Key topics:

- Improved simulation methods
- Lubrication for enhanced efficiency
- Condition monitoring with smart gear system
- Multi-body simulation and NVH prediction
- Improved calculation methods for strength and efficiency

Associated organisations:

American Gear Manufacturers, USA
ARTEMA, France
ASSIOT, Italy
BAPT
British Gear Association
Chinese Mechanical Engineering Society
Canadian Society for Mechanical Engineering
CSI, Czechia
Drive Technology Research Association, Germany
Gear Research Institute, USA

Scientific Society of Mechanical Engineers, Hungary
IFToMM
Institution of Mechanical Engineers, United Kingdom
Japan Society of Mechanical Engineers
The Korean Society of Mechanical Engineers, Korea
SICE, Japan
Romanian Association of Mechanical Transmissions
Technical Chamber of Greece
WiGeP, Germany

Visit parallel conferences free of charge

Gear Production 2021
www.vdiconference.com/02TA411021

High Performance Plastic Gears 2021
www.vdiconference.com/02TA409021

An event organized by VDI Wissensforum
www.vdi-gears.eu
<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:15</td>
<td>Registration</td>
</tr>
<tr>
<td>09:45</td>
<td>Joint welcome and opening of</td>
</tr>
<tr>
<td></td>
<td>- International Conference on Gears 2021</td>
</tr>
<tr>
<td></td>
<td>- International Conference on High Performance Plastic Gears 2021</td>
</tr>
<tr>
<td></td>
<td>- International Conference on Gear Production 2021</td>
</tr>
<tr>
<td></td>
<td>Prof. Dr.-Ing. Karsten Stahl, FZG, Technical University of Munich (TUM), Garching, Germany</td>
</tr>
<tr>
<td>10:05</td>
<td>Welcome address by</td>
</tr>
<tr>
<td></td>
<td>Dr.-Ing. Burkhard Pinnekamp, Head of Central Technology, Renk GmbH, Augsburg; President, Research Association for Drive Technology (FVA), Frankfurt, Germany</td>
</tr>
<tr>
<td>10:15</td>
<td>Keynote session: Innovation flashlights: What will be the next game-changing innovations and technologies?</td>
</tr>
<tr>
<td></td>
<td>Demands in gear technology in structural change in the economy</td>
</tr>
<tr>
<td></td>
<td>Prof. Dr.-Ing. Aizoh Kubo, General Manager, Research Institute for Applied Sciences, Kyoto, Japan</td>
</tr>
<tr>
<td></td>
<td>The innovator’s DNA</td>
</tr>
<tr>
<td></td>
<td>New ways to lubricate</td>
</tr>
<tr>
<td></td>
<td>Dr. Lutz Lindemann, Member of the Executive Board (CTO), FUCHS PETROLUB SE, Mannheim, Germany</td>
</tr>
<tr>
<td></td>
<td>High performance plastic gears in future applications</td>
</tr>
<tr>
<td></td>
<td>Prof. Dr.-Ing. Karl Kuhmann, Head of Polymer Technology Development, High Performance Polymers, Evonik Operations GmbH, Marl, Germany</td>
</tr>
<tr>
<td></td>
<td>Roller pairings with lubricant-impregnated sintered material</td>
</tr>
<tr>
<td></td>
<td>Prof. i. R. Dr.-Ing. Bernd-Robert Höhn, TUM emeritus of excellence, Gear Research Centre (FZG), Technical University of Munich (TUM), Garching, Germany</td>
</tr>
<tr>
<td>12:00</td>
<td>Time for working lunch – meet &amp; greet in the exhibition area, poster presentation area and GearArena</td>
</tr>
<tr>
<td></td>
<td>With digital polls during the speeches</td>
</tr>
<tr>
<td>13:30</td>
<td>Intl Conference on Gears</td>
</tr>
<tr>
<td>Lecture Room A</td>
<td>Determining tooth root strength</td>
</tr>
<tr>
<td>Lecture Room B</td>
<td>NVH</td>
</tr>
<tr>
<td>Lecture Room C</td>
<td>EHL contact</td>
</tr>
<tr>
<td>Lecture Room D</td>
<td>Applications</td>
</tr>
<tr>
<td>Lecture Room E</td>
<td>Manufacturing of internal gears</td>
</tr>
<tr>
<td>15:00</td>
<td>Coffee break – meet &amp; greet in the exhibition area, poster presentation area and GearArena</td>
</tr>
<tr>
<td>16:00</td>
<td>Loaded tooth contact analysis</td>
</tr>
<tr>
<td></td>
<td>Non-involute and asymmetric gears</td>
</tr>
<tr>
<td></td>
<td>Condition monitoring/smart gears</td>
</tr>
<tr>
<td></td>
<td>Material properties</td>
</tr>
<tr>
<td></td>
<td>Innovative manufacturing processes</td>
</tr>
<tr>
<td>18:00</td>
<td>Organized bus transfer to the evening reception</td>
</tr>
<tr>
<td>19:00</td>
<td>Evening reception at the Hofbräuhaus in Munich</td>
</tr>
<tr>
<td></td>
<td>Dinner Speech: Prof. Dr. Dr. h. c. mult. Wolfgang A. Herrmann, President Emeritus, Technical University of Munich (TUM), Garching &amp; Chairman of the Founding Board, Deutsches Zentrum Mobilität der Zukunft (DZM), Munich, Germany</td>
</tr>
<tr>
<td>Time</td>
<td>Lecture Room A</td>
</tr>
<tr>
<td>------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>08:30</td>
<td>Gear strength</td>
</tr>
<tr>
<td>10:00</td>
<td>Coffee break – meet &amp; greet in the exhibition area, poster presentation area and GearArena</td>
</tr>
<tr>
<td>11:00</td>
<td>Planetary gears</td>
</tr>
<tr>
<td>12:30</td>
<td>Time for working lunch – meet &amp; greet in the exhibition area, poster presentation area and GearArena</td>
</tr>
<tr>
<td>14:00</td>
<td>Gear dynamics</td>
</tr>
<tr>
<td>15:30</td>
<td>Coffee break – meet &amp; greet in the exhibition area, poster presentation area and GearArena</td>
</tr>
<tr>
<td>16:30</td>
<td>Gear strength – flank properties</td>
</tr>
<tr>
<td>18:00</td>
<td>Evening reception at the conference venue</td>
</tr>
</tbody>
</table>

**3rd Conference day**

<table>
<thead>
<tr>
<th>Time</th>
<th>Lecture Room A</th>
<th>Lecture Room B</th>
<th>Lecture Room C</th>
<th>Lecture Room D</th>
<th>Lecture Room E</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:30</td>
<td>Friction</td>
<td>Simulation and optimization</td>
<td>Worm and crossed helical gears</td>
<td>Lubrication</td>
<td>Measurement technology</td>
</tr>
<tr>
<td>10:00</td>
<td>Coffee break – meet &amp; greet in the exhibition area, poster presentation area and GearArena</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:00</td>
<td>Multiparameter optimization</td>
<td>Material and heat treatment</td>
<td>High speed gears</td>
<td>Tribological investigation</td>
<td>Gear hard machining</td>
</tr>
<tr>
<td>12:30</td>
<td>Closing remarks</td>
<td>Closing remarks</td>
<td>Closing remarks</td>
<td>Closing remarks</td>
<td>Closing remarks</td>
</tr>
<tr>
<td>12:45</td>
<td>Awarding of the best presentation for junior engineers by Prof. Dr.-Ing. Karsten Stahl, FZG, Technical University of Munich (TUM), Garching, Germany</td>
<td>Awarding of the best paper by Dr.-Ing. Franz Völkel, Sr. Vice President R&amp;D, Business Division Transmission Systems, Schaeffler Technologies AG &amp; Co. KG, Herzogenaurach, Germany</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14:15</td>
<td>End of the conferences</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Europe invites the world!**
Program

1st Conference day
Wednesday, September 15th, 2021

08:30 Registration

Plenary lectures

09:45 Joint welcome and opening of
  - International Conference on Gears 2021
  - International Conference on High Performance Plastic Gears 2021
  - International Conference on Gear Production 2021

Prof. Dr.-Ing. Karsten Stahl, FZG, Technical University of Munich (TUM), Garching, Germany

10:05 Welcome address by
  Dr.-Ing. Burkhard Pinnekamp, Head of Central Technology, Renk GmbH, Augsburg; President, Research Association for Drive Technology (FVA), Frankfurt, Germany

10:15 - 12:00 Keynote session: Innovation flashlights: What will be the next game-changing innovations and technologies?

Moderation: Prof. Dr.-Ing. Karsten Stahl, FZG, Technical University of Munich (TUM), Garching, Germany

Demands in gear technology in structural change economy
- High performance in the inflating structure of the economy
- Motive force behind human activity is desire
- Necessary performance in sustainable structure of the economy

Prof. h. c. Dr.-Ing. Aizoh Kubo, General Manager, Research Institute for Applied Sciences, Kyoto, Japan

The innovator’s DNA
- Exploration
- Acceleration
- Serendipity


New ways to lubricate
- Sustainability requirements change in raw material landscape
- Sensor technologies – what’s possible
- New basefluids – why not water

Dr. Lutz Lindemann, Member of the Executive Board (CTO), FUCHS PETROLUB SE, Mannheim, Germany

High performance plastic gears in future applications
- Intelligent plastics material design
- Processing and design freedom of plastic gears
- Evaluation of plastic gears for new mobility vehicles

Prof. Dr.-Ing. Karl Kuhmann, Head of Polymer Technology Development, High Performance Polymers, Evonik Operations GmbH, Marl, Germany

Roller pairings with lubricant-impregnated sintered material
- Lubrication of the contact by escaping lubricant
- Separation of the contact of the Roller pairings, without metallic contact
- Influence of the surface structure

Prof. i. R. Dr.-Ing. Bernd-Robert Höhn, TUM emeritus of excellence, Gear Research Centre (FZG), Technical University of Munich (TUM), Garching, Germany

12:00 Time for a working lunch – meet & greet in the exhibition area, poster presentation area and GearArena

Every participant gets a voice – you will be involved via digital polls during the speeches.
13:30 Gear root bending strength: statistical treatment of single tooth bending fatigue tests results
- Statistical analysis of STBF (Single Tooth Bending Fatigue Test) data
- Gear SN-curve estimation via maximum likelihood estimation (MLE) and statistic of extremes
Luca Bonaiti, M. Sc., Prof. Ing. Carlo Gorla, Associate Professor, Prof. Dr.-Ing. Francesco Rosa, Assistant Professor, Department of Mechanical Engineering, Politecnico di Milano, Italy

14:00 Improved method for the determination of tooth root endurance strength
- Load increment procedure for the precise estimation of the load capacity of each test tooth
- Evaluation of the influencing geometry parameters for an accurate calculation of fatigue strength
Ahmad Alnahlaui, M. Sc., Research Assistant, Prof. Dr.-Ing. Peter Tenberge, Full Professor, Chair of Industrial and Automotive Drivetrains, Ruhr-University Bochum, Germany

14:30 A comparison of gear tooth bending fatigue lives from single tooth bending and rotating gear tests
- Discussion of statistical regression techniques for single tooth bending and rotating gear tests
- Translation factors for converting single tooth bending data to rotating gear data are introduced
Isaac Hong, Ph. D., Research Scientist, Zach Teaford, Graduate Research Associate, Prof. Ahmet Kahraman, Howard D. Winbigler, Professor and Director, Gear and Power Transmission Research Laboratory, Department of Mechanical and Aerospace Engineering, The Ohio State University, Columbus, USA

15:00 Coffee break – meet & greet in the exhibition area, poster presentation area and GearArena

15:30 - Poster presentations in the poster exhibition area
16:00  Design, strength calculation by ISO10300 and loaded tooth contact analysis (TCA) of forged differential bevel gears
   • Full design of forged differential gear sets
   • Loaded tooth contact analysis of forged differential gear sets

Dr.-Ing. Joachim Thomas, Managing Director, ZG Hypoid GmbH, Aschheim, Dipl.-Ing. Frederik Mieth, Research Assistant, Institute of Machine Elements and Machine Design, Faculty of Mechanical Science and Engineering, Technical University of Dresden, Germany; Claude Gosselin, P. Eng., Ph. D., Managing Director/CEO, Involute Simulation Softwares Inc., Quebec, Canada

16:30  Innovative tooth contact analysis with non-uniform rational b-spline (NURBS) surfaces
   • Comparison of NURBS and Bézier approach in tooth contact analysis (TCA)
   • Potential of flank and root description regarding stress and lifetime prediction

Dipl.-Ing. Felix Müller, Research Assistant, Dr.-Ing. Stefan Schumann, Chief Engineer, Prof. Dr.-Ing. Berthold Schlecht, Full Professor, Institute of Machine Elements and Machine Design, Faculty of Mechanical Science and Engineering, Technical University of Dresden, Germany

17:00  Helical gear tooth micro-geometry optimization and its impact on gear durability and NVH
   • Reduction of contact stresses, transmission error and mesh misalignment analysis
   • Purpose suitable micro geometrical modification to gear tooth profile

Muhammad Asad Ur Rehman Bajwa, Ph. D. Mech Eng., Researcher, Mechanical Engineering, Tianjin University, China

17:30  End of the first conference day

18:00  Organized bus transfer to the evening reception

19:00  Evening reception at the Hofbräuhaus in Munich

You can look forward to a special evening event. Enhance your personal network and use the informal atmosphere for deeper-going discussions.

You are invited!

"Mobility is not only an essential feature of freedom – without it, living nature is unimaginable. The key to mobility of humankind and its communities has always been innovation, shaped by our engineers, coming full circle back to living freedom."

Source: © Hofbräuhaus München
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:30</td>
<td>Calculation approach to determine the risk of premature failures on gear drives components due to subsurface initiated cracks by contact stresses</td>
</tr>
<tr>
<td></td>
<td>- Knowledge and experiences-based calculation method for the premature failure modes Tooth Flank Fracture (TFF) and White Etching Cracks (WEC)</td>
</tr>
</tbody>
</table>
|           | - Calculation method in detail on TFF and WEC and summary of experiences explained by examples  
|           | Dipl.-Ing. Dirk-Olaf Leimann, Development Engineer, Moers, Germany |
| 09:00     | Advanced use of DOE in gear macro-geometry optimization             |
|           | - Optimization of NVH-behavior, gear durability and efficiency      |
|           | - Quality and robustness improvement for gear performance           |
| 09:30     | Influence of light grinding notches on the tooth root bending strength of case carburized cylindrical gears |
|           | - Experimental investigations and grinding notch measurement analysis |
|           | - Gears of different sizes and shot blasting treatments             |
|           | Karl Jakob Winkler, M. Sc., Research Associate, Teamleader manufactur-   |
|           | ing and lubrication, Dr.-Ing. Thomas Tobie, Head of Department,      |
|           | Department Load-Capacity Cylindrical Gears, Prof. Dr.-Ing. Karsten Stahl, Full Professor, Institute of Machine Elements, Director, Gear Research Centre (FZG), Technical University of Munich (TUM), Garching, Germany |
| 10:00     | Coffee break – meet & greet in the exhibition area, poster presentation area and GearArena |
| 10:30     | Poster presentations in the poster exhibition area                 |

**Lecture Room A**

**Gear strength**

**Moderation:** Dr.-Ing. Ralf Hess, Flender GmbH, Germany/
Robin Olson, M. Sc., Rexnord Industries, LLC, USA

**Lecture Room B**

**Wear**

**Moderation:** Prof. Dr.-Ing. Peter Tenterme, Ruhr-University, Germany/
Prof. Ing. Carlo Gotta, Politecnico di Milano, Italy

**Analysis of the mechanisms of action within the dry lubricated rolling-sliding contact of coated surfaces**

- Characterization of the friction behavior
- Local wear analysis of the coating

**Sebastian Sklenak, M. Eng., Research Assistant, Dr.-Ing. Jens Brimmer, M. Sc., Chief Engineer, 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**

**Improving pitting durability by introducing the non-linear wear propagation property of helical gears**

- Mechanism of pitting durability deviations at high loads
- Influence of tooth-edge modifications on wear

**Dr.-Ing. Koji Kumagai, Development Engineer, Powertrain Production Engineering and Development Division, Nissan Motor Co., Ltd., Kanagawa, Japan**

**Wear simulation of worm gears based on an energetic model**

- Transient simulation of friction and wear of worm gears
- Experimental determination of wear model parameters

**Dipl.-Ing. Kevin Daubach, Research Assistant, Jun. Prof. Dr.-Ing. Manuel Delher, Junior Professor for Mechanical Drive Technology, Prof. Dr.-Ing. Bernd Sauer, Full Professor, Head of MEGT – Institute of Machine Elements, Gears and Transmission, Department of Mechanical and Process Engineering, Technische Universität Kaiserslautern, Germany**

**Lecture Room C**

**Bevel and hypoid gears**

**Moderation:** Prof. Dr.-Ing. Michael Weigand, TU Wien, Austria/
Prof. Dr. Eng. Ichiro Moriwaki, Kyoto Institute of Technology, Japan

**Development of IP-bevel gears for industrial operation**

- Gear features in design and manufacturing
- Performance in transmission error and in load carrying capability

**Prof. h. c. Dr.-Ing. Aizoh Kubo, General Manager, Research Institute for Applied Sciences, Kyoto, Japan; Dr.-Ing. Aki Ueda, President, AMTEC Inc, Osaka, Japan; Dipl.-Ing. Hiroya Ishiyama, Productengineer, DMG/MORI Co. Ltd., Iga, Japan**

**Enhanced loaded tooth contact analysis of hypoid gears within a multi-body-system simulation**

- Enhanced load distribution calculation with reduced number of contact points
- Stress analysis with speed improvements on hypoid gears

**Dipl.-Ing. Wolf Wagner, Research Assistant, Dr.-Ing. Stefan Schumann, Chief Engineer, Prof. Dr.-Ing. Berthold Schlecht, Full Professor, Institute of Machine Elements and Machine Design, Faculty of Mechanical Science and Engineering, Technical University of Dresden, Germany**

**Evolution mechanism and meshing performance of a series of novel worm drives with adjustable backlash**

- Local conjugation theory of novel worm drive based on meshing media
- Meshing performance of novel worm drive during the evolution from line contact to point contact

**Xinxin Ye, Academic Assistant, College of Mechanical and Vehicle Engineering, Chongqing University, China**
<table>
<thead>
<tr>
<th>Lecture Room A</th>
<th>Lecture Room B</th>
<th>Lecture Room C</th>
</tr>
</thead>
</table>
| **Planetary gears**  
Moderation: Dipl.-Ing. Zsolt Roth, J. M. Voith SE & Co. KG | **Gear geometry optimization**  
Moderation: Prof. Dr.-Ing. Gerhard Poll, Leibniz University Germany/ Prof. Dr. Geng Liu, Northwestern Polytechnical University & Shanya Engineering Laboratory for Transmissions and Controls, China | **Enhanced testing methods**  
Moderation: Dr.-Ing. Carsten Gitt, Mercedes-Benz AG, Germany/ Prof. Dr.-Ing. José I. Pedrero, Universidad Nacional de Educación a Distancia (UNED), Spain |
| *Dynamic load distribution of planetary gear sets subject to both internal and external excitations*  
- Dynamic response and contact stress distribution in planetary gears  
- Influence of input torsional excitations  
Lokaditya Ryali, Graduate Research Associate, Dr. David Talbot, Assistant Professor, Gear and Power Transmission Research Laboratory, Department of Mechanical and Aerospace Engineering, The Ohio State University, Columbus, USA | *Parametric study of hypocycloidal involute gears*  
- Definition of the tip/tip interference condition in the internal gearing with a low tooth number difference  
- Definition of the effective contact ratio of hypocycloidal involute gears under load  
Dr.-Ing. Alex Kapelevich, Consultant, Yuriy V. Shekhtman, Senior Researcher, AKGears, LLC, Shoreview, Minnesota, USA | *Suitability of the test results of micropitting tests acc. to FVA 54/7 for modern practical gear applications*  
- Influence of the material of case-hardened gears on the test results  
- Influence of geometry (use of flank modifications and helical gears) and grinding method (profile grinding) of test gears on the test result  
Nadine Sagraloff, M. Sc., Research Associate, Dr.-Ing. Thomas Tobie, Head of Department, Department Load-Capacity Cylindrical Gears, Prof. Dr.-Ing. Karsten Stahl, Full Professor, Institute of Machine Elements, Director, Gear Research Centre (FZG), Technical University of Munich (TUM), Garching, Germany |
| *Experimental investigation of the dynamic load sharing of planetary gearboxes*  
- High speed double-helical planetary gearbox  
- Influence of load and speed on load sharing behavior  
Joshua Götz, M. Sc., Research Associate, Team Leader Gear Dynamics, Department Calculation and Verification of Gearbox Systems, Marius Fürst, M. Sc., Research Associate, Felix Siglmüller, M. Sc., Research Associate, Institute of Machine Elements, Gear Research Centre (FZG), Technical University of Munich (TUM), Garching, Germany | *Pitch error analysis on gear rolling-forming with radial-feeding*  
- Pitch error analysis of gear rolling-forming process with radial feeding  
- Experiment validation of pitch error with two sets of tooth numbers  
Dr.-Ing Peng Bo, Yuanxin Luo, Chengsheng Li, College of Mechanical and Vehicle Engineering, Chongqing University, China | *Test rig concept for high power very high cycle fatigue (VHCF) gear testing*  
- Concept for tooth root testing at high rotational speeds  
- Challenges for high-speed gear testing under reversed bending  
Moritz Tripp, M. Sc., Research Assistant, Gear Department, Dr.-Ing. Jens Brimmers, M. Sc., Chief Engineer, 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 |
| *Influences on the excitation behavior of lightweight planetary gearboxes*  
- Influences of misalignments and flexible ring gears on the transmission error  
- Extension and validation of a tooth contact analysis  
Julian Theling, M. Sc., Team Leader Gear Acoustics, Gear Department, Dr.-Ing. Jens Brimmers, M. Sc., Chief Engineer, 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 | *Very fast tooth root optimization – general tool geometry for much smaller tooth root stresses*  
- Stepwise modification of the hobbing tool geometry and fast simulation of the hobbing process  
- Using a new FEM calibrated analytic function for a fast optimization process to minimize the maximum tooth root stress  
Prof. Dr.-Ing. Peter Tenberge, Full Professor, Chair of Industrial and Automotive Drivetrains, Ruhr-University Bochum, Germany | *Mode III threshold under rolling contact fatigue (RCF) and development of a test gearbox for planet gears*  
- Determining mode III threshold under RCF for thin-rimmed gears  
- Development of test rig for testing 3-gear train planet gears layout  
Prasad Mahendra Rao, M. Sc., Prof. Dr.-Ing. Stefano Foletti, Associate Professor, Prof. Ing. Carlo Goria, Associate Professor, Department of Mechanical Engineering, Politecnico di Milano, Italy |

**Program**

- **11:00** Dynamic load distribution of planetary gear sets subject to both internal and external excitations
- **11:30** Experimental investigation of the dynamic load sharing of planetary gearboxes
- **12:00** Influences on the excitation behavior of lightweight planetary gearboxes
- **12:30** Time for a working lunch - meet & greet in the exhibition area, poster presentation area and GearArena
- **13:00** Poster presentations in the poster exhibition area
14:00 An experimental study of parametric resonances of a spur gear pair at speeds above its primary resonance
- Experimental demonstrations of parametric resonances of a spur gear pair
- High-speed spur gear set-up and associated instrumentation
  Prof. Ahmet Kahraman, Professor and Director, Cihan A. Celikay, Graduate Research Assistant, Ata Donmez, Graduate Research Assistant, Gear and Power Transmission Research Laboratory, The Ohio State University, Columbus, Ohio, USA

14:30 Application of gear profile dynamic modification on a three-axis integrated transmission system for vibration reduction
- Performance optimisation of manufacturing deviations
- Design, simulation and analysis of gears and transmissions
  Pu Gao, Ph. D., Research Assistant, Prof. Hui Liu, Professor, Vehicle Research Center, Beijing Institute of Technology, Prof. Dr. Changle Xiang, Vice-President, Beijing Institute of Technology, Director, National Key Lab of Vehicle Transmission, Beijing, China

15:00 Influence of thin rimmed/-webbed gears on transmission dynamic behavior – approximate dynamic factor formula
- Dynamic factor formula for the 3D FE gear hybrid model
- Web/mesh dynamic coupling in a thin-rimmed/-webbed gear
  Dr.-Ing. Guibert Bérengère, Associate Prof., Prof. Dr.-Ing. Philippe Vellex, Full Professor, LaMCoS, INSA – Institut National des Sciences Appliquées de Lyon, Villeurbanne Cédez, France

15:30 Coffee break – meet & greet in the exhibition area, poster presentation area and GearArena

16:00 - 16:20 Poster presentations in the poster exhibition area
**Program**

**16:30** Combining improved gear efficiency and improved fatigue performance through mass finishing
- **Friction modified by enhanced topography and microstructure**
  - Fatigue modified by introduced compressive stress

**17:00** Influence of material roughness, hardness and lubricant additives on the micropitting behaviour of gears
- **Influence of material properties on the micropitting process**
  - Effect of lubricant additives for suppressing micropitting
  **Takuya Ohno, B. Eng., Lubricants Researcher, Lubricants Research Laboratory, Idenitsu Kosan Co., Ltd., Ichihara-shi, Japan; Dr.-Ing. René Greschert, Testing Engineer, Dr.-Ing. Jens Brimmers, M. Sc., Chief Engineer, Gear Department, Chair of Machine Tools, Laboratory for Machine Tools and Production Engineering (WZL), Faculty for Mechanical Engineering, RWTH Aachen University, Germany**

**17:30** Increased load carrying capacity of gears through optimized steel surface, condition and processes
- **Back-to-back testing of three steel performance levels**
  - Steel performance influence on high-quality manufacturing
  **Elias Löthman, M. Sc., Application Engineer, Industry Solutions Development, Ovako AB, Hofors, Sweden; Dr.-Ing. Michael Hein, Head of Department Wear gears and Bevel gears, Fatigue life analysis, Gear Research Centre (FZG), Technical University of Munich (TUM), Garching, Germany; Urs Steiner, M. Eng., Team leader, Research and Testing, Humbel Zahnradh. AG, Kradolf, Switzerland**

**18:00** Evening reception at the university
- Enhance your personal network and use the relaxed and informal atmosphere for deeper-going conversations with other participants and speakers.

---

**You are invited!**

"Despite all digitalization in the world, also in future real forces will have to be transmitted. Thus, developing and manufacturing transmission systems which aim at the best efficiency factor as well as the lowest possible lifetime costs will always be a challenge for all people involved."
<table>
<thead>
<tr>
<th>Lecture Room A</th>
<th>Lecture Room B</th>
<th>Lecture Room C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Friction</strong></td>
<td><strong>Simulation and optimization</strong></td>
<td><strong>Worm and crossed helical gears</strong></td>
</tr>
<tr>
<td>Moderation: Dr.-Ing. Andreas Klein, Flender GmbH – Winergy, Germany/ Dr. Michel Octrue, former CETIM (Technical Center for Mechanical Engineering Industries), Senlis, France</td>
<td>Moderate: Dipl.-Ing. Christian Hartmann, Magna PT B.V. &amp; Co. KG, Germany/ Prof. h.c. Dr.-Ing. Aizoh Kubo, Research Institute for Applied Sciences, Kyoto, Japan</td>
<td>Moderation: Prof. Dr.-Ing. Georg Jacobs, RWTH Aachen University, Germany/ Dr.-Ing. Joachim Thomas, ZG Hypoid GmbH, Germany</td>
</tr>
<tr>
<td>08:30 Minimum friction losses in wind turbine gearboxes</td>
<td>Simulation and optimization: University of Engineering and Technology, India</td>
<td>Calculation method for the tooth thickness of cylindrical worm gears</td>
</tr>
<tr>
<td>• Optimal shift coefficients of wind turbine gearboxes for minimum friction losses</td>
<td>• Establishing the electromechanical coupling model considering the internal excitation of gear system and the electromagnetic characteristics of the generator</td>
<td></td>
</tr>
<tr>
<td>• Minimum friction losses, with regard to bending and pitting strength requirements</td>
<td>• Effects of different structural parameters of the generator on the dynamic characteristics of the gear system</td>
<td></td>
</tr>
<tr>
<td>Prof. Dr.-Ing. José I. Pedreiro, Full Professor, Dr.-Ing. Miguel Pleguezuelos, Associate Professor, Department of Mechanics, Faculty of Engineering, Universidad Nacional de Educación a Distancia (UNED), Madrid, Spain; Ing. José Calvo-Irirsarri, Gearbox Section Manager, Gamesa Energy Transmission – SGRE ON, Zamudio, Spain</td>
<td>Ruibo Chen, Ph. D., The State Key Lab of Mechanical Transmissions, Chongqing University, China</td>
<td></td>
</tr>
<tr>
<td>09:00 Holistic friction optimization of transmissions – a significant contribution to sustainability</td>
<td>Gear typical fault modeling and fault signal characteristics analysis</td>
<td>Investigation of the meshing friction heat generation of worm gears and the influence of the contact shape</td>
</tr>
<tr>
<td>• Universal friction model for bearings and gears</td>
<td>• Gear typical fault modeling</td>
<td>• Transient thermal behaviour among different pinion machine-setting parameters</td>
</tr>
<tr>
<td>• Friction reduction in transmissions with an optimization algorithm</td>
<td>• Analysis of gear fault characteristic signal</td>
<td>• Influence of worm gear contact pattern on heat generation</td>
</tr>
<tr>
<td>Philipp Rödel, M. Sc., Senior Specialist – Engineering Methods, Dipl.-Ing. Roland Spieler, Expert – Engineering Methods &amp; Tool Development, R&amp;D Analysis Tools &amp; Methods Development, Schaeffler Technologies AG &amp; Co. KG, Schweinfurt; Dipl.-Technomat. Tobias Nüßl, Senior Specialist Engineering Methods &amp; Tools Development, R&amp;D Analysis Tools for Digital Services, Schaeffler Technologies AG &amp; Co. KG, Herzogenaurach, Germany</td>
<td>Wenjin Bei, M. Sc., Prof. Hui Liu, Professor, Pu Gao, Ph. D., Research Assistant, School of Mechanical Engineering, Beijing Institute of Technology, Beijing, China</td>
<td>Prof. Dr.-Ing. Aleksandar Miltenović, Professor, Department for mechanical design, development and engineering, Prof. Dr.-Ing. Milan Banić; Faculty of Mechanical Engineering, University of Niš, Serbia</td>
</tr>
<tr>
<td>09:30 Coefficient of friction behavior of gear oils and significance for the meshing process of spur gears</td>
<td>Automation of gearbox design</td>
<td>Scuffing load capacity calculation of worm gears</td>
</tr>
<tr>
<td>• Base oil and type of VI improver determine friction</td>
<td>• Automation through knowledge-based shaft design and load capacity calculation</td>
<td>• Contact temperature calculation</td>
</tr>
<tr>
<td>• Low friction leads to lower noise emissions of the gearbox</td>
<td>• Automated selection of suitable machine elements in gearbox design</td>
<td>• Safety factor determination</td>
</tr>
<tr>
<td>Dr.-Ing. Axel Baumann, Head of Application Support, Instrumentation and Test Systems, AVL Deutschland GmbH, Mainz-Kastel, Germany</td>
<td>Marius Forst, M. Sc., Research Associate, Institute of Machine Elements, Gear Research Centre (FZG), Technical University of Munich (TUM), Garching, Germany</td>
<td>Philipp Roth, M. Sc., Team Leader Worm Gears, Dr. Michael Hein, Department Head Worm and Bevel Gears, Prof. Dr.-Ing. Karsten Stahl, Full Professor, Institute of Machine Elements, Director, Gear Research Centre (FZG), Technical University of Munich (TUM), Garching, Germany</td>
</tr>
</tbody>
</table>

10:00 Coffee break – meet & greet in the exhibition area, poster presentation area and GearArena

3rd Conference day
Friday, September 17th, 2021
11:00 A comprehensive, fully parametrized calculation model for improved helical-hypoid gearbox efficiency
- Automated multi-parameter sensitivity study via digital twin
- Enhanced efficiency and life span for a modular gearbox system

Dipl.-Ing. (FH) Ermmat Lamaj, M. Sc., Computational Engineer, Dipl.-Ing. (FH) Jens Blömeke, Development Engineer, Dipl.-Ing. Felix Rudolph, Development Engineer, Development Gear Units, SEW-Eurodrive GmbH & Co. KG, Bruchsal, Germany

11:30 Sustainable and multi-criterion optimization of helical gear unit
- Study of the impact of taking the complete transmission in two approaches
- Macro and micro-geometry parameters used as decision variables

Dipl.-Ing. Emma Ben Younes, LaMCoS, INSA-Institut National des Sciences Appliquées de Lyon, Villeurbanne, Cedex, France; Prof. Dr.-Ing. Christophe Changenet, Research and R&D director, ECAM, Lyon, Dr.-Ing. Emmanuel Rigaud, Associate Professor, LTDS – Laboratoire de Tribologie et Dynamique des Systemes, Ecole Central de Lyon, France

12:00 Gear design optimization for multi-mesh and multi-power flow transmissions under a broad torque range incorporated with multi-body simulations
- Complex gear train system design optimization with a wide range of torques
- Multi-body simulation for accurate gear contact analysis

Daehyun Park, Ph. D., Research Engineer Advanced, Gear Train System Design and Analysis, Tommaso Tammarozzi, Ph. D., Senior Research Engineer, Siemens Industry Software NV, Leuven, Belgium; Yeohyeon Gwon, M. Sc., Senior Research Engineer, DCT Development, Hyundai Motor Company, Gyeonggi-Do, Korea

12:30 Closing remarks

12:45 Awarding of the best presentation for junior engineers by Prof. Dr.-Ing. Karsten Stahl, FZG, Technical University of Munich (TUM), Garching, Germany

Awarding of the best paper by Dr.-Ing. Franz Völkel, Sr. Vice President R&D, Business Division Transmission Systems, Schaeffler Technologies AG & Co. KG, Herzogenaurach, Germany

14:15 End of the conference
The Gear Research Centre (FZG) of the Technical University of Munich has comprehensive facilities for examination and testing of machine elements, such as gears, bearings, synchronizations and couplings. Based on the research results developed here during the past decades, FZG is the leading international research institute for gears and transmissions today. Development and validation of methods and tools of reliable determination of fatigue life, efficiency, and vibration characteristics of gears and transmission elements are in focus of research activities at FZG. Implementation of the research is carried out in close cooperation with industry and standardization organizations, funded either through public research grants or industrial collective and contract research.
<table>
<thead>
<tr>
<th>Poster Exhibition</th>
</tr>
</thead>
</table>
| **P1** Computation of dynamic transmission error for gear transmission systems using modal decomposition and Fourier series  
*Eddy Abboud, M. Sc.*, LISPEN, Arts et Métiers Institute of Technology, Lille Cedex, France |
| **P2** Integrated optimization of structural and control parameters for a hybrid electric system  
*Lin Bo, B. E.*, School of Mechanical Engineering, Beijing Institute of Technology, China |
| **P3** Efficiency improvement and surface protection by using particle-based pyrophosphate-additive  
*Dr. rer. nat. Petr Chizhik*, Lead Application Scientist, Rewitec GmbH (CRODA International PLC.), Lahnau, Germany |
| **P4** An approach on contact analysis for micro geometry optimization of the gear unit HypoGear  
*Florian Eigner, M. Sc.*, Professor Montage- and Handhabungstechnik (MHT), Institut für Füge- und Montagetechnik (IFMT), Technische Universität Chemnitz, Germany |
| **P5** Material database for the mechanical design of components made of powder metallurgy material  
*Miao Jiacheng, M. Sc.*, State Key Laboratory of Mechanical Transmission, Chongqing University, China |
| **P6** Plastic gear remaining useful life prediction using artificial neural network  
*Bui Huy Kien, M. Sc.*, Faculty of Mechanical Engineering, Kyoto Institute of Technology, Japan |
| **P7** Tooth root fillet optimization of cylindrical gear  
*Egor Kozharinov, Ph. D.*, Head of group, Strength, resource and optimal design of aviation drives, Central Institute of Aviation Motors (CIAM), Moscow, Russia |
| **P8** Online high resolution wear measurement – a powerful tool for the analysis of initial stages of wear  
*Dr.-Ing. Dominic Linsler*, Deputy group leader, Mikrotribologie Centrum µTC, Fraunhofer Institute for Mechanics of Materials IWM, Karlsruhe, Germany |
| **P9** Research into the optimization of tooth profile modification based on a high precision three-dimensional finite element model of helical gears  
*Dr. Yanping Liu*, Research Assistant, College of Mining and Safety Engineering, Shandong University of Science and Technology, Qingdao, China |
| **P10** Quality inspection of common step gearings – overview of different types and their assessment  
*Dr.-Ing. Karsten Lübke*, Software development special geometries, Hexagon Metrology GmbH, Wetzlar, Germany |
| **P11** Calculating component temperatures in gearboxes for transient operation conditions  
*Constantin Paschold, M. Sc.*, Research Associate, Department EHL-Tribological-Contact and Efficiency, Institute of Machine Elements, Gear Research Centre (FZG), Technical University of Munich (TUM), Garching |
| **P12** Relationship between cumulative stress during running-in process and pitching fatigue life  
*Masaru Nakao*, Bachelor of Engineering, Tokyo Institute of Technology, Department of Mechanical Engineering, School of Engineering, Tokyo, Japan |
| **P13** Effect of wear on load ratio during the running-in process  
*Josí Ayu Wulandari Pratama*, Bachelor of Engineering, Tokyo Institute of Technology, Department of Mechanical Engineering, School of Engineering, Tokyo, Japan |
| **P14** Light in the Black Box: identifying unknown mechanisms of action with AI software and solving acoustic/NVH problems of the gears – practical example of car power train  
*Dipl.-Ing. (FH) Frank Thurner*, Managing Director, Management, Lean Six Sigma Master Black Belt, mts Consulting & Engineering GmbH, Fürstenfeldbruck, Germany |
| **P15** Advanced method of cutting spiraloid, worm and bevel gear-wheel teeth by running cutter head double-stage gearboxes for pipeline valves  
*Evgeniy Trubachev, D. Sc.*, Professor, Institute of Mechanics, Kalashnikov Izhevsk State Technical University, & Head, Small Innovative Enterprise “Mechanic” Ltd, Izhevsk, Russia |
| **P16** Dynamic analysis of a gear-shaft system with the distributed parameter shaft  
*Zhen Wang, M. Sc.*, School of Mechanical Engineering, Beijing Institute of Technology, China |
| **P17** The influence of thermal deformation on spur gear dynamic modification  
*Pengfei Yan, M. Sc.*, School of Mechanical Engineering, Beijing Institute of Technology, China |
| **P18** Coupling analysis of control parameters and mechanical parameters in torsional vibration of electro-mechanical transmission  
*Wei Zhang, M. Sc.*, School of Mechanical Engineering, Beijing Institute of Technology, China |
| **P19** Vibration characteristics of gear system with a cracked gear tooth: modelling and experiments  
*Songtao Zhao, M. Eng.*, Development Engineer, School of Aerospace Engineering and Applied Mechanics, Tongji University, Shanghai, China |
| **P20** Thermal deformation characteristic of gear hobbing based on multivariable integrated model  
*Zheyu Li, B. Eng.*, State Key Laboratory of Mechanical Transmission, Chongqing University, China |
| **P21** Design method for global properties of point-contact tooth surface based on envelope-approximation theory  
*Prof. Kaikong Zhou, Ph. D.*, Professor, Engineering Mechanics, Mechanical transmission, Robot and CNC Manufacture Technology for Sculptured Surface, College of Mechanical and Control Engineering, Guilin University of Technology, China |
| **P22** Research into tooth flank twist compensation in continuously generating grinding gear based on a flexible electronic gearbox  
*Lei Zhou*, Research Center, School of Mechanical Engineering, Hefei University of Technology, China |
4th International Conference on Gear Production 2021
September 15 - 17, 2021, Garching/Munich, Germany

Key topics:
• Increasing productivity in gear skiving
• Higher tool life for hard finishing processes
• Improved gear-quality inspection
• Methods for designing and manufacturing face, bevel and worm gears
• Improved tribo system within the manufacturing process
• Enhanced simulation methods for improving the gear manufacturing process

Presidency:
Prof. Dr.-Ing. Christian Brecher, Full Professor, Chair of Machine Tools, Laboratory for Machine Tools and Production Engineering (WZL), RWTH Aachen University, Germany
Prof. Dr.-Ing. Karsten Stahl, Full Professor, Institute of Machine Elements, Director, Gear Research Centre (FZG), Technical University of Munich (TUM), Garching, Germany

With experts from:
Applied Nano Surfaces Sweden | Balance Drive | Georgii Kobold | Gleason Corporation | Hexagon Metrology | Involute Simulation Softwares | Mitsubishi Heavy Industries Machine Tool | OTTO FUCHS Dülken | Physikalisch-Technische Bundesanstalt | SEW-Eurodrive

Further details and the final program can be found here:
www.vdiconference.com/02TA411021

Free of charge for participants of the “International Conference on Gears 2021”

4th International Conference on High Performance Plastic Gears 2021
September 15 - 17, 2021, Garching/Munich, Germany

Key topics:
• Latest developments for the enhanced performance of plastic gears
• Status and future of standardized plastic gear strength calculation
• High performance plastic gear applications
• Potential of composite gears with fiber reinforcement
• Lubrication and tribology of plastic gears

Presidency:
Prof. Dr.-Ing. Karsten Stahl, Full Professor, Institute of Machine Elements, Director, Gear Research Centre (FZG), Technical University of Munich (TUM), Garching, Germany

Conference Board:
Dr.-Ing. Marco Baccalaro, Chassis Systems Control, Gear Development and Test Conception/Realization, Robert Bosch GmbH, Heilbronn, Germany
Dipl.-Ing. Klemens Humm, Manager Gear Development, Corporate Research and Development, ZF Friedrichshafen AG, Friedrichshafen, Germany
Dr.-Ing. Ulrich Kissling, President, KISSsoft AG, Bubikon, Switzerland
Dr.-Ing. Andreas Langheinrich, Development Drive Technology, Horst Scholz GmbH & Co. KG, Kronach, Germany

With experts from:

Further details and the final program can be found here:
www.vdiconference.com/02TA409021
GearArena

Gather hands-on experience in the transmission world!
Take a look at individual gear components, gain an insight into how the different components interact and compare design and workmanship! You will find an on-site contact person from the exhibitor to answer all your questions.

FZG lab tours

Get the chance to visit innovative laboratory facilities!
Seize the opportunity and visit the nearby test and laboratory facilities at the Gear Research Centre (FZG). Several guided tours with different core topics offer opportunities of gaining deeper insights into a variety of innovative gear test rigs and laboratory equipment. For registration meet at the FZG information desk during the conference.

Speakers meet up

Do you still have unresolved questions?
You can address your questions to the speakers right after the lecture during the coffee break. Take the chance to say hello to your favorite speaker and to connect with them. They will be available for at least 15 minutes after their session.

Two gear community nights

Your networking hotspot for the international gear community!
Enjoy the evening reception at the Hofbräuhaus as well as another social event on the second conference day at the university. The Hofbräuhaus is the cradle of Bavarian tavern culture – the origin of tradition, “Gemütlichkeit” and hospitality. Both – the get-together at the FZG and the brewery visit – offer you an excellent opportunity to network with your peers and catch up on trends.
Presidency

Conference president
Prof. Dr.-Ing. Karsten Stahl, Full Professor, Institute of Machine Elements, Director, Gear Research Centre (FZG), Technical University of Munich (TUM), Garching, Germany

Conference Board/Vice President:
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), Technical University of Munich (TUM), Garching, Germany

Dr.-Ing. Burkhard Pinnekamp, Head of Central Technology, Renk GmbH, Augsburg; President, Research Association for Drive Technology (FVA), Frankfurt, Germany

Board of Gear Excellence

Ir. J.J. Bos, Technical Consultant, Bos Gear Solutions, Middelburg, The Netherlands
Prof. Dr. Eng. Jože Duhovnik, Full Professor, former Dean and Head of LECAD Group, Laboratory, Faculty for Mechanical, Engineering, University of Ljubljana, Slovenia
Prof. Dr.-Ing. Manfred Hirt, Past President, Research Association for Drive Technology (FVA), Frankfurt/Main; former board of Renk GmbH, Augsburg, Germany
Prof. Haruo Houjoh, Emeritus Professor, Tokyo Institute of Technology, Japan
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. Michel Octtrue, former Senior Gear Expert Mechanical Power Transmissions, CETIM (Technical Center for Mechanical Engineering Industries), Senlis, France
Prof. Ray Snidle, Emeritus Professor of Mechanical Engineering, Cardiff University, United Kingdom
Dr.-Ing. Toni Weiss, Gear Consultant, ret. from Renk GmbH, Augsburg, now GanaCon – Gear analysis and Consulting, Ingling, Germany

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 Arnoldscheidt, Head of Dynamic and Duty Cycle Simulation, Volkswagen AG, Wolfsburg
Dr.-Ing. Jörg Börner, Gear Fundamentals & Programs, Mechatronics Engineering & Technologies, 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. Ralf Döbereiner, Product Line Manager Commercial Vehicles, AVL List GmbH, Graz, Austria
Dr.-Ing. Hartmut Faust, Head of R&D Competence. Schaeffler Automotive Buehl GmbH & Co. KG, Bühl
Dipl.-Ing. (FH) Hans-Peter Fleischmann, Manager Technical Development Dual-Clutch Transmissions and Advanced Development Transmission, AUDI AG, Ingolstadt
Dr.-Ing. Carsten Gitt, Senior Manager, Simulation/Mechatronics/Advanced Engineering (Drivetrain/Transmission), Mercedes-Benz AG, Stuttgart
Dipl.-Ing. Norbert Haefke, Managing Director, Research Association for Drive Technology (FVA), Frankfurt/Main
Dipl.-Ing. Christian Hartmann, Senior Manager Gear Design & Material, Magna PT B.V. & Co. KG, Unterguppenbach, Germany
Dr.-Ing. Jörg Hermes, Managing Director, Innovation Mechanics, SEW-Eurodrive GmbH & Co. KG, Bruchsal
Dr.-Ing. Ralf Hess, Senior Key Expert, Flender GmbH, Bocholt
Prof. Dr.-Ing. Georg Jacobs, Head of Institute for Machine Elements and Systems Engineering, RWTH Aachen University
Dr.-Ing. Andreas Klein, Vice President Engineering, Flender GmbH – Winergy, Voerde
Dr.-Ing. Kai Lubenow, Director Engineering, Eickhoff Antriebstechnik GmbH, Bochum
Prof. Dr.-Ing. Gerhard Poll, Director, Institute for Machine Design and Tribology, Leibniz University Hannover
Dipl.-Ing. Zsolt Roth, Development Engineer – Toothyng, J. M. Voith SE & Co. KG | VTA, Heidenheim
Prof. Dr.-Ing. Bernd Sauer, Full Professor, Head of MEGT – Institute of Machine Elements, Gears and Transmission, Department of Mechanical and Process Engineering, Technische Universität 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
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, Aschheim
Dr.-Ing. Franz Völkel, Sr. Vice President R&D, Business Division Transmission Systems, Schaeffler Technologies AG & Co. KG, Herzogenaurach
Dr.-Ing. Reiner Vonderschmidt, Shareholder, Georgii Kobold GmbH & Co. KG, Horb
International Members

Eng. Amir Aboutaleb, Vice President, Technical Division, American Gear Manufacturers Association, Alexandria, USA

Luc Amar, Ph. D., Research Engineer, Power Transmissions (TDP), CETIM (Technical Center for Mechanical Engineering Industries), Senlis Cedex, France

Prof. Bingkui Chen, The State Key Lab of Mechanical Transmissions, Chongqing University, China

Prof. Ing. Carlo Gorla, Associate Professor, Department of Mechanical Engineering, Politecnico di Milano, Italy

Prof. Ahmet Kahraman, Howard D. Winbigler Professor and Director, Gear and Power Transmission Research Laboratory, Department of Mechanical and Aerospace Engineering, The Ohio State University, Columbus, USA

Dr.-Ing. Alex Kapelevich, Consultant, AKGears, LLC, Shoreview, Minnesota, USA

Prof. Dr. Geng Liu, Full Professor, School of Mechanical Engineering, Northwestern Polytechnical University; Director, Shaanxi Engineering Laboratory for Transmissions and Controls, Xi’an, China

Prof. Dr.-Ing. Athanassios Mihailidis, Full Professor, Head of the School of Mechanical Engineering, Laboratory of Machine Elements and Machine Design, Aristotle University of Thessaloniki, Greece

Prof. Dr.-Ing. Aleksandar Miltenović, Professor, Department for mechanical design, development and engineering, Faculty of Mechanical Engineering, University of Niš, Serbia

Prof. Dr. Eng. Ichiro Moriwaki, Professor, Faculty of Mechanical Engineering, Kyoto Institute of Technology, Kyoto, Japan

Robin Olson, M. Sc., Director of Applications Engineering, Material Handling Vertical, Rexnord Industries, LLC, Milwaukee, Wisconsin, USA

Prof. Dr.-Ing. José I. Pedrero, Full Professor, Department of Mechanics, Faculty of Engineering, Universidad Nacional de Educacion a Distancia (UNED), Madrid, Spain

Prof. Dr. Datong Qin, Full Professor of the State Key Lab of Mechanical Transmission, Distinguished Professor of Cheung Kong Scholars appointed by Ministry of Education of China, Director of the Institute of Power Transmission and control, Chongqing University, China

Prof. Dr.-Ing. Philippe Velex, Full Professor, LaMCoS, INSA – Institut National des Sciences Appliquées de Lyon, Villeurbanne Cédex, France

Prof. Wenzhong Wang, School of Mechanical Engineering, Beijing Institute of Technology, China

Prof. Dr.-Ing. Michael Weigand, Full Professor and Head of Research Unit – Institute for Engineering Design and Product Development (IKP), Research Unit Machine Elements and Transmissions for Aviation, TU Wien, Vienna, Austria

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

The Event App

Plan your visit in advance and get to know all the details of the International Conference on Gears 2021!

Make use of this full-service app for your visit to the International Conference on Gears 2021 – 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 offers you.
**Become an exhibitor or sponsor!**

Would you like to get face to face with the high-powered delegates attending this VDI conference and present your products and services to a specialist sector of your market? For an optimum presentation of your company, make use of the exhibition held in parallel with the conference.

Here you can meet industry decisionmakers – make your target contacts neatly and without a great deal of organisational outlay. Secure your stand space right at the heart of this industry rendezvous and/or use a sponsorship package specially tailored to your requirements to enable you to stand out more clearly and effectively from your competitors. We can supply you with exclusive communication possibilities before, during and after the event.

**Your contact person:**
Vanessa Ulbrich
Project Consultant Exhibition & Sponsorship
VDI Wissensforum GmbH
VDI-Platz 1
40468 Düsseldorf, Germany

Phone: +49 211 6214-918
Fax: +49 211 6214-97918
Email: ulbrich@vdi.de

---

**List of exhibitors**
(May 2021)

ELTRO Gesellschaft
Evonik Operations GmbH
FRENCO GmbH
GEORGII KOBOLD GmbH & Co. KG
IMS Gear SE & Co. KGaA
KISSsoft AG
Metal Improvement Company Inc.
SMT
Telemetrie Elektronik GmbH

---

**The participants – your customers**

<table>
<thead>
<tr>
<th>Function</th>
<th>Attendance 2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experts</td>
<td>46%</td>
</tr>
<tr>
<td>Research and Development</td>
<td>40%</td>
</tr>
<tr>
<td>Project manager</td>
<td>25%</td>
</tr>
<tr>
<td>University/research institutions</td>
<td>18%</td>
</tr>
<tr>
<td>Production engineer</td>
<td>17%</td>
</tr>
<tr>
<td>Construction and development</td>
<td>17%</td>
</tr>
<tr>
<td>Project management</td>
<td>7%</td>
</tr>
<tr>
<td>Production</td>
<td>9%</td>
</tr>
<tr>
<td>Sales</td>
<td>9%</td>
</tr>
<tr>
<td>Others</td>
<td>7%</td>
</tr>
<tr>
<td>Others</td>
<td>7%</td>
</tr>
</tbody>
</table>
Postponed - New date: September 12th to 14th, 2022

Please register for (price per person plus VAT):

<table>
<thead>
<tr>
<th>International Conference on Gears 2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>September 15 - 17, 2021, Garching near Munich, Germany</td>
</tr>
</tbody>
</table>

☐ Early bird price until July 1st, 2021
EUR 1,490.-

☐ From July 2nd, 2021
EUR 1,590.-

☐ Participation fee for personal VDI members and members of associated organisations of the International Conference on Gears 2021
save EUR 50.- each conference day
VDI membership no.*:_____________________________________

* For this price category, please state your VDI membership number or the name of the associated organisation (outlined at the homepage www.vdi-gears.eu)

☐ I'm interested in sponsoring and/or the exhibition

General terms and conditions of VDI Wissensforum can be found online at:
www.vdi-wissensforum.de/en/terms-and-conditions/

Venue:
Conference: Technische Universität München (Technical University of Munich), Institute of Machine Elements, Gear Research Centre (FZG), Boltzmannstraße 15, 85748 Garching, Germany,
www.mw.tum.de/en/fzg/home/

Hotel Reservation: A limited number of rooms have been reserved for conference participants. For booking please visit www.vdi-gears.eu where you will find a link for special room rates.

www.vdi-wissensforum.de/hrs

Information:
The price includes conference documents (e-book), coffee breaks, and beverages during breaks, lunches and two evening receptions.

Exclusive offer:
All participants at this event are entitled to a free three-month trial VDI membership. (Offer applies exclusively to new members.)

Data protection:
VDI Wissensforum GmbH uses the email address you have provided to regularly inform you about similar VDI Wissensforum GmbH events. If you would no longer like to receive any information or offers, you can object to your data being used for this purpose at any time. To do so, use the following email address wissensforum@vdi.de or one of the other contact possibilities mentioned above.

We would like to make you aware of general information about the usage of your data here:
https://www.vdi-wissensforum.de/en/privacy-policy/

We hereby agree to VDI's terms and conditions and confirm that the data I have provided to register above is correct.

Your contact data was obtained based on article 6, paragraph, sentence 1 lit. f) DSGVO (legitimate interest).
Our legitimate interest is to select a precise selection of possible interested parties for our events. You can get more information about the source and usage of your data here:
https://www.vdi-wissensforum.de/en/source-of-address/

You need help? Please contact us!
Phone: +49 211 6214-201
Fax: +49 211 6214-154
Email: wissensforum@vdi.de
www.vdi-gears.eu

First Name ___________________________________ Last Name (Family Name) ________________
Title ________________________________________ VAT-ID ________________________________
Company/Institute ____________________________ Job Title ______________________________
Department _____________________________________
Street ________________________________________________________________________________
ZIP Code, City, Country ______________________________
Phone ________________________________ Email ________________________________ Fax __________________
Deviating bill address ____________________________________________________________

Deviating bill address outside of Austria, Germany and Switzerland are kindly requested to pay by credit card. Please don't send your credit card details via email, fax or post. Please book your ticket at www.vdi-gears.eu. Transferring your credit card details via our website ensures your details are encrypted and security of your data is guaranteed.

www.vdi-gears.eu