for Mechanical  
Engineering



The Czech Association of  
Scientific and Technical Societies



Drive Technology Research  
Association, Germany



Institution of Mechanical Engineers,  
United Kingdom



Japan Society of  
Mechanical Engineers



Romanian Association of  
Mechanical Transmissions



Scientific Society of Mechanical  
Engineers, Hungary



The Institution of Engineers,  
India



The Korean Society of Mechanical  
Engineers, Korea



Koninklijk Instituut van Ingenieurs,  
The Netherlands



The Society of Instrument and  
Control Engineers, Japan



Gear Research Institute, USA



WiGeP, Germany

## With accompanying conferences free of charge



Gear Production 2017  
[www.vdi.de/gearproduction](http://www.vdi.de/gearproduction)



High Performance Plastic Gears 2017  
[www.vdi.de/plasticgears](http://www.vdi.de/plasticgears)



An event organized by  
VDI Wissensforum  
[www.vdi-gears.eu](http://www.vdi-gears.eu)  
Phone +49 211 6214-201  
Fax +49 211 6214-154

Location/Venue  
International Conference  
on Gears 2017

Technische Universität München  
(Technical University of Munich)  
Institute of Machine Elements  
Gear Research Centre (FZG)  
Boltzmannstr. 15  
85748 Garching, Germany



How To Find Us

Scan the QR code and find all travel information at a glance!



Program Committee  
National Members

**Prof. Dr.-Ing. Dr. h.c. Albert Albers**, Full Professor and Head of IPEK – Institute of Product Engineering, Department of Mechanical Engineering, Karlsruhe Institute of Technology (KIT)

**Dr.-Ing. Heinz-Uwe Arnscheidt**, Head of Transmission Calculation and Gear-teeth Development, Volkswagen AG, Wolfsburg

**Dr.-Ing. Jörg Börner**, Gear Expert, Central Research & Development, ZF Friedrichshafen AG

**Prof. Dr.-Ing. Christian Brecher**, Full Professor, Chair of Machine Tools, Laboratory for Machine Tools and Production Engineering, Faculty for Mechanical Engineering, RWTH Aachen University

**Dr.-Ing. Hartmut Faust**, Senior Vice President R&D Transmission Systems, LuK GmbH & Co. KG, Bühl

**Dipl.-Ing. Norbert Haefke**, Managing Director, Research Association for Drive Technology (FVA), Frankfurt/Main

**Dr.-Ing. Ralf Hess**, Senior Key Expert, Process Industries and Drives, Mechanical Drives, Siemens AG, Bocholt

**Dr.-Ing. Jörg Hermes**, Head of Development, Gear Units, SEW-EURODRIVE GmbH & Co. KG, Bruchsal

**Prof. Dr.-Ing. Georg Jacobs**, Full Professor, Institute for Machine Elements and Machine Design, Faculty for Mechanical Engineering, RWTH Aachen University

**Dr.-Ing. Carsten Gitt**, Senior Manager, Advanced Engineering + Calculation Transmission/Drivetrain, Daimler AG, Stuttgart

**Dr. Ulrich Knödel**, Senior Manager Core Design & Verification Engineering, GETRAG Magna Powertrain, GETRAG Getriebe- und Zahnradfabrik Hermann Hagenmeyer GmbH & Cie KG, Untergruppenbach

**Prof. Dr.-Ing. Erhard Leidich**, Director, Institute of Design Engineering and Drive Technology, Department of Mechanical Engineering, Technical University of Chemnitz

**Dr.-Ing. Burkhard Pinnekamp**, Head of Central Technology, Renk AG, Augsburg

**Prof. Dr.-Ing. Gerhard Poll**, Director, Institute for Machine Design and Tribology, Leibniz University Hannover

**Dipl.-Ing. Zsolt Roth**, Mechanical Design Engineer, Voith Turbo GmbH & Co. KG, Heidenheim

**Prof. Dr.-Ing. Bernd Sauer**, Full Professor, Vice Dean and Head of MEGT – Institute of Machine Elements, Gears and Transmission, Department of Mechanical and Process Engineering, University of Kaiserslautern

**Prof. Dr.-Ing. Berthold Schlecht**, Full Professor, Institute of Machine Elements and Machine Design, Faculty of Mechanical Science and Engineering, Technical University of Dresden

**Dipl.-Ing. Michael Schöffmann**, Head of Transmission Development, Audi AG, Ingolstadt

**Prof. Dr. Alfred J. H. Schoo**, Professor, Mechanical Engineering, Westfälische Hochschule Gelsenkirchen Bocholt Recklinghausen, University of Applied Sciences, Bocholt

**Prof. Dr.-Ing. Peter Tenberge**, Full Professor, Chair of Industrial and Automotive Drivetrains, Ruhr-University Bochum

**Dr.-Ing. Joachim Thomas**, Managing Director, ZG Hypoid GmbH, Eching

**Dr.-Ing. Reiner Vonderschmidt**, Shareholder, Georgii Kobold GmbH & Co. KG, Horb

**Dr.-Ing. Ralf Georg Wittor**, Managing Director, Eickhoff Antriebstechnik GmbH, Bochum

Program Overview – International Conference on Gears and accompanying conferences

1<sup>st</sup> Conference Day, Wednesday, September 13<sup>th</sup>, 2017

With accompanying conferences free of charge

	Lecture Room A	Lecture Room B	Lecture Room C	Lecture Room D	Lecture E
08:30 - 18:00	International Conference on Gears			Gear Production	Plastic Gears
18:15	Organized bus transfer to the evening reception				
19:00	Evening reception at „Hofbräuhaus München“				

2<sup>nd</sup> Conference Day, Thursday, September 14<sup>th</sup>, 2017

With accompanying conferences free of charge

	Lecture Room A	Lecture Room B	Lecture Room C	Lecture Room D	Lecture E
08:30 - 18:30	International Conference on Gears			Gear Production	Plastic Gears
18:30	Evening reception at the University				

3<sup>rd</sup> Conference Day, Friday, September 15<sup>th</sup>, 2017

	Lecture Room A	Lecture Room B	Lecture Room C	Lecture Room D
08:30 - 15:00	International Conference on Gears			

Presidency



Conference President

**Prof. Dr.-Ing. Karsten Stahl**, Full Professor, Institute of Machine Elements, Director, Gear Research Centre (FZG), Technische Universität München (TUM), Garching, Germany



Vice Presidents

**Dr.-Ing. Bernhard Bouché**, Director of Research and Development Mechanics, Getriebebau NORD GmbH & Co. KG, Bargteheide, Germany



**Prof. i.R. Dr.-Ing. Bernd-Robert Höhn**, TUM emeritus of excellence, Gear Research Centre (FZG), Technische Universität München (TUM), Garching, Germany



Conference Board

**Dr.-Ing. Arbogast M. Grunau**, President of the Managing Board, Research Association for Drive Technology (FVA), Frankfurt a.M., Germany; Senior Vice President, Corporate R&D Competence and Services, Schaeffler AG, Herzogenaurach, Germany



**Dr.-Ing. Harald Naunheimer**, Senior Vice President Research and Development ZF Group, ZF Friedrichshafen AG, Germany

International Conference on Gears 2017

1<sup>st</sup> Conference Day, Wednesday, September 13<sup>th</sup>, 2017

08:30 Registration

Plenary Lectures

09:30 Welcome and opening by the conference presidents of the “International Conference on Gears 2017”

**Prof. Dr.-Ing. Karsten Stahl**, FZG, Technische Universität München (TUM), Garching, Germany

**Prof. i.R. Dr.-Ing. Bernd-Robert Höhn**, TUM emeritus of excellence, FZG, Technische Universität München (TUM), Garching, Germany

**Dr.-Ing. Bernhard Bouché**, Getriebebau NORD GmbH & Co. KG, Bargteheide, Germany

Panel Discussion: The Future of Gears – a high-tech product?

09:45-11:45



*“With modern gearing technologies, different materials and manufacturing processes can be combined for tailored gear design to meet the demands regarding cost, power density, NVH-behavior and efficiency. The potentials and challenges of conventional gears, powder metal gears, plastic gears and gears cut on universal 5-axis-CNC-machines are going to be discussed by corresponding senior experts.”*

**Moderation: Prof. Dr.-Ing. Karsten Stahl**, FZG, Technische Universität München (TUM), Garching, Germany



*“Why is conventional thinking and manufacturing paradigms preventing the widespread adoption of cost-effective powder-metal energy transfer solutions that minimize NVH and maximize efficiency and power density?”*

**Andrew Dempsey**, Vice President – Powder Metal Division, Stackpole International, Ancaster, Canada



*“Successful plastic gear gearbox applications provide significant reductions in noise, weight and cost while maintaining product performance. The optimization of the plastic gear tooth form is a critical factor in order to reach maximum performance.”*

**George Diaz**, General Manager, Gleason Plastic Gears, Rochester, New York, USA



*“CnC machines offers flexibility and cost effectiveness in gear manufacturing. Like for dedicated machines, Closed Loop is essential, but should not be based on the „point cloud“ method which normally requires an external Tooth Flank Generator.”*

**Claude Gosselin Ph.D. P. Eng.**, President Involute Simulation Softwares Inc., Quebec, Canada



*“Tradition vs. Progress – how can we match the potential of material, lube oil, calculation and machining with increasing emphasis on reliability, efficiency, light weight, and cost?”*

**Dr.-Ing. Burkhard Pinnekamp**, Head of Central Technology, Renk AG, Augsburg, Germany

11:45 Lunch break and visit to the exhibition and poster presentations

Lecture Room A

Gear endurance – tribology and material
<b>Moderation: Prof. Ray Snidle</b> , Cardiff University, United Kingdom / <b>Dr.-Ing. Carsten Gitt</b> , Daimler, Germany

13:15

Simulation of gear wear using a dynamic load distribution model

- Prediction of the effect of parallel axis gear dynamic load distribution on gear wear
- Prediction of the effect wear of dynamic behavior of parallel-axis gear load distribution

**Prof. David Talbot Ph.D.**, Research Assistant Professor, Mechanical and Aerospace Engineering, Prof. Ahmet Kahraman, Howard D. Winbigger Professor and Director, Gear and Power Transmission Research Laboratory, Department of Mechanical and Aerospace Engineering, The Ohio State University, Columbus, USA

Lecture Room B

Planetary gear systems – design and analysis
<b>Moderation: Dr.-Ing. Burkhard Pinnekamp</b> , Renk, Germany / <b>Prof. Dr. Datong Qin</b> , Chongqing University, China

Holistic simulation of gearboxes in wind power plants

- Analysis of complete systems with gearboxes
- Interactions between mechanical, thermal and electrical systems

**Dipl.-Ing. Sebastian Grützner**, Chief of Library Development, Mechanical Engineering, Alex Magdanz B.Sc., Application and Development Engineer, Energy Industry Team Leader, ESI ITI GmbH, Dresden, Germany

Lecture Room C

Applications – electrified power train
<b>Moderation: Prof. Dr.-Ing. Dr. h.c. Albert Albers</b> , IPEK, KIT, Germany / <b>Ir. J.J. Bos</b> , Damen Schelde Gears, The Netherlands

Design, analysis and experimental work on a novel seamless auto transmission for electric vehicles

- An innovative two-speed seamless auto transmission
- Experiment and verification of the transmission’s feasibility

**Jie Yu**, Ph.D. candidate, Research Assistant, Prof. Ligang Yao, Dean, Chengcheng Ren, Master Candidate, Institute of Mechanical Engineering and Automation, Fuzhou University, Fuzhou City, Fujian Province, China



Lecture Room A	
13:45	<b>Self-lubricating gears with oil-impregnated sintered materials</b> - Coefficient of friction and bulk temperature measurement on an efficiency gear-test rig - Interpretation of results and operating principle of self-lubricating gears <b>Martin Ebner M.Sc.</b> , Research Associate, Thomas Lohner M.Sc., Head of Department of Mechanical Engineering, Prof. i.R. Dr.-Ing. Bernd-Robert Höhn, TUM emeritus of excellence, Gear Research Centre (FZG), Technische Universität München (TUM), Garching, Germany
14:15	<b>Simulation of the lubricant’s influence on the wear and fatigue mechanisms on tooth flanks</b> - Conditioning of the tooth surface due to lubricant - New experimental test method to investigate wear and fatigue in highly loaded tooth contacts <b>Leonard Gondecki M.Sc.</b> , Research Assistant, Max Weibring M.Sc., Research Assistant, Prof. Dr.-Ing. Peter Tenberge, Full Professor, Chair of Industrial and Automotive Drivetrains, Ruhr-University Bochum, Germany
14:45	<b>Change of steel quality for gears as function of globalization</b> - Deterioration of gear steel quality as function of globalization leads to many outbreaks of gear failure - Many measured points of hardness with high-speed automatic apparatus can help find bad steel quality <b>Prof. h.c. Dr.-Ing. Aizoh Kubo</b> , General Manager, Research Institute for Applied Sciences, Kyoto, Japan

15:15 ☕ **Coffee break and visit to the exhibition and poster presentations**

Lecture Room A	
Gear endurance – micropitting and tooth flank properties	
	<b>Moderation: Dr.-Ing. Ralf Hess</b> , Siemens, Germany / <b>Prof. Dr.-Ing. Vojislav Miltenovic</b> , University of Niš, Republic of Serbia
16:00	<b>Practical use of micropitting test results according to FVA 54/7 for calculation of micropitting load capacity acc. to ISO/TR 15144-1</b> - Practical guideline for setting the right test parameters for micropitting tests - Calculation of micropitting load capacity using results from FVA 54/7 <b>Nadine Sagraloff M.Sc.</b> , Research Associate, Dipl.-Ing. Michael Hein, Team Leader, Prof. Dr.-Ing. Karsten Stahl, Full Professor, Institute of Machine Elements, Director, Gear Research Centre (FZG), Technische Universität München (TUM), Garching, Germany
16:30	<b>Shot-peening of gear tooth flanks: search for an optimal surface topography countering micropitting</b> - Improvement of the micropitting load capacity by an optimal shot peening - Influence of surface topography on micropitting damages <b>Dr. Dhafer Ghribi</b> , Dr. Catherine Peyrac, both R&D Engineers, Dr. Michel Octrue, Senior Gear Consultant, Mechatronics, Power Transmissions and Sensors (MEC), CETIM (Technical Center for Mechanical Engineering Industries), Senlis Cedex, France
17:00	<b>Isotropic superfinishing of high-hardness steels</b> - Isotropic superfinishing enhances gear performance - ISF® Process identifies & repairs distressed metal zones <b>Martin McCormick M.Chem.</b> , Sales Manager, REM Surface Engineering, St. Neots, United Kingdom
17:30	<b>Investigation on the flank surface durability of gears with increased pressure angle</b> - Tooth flank load carrying capacity of gears - Variation of pressure angles <b>Christian Weber M.Sc.</b> , Research Associate, Dr.-Ing. Thomas Tobie, Head of Department, Prof. Dr.-Ing. Karsten Stahl, Full Professor, Institute of Machine Elements, Director, Gear Research Centre (FZG), Technische Universität München (TUM), Garching, Germany
18:15	<b>Organized bus transfer to the evening reception</b>
19:00	<b>Evening reception at the „Hofbräuhaus München“</b> At the end of the first conference day we cordially invite you to our evening reception at the „Hofbräuhaus München“, a traditional Bavarian brewery with deep roots in Munich. Enhance your personal network and use the relaxed and informal atmosphere for deeper-going discussions with other participants and speakers.



**Dinner Speech:**  
**Dipl.-Ing. Oliver Zipse**, Member of the Board of Management, Production, BMW AG, Munich, Germany

Lecture Room B	
<b>Design of cycloid planetary gear drives with tooth number difference of two – a comparative study of contact characteristics and load analysis</b> - Systematic influence analysis of design parameters regarding tooth contact characteristics - Basic equations, loaded-tooth contact analysis approach and design guideline <b>Dr.-Ing. Shyi-Jeng Tsai</b> , Assistant Professor, Ling-Chao Chang B.Sc., Master student, Chin-Hao Huang B.Sc., Ph.D. student, Machine Design Lab, Department of Mechanical Engineering, National Central University, Taoyuan City, Taiwan	
<b>Finite element method based analysis of planetary gear systems considering backlash and manufacturing errors</b> - Advanced FE mesh generation for gears - Load distribution in planetary gear systems <b>Prof. Dr.-Ing. Athanassios Mihailidis</b> , Full Professor, Head of the Laboratory of Machine Elements and Machine Design, Mechanical Engineering, Aristotle University of Thessaloniki, Greece	

<b>Loaded-tooth contact analysis under load on double helical geared planetary gearboxes</b> - Investigation of load distribution and noise level - Comparison of design variants: spur-, helical- and double-helical gears <b>Dr.-Ing. Tobias Schulze</b> , Managing Director/CEO, DriveConcepts GmbH, Dresden, Germany	
<b>Topographical tooth modifications in planetary gears for reduction of noise excitation without load-capacity loss</b> - Noise reduction without load capacity loss - Noise reduction in helical gears and planetary gears <b>Dr.-Ing. Johannes W. Vriesen</b> , Winergy – Engineering Technology, Key Expert, Mechanical Drives, Process Industries and Drives, Siemens AG, Voerde, Germany	
<b>Investigating the dynamic behavior of planetary gear trains through the systematic approach</b> - Modal dynamic models for planetary gear trains - Applying innovative methods based upon systematic approach and ABAQUS <b>Prof. Antoaneta Dobрева Ph.D.</b> , Head of department Machine Science, Machine Elements and Engineering Graphics, Svetlin Stoyanov, Ph.D., Assoc. Prof. Vasko Dobrev, Dean of Transport Faculty, University of Ruse, Bulgaria	

Lecture Room B	
Planetary gear systems – NVH behavior	
	<b>Moderation: Prof. Dr. Eng. Jože Duhovnik</b> , University of Ljubljana, Slovenia / <b>Prof. i.R. Dr.-Ing. Bernd-Robert Höhn</b> , Technische Universität München (TUM), Germany
<b>The iterative spectral method for computing the planetary-gear dynamic response</b> - Analysis of local and global dynamic transmission errors - Comparison with the Runge-Kutta time integration scheme <b>Jessica Neufond</b> , Engineer, Joel Pierre-Liaudet, Ph.D., Associate Professor of Mechanics, Emmanuel Rigaud, Ph.D., Associate Professor of Mechanics, Tribology and Systems Dynamics Laboratory, LTDS - Ecole Centrale de Lyon, France	
<b>The influence of mesh misalignment on planetary gear set with time-varying mesh stiffness</b> - Establishing of a dynamic model of planetary gear set, in which the time-varying mesh stiffness (TVMS) coupled with the mesh misalignment model are taken into consideration - Length fluctuation of the contact line and the load distribution due to mesh misalignment are obtained by dividing the tooth into several slices along tooth width direction <b>Sitao Ping</b> , Master Student, Professor, Yimin Shao, State Key Laboratory of Mechanical Transmission, Chongqing University, Chongqing, China	

Lecture Room C	
<b>Electrical stress and parasitic currents in machine elements of drive trains with voltage source inverters</b> - Drive train behavior as a capacitive voltage divider - Estimation of EDM-currents over gears and bearings <b>M.Eng. Alexander Furtmann</b> , Research Associate, Prof. Dr.-Ing. Gerhard Poll, Director, Institute for Machine Design and Tribology, Leibniz University Hannover	
<b>Validation approach of PM (Powder Metallurgy) gears for eDrive applications</b> - From powder to part of system - Component and system testing of PM gears for eDrive applications <b>Dipl.-Ing. Björn Leupold</b> , Manager Advanced Gear Programs, Advanced Engineering, Vitali Janzen, Manager Advanced NVH Development, GKN Sinter Metals Engineering GmbH, Radevormwald, Dominic Eichholz, Programme Engineering Manager eDrive, GKN Driveline Technoloy Centre, GKN Driveline International GmbH, Lohmar, Germany	

<b>Research into dynamic power split characteristics and electric-power-coordinated control for a hybrid transmission system</b> - Coupling response of the power-split hybrid transmission - Double closed-loop electric-power-coordinated control strategy <b>Dr. Weida Wang</b> , Associate Professor, Dr. Lijin Han, Lecturer, Dr. Qingdong Yan, Professor, School of Mechanical Engineering, Beijing, China	
<b>Thrust cone bearings provide increased efficiency for helical gears at moderate speed levels: indications of possible energy-saving potential in an expanded field of application</b> - Higher gearbox efficiency for partial load operation - Quantification of wear resistance for mixed friction conditions <b>Dipl.-Ing. Marcel Heß</b> , Scientific Employee, Prof. Dr.-Ing. Armin Lohrengel, Head of Department, Fritz-Süchting-Institute for Mechanical Engineering, Clausthal University of Technology, Clausthal-Zellerfeld, Germany	
<b>Evaluation of a developed micro-gear endurance test system and a basic study of the load-carrying characteristics of sour micro-gears</b> - A method for the appropriate endurance testing of micro-gears - Results of micro-gear acceleration endurance testing <b>Dr. Mikio Takahashi</b> , Technical Official, Takayoshi Itagaki, Department of Mechanical Engineering, National Institute of Technology, Kisarazu College, Kisarazu, Chiba, Noritsugu Maeda, Development Division, Ogasawara Precision Laboratory co. ltd, Ashigarakami, Kanagawa, Japan	

Lecture Room C	
Applications	
	<b>Moderation: Prof. Dr.-Ing. Michael Weigand</b> , Vienna University of Technology, Austria / <b>Dr.-Ing. Ralf Georg Wittor</b> , Eickhoff Antriebstechnik, Germany
<b>Influential criteria in the optimization of a gearbox, with application to an automatic transmission</b> - Generation of geometric variants of a gearbox with fixed ratios - LTCA (Loaded Tooth Contact Analysis) and FEM calculation for noise and efficiency evaluation <b>Dipl.-Ing. Thomas Panéro</b> , Development Engineer, KISSsoft AG, Bubikon, Switzerland, Prof. Dr.-Ing. Peter Tenberge, Full Professor, Daniel Kupka M.Sc., Research Associate, Chair of Industrial and Automotive Drivetrains, Ruhr-University Bochum, Germany	
<b>Kinematic classification of a gearbox comprising separate thrustted teeth and its advantages regarding existing approaches</b> - Classification of the Galaxie® kinematics by comparing the representation of the kinematic chain with existing kinematic approaches - Description of the advantages of the linear guiding of the tooth element <b>Dr.-Ing. Tobias Röthlingshöfer</b> , Team Leader, Dipl.-Ing. Heiko Schreiber, Development Engineer, Galaxie Start Up, WITTENSTEIN SE, Igersheim, Germany	

International Members

- Eng. Amir Aboutaleb**, Vice President, Technical Division, American Gear Manu-facturers Association, Alexandria, USA
- Ir. J.J. Bos**, Manager engineering and Di-rector of Damen Schelde Gears, Vlissingen, The Netherlands
- Prof. Bingkui Chen**, Director, The State Key Lab of Mechanical Transmissions, Chongqing University, China
- Prof. Dr. Eng. Jože Duhovnik**, Full Professor, Dean and Head of LECAD Group Laboratory, Chair for Design and Transport systems, Faculty for Mechanical Enginee-ring, University of Ljubljana, Slovenia
- Prof. Dr. Geng Liu**, Full Professor, Deputy Dean, School of Mechanical Engineering, Northwestern Polytechnical University; Di-rector, Shaanxi Engineering Laboratory for Transmissions and Controls, Xi’an, China
- Prof. Dr. Sc. Veniamin Goldfarb**, Direc-tor, Institute of Mechanics, Izhevsk State Technical University, Russia
- Prof. Ing. Carlo Gorla**, Associate Profes-sor, Department of Mechanical Enginee-ring, Politecnico di Milano, Italy
- Prof. Ahmet Kahraman**, Howard D. Winbigger Professor and Director, Gear and Power Transmission Research Laboratory, Department of Mechanical and Aerospace Engineering, The Ohio State University, Columbus, USA
- Dipl.-Ing. Dirk-Olaf Leimann**, Gear Technology, Manager Gear Technology & Advanced Engineering, ZF Wind Power Antwerpen NV, Lommel, Belgium
- Prof. Dr.-Ing. Athanassios Mihailidis**, Full Professor, Head of the Laboratory of Machine Elements and Machine Design, Mechanical Engineering, Aristotle Univer-sity of Thessaloniki, Greece
- Prof. Dr.-Ing. Vojislav Miltenovic**, Full Professor, Machines Development and Construction Centre, Faculty of Mechanical Engineering, University of Niš, Republic of Serbia
- Prof. Dr. Eng. Ichiro Moriwaki**, Professor of Mechanical Engineering, Kyoto Institute of Technology, Kyoto, Japan
- Dr. Michel Octrue**, Senior Gear Consul-tant, Mechatronics, Power Transmissions and Sensors (MEC), CETIM (Technical Cen-ter for Mechanical Engineering Industries), Senlis Cedix, France
- M.Sc. Robin Olson**, Sustaining Engi-neering Manager, Gear Group, Rexnord Corporation, Milwaukee, Wisconsin, USA
- Prof. Dr.-Ing. José I. Pedrero**, Full Profes-sor, Department of Mechanics, Faculty of Engineering, Universidad Nacional de Edu-cación a Distancia (UNED), Madrid, Spain
- Prof. Dr. Datong Qin**, Full Professor, Vice Dean of Graduate School, Deputy Director of Academic Committee of State Key Lab of Mechanical Transmission, Director of Power Transmission Institute, Faculty of Enginee-ring, Chongqing University, China
- Prof. Ray Snidle**, Professor of Mechanical and Engineering, School of Engineering, Cardiff University, United Kingdom
- Prof. Dr. Ing. Philippe Velez**, Full Profes-sor, LaMCoS, INSA – Institut National des Sciences Appliquées de Lyon, Villeurbanne Cédex, France
- Prof. Dr.-Ing. Michael Weigand**, Full Pro-fessor and Head of Institute IKL – Institute for Engineering Design and Logistics Engi-neering, Machine Design and Rehabilitati-on Engineering Division, Vienna University of Technology, Austria

Board of Gear Excellence

- Prof. Dr.-Ing. Kiril Arnauodov**, Emeritus Professor, Institute of Mechanics, Bulgari-an Academy of Sciences, Sofia, Bulgaria
- Prof. Dr. Eng. Adam Döbröczöni**, Professor, Institute of Machine and Product Design, University of Miskolc, Hungary
- Prof. Dr.-Ing. Manfred Hirt**, Past President, Research Association for Drive Technology (FVA), Frankfurt/Main; former board of Renk AG, Augsburg, Germany
- Haruo Houjoh**, **Prof. Emeritus**, Tokyo Institute of Technology, Japan
- Prof. Dr. D. Houser**, Emeritus Professor, Department of Mechanical-Engineering, Ohio State University, Columbus, USA
- Prof. h.c. Dr.-Ing. Aizoh Kubo**, General Manager, Research Institute for Applied Sciences, Kyoto, Japan
- Prof. Dr.-Ing. habil. Heinz Linke**, Emeritus Professor, Institute of Machine Elements and Machine Design, Faculty of Mechanical Science and Engineering, Technical University of Dresden, Germany
- Dr.-Ing. Toni Weiss**, Gear Consultant, ret. from Renk AG Augsburg, now GanaCon – Gear analysis and Consulting, Inning, Germany

You are invited!

Source: BBMC Tobias Ranzinger





Poster Exhibition

**P-1 Efficiency evaluation of a multi-speed transmission**  
**Associate Prof./Dr. Fuchun Yang**, Associate Professor, School of Mechanical Engineering, Shandong University, Jinan, China

**P-2 An improved lifetime prediction technique for plastic gears through finite element analysis and continuum damage mechanics**  
**Amir K. Shojaei Ph.D.**, Mechanical Engineering Consultant, DuPont Performance Materials, Delaware, USA

**P-3 Pentac® Mono-RT high-performance face milling cutter heads**  
**Dipl.-Ing. (FH) Eyüp Böyükbas**, Senior Application and Process Engineer Bevel Gears, Bevel Gear Application, Gleason-Pfauter Maschinenfabrik GmbH, Ludwigsburg, Germany

**P-4 Experimental measurement of gear impacts in transmission**  
**Ing., Ph.D. Ondrej Berka**, Academic Assistant, Department of Designing and Machine Components, Czech Technical University of Prague, Czech Republic

**P-5 Heat-fluid coupled analysis of the temperature field of gearboxes**  
**Bachelor Hauifeng Yang**, Student, The State Key Lab of Mechanical Transmission, Chongqing University, China

**P-6 High-precision test rig for the transmission performances of precision planetary reducers**  
**Peng Changyan**, The State Key Lab of Mechanical Transmission, Chongqing University, China

**P-7 Friction loss and surface durability of WN gears (comparison with involute gears)**  
**Professor/Ph.D. Ryoze Nemoto**, Professor, Monozukuri Engineering Department, Tokyo Metropolitan College of Industrial Technology, Tokyo, Japan

**P-8 Load-carrying capacity of crossed helical gears with high contact ratio**  
**Professor/Ph.D. Ema Tamura**, Professor, Monozukuri Engineering Department, Tokyo Metropolitan College of Industrial Technology, Tokyo, Japan

**P-9 Is the mean stress effect for shafts dependent on the geometry, material or load type?**  
**Dipl.-Ing. Kai Neikes**, Research Assistant, Chair of Machine Elements, Institute of Machine Elements and Machine Construction, Faculty of Mechanical Science and Engineering, Technical University Dresden, Germany

**P-10 Analysis of the grinding-notch effect according to ISO 6336 and FEM**  
**Inho Bae Ph.D.**, Head of Support, KISSsoft AG, Bubikon, Switzerland

**P-11 A compensation method of tooth surface error in continuous generating grinding based in the virtual-axis**  
**Kai Xu B.Sc.**, The State Key Lab of Mechanical Transmission, Chongqing University, China

**P-12 Influence of casing deformation in transmissions**  
**Dipl.-Ing. Jürg Langhart**, Sales Engineer, KISSsoft AG, Bubikon, Switzerland

**P-13 Comparative analysis of a few new procedures for spur-gears tooth-profile optimization with different methods and aspects**  
**Dr. sci. Ivana Atanasovska**, Associate Research Professor, Department of Mechanics, Mathematical Institute, Serbian Academy of Sciences, Belgrade, Serbia

**P-14 Modelling of a gear-rotor system considering tooth-contact temperature and its dynamic characteristics**  
**Prof./Dr. Xiangfeng Gou**, Head of Department, School of Mechanical Engineering, Lanzhou Jiaotong University, Gansu, China

**P-15 Traction drive analysis identified with rheological friction property of traction fluid**  
**Master Toshihiro Saito**, Chief Engineer, Honda R&D Co., Ltd. Automobile R&D Center, Tochigi, Japan

**P-16 A reduced order internal combustion engine model for transmission development**  
**Kazuhide Togai Ph.D.**, Professor, Department of Mechanical Engineering for Transportation, Osaka Sangyo University, Daitou, Japan

**P-17 Prediction of heat generation in transmission bearings by application of FEM**  
**Dr.-Ing. Aleksandar Miltenovic**, Assistant Professor, Department of mechanical design, development and engineering, Faculty of Mechanical Engineering, University of Nis, Serbia

2<sup>nd</sup> Conference Day, Thursday, September 14<sup>th</sup>, 2017

Lecture Room A

Gear endurance – damage initiation and propagation

**Moderation: Robin Olson M.Sc.**, Rexnord Corporation, Milwaukee, USA / **Dr.-Ing. Reiner Vonderschmidt**, Georgii Kobold, Germany

08:30 **Fracture analysis of pitting damages of case hardening steels in gear applications**  
- Separation of pitting area in fatigue and ruptured zone  
- Explanation of pitting damage by local stress components  
**Fabian Goergen M.Sc.**, Research Assistant, Dieter Mevissen M.Sc., Workgroup Leader, Gear Department, Prof. Dr.-Ing. Christian Brecher, Full Professor, Chair of Machine Tools, Laboratory for Machine Tools and Production Engineering, Faculty for Mechanical Engineering, RWTH Aachen University, Germany

09:00 **Simulation and measurement of flank geometry deviations of bevel gears caused by pittings and micro pittings**  
- Optical measuring method for micro-topology deviations  
- Simulation of progressing tooth-flank damage  
**Dipl.-Ing. Felix Müller**, Research Assistant, Prof. Dr.-Ing. Berthold Schlecht, Full Professor, Dr.-Ing. Stefan Schumann, Chair of Machine Elements, Institute of Machine Elements and Machine Design, Faculty of Mechanical Science and Engineering, Technical University of Dresden, Germany

09:30 **Simulation of fatigue failure on tooth flanks in consideration of pitting initiation and growth**  
- Analysis of the fatigue mechanisms of gear tooth flanks  
- Crack initiation and growth and the occurrence of pittings  
**Max Weibring M.Sc.**, Research Assistant, Leonard Gondecki M.Sc., Research Assistant, Prof. Dr.-Ing. Peter Tenberge, Full Professor, Chair of Industrial and Automotive Drivetrains, Ruhr-University Bochum, Germany

10:00 ☕ **Coffee break and visit to the exhibition and poster presentations**

Gear endurance – stress and material properties

**Moderation: Ir. J.J. Bos**, Damen Schelde Gears, The Netherlands / **Dr.-Ing. Toni Weiss**, GanaCon, Germany

10:45 **Flank fracture assessment under consideration of material quality**  
- Modelling of flank fracture with a monte carlo approach  
- Influence of geometry, heat treatment and material quality on the interior fatigue of gear  
**Dipl.-Ing. Jean-André Meis**, Head of CAE, Mechanical Drives, Process Industries and Drives, Siemens AG, Bocholt, Germany

11:15 **“Alternative” microstructures and their influence on mechanical properties of case-hardened gears**  
- Load-carrying capacity of gears  
- Variation of microstructure  
**Dipl.-Ing. Christian Güntner**, Research Associate, Dr.-Ing. Thomas Tobie, Head of Department, Prof. Dr.-Ing. Karsten Stahl, Full Professor, Institute of Machine Elements, Director, Gear Research Centre (FZG), Technische Universität München (TUM), Garching, Germany

11:45 **Tooth profile design and stress analysis of double helical gear transmissions with geometric elements constructed tooth pairs**  
- Generation principle and mathematical model of tooth profiles  
- Stress analysis and performance comparison  
**Dr. Dong Liang**, Researcher, Prof. Bingkui Chen, Director, Chaoyang Li, Research Assistant, The State Key Laboratory of Mechanical Transmissions, Chongqing University, China

12:15 **Influence of surface-layer properties on tooth-root bending-strength of cylindrical gears**  
- Weakest-link approach for tooth root bending strength calculation  
- Surface layer properties influencing tooth root load carrying capacity  
**Jonas Pollaschek M.Sc.**, Research Assistant, Prof. Dr.-Ing. Christian Brecher, Chair of Machine Tools, Full Professor, Dr.-Ing. Dipl.-Wirt.-Ing. Christoph Löpenhaus, Chief Engineer, Laboratory for Machine Tools and Production Engineering, Faculty for Mechanical Engineering, RWTH Aachen University, Aachen, Germany

12:45 🕒 **Lunch break and visit to the exhibition and poster presentations**

Lecture Room B

Planetary gear systems – efficiency and strength

**Moderation: Dr.-Ing. Hartmut Faust**, LuK, Germany / **Prof. Dr. Geng Liu**, Northwestern Polytechnical University & Shaanxi Engineering Laboratory for Transmissions and Controls, China

**Smashing the efficiency barrier – a practical comparison of a planetary and orbitless gear-head**  
- Overview of the novel Orbitless drive technology  
- Load and efficiency test of a prototype Orbitless gear-head  
**Dr./Ph.D. Leo Stocco**, President, Research & Development, Orbitless Drives Inc., Vancouver, British Columbia, Canada, Robert Gloeckner, Research and Development Engineer, Advanced Engineering, Micromo, Clearwater, USA

**Development of a novel test stand for three-axis driving planetary gear-train control and analysis of a novel PGT for noise reduction**  
- Balance of inertia in PGT for stable driving and novel control  
- Noise reduction with novel component  
**Master Masao Nakagawa**, Research Fellow, Doctoral Student, Graduate School of Mechanical Engineering, Doshisha University, Kyoto, Japan

**Effects of external splines on deformations of ring gears of planetary gear sets**  
- Experimental methodologies to quantify the deflections and hoop stresses of ring gears of planetary gear sets with splines  
- Computational model to study the effects of outside splines on ring gear deflections  
**Prof. Ahmet Kahraman**, Winbigler Professor and Director, Haris Ligata Ph.D., Graduate Research Associate, Gear and Power Transmission Research Laboratory, Department of Mechanical and Aerospace Engineering, The Ohio State University, Columbus, USA

Bevel gears

**Moderation: Dipl.-Ing. Michael Schöffmann**, Audi, Germany / **Prof. Dr.-Ing. Athanassios Mihailidis**, Aristotle University of Thessaloniki, Greece

**Global synthesis of speed increasing spiral bevel and hypoid gears**  
**Peng Wang Ph.D.**, Research Assistant, School of Mechanical and Materials Engineering, North China University of Technology, Beijing, China

**Influence analysis of system parameters on nutation drive characteristics for double-circle arc spiral bevel gears**  
- It is of great significance to study the influence of error on the transmission characteristics for the correct design, manufacture and use  
- The dynamic meshing force plays an important role in the characteristics of shock, vibration and noise  
**Yongwu Cai**, Ph.D. candidate, Ligang Yao, Professor, Zhiyu Xie, Master Candidate, School of Mechanical Engineering and Automation, Fuzhou University, Fuzhou City, Fujian Province, China

**Optimizing tooth proportions to improve top-land balance in aerospace bevel gears**  
- Influence of working depth, gear addendum and gear/pinion dedendum angles on top-land unbalance  
- Reverse calculation method for obtaining optimum tooth proportions for reduced top-land unbalance  
**Erdem Erkilic M.Sc.**, Gear Design Engineer, Zihni Burcay Saribay Ph.D., Transmission Design Manager, Transmission Design Department, Turkish Aerospace Industries, Ankara, Turkey

**Tooth contact analysis of a new type of face gear drive**  
- Mathematical models of the torus-face gear pair  
- Tooth contact analysis / Check of curvature interference  
**Associate professor, Lei Liu Ph.D.**, Nanjing University of Aeronautics and Astronautics, Nanjing, China

Lecture Room C

Worm and crossed helical gears – simulation

**Moderation: Prof. Dr.-Ing. Bernd Sauer**, University of Kaiserslautern, Germany / **Prof. Dr. Eng. Ichiro Moriwaki**, Kyoto Institute of Technology, Japan

**Comprehensive simulation methods for crossed helical gear sets with the main focus on the calculation of contact patterns**  
- Calculation possibilities of crossed helical gears  
- Contact pattern of crossed helical gears  
**Philipp Norgauer M.Sc.**, Research Associate, Worm Gears Department, Dr.-Ing. Daniel Kadach, Head of Department Worm and Bevel Gears, Prof. Dr.-Ing. Karsten Stahl, Full Professor, Institute of Machine Elements, Director, Gear Research Centre (FZG), Technische Universität München (TUM), Garching, Germany

**A new standardizable calculation method to predict the efficiency of worm gear drives**  
- Physically based simulation method for the efficiency of worm gear drives  
- Derivation of easy-to-handle formulas for German standard DIN 3996  
**Jun. Prof. Dr.-Ing. Balázs Magyar**, Junior Professor, Dipl.-Ing. Manuel Oehler, Research Associate, Prof. Dr.-Ing. Bernd Sauer, Full Professor, Vice Dean and Head of MEGT - Institute of Machine Elements, Gears and Transmissions, University of Kaiserslautern, Germany

**Computation of the tooth root strength of worm wheels with a calculation program based on local stresses**  
- Algorithm to compute the stresses of worm wheels  
- Using the stresses in the tooth root to determine strength  
**Dr.-Ing. Jan Reißmann**, Research Assistant, Prof. Dr.-Ing. Erhard Leidich, Director, Institute of Design Engineering and Drive Technology, Department of Mechanical Engineering, University of Chemnitz, Germany

Worm gears – design and quality

**Moderation: Dr.-Ing. Jörg Hermes**, SEW-EURODRIVE, Germany / **Prof. Dr.-Ing. Erhard Leidich**, Technical University of Chemnitz, Germany

**New tolerance concepts for the realization of steel-only worm gears**  
- Development of a design and bearing concept as well as an adjustment concept for the substitution of bronze with steel in worm gears  
- Use of tolerance management methods, such as Key Characteristics (KC), KC flowdown, tolerance chains and their optimization  
**Leonie Schirmer M.Sc.**, Research Assistant, Assembly Processes and Automation, Prof. Dr.-Ing. Rainer Müller, CEO, ZeMA - Zentrum für Mechatronik und Automatisierungstechnik GmbH, Saarbrücken, Germany

**Technical guideline for the quality determination of bronze**  
- Definition of quality parameters to describe bronze for worm wheels  
- Assistance for sample preparation and testing procedures  
**Dr.-Ing. Björn Sievers**, Gear-Development Engineer, R&D Standard Gear Units, Dr.-Ing. Jörg Hermes, Head of Development, Gear Units, SEW-EURODRIVE GmbH & Co KG, Bruchsal, Dr.-Ing. Marius Berger, Project leader R&D, Ed. Fitscher GmbH & Co. KG, Oberhausen, Germany

**Design of transmission accuracy of the involute cylindrical gear-worm gear system under large temperature difference**  
- Modelling of the transmission accuracy of worm gear transmission error chain  
- Influence of main factors on the transmission error of the gear-worm system  
**Dr. Wang Yue**, Development Engineer, Structure Design Department, Dr. Bo Peng, R&D Center, China Academy of Launch Vehicle Technology, Beijing, Prof. Dr. Geng Liu, Full Professor, Deputy Dean, School of Mechanical Engineering, Northwestern Polytechnical University, Xi’an, China

**The development of worm gears**  
- A comprehensive compilation of state-of-the-art information on worm drives with regard to geometry, contact analysis, materials, manufacturing processes, efficiencies, failure, and condition monitoring  
- Future prospects in relevant research and development information on worm drives  
**Joe Liou Ph.D.**, Senior Scientist, USCRC, Stefan Rakuff Ph.D., Principal Scientist, ABB, Inc., Bloomfield, USA





Lecture Room A	Lecture Room B	Lecture Room C	Lecture Room D
<div>Load-sharing – load distribution</div> <div>Moderation: Prof. Dr.-Ing. Manfred Hirt, former Renk, Germany / Prof. Dr.-Ing. Gerhard Poll, Leibniz University Hannover, Germany</div>	<div>Non-involute tooth profiles</div> <div>Moderation: Prof. Bingkui Chen, The State Key Lab of Mechanical Transmissions, Chongqing University, China / Dr.-Ing. Arbogast M. Grunau, Research Association for Drive Technology (FVA) &amp; Schaeffler, Germany</div>	<div>Condition monitoring and diagnostic</div> <div>Moderation: Prof. Dr.-Ing. Berthold Schlecht, Technical University of Dresden, Germany / Dr.-Ing. Heinz-Uwe Arnscheidt, Volkswagen, Germany</div>	<div>Efficiency</div> <div>Moderation: Prof. Ing. Carlo Gorla, Politecnico di Milano, Italy / Prof. Dr.-Ing. Peter Tenberge, Ruhr-University Bochum, Germany</div>
08:30 <div><div>A multiple-split load-sharing model of star gearing system for 2-stage external gearing</div><div>- Calculation of the load sharing coefficient based on transmission error</div><div>- Obtaining the floating orbit and floating displacement of the sun gear</div><div>Dr. Mo Shuai Ph.D., Team Leader, Master Ma Shuai, Student, Jin Guoguang Ph.D., Professor, School of Mechanical Engineering, Tianjin Polytechnic University, China</div></div>	<div><div>A strain wave gearing with a new profile of teeth</div><div>- Analysis of the movement locus of flexible gear tooth</div><div>- Increase load capacity by dispersing the stress</div><div>Bachelor Shoichi Ishikawa, Technical Adviser, Bachelor Yuya Murayama, Engineer, Harmonic Drive Laboratory, Harmonic Drive Systems Inc., Tokyo, Dr. Eng. Satoshi Kishi, Research Engineer, Production Technology Dept. Adviser, Harmonic Drive Systems Inc., Nagano, Japan</div></div>	<div><div>Gear diagnostic system using zonal laser beam for practical use</div><div>- Damage detection on the gear surface</div><div>- Tendencies in the accuracy of size and position</div><div>Prof. Dr. Eng. Eiichiro Tanaka, Professor, Faculty of Science and Engineering, Graduate School of Information, Production and Systems, Han-Ching Lin, Student, Waseda University, Kitakyushu, Fukuoka, Japan</div></div>	<div><div>Numerical modeling of the churning power losses of gears: an innovative 3D computational tool suitable for planetary gearbox simulation</div><div>- Efficiency calculation of planetary gearboxes</div><div>- CFD simulations of churning and lubricant fluxes</div><div>Franco Concli Ph.D.-Ing., Assistant Professor, Faculty of Science and Technology, Free University of Bolzano, Prof. Ing. Carlo Gorla, Associate Professor, Department of Mechanical Engineering, Politecnico di Milano, Italy</div></div>
09:00 <div><div>Load distribution in planetary gears considering effects of manufacturing tolerances with a statistical approach</div><div>- Manufacturing deviations and effect of probability</div><div>- Monte-Carlo simulation</div><div>Dr.-Ing. Jennifer Papies, Development Engineer, Calculation department, Mechanical Drives, Process Industries and Drives, Siemens AG, Bocholt, Germany</div></div>	<div><div>Non-standard spur-gear tooth profiles for improved epicyclic gear system performance in low speed applications</div><div>- Multi-parametric analysis of spur gear design factors</div><div>- Load-carrying capacity of non-standard planetary gearings</div><div>Erasmus Chiappetta, Ph.D. student, Prof. Denise Morrey, Professor, Mechanical Engineering and Mathematical Sciences, Oxford Brookes University, Oxford, United Kingdom</div></div>	<div><div>The application of relative mesh load intensity distribution for in-service condition monitoring</div><div>- Gearbox instrumentation and reliability</div><div>- Gear alignment and failure prevention</div><div>Tomas Rosinski M.Eng., Senior Mechanical Engineer, Jarek Rosinski, CEO, Steve Lowry, Electronics Engineer, JR Dynamics Ltd, Cramlington, United Kingdom</div></div>	<div><div>Improved calculation method for load-dependent gear losses</div><div>- Experimental determination of the mean coefficient of friction</div><div>- Frictional behavior of helical gears with flank modifications</div><div>Dipl.-Ing. Thomas Jurkschat, Team Leader, Dr.-Ing. Thomas Lohner, Head of Department, Prof. Dr.-Ing. Karsten Stahl, Full Professor, Institute of Machine Elements, Director, Gear Research Centre (FZG), Technische Universität München (TUM), Garching, Germany</div></div>
09:30 <div><div>Load-sharing model for spur gears with tip relief</div><div>- Influence of tip relief on load-sharing ratio</div><div>- Effective contact ratio on loaded tooth</div><div>Prof. Dr. Eng. José I. Pedrero, Professor, Dr. Eng. Miguel Pleguezuelos, Associate Professor, Dr. Eng. Miryam B. Sánchez, Assistant Professor Department of Mechanics, Faculty of Engineering, Universidad Nacional de Educación a Distancia (UNED), Madrid, Spain</div></div>	<div><div>Point-line meshing gear drive</div><div>- Characteristics of a point-line meshing gear drive</div><div>- Manufacture, testing and application of a point-line meshing gear drive</div><div>Huang Hai Ph.D., Associate Professor, School of Logistic Engineering, Prof. Haixiang Li, Team Leader, Wuhan University of Technology, China</div></div>	<div><div>Estimation of loaded static transmission error using vibration measurement under operating conditions in a two-stage helical gear reducer</div><div>- Evaluation of mesh excitation for each gear in a gearbox</div><div>- Estimation of relative tooth-surface shape of gear pair</div><div>Dr. Toshiya Nagumo, Engineer, Sumitomo Heavy Industries, Ltd., Yokosuka-shi, Kanagawa, Japan</div></div>	<div><div>General modelling method of power losses in transmission with parameter identification</div><div>- Selection of power loss models of transmission components</div><div>- Identification of the uncertain and influential parameters of models</div><div>Ye Shen M.Sc., Research Associate, Prof. Dr.-Ing. Stephan Rinderknecht, Head of Institute, Institute for Mechatronic Systems in Mechanical Engineering, Technische Universität Darmstadt, Germany, Dr.-Ing. Maik Hoppert, Engineering Specialist – Tribology &amp; Low Carbon, Romax Technology Ltd, Nottingham, United Kingdom</div></div>
10:00 <div><div>Mesh stiffness of cylindrical gear including tooth surface friction based on FEA method</div><div>- Mesh stiffness of cylindrical gears considering friction and oil</div><div>- A method using FEA and contact analysis</div><div>Mimi Nan, Ph.D. student, Prof. Dr. Geng Liu, Full Professor, Deputy Dean, Lan Liu Ph.D., Associate Professor, School of Mechanical Engineering, Northwestern Polytechnical University, Xi’an, China</div></div>	<div><div>Curvature interference characteristic of conical surface enveloping a spiroid</div><div>- Global properties of curvature interference limit line</div><div>- Measures to avoid curvature interference</div><div>Yaping Zhao Ph.D., Professor, Mechanical Engineering Department, Northeastern University, Shenyang, China</div></div>	<div><div>Printing of a crack-detection sensor and meander line antenna for spur gears by laser sintering of conductive ink</div><div>- Smart gear by printed technology</div><div>- Development of a 4-axis laser printer</div><div>Dr. Daisuke Iba, Associate Professor, Shintaro Futagawa, Master student, Prof. Dr. Eng. Ichiro Moriwiki, Professor, Department of Mechanical Engineering, Kyoto Institute of Technology, Kyoto, Japan</div></div>	<div><div>Thermal analysis and optimization of gearboxes by simulation</div><div>- Simulation of oil distribution on the gearbox housing</div><div>- Simulation of air flow along the gearbox surface</div><div>Dr.-Ing. Björn Bauer, Head of Product Development, Dr. Ralf Hambrecht, Head of Product Line Management, Andreas Kube, Head of System Engineering, Siemens AG, Voerde, Germany</div></div>
10:30 <div><div>☕ Coffee break and visit to the exhibition and poster presentations</div></div>			
<div>Transmission error</div> <div>Moderation: Prof. Dr.-Ing. Karsten Stahl, Technische Universität München (TUM), Germany / Prof. h.c. Dr.-Ing. Aizoh Kubo, Research Institute for Applied Sciences, Japan</div>	<div>Materials</div> <div>Moderation: Dr. Michel Octrue, CETIM, France / Dr.-Ing. Jörg Börner, ZF Friedrichshafen, Germany</div>	<div>Quality / measurement</div> <div>Moderation: Dr.-Ing. Bernhard Bouché, Getriebebau NORD, Germany / Prof. Dr. Ing. Philippe Velex, INSA Lyon, France</div>	<div>Reliability</div> <div>Moderation: Prof. i.R. Dr.-Ing. Bernd-Robert Höhn, Technische Universität München (TUM), Germany / Prof. Dr.-Ing. José I. Pedrero, UNED, Spain</div>
11:15 <div><div>Robust optimization of gear macro- and micro-geometries in order to minimize static transmission error and gear stiffness fluctuations</div><div>- NVH optimization method acting of both macro and microgeometries</div><div>- Semi-analytical tooth bending model coupled with an efficient contact model</div><div>Pierre Garambois, Post-doctoral Researcher, Joel Pierre-Liaudet Ph.D., Associate professor of mechanics, Emmanuel Rigaud, Ph.D., Associate Professor of Mechanics, Tribology and Systems Dynamics Laboratory, Ecole Centrale de Lyon, France</div></div>	<div><div>Prediction of powertrain component performance based on novel steel quantification techniques and procedures</div><div>- Prediction of fatigue performance based on steel quantification</div><div>- Increasing permissible power density with clean steel</div><div>Patrik Ölund M.Sc., Head of Group R&amp;D, Joakim Fagerlund M.Sc., Senior R&amp;D Engineer, Lily Kamjou M.Sc., Senior Specialist Powertrain, Industry Solution, Ovako AB, Hofors, Sweden</div></div>	<div><div>Grinding burn inspection – tools for supervising and objectifying the testing process</div><div>- Grinder burns - testing reliability - reference blocks - LASER treatment</div><div>- Surface temper etching - eddy current-testing - Barkhausen-noise method</div><div>Dr. rer. nat. Dr. sc. techn. Martin W. Seidel, CEO, Dr. rer. nat. Antje Zösch, Head of R/D, B.Eng. Konstantin Härtel, Project Engineer, imq Ingenieurbetrieb für Materialprüfung, Qualitätssicherung und Schweißtechnik GmbH, Crimmitschau, Germany</div></div>	<div><div>Documentation of gearbox reliability – an upcoming demand</div><div>- Reliability provides a comparative statement for individual gearbox components</div><div>- Identification of the weakest elements in a drive system</div><div>Dr.-Ing. Ulrich Kissling, Managing Director, Dr.-Ing. Michael Stangl, Senior Software Engineer, KISSsoft AG, Bubikon, Switzerland</div></div>
11:45 <div><div>The influence of the overlap ratio on transmission error in parallel axis gears</div><div>- Comparison of transmission error between spur-gears and helical gears</div><div>- Influence of the overlap ratio on the transmission error of helical gears considering misalignment and micro-modifications</div><div>Master Layue Zhao, Mechanical Engineer, National Key Lab of Vehicle Transmission, China North Vehicle Research Institute, Beijing, China, Dr. Robert Frazer, Senior Engineer, Expert, Dr. Brian Shaw, Director, Design Unit, Newcastle University, Newcastle Upon Tyne, United Kingdom</div></div>	<div><div>Development and investigation of austempered ductile iron (ADI) for thick-walled gear components</div><div>- Optimized casting and heat treatment of planetary carriers</div><div>- Correlation of mechanical and microstructural properties</div><div>Dr.-Ing. Jochen Lohmiller, Development Engineer, Dr.-Ing. Jürgen Hoffmeister, Head of Technology department Materials Technology, Dr.-Ing. Jörg Hermes, Head of Development Gear Units, SEW-EURODRIVE GmbH &amp; Co. KG, Bruchsal, Germany</div></div>	<div><div>Automatic geometrical separation of involute flank areas</div><div>- Geometrical decomposition of involute flanks</div><div>- Automated approximation of geometric parameters</div><div>Dipl.-Ing. Axel von Freyberg, Research Assistant, Prof. Dr.-Ing. Andreas Fischer, Professor, Bremen Institute for Metrology, Automation and Quality Science (BIMAQ), University of Bremen, Germany</div></div>	<div><div>The remaining useful life of gears with inherent uncertainties</div><div>- Prediction of the remaining useful life reliability</div><div>- Development of an efficient modeling of gear-tooth crack propagation</div><div>Prof. Ph.D. Stephen Ekwaro-Osire, Professor, Haileyesu B. Endeshaw M.Sc., Research Assistant, Department of Mechanical Engineering, Texas Tech University, Lubbock, Fisseha M. Alemayehu Ph.D., Assistant Professor, West Texas A&amp;M University, Canyon, USA</div></div>

Lecture Room A	Lecture Room B	Lecture Room C	Lecture Room D
<p>12:15    <b>The influence of meshing stiffness with tooth friction on vibration displacement in helical gear system</b></p> <ul style="list-style-type: none"> <li>- Performance optimization of vibration and noise</li> <li>- Influence of optimized meshing stiffness technology</li> </ul> <p><b>Associate Professor/Doctorate Wenliang Li</b>, Engineer, Transmission department, Research Institute of China Shipbuilding Industry Corporation (CSIC), Harbin, China</p>	<p><b>Austempered Ductile Iron (ADI) for gears: manufacturing, performances and tests</b></p> <ul style="list-style-type: none"> <li>- Bending fatigue tests on gears made of ADI</li> <li>- Contact fatigue tests on gears made of ADI</li> </ul> <p><b>Edoardo Conrado Ph.D.-Ing.</b>, Assistant Professor, Dr. Eng. Francesco Rosa, Assistant Professor, Department of Mechanical Engineering, Politecnico di Milano, Franco Concli Ph.D.-Ing., Assistant Professor, Faculty of Science and Technology, Free University of Bolzano, Italy</p>	<p><b>Paradigm change in cylindrical gear metrology using areal measurements and evaluations</b></p> <ul style="list-style-type: none"> <li>- Production-oriented modification and deviation parameters referring to the entire gear instead of individual flanks</li> <li>- Area-oriented instead of line oriented evaluations</li> </ul> <p><b>Prof. Dr.-Ing. Gert Goch</b>, Professor, Mechanical Engineering and Engineering Science, Kang Ni, Ph.D. student, Yue Peng, Ph.D. student, University of North Carolina at Charlotte, USA</p>	<p><b>Test method for time-scaled fatigue tests of transmission systems</b></p> <ul style="list-style-type: none"> <li>- Transmission system test methods</li> <li>- Evaluation of shortened tests w/o reaching failure criteria</li> </ul> <p><b>Dipl.-Ing. Michael Hein</b>, Team Leader Flank Load Carrying Capacity, Load capacity cylindrical gears, Fatigue life analysis, Dr.-Ing. Thomas Tobie, Head of Department, Prof. Dr.-Ing. Karsten Stahl, Full Professor, Institute of Machine Elements, Director, Gear Research Centre (FZG), Technische Universität München (TUM), Garching, Germany</p>
<p>12:45    <b>Simultaneous experimental characterization of dynamic transmission error in regard to the noise and vibration behavior of a gear system under load</b></p> <ul style="list-style-type: none"> <li>- Gear noise measurement methodology</li> <li>- NVH performance of a gear system in relation to transmission error</li> </ul> <p><b>Sebastien Dalle</b>, Head of Acoustics Department, Noise and Vibrations Engineering, Christophe Patte, Power Transmission Engineer, CETIM, Senlis, France</p>	<p><b>Prediction of local load carrying capacity for gears – a materials science approach</b></p> <ul style="list-style-type: none"> <li>- Heat treatment simulation considering heat specific chemical composition</li> <li>- Prediction of hardness profile for tooth root and flank</li> </ul> <p><b>Dr.-Ing. Maximilian Schwenk</b>, Development Engineer, Dr.-Ing. Jürgen Hoffmeister, Head of Technology Department Materials Technology, Dr.-Ing. Jörg Hermes, Head of Development Gear Units, SEW-EURODRIVE GmbH &amp; Co. KG, Bruchsal, Germany</p>	<p><b>Non-contact measurement of 3D tooth flank-form accuracy of bevel gears on a 5-axis machining center</b></p> <ul style="list-style-type: none"> <li>- We achieved using 5-X &amp; Light sectioning probe</li> <li>- We achieved 1.5um repeatability(2sigma) with 70 % time reducing</li> </ul> <p><b>Kenta Kanto</b>, Section Manager 3<sup>rd</sup> Development Section, Development Department, Industrial Metrology Business Unit, Nikon Corporation, Yokohama-city, Junichi Morishita, Engineer, DMG MORI, Nagoya, Prof. Dr.-Ing. h.c. Aizoh Kubo, Research Institute for Applied Sciences, Kyoto, Japan</p>	<p><b>Reliability safeguarding for an 8 MW wind-energy gearbox in serial production</b></p> <ul style="list-style-type: none"> <li>- Prototype development covering verification and validation processes</li> <li>- Serial process development ensuring stable quality at the highest level</li> </ul> <p><b>Dr.-Ing. Dirk Strasser</b>, Head of Wind Gearbox Development Witten, Dipl.-Ing. Stefan Troll, Project Manager, Process Engineering, Dipl.-Ing. Ralf Sperlich, Design Engineer, Product Design, Multi Megawatt Windgearboxes, Business Unit Wind Turbine Drives, Division Industrial Technology, ZF Industrieantriebe Witten GmbH, Germany</p>
<p>13:15    <b>Closing remarks</b></p>	<p><b>Closing remarks</b></p>	<p><b>Closing remarks</b></p>	<p><b>Closing remarks</b></p>
<p>13:30     <b>Awarding of the best presentation for junior engineers by the conference president in the main hall + Lunchtime snack</b></p>			
<p>15:00     <b>End of the conference</b></p>			

September 13<sup>th</sup> to 14<sup>th</sup>, 2017

Visit accompanying VDI-Conferences – free of charge



Source: ©SEW-EURODRIVE GmbH & Co. KG

## International Conference on Gear Production 2017

**Presidency**

**Prof. Dr.-Ing. Karsten Stahl**, Full Professor, Institute of Machine Elements, Director, Gear Research Centre (FZG), Technische Universität München (TUM), Garching, Germany

**Prof. Dr.-Ing. Christian Brecher**, Full Professor, Chair of Machine Tools, Laboratory for Machine Tools and Production Engineering (WZL), Faculty for Mechanical Engineering, RWTH Aachen University, Germany

**Prof. Dr.-Ing. Dr.-Ing. E.h. Dr. h.c. Dr. h.c. Fritz Klocke**, Full Professor, Chair of Manufacturing Technology, Laboratory for Machine Tools and Production Engineering (WZL), Faculty for Mechanical Engineering, RWTH Aachen University, Germany

**Key topics discussed:**

- Process optimization by digital gear manufacturing
- Future potential of PM gear technology
- Improved running behavior by manufacturing of functional surfaces
- New approaches for productivity increases and enhanced flexibility in gear manufacturing
- Advances in cylindrical gear production
- Manufacturing relating to product properties

**With Experts from:**

Applied Nano Surfaces Sweden · Daido steel · Gleason PFAUTER Maschinenfabrik · Högnäs · Involute Simulation Softwares · JATCO · KISSsoft · Klingelnberg · Miba · High Tech Coatings · mimatic · SEW-Eurodrive · Stackpole International · ZF Friedrichshafen

Further details and the final program can be found here:  
[www.vdi.de/gearproduction](http://www.vdi.de/gearproduction)



Source: ©Technische Universität München (TUM)

## International Conference on High Performance Plastic Gears 2017

**Presidency**

**Prof. Dr.-Ing. Karsten Stahl**, Full Professor, Institute of Machine Elements, Director, Gear Research Centre (FZG), Technische Universität München (TUM), Garching, Germany

**Prof. Dr.-Ing. Dietmar Drummer**, University Professor, Institute of Polymer Technology, Friedrich-Alexander Universität, Erlangen, Germany

**Key topics discussed:**

- Novel precision plastic gear applications in various industries
- Characterization of thermo-elastohydrodynamically lubricated (TEHL) contacts of thermoplastic gears
- Design investigations and indications for acoustical optimized gear meshes using plastic gears
- High performance polymers for future tribological application

**With Experts from:**

Bosch · Bühler Motor · DSM · DuPont · Gleason Higher Education Centre Novo Mesto · IMS Gear · KISSsoft · Klüber Lubrication · Sabic · Scholz · Victrex · ZF · IWM


Further details and the final program can be found here:  
[www.vdi.de/plasticgears](http://www.vdi.de/plasticgears)

Scientific Support:



VDI Society Product and Process Design

The VDI SOCIETY PRODUCT AND PROCESS DESIGN (VDI-GPP) and its technical divisions provide all sectors with verified knowledge on the design of products and processes and their optimization in terms of quality and the time- and cost-benefit ratio.

[www.vdi.eu](http://www.vdi.eu)



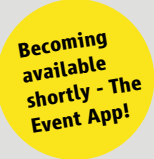
Media Partners

The Event App

Plan your visit in advance and get to know all the details on International Conference on Gears 2017!

Make use of this full-service app for your visit of the International Conference on Gears 2017 – the International Expo and Conference for connected car and mobility solutions: You can not only plan your stay in Garching but also make use of the networking possibilities the app is offering you.





# International Conference on Gears 2017

## ire

**Data protection:** Your personal data will be maintained for internal business and marketing purposes