Key topics:

- Sustainable gears with reduced carbon footprint and increased efficiency
- Optimization of gear design and geometry
- New test methods for endurance, efficiency and NVH behavior
- Numerical methods and multiscale simulation tools to improve gear performance
- Smart gears for condition monitoring systems and additional functions
- Life cycle assessment of geared drive systems

Associated organisations:

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

Visit parallel conferences free of charge

Gear Production 2023
www.vdi-wissensforum.de/02TA411023

High Performance Plastic Gears 2023
www.vdiconference.com/02TA409023

An event organized by VDI Wissensforum
www.vdi-gears.eu
# Program overview

## International Conference on Gears and parallel conferences

### 1st Conference day

**Wednesday, September 13th, 2023**

#### Plenary lectures

- **08:15** Registration

- **09:30** Common welcome and opening of the conferences:
  - International Conference on Gears 2023
  - International Conference on High Performance Plastic Gears 2023
  - International Conference on Gear Production 2023
  - **Prof. Dr.-Ing. Karsten Stahl**, Full Professor, Institute of Machine Elements, Director, Gear Research Center (FZG), TUM School of Engineering and Design, Technical University of Munich, Garching, Germany

- **09:55** Welcome address by:
  - **Prof. Dr. sc. tech. Gerhard Kramer**, Senior Vice President Research and Innovation, TUM School of Engineering and Design, Technical University of Munich, Garching, Germany
  - **Prof. Dr.-Ing. Birgit Vogel-Heuser**, Vice Dean Research and Innovation TUM School of Engineering and Design, Chair of Automation and Information Systems, Technical University of Munich, 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** Keynote session: Re-X: Recycle | Reuse | Reduce
  - **From why to how: It is time for sustainability to move from the executive agenda into the real world**
  - **Dominik Leisinger**, EMBA, Partner & Europe Lead Product Excellence (PERLab), A.T. Kearney (International) AG, Zurich, Switzerland
  - **The need for global standards to define CO2, footprint in product specifications**
  - **Erik Claesson**, M. Sc., Director, Automotive Segment & Group Business Intelligence, Ovako AB, Hofors, Sweden
  - **Refurbishing tracked vehicle transmissions**
  - **Dr.-Ing. Burkhard Pinnekamp**, Head of Central Technology, Sebastian Schießler, M. Eng., Head of Repair, Vehicle Mobility Solutions, RENK GmbH, Augsburg, Germany
  - **Increasing air travel and the challenges to reduce emissions**
  - **Dr.-Ing. David Krüger**, Design Engineer, R&T Project Manager, Transmissions, Rolls-Royce Deutschland Ltd & Co. KG, Blankenfelde-Mahlow, Germany
  - **Efficiency-improvement with low-loss-gears by two different applications**
  - **Prof. i.R. Dr.-Ing. Dr. h.c. Bernd-Robert Höhn**, TUM emeritus of excellence, Michael Geitner, M. Sc., Research Associate, Institute of Machine Elements, Gear Research Center (FZG), TUM School of Engineering and Design, Technical University of Munich, Garching, Germany

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

### Parallel sessions

#### International Conference on Gears

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>13:30</td>
<td>Tooth root load &amp; carrying capacity</td>
</tr>
<tr>
<td>15:00</td>
<td>Coffee break – meet &amp; greet in the exhibition area, poster presentation area and GearArea</td>
</tr>
<tr>
<td>16:00</td>
<td>Damage detection</td>
</tr>
<tr>
<td>17:30</td>
<td>Evening reception at the university</td>
</tr>
</tbody>
</table>

#### Parallel conferences

- **Parallel conferences** – free of charge –
  - **International Conference on Plastic Gears**
  - [www.vdi-wissensforum.de/02TA409023](http://www.vdi-wissensforum.de/02TA409023)
  - **International Conference on Gear Production**
  - [www.vdi-wissensforum.de/02TA411023](http://www.vdi-wissensforum.de/02TA411023)
  - **Lecture Room E**
  - **Innovations in gear production**
  - **Lecture Room B**
  - **Efficiency and friction**
  - **Lecture Room D**
  - **Tooth root strength**
  - **Lecture Room C**
  - **Sustainability**
  - **Lecture Room F**
  - **Software in gear production**

**With digital polls during the speeches**
## Program overview

### 2nd Conference day
**Thursday, September 14th, 2023**

<table>
<thead>
<tr>
<th>Lecture Room A</th>
<th>Lecture Room B</th>
<th>Lecture Room C</th>
<th>Lecture Room D</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:30 Load capacity</td>
<td>08:30 Planetary gears: Simulation and lubrication</td>
<td>08:30 Efficiency: Gearbox</td>
<td>08:30 Fibre reinforcement</td>
</tr>
<tr>
<td>10:00 Coffee break</td>
<td>10:00 CFD: Applications</td>
<td>10:00 Bevel and hypoid gears</td>
<td>10:00 NVH</td>
</tr>
<tr>
<td>11:00 Planetary gears: NVH</td>
<td>11:00 Planetary gears: Design</td>
<td>11:00 Strength: Bevel, hypoid &amp; worm gears</td>
<td>11:00 NVH</td>
</tr>
<tr>
<td>12:30 Time for Working lunch</td>
<td>12:30 NVH: Analysis</td>
<td>12:30 Design geometry</td>
<td>12:30 Gear geometry and calculation</td>
</tr>
<tr>
<td>15:30 Coffee break</td>
<td>15:30 Tooth flank load capacity</td>
<td>15:30 End of the lectures</td>
<td>15:30 Coffee break</td>
</tr>
<tr>
<td>16:30 Design, application, standardization</td>
<td>16:30 NVH: Analysis</td>
<td>16:30 End of the lectures</td>
<td>16:30 Coffee break</td>
</tr>
<tr>
<td>18:00 End of the lectures</td>
<td>18:00 End of the lectures</td>
<td>18:00 Dinner Speech: Dr.-Ing. Bernhard Bouché</td>
<td>18:00 End of the conferences</td>
</tr>
<tr>
<td>18:05 Switch to the plenary session</td>
<td>18:05 Dinner Speech: Dr.-Ing. Bernhard Bouché</td>
<td>18:05 Dinner Speech: Dr.-Ing. Bernhard Bouché</td>
<td>18:05 End of the conferences</td>
</tr>
<tr>
<td>18:45 Organized bus transfer to the evening reception</td>
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<td>18:45 End of the conferences</td>
</tr>
<tr>
<td>19:30 Evening reception at the “Löwenbräukeller” in Munich</td>
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<td>19:30 End of the conferences</td>
</tr>
</tbody>
</table>

### 3rd Conference day
**Friday, September 15th, 2023**

<table>
<thead>
<tr>
<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 Planetary gears: Load distribution</td>
<td>08:30 Smart gears</td>
<td>08:30 Efficiency and friction</td>
<td>08:30 Performance and validation of plastic gears</td>
<td>08:30 Sustainability and surface integrity</td>
</tr>
<tr>
<td>10:00 Coffee break</td>
<td>10:00 Load capacity</td>
<td>10:00 Digitalization of the product development process</td>
<td>10:00 Tribology and thermal behavior</td>
<td>10:00 Manufacturing processes</td>
</tr>
<tr>
<td>11:00 Closing remarks</td>
<td>11:00 NVH</td>
<td>11:00 Digitalization of the product development process</td>
<td>11:00 Tribology and thermal behavior</td>
<td>11:00 Manufacturing processes</td>
</tr>
<tr>
<td>12:30 Awarding of the best presentation for young engineers</td>
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</tr>
<tr>
<td>14:15 End of the conferences</td>
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</tr>
</tbody>
</table>

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Europe invites the world!
1st Conference day
Wednesday, September 13th, 2023

08:15 Registration

09:30 Common welcome and opening of the conference
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  Prof. Dr.-Ing. Karsten Stahl, Full Professor, Institute of Machine Elements, Director, Gear Research Center (FZG), TUM School of Engineering and Design, Technical University of Munich, Garching, Germany

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- Prof. Dr. sc. tech. Gerhard Kramer, Senior Vice President Research and Innovation, TUM School of Engineering and Design, Technical University of Munich, Garching, Germany
- Prof. Dr.-Ing. Birgit Vogel-Heuser, Vice Dean Research and Innovation TUM School of Engineering and Design, Chair of Automation and Information Systems, Technical University of Munich, Garching, Germany

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- 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: Re-X: Recycle | Reuse | Reduce
Moderation: Prof. Dr.-Ing. Karsten Stahl, (FZG), TUM School of Engineering and Design, Technical University of Munich, Garching, Germany

- From why to how: It is time for sustainability to move from the executive agenda into the real world
  Dominik Leisinger, EMBA, Partner & Europe Lead Product Excellence (PERLab), A. T. Kearney (International) AG, Zurich, Switzerland

- The need for global standards to define CO₂ footprint in product specifications
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- Efficiency-improvement with low-loss-gears by two different applications
  Prof. i.R. Dr.-Ing. Dr. h.c. Bernd-Robert Höhn, TUM emeritus of excellence, Michael Geitner, M. Sc., Research Associate, Institute of Machine Elements, Gear Research Center (FZG), TUM School of Engineering and Design, Technical University of Munich, Garching, Germany

12:00 Time for a working lunch – meet & greet in the exhibition area, poster presentation area and GearArena
13:30 Optimised statistical evaluation for the determination of tooth root endurance strength
- Influence of asymmetrical clamping of a gear in pulsator tests
- Evaluation of the real geometry of test gears
Ahmad Alnahlaui, M. Sc., Research Assistant, Prof. Dr. Ing. Peter Tenberge, Full Professor, Chair of Industrial and Automotive Drivetrains (IFA), Faculty of Mechanical Engineering, Ruhr-University Bochum, Germany

14:00 The consequences of different methodologies for the elaboration of pulsator test results with respect to the load spectrum assessment of Gears
- Statistical analysis of STBF (Single Tooth Bending Fatigue Test) data
- Effect of the curve shape within the framework of load spectrum assessment
Luca Bonaiti, M. Sc., PhD candidate in Mechanical Engineering, Prof. Ing. Carlo Gorla, Associate Professor, Department of Mechanical Engineering, Politecnico di Milano, Italy; Prof. Dr.-Ing. Karsten Stahl, Full Professor, Institute of Machine Elements, Director, Gear Research Center (FZG), TUM School of Engineering and Design, Technical University of Munich, Garching, Germany

14:30 Tooth bending strain rate analysis in a counter shaft drivetrain and implications on fatigue strength
- Dynamic tooth bending strain analysis
- Material fatigue strength behaviour under variable strain rate
Dr. Isaac Hong, Research Assistant Professor, Dr. David Talbot, Assistant Professor; 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 - 15:50 Poster presentation in the poster exhibition area
Program

Lecture Room A

**Damage detection**

**Moderation:** Dr.-Ing. Todor Radev, Volkswagen AG, Germany/
Prof. Dr.-Ing. Philippe Velex, INSA – Institut National des Sciences Appliquées de Lyon, France

- 16:00 Investigation of the electrical behavior of a spur gear stage pair by means of impedance measurements
  - Measuring system for determining the electrical properties
  - First results and behaviors of the impedance of a spur gear
  - Dipl.-Ing. Michael Werneh, Research Assistant, Simon Graf, M. Eng., M. Eng., Research Assistant, Jun. Prof. Dr.-Ing. Manuel Oehler; Junior Professor for Mechanical Drive Technology, Chair of Machine Elements, Gears and Tribology (MEGT), Department of Mechanical and Process Engineering, Rheinland-Pfalzische Technische Universität Kaiserslautern-Landau (RPTU), Kaiserslautern, Germany

- 16:30 Measuring instantaneous angular speed using a gear wheel as material measure to detect pitting damage during an endurance test
  - Influence of the transfer path
  - Comparing different measurement systems
  - Yanik Koch, M. Sc., Research Assistant, Prof. Dr.-Ing. Eckard Kirchner, Director, Institute of Product Development and Machine Elements, Technische Universität Darmstadt; Julian Hirschmann, B. Eng., product engineer vibration analysis, SEW-Eurodrive GmbH, Bruchsal, Germany

- 17:00 Pitting detection for prognostics and health management in gearbox applications
  - Experimental study with predamaged gears
  - All based damage detection
  - Lisa Binanzer, M. Sc., Research Assistant, Drive Technology, et. al, Institute of Machine components (IMA), Universität Stuttgart, Germany

Lecture Room B

**Asymmetric gear geometry**

**Moderation:** Prof. Dr.-Ing. Christian Brecher, RWTH Aachen University, Germany/Dr.-Ing. Reiner Vonderschmidt, Georgii Kobold GmbH & Co. KG, Germany

- 16:00 Design optimization of multi-stage gear trains with asymmetric teeth under a broad range of torques by incorporating multibody simulations
  - Asymmetric gear complex gear train design optimization with a wide range of torques
  - Multibody simulation for accurate gear contact analysis for NVH performance evaluation
  - Daehyun Park, PhD, Senior Research Engineer, Ali Rezayat, PhD, Advanced Research Engineer, Motion Product Development, Siemens Industry Software NV, Leuven, Belgium; Yeohyeon Gwon, M. Sc., Senior Researcher, EV geartrain NVH, Hyundai Motor Company, Gyeonggi-Do, Korea

- 17:00 Comparing the contact characteristics of involute gear/eccentric cycloidal gear calculated by various loaded tooth contact analysis models
  - Compare results of involute gear from different models
  - Propose a new contact analysis approach for EC gears
  - Ling Chiao Chang, M. Sc., Research Associate, Dr.-Ing. Shi-Jeng Tsai, Associate Professor, Department of Mechanical Engineering, National Central University, Taoyuan City, Taiwan; Prof. Dr.-Ing. Karsten Stahl, Full Professor, Institute of Machine Elements, Director, Gear Research Center (FZG), TUM School of Engineering and Design, Technical University of Munich, Garching, Germany

Lecture Room C

**Efficiency and friction**

**Moderation:** Prof. Dr. Eng. Jože Duhovnik, University of Ljubljana, Slovenia/Dr.-Ing. Burkhard Pinnekamp, RENK GmbH, Germany

- 16:00 Gear friction coefficient estimation using directional parameter under ATF lubricated condition
  - Gear frictional properties and the directivities of tooth surfaces
  - Gear friction estimation under ATF lubricated condition
  - Junichi Hongu, Senior Lecturer, Department of Mechanical and Aerospace Engineering, Graduate School of Engineering, Tottori University, Tottori, Japan

- 17:00 Frictional behavior in injection lubricated and loss of lubrication conditions: Twin-disc test experiments and simulations
  - Friction and lubrication gap during high velocity and high-pressure conditions
  - Influence of topography and loading conditions on time of failure during loss of lubrication
  - Dr.mont. Ulrike Cihak-Bayr, Projectmanager, Key Scientist – Material Simulation, Thomas Wopeka, PhD, Senior Scientist for Nanoscale Wear Analysis, Christoph Wintersteiger, PhD, Junior Scientist, AC2T research GmbH, Wiener Neustadt, Austria

- 17:30 End of the first conference day

Get-together

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.
08:30 Crack growth based tooth root life prediction model
- Crack growth based tooth root lifetime prediction model for very high cycle fatigue
- Analysis of influencing factors on tooth root lifetime
  **Johannes Löwenich, M. Sc., Research Associate, Moritz Zalfen, M. Sc.,**
  Group Leader Gear Power Density, 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

09:00 Experimental investigation of the load carrying capacity of beveloid gears with optimized flank topography
- Test bench to test the tooth root load carrying capacity of beveloid gears
- Tooth root load carrying capacity for beveloids with intersecting axes
  **Marius Willecke, M. Sc., Research Assistant, Prof. Dr.-Ing. Christian Brecher, Full Professor, Chair of Machine Tools, 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**

09:30 Statistical study of the mesh load factor of planetary gear transmissions affected by inherent manufacturing errors
- Application of the Monte Carlo method in the analysis of the planetary gear transmissions performance
- Combination of the effects of different manufacturing errors
  **Javier Sanchez-Espiga, PhD, Assistant Professor, Prof. Dr. Fernando Viadero, Full Professor, Prof. Dr. Alonso Fernandez-del-Rincon, Full Professor, Structural and Mechanical Engineering, University of Cantabria, Santander, Spain**

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

10:30 Poster presentations in the poster exhibition area
11:00 Vibration reduction of planetary gear drive using mesh phasing: Modelling and experimental validation
- Conceptual assessment on gears helps improving NVH performance: Gear mesh phasing, suppressing vibrations, operational deflection shapes
- Electric drive unit NVH performance optimization: High speed application, multibody simulation and correlation, evaluation of different planetary designs


11:30 Influence of axis misalignments in stepped planetary gear stages on the excitation behavior – Test rig development and simulative analysis
- Test rig for investigation of axis misalignments
- Multi body simulation of misaligned stepped planetary gears

Christian Westphal, M. Sc., Group Leader Gearbox NVH, Research Assistant, Prof. Dr.-Ing. Christian Brecher, Full Professor, Chair of Machine Tools, Dr.-Ing. Jens Birmmers 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

12:00 Excitation behavior of double helical planetary gear units – Influence of the apex point
- Validation of simulation method by developing and using a back-to-back planetary test rig
- Evaluation of influence of apex point tolerances on excitation behavior by applying the validated simulation method

Dr.-Ing. Uwe Weinberger, M. Sc., Former Gear Research Center (FZG), TUM School of Engineering and Design, Technical University of Munich, Garching, Germany

12:30 Time for a working lunch – meet & greet in the exhibition area, poster presentation area and GearArena

13:00 –

Lecture Room A

Planetary gears: NVH
Moderation: Prof. Ing. Carlo Gorla, Politecnico di Milano, Italy/Dr.-Ing. Benedikt Neubauer, Schaeffler Technologies AG & Co. KG, Germany

13:20 Challenges and possibilities of virtual development of e-axle transmissions
- Optimization of oil flow in early design stages
- Prediction of torque losses due to oil splashing

Michael Reichl, M. Sc., Senior Simulation Engineer, Philipp Lenz, M. Sc, Simulation Engineer, AVL Deutschland GmbH, Munich, Germany

Lecture Room B

CFD: Applications
Moderation: Eng. Amir Aboutaleb, American Gear Manufacturers Association, USA/Prof. Daisuke Iba, Kyoto Institute of Technology, Japan

Latest advancements in the lubrication simulations of geared systems: A technology ready for industrial applications
- Lubrication simulations of gearboxes
- Latest modelling approaches with high computational efficiency

Prof. Dr.-Ing. Franco Concili, PhD, Professor of Machine Design, Head of the Materials Characterization Lab, Faculty of Engineering, Free University of Bozen, Italy

Lecture Room C

Bevel and hypoid gears
Moderation: Prof. Dr.-Ing. Aleksandar Mitrović, University of Niš, Serbia/Dipl.-Ing. Zsolt Roth, J. M. Voith SE & Co. KG | VTA, Germany

The relevance of pinion deflection and twisting for loaded tooth contact analysis of high reduction hypoid gears
- FEA simulations of contact of high reduction hypoid gears
- Influence of twist and bending on the contact pattern of HRHs

Dipl.-Ing. Wolf Wagner, Research Associate, Dr.-Ing. Stefan Schumann, Chief Engineer, Prof. Dr.-Ing. Berthold Schlecht, Full Professor and Head of Institute of Machine Elements and Machine Design, Faculty of Mechanical Science and Engineering, Technische Universität Dresden, Germany

The effect of pinion axial positioning on noise and transmission error of face hobbed and face milled bevel gears
- Results of an experimental campaign performed on bevel gears
- Particular considerations are made with respect to the effect of misalignments

Luca Bonaiti, M. Sc., PhD candidate in Mechanical Engineering, Prof. Dr.-Ing. Paolo Chiarotti, Department of Mechanical Engineering, Prof. Ing. Carlo Gorla, Associate Professor, Department of Mechanical Engineering, Politecnico di Milano, Italy

Exploration of trade-offs between NVH and efficiency in bevel gear design
- Efficiency and NVH optimization
- Pareto front exploration

Eugenio Grabovic, PhD, Assistant Professor, Prof. Ing. Alessio Artoni PhD, Associate Professor, Prof. Ing. Marco Gabiccini PhD, Associate Professor, Department Civil and Industrial Engineering, Università di Pisa, Italy

Poster presentations in the poster exhibition area

13:00 - 13:20
<table>
<thead>
<tr>
<th>Time</th>
<th>Lecture Room A</th>
<th>Lecture Room B</th>
<th>Lecture Room C</th>
</tr>
</thead>
</table>
| 14:00        | Review of different calculation approaches for the mean coefficient of friction in ISO 6336  
  - Analysis of approaches due to origin and validated ranges  
  - Exemplary comparative calculations for various applications  
  niklas blech, m. sc., research associate, dr.-ing. thomas tobie, head of department, load-capacity cylindrical gears, prof. dr.-ing. karsten stahl, full professor, institute of machine elements, director, gear research center (FZG), TUM school of engineering and design, Technical University of Munich, Garching, Germany  | Design and analysis of compound stepped planetary gear drives for better transmission performances  
  - Design rules for compound stepped planetary gear sets  
  - Effects of meshing-phase on transmission performances by LTCA  
  ling chiao chang, m. sc., PhD candidate, dr.-ing. shyi-jeng tsai, associate professor, qi-you zhuang m. sc., PhD candidate, department of mechanical engineering, National Central University Taiwan, Taoyuan City, Taiwan  | Transferability of the scuffing load capacity of gear oils determined on spur gears to hypoid gears  
  - Comparison of test methods  
  - Transferability of test results from spur to hypoid gears  
  alexander drchelsius, m. sc., team leader Bevel gears and lean management, Dr.-Ing. Josef Pellkofer, head of department of Worm gears and Bevel gears, Fatigue life analysis, prof. Dr.-Ing. Karsten Stahl, full professor, Institute of Machine Elements, Director, Gear Research Center (FZG), TUM School of Engineering and Design, Technical University of Munich, Garching, Germany  |
| 14:30        | Forward performance-driven design of gear parameters  
  - Multi-objective optimization design of gear parameters  
  - Universal design method of symmetric and asymmetric gears  
  Prof. changzhao liu, PhD, Associate Professor, Shuxin Chen, Master Student, Prof. Datong Qin, PhD, Professor, State Key Laboratory of Mechanical Transmissions, Chongqing university, China  | Evaluation of the effect of the rim thickness on the root stress cycle of helical planet gears with integrated rollers  
  - Stress analyses of planet-sun and planet-ring models  
  - Finite element modelling considering the rollers rigidity  
  Dr. Ignacio Gonzalez-Perez, Full Professor, Department of Mechanical Engineering, Materials and Manufacturing, Universidad Politecnica de Cartagena, Spain; Alfonso Fuentes-Aznar, Professor, Rochester Institute of Technology, Rochester NY, USA; Jose Calvo-Irisarri, Engineer, Gamesa Energy Transmission S.A., Zamudio, Spain  | Fatigue testing of large sized bevel gears  
  - Novel testing setup capable of fatigue tests with high power and large gears  
  - Proven capability to produce TFF failures in testing environment  
  erikka Virtanen, m. sc., (Tech), Doctoral researcher/PhD Student, Mikko Kanerva, Associate Professor, Faculty of Engineering and Natural Sciences, unit of Material Sciences, research group of Tribology and Machine Elements, Faculty of Engineering and Natural Sciences, Tampere University; Gabor Szanti, M.Sc., (Tech), Engineering and Development Manager, ATA Gears Oy, Tampere, Finland  |
| 15:00        | Analysis of quasi-static mesh characteristics of gear transmission considering system deformation  
  - LTCA method considering system deformation  
  - Coupling characteristics of symmetric and asymmetric systems  
  Prof. dr. geng liu, full professor, dr. jingyi gong, school of mechanical engineering, Northwest Polytechnical university; director; shaanxi engineering laboratory for transmissions and controls, xi’an, china; bing yuan, PhD, associate professor, xi’an technological university, China  | Experimental investigation of moving contact pattern in helical planetary gearboxes  
  - Impact of shaft misalignments on the contact pattern, depending on the carrier rotational position  
  - Tooth root strain and coordinate measurements  
  Marius Furst, M. Sc., Research Associate, Sebastian Sepp, M. Sc., Research Associate, Daniel Schweigert, M. Sc., Research Associate, Dr.-Ing. Michael Otto, Head of department Calculation and Verification of Transmission Systems, Prof. Dr.-Ing. Karsten Stahl, Full Professor, Institute of Machine Elements, Director, Gear Research Center (FZG), TUM School of Engineering and Design, Technical University of Munich, Garching, Germany  | Calculation method for wear of steel-bronze rolling-sliding contacts relating to worm gears  
  - Wear behavior of steel-bronze rolling-sliding contacts  
  - Wear calculation of steel-bronze pairings  
  dipl.-Ing. (FH) Philipp Schnetzer, M. Sc., Research Associate, Dr.-Ing. Josef Pellkofer, Head of Department of Worm gears and Bevel gears, Fatigue life analysis, Prof. Dr.-Ing. Karsten Stahl, Full Professor, Institute of Machine Elements, Director, Gear Research Center (FZG), TUM School of Engineering and Design, Technical University of Munich, Garching, Germany  |
| 15:30        | Coffee break – meet & greet in the exhibition area, poster presentation area and GearArena  |                                                                                   |                                                                                   |
| 15:45 - 16:00| Poster presentations in the poster exhibition area                                                                                           |                                                                                   |                                                                                   |
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International Conference on Gears 2023
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16:30 Scuffing load carrying capacity of high-speed gears with an isotropic superfinished surface
- Scuffing load carrying capacity of high-speed gears
- Improved method to calculate scuffing
Jaacob Vorgerd, M. Sc., Research Assistant, Prof. Dr.-Ing Peter Tenberge, Full Professor, Chair of Industrial and Automotive Drivetrains (IFIA), Faculty of Mechanical Engineering, Ruhr-University Bochum, Germany

17:00 On the testing of flank fracture calculations based on 3D-gears
- Calculation of flank fracture damage with different approaches
- Application of the calculation approaches on three dimensional gears
Dipl.-Ing. Thi Tra My Truong, Research Associate, Prof. Dr.-Ing Stefan Schumann, Chief Engineer, Prof. Dr.-Ing. Berthold Schlecht, Full Professor and Head of Institute of Machine Elements and Machine Design, Faculty of Mechanical Science and Engineering, Technische Universität Dresden, Germany

17:30 White Etching Cracks (WECs) on gears of E-Axle applications
- Premature tooth flank fatigue due to WECs
- Testing of oils concerning WEC-potential
Dipl.-Ing. (FH) Thomas Schmidt, Senior Specialist, Gears, Dr.-Ing. Benedikt Neubauer, Director Gears e-mobility, Schaeffler Technologies AG & Co. KG, Herzogenaurach; Dipl.-Ing. Daniel Merk, Senior Expert Bearing Technology, Validation Industrial, Schaeffler Technologies AG & Co. KG, Schweinfurt, Germany

18:00 End of the lectures
- Switch to the plenary session-

18:05 Dinner speech
What is the taste of gears like?
Dr.-Ing. Bernhard Bouché, Director of Research and Development Mechanics, Getriebebau NORD GmbH & Co. KG, Bargteheide, Germany

18:45 Organized bus transfer to the evening reception
You can look forward to a special evening event. Enhance your personal network and use the informal atmosphere for deeper-going discussions.

19:30 Evening reception at the “Löwenbräukeller” in Munich

Program

Lecture Room A
Tooth flank load capacity
Moderation: Dr.-Ing. Bernhard Bouché, Getriebebau NORD GmbH & Co. KG, Germany
Prof. Bingkui Chen, Chongqing University, China

16:30 Scuffing load carrying capacity of high-speed gears with an isotropic superfinished surface
- Scuffing load carrying capacity of high-speed gears
- Improved method to calculate scuffing
Jaacob Vorgerd, M. Sc., Research Assistant, Prof. Dr.-Ing Peter Tenberge, Full Professor, Chair of Industrial and Automotive Drivetrains (IFIA), Faculty of Mechanical Engineering, Ruhr-University Bochum, Germany

Lecture Room B
NVH: Analysis
Moderation: Dr.-Ing. Alex Kapelevich, AKGears, LLC, USA
Dr.-Ing. Andreas Klein, Flender GmbH – Winergy Voerde, Germany

17:00 On the testing of flank fracture calculations based on 3D-gears
- Calculation of flank fracture damage with different approaches
- Application of the calculation approaches on three dimensional gears
Dipl.-Ing. Thi Tra My Truong, Research Associate, Prof. Dr.-Ing Stefan Schumann, Chief Engineer, Prof. Dr.-Ing. Berthold Schlecht, Full Professor and Head of Institute of Machine Elements and Machine Design, Faculty of Mechanical Science and Engineering, Technische Universität Dresden, Germany

Lecture Room C
Design geometry
Moderation: Dr.-Ing. Johannes König, ZF Friedrichshafen AG, Germany

17:30 White Etching Cracks (WECs) on gears of E-Axle applications
- Premature tooth flank fatigue due to WECs
- Testing of oils concerning WEC-potential
Dipl.-Ing. (FH) Thomas Schmidt, Senior Specialist, Gears, Dr.-Ing. Benedikt Neubauer, Director Gears e-mobility, Schaeffler Technologies AG & Co. KG, Herzogenaurach; Dipl.-Ing. Daniel Merk, Senior Expert Bearing Technology, Validation Industrial, Schaeffler Technologies AG & Co. KG, Schweinfurt, Germany

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Local load capacity analysis for the design of a balanced flank modification for cylindrical gears according to bevel gear procedures
- Influence using Weber-Banaschek, BEM and FEA for the calculation of load distribution and load capacity for cylindrical gears
- Influence of the interaction of cylindrical gears and the overall system on the load distribution
Dipl.-Ing. Frederik Mieth, Software development engineer, Modeling and Simulation, Dipl.-Ing. Dennis Tazir, Software development engineer, FVA GmbH, Frankfurt am Main, Germany

Analysis of new tooth profile design based on the biomimetics principles
- The idea for profile design inspired by nature is presented
- Procedure based on FEA and TCD is explained and implemented
Dr. Ivana Atanassovska, Research Professor, Mathematical Institute of the Serbian Academy of Sciences and Arts (Mathematical Institute SANU), Department of Mechanics; Dr. Dejan Momcilovic, Assistant Research Professor; Institute for material testing IMS, Belgrade, Serbia

Analysis of the tip interference in low gear ratio internal spur gears with profile modification
- A discussion on the influence of the depth of relief on the tip interference in internal gears
- A new methodology to combine modifications of center distance, teeth height, rack shift coefficients and tip relief depths to maximize the contact ratio
Prof. Dr.-Ing. José I. Pedrero, Full Professor, Dr.-Ing. Miguel Pleguezuelos, Associate Professor, Dr.-Ing. Miryam B. Sánchez, Associate Professor, Department of Mechanics Faculty of Engineering, Universidad Nacional de Educación a Distancia (UNED), Madrid, Spain
Planetary gears: Load distribution
Moderation: Prof. Ahmet Kahraman, The Ohio State University, Columbus, USA

08:30 Parametric system simulation of load sharing in planetary gearboxes
- FE simulation of contact behavior in planetary stages to analyse load sharing
- Influence of stiffness of structural components and of misalignments on load sharing
Dipl.-Ing. Jean-André Meis, Head of Technology and Materials, Technology & Innovation, Flender GmbH, Bocholt, Germany

09:00 Mesh load factor in multiple planetary stage gearboxes
- System understanding of a gearbox with 3 planetary stages
- Interaction of planetary stages and those impact on mesh load factor
Abdul Baseer, M. Eng., Simulation Engineer, Dr.-Ing. Björn Bauer, Head of Gearbox Development, Cong Wang, M. Eng., General Manager, DHH Germany GmbH, Bochum, Germany

09:30 Assessing gear mesh misalignment in a helical gear set by transmission error measurements
- Indirect gear flank load distribution assessment
- Gear transmission error versus flank load distribution
Nico De Bie, M. Sc., Gear Technology Engineer, Wim Smet, B. Sc., Gear Expert Engineer, Product Technology, Business Unit Wind Power Technology, Tom Van Der Kemp, B. Sc., Test Engineer, NVH & Loads, ZF Wind Power, Lommel, Belgium

Smart gears
Moderation: Prof. Dr.-Ing. Oliver Koch, Rheinland-Pfalzische Technische Universität Kaiserslautern-Landau (RPTU), Germany/
Prof. Dr. Geng Liu, Northwestern Polytechnical University; Shaanxi Engineering Laboratory for Transmissions and Controls, China

Lecture Room B

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Lecture Room C

Helicopter drive system safety dissertation
- Helicopter gearbox failure detection system design & testing
- Loss of lubricant conditions: design & testing phase
Sergio Sartori, Eng., Head of Analysis & Innovation, Transmission Systems Design & Development, Leonardo SpA, Samarate, Italy

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Efficiency & friction
Moderation: Dr.-Ing. Ralf Möllendorf, Flender GmbH, Germany/
Dr.-Ing. Toni Weiss, Gear Consultant, ret. from RENK GmbH, now GanaCon – Gear analysis and Consulting, Germany

Gearbox efficiency of eDrives: Correlation between measurement and calculation of load-dependent torque losses
- Calculation of gearbox efficiency
- Correlation between measurement and calculation
Dr.-Ing. Mustafa Yılmaz, Development Engineer Gear Design, Gear Development, ZF Friedrichshafen AG, Friedrichshafen, Germany

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

Simulation-based optimization of gear efficiency using thin coatings
- Potential of tooth flank coatings for friction reduction
- Impact of thermo-physical properties of a coating
Dipl.-Ing. Ronny Bellicke, Project Engineer, Prof. Dr.-Ing. Dirk Bartel, CEO, Dr.-Ing. Lars Bobach, Software Developer, Tribotechnologies GmbH, Magdeburg, Germany

Effect of load cycles on return loss and resistance of sensor and antenna circuits printed on plastic gears
- Smart gear system for health monitoring
- Wireless health monitoring during operation
Dr. Daisuke Iba, Professor, Department of Mechanical Engineering, Kyoto Institute of Technology, Kyoto, Japan

Effects of surface engineering on the efficiency of involute helical gears – An experimental investigation
- Modifying gear surface by superfinishing and coating
- Quantifying efficiency gains by surface engineering
Jishan Zhang, PhD, Senior Test Engineer, Design Unit, School of Engineering, Newcastle University, Newcastle upon Tyne, United Kingdom

10:00 Coffee break – meet & greet in the exhibition area, poster presentation area and GearArena
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<th>Time</th>
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<td></td>
<td>Luc Amar, PhD, Research Engineer, Power Transmissions (TDP), CETIM</td>
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<td>(Technical Center for Mechanical Engineering Industries), Senlis Cedex,</td>
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<td>France; Dr.-Ing. Ulrich Kissling, President, KISSsoft AG, Bubikon,</td>
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<td>• Interaction between body stress and dynamic mesh force</td>
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<td>Full Professor, Prof. Dr.-Ing. Philippe Velux, Full Professor, LaMCoS,</td>
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<td>INSA – Institut National des Sciences Appliquées de Lyon, Villeurbanne</td>
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<td>12:00</td>
<td>Development of damage-based accelerated life test code for gearbox</td>
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<td>• Guarantee the mechanical components life within short period of time</td>
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<td>Jung-Ho Park, PhD Student, Biosystems engineering, Seoul National</td>
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<td>University, Seoul, Republic of Korea</td>
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<td>12:30</td>
<td>Closing remarks</td>
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<td>12:45</td>
<td>Awarding of the best presentation for junior engineers by</td>
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<td>Prof. Dr.-Ing. Karsten Stahl, Gear Research Center (FZG), TUM School of</td>
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<td>Engineering and Design, Technical University of Munich, Garching,</td>
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**Lecture Room A**

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<td>Lecture Room A</td>
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<tr>
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<td>Load capacity</td>
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<td>Moderation: Prof. Dr.-Ing. Karsten Stahl, Technical University of Munich,</td>
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**Lecture Room B**

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<td>Moderation: Dr.-Ing. Bernhard Bouché, Getriebebau NORD GmbH &amp; Co. KG,</td>
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<tr>
<td>11:00</td>
<td>Electromechanical coupling modeling and torsional vibration analysis of</td>
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<td>helicopter electric propulsion system</td>
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<td>• Electromechanical model of electric propulsion system</td>
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<td>• Prediction and suppression of torsional vibration</td>
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<td>Hanjie Jia, PhD, Lecturer, Datong Qin, PhD, Professor, Guanghong Hu,</td>
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<td>Master Student, Xiangyang Xu, PhD, Professor, Chongqing Jiaotong</td>
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<td>University, China</td>
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<td>11:30</td>
<td>Numerical analysis of bevel gear transmission acoustic emission</td>
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<td>using a 3D gear contact force model within a multibody system</td>
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<td>dynamic simulation</td>
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<td>• Accurate 3D gear contact analysis of spiral bevel gears using flexible</td>
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<td>multibody simulation</td>
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<td>• Vibro-acoustic performance simulation of bevel geared drivetrains</td>
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<td>Wim Smet, B. Sc., Gear Technology, ZF Wind Power Antwerpen NV, The</td>
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<td>Netherlands; Dr. Mathijs Vetet, Research Engineering Manager, Product</td>
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<td>Development – Simulation 3D Mechanical, Siemens Digital Industries</td>
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<td>Software, Leuven, Belgium</td>
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<td>12:00</td>
<td>Experimental investigation of influence of indexing errors on gear</td>
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<td>• Vibro-impacts of gearshaving spacing errors under lightly loaded</td>
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<td>operating conditions</td>
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<td>• Gear set-up with external torque fluctuation capabilities and</td>
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<td>associated instrumentation</td>
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<td>Prof. Ahmet Kahraman, Professor and Director, Dr. Ata, Donmez,</td>
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<td>Postdoctoral Researcher, Gear and Power Transmission Research Laboratory,</td>
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<td>Department of Mechanical and Aerospace Engineering, The Ohio State</td>
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<td>University, Columbus, Ohio, USA</td>
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<td>12:30</td>
<td>The impact of different reliability data on a cloud-based gearbox digital</td>
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<td>twin using telematic data</td>
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<td>• Set up of a cloud-based digital twin using telematic data from</td>
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<td>• Interpretation of different reliability data in this digital twin and</td>
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<td>and Innovation, Romax Technology, Ltd., Nottingham, United Kingdom;</td>
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<td>Dipl.-Ing. (FH) Detlev Runkel, Senior Solutions Strategist,</td>
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<td>Hexagon Applied Solutions Group, Garching, Group</td>
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**Lecture Room C**

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<td>Lecture Room C</td>
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<tr>
<td></td>
<td>Digitalization of the product development process</td>
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<tr>
<td></td>
<td>Moderation: Prof. Dr.-Ing. Georg Jacobs, RWTH Aachen University,</td>
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<tr>
<td>11:00</td>
<td>Digitalization of the gear development process – Chances, benefits and</td>
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<td>risks</td>
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<td>• Data exchange during the complete product development cycle</td>
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<td>• Integration of digital twin models and services into Catena-X</td>
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<td></td>
<td>Dr.-Ing. Johannes König, Manager Gear Fundamentals &amp; Digitalization,</td>
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<td>Dr.-Ing. Martin Obermayr, Manager CoE Digital Twin, Tobias Klein M. Sc.,</td>
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<td>R&amp;D Engineer, ZF Friedrichshafen AG, Friedrichshafen, Germany</td>
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<tr>
<td>11:30</td>
<td>Opportunities arising from digital twins in gear development</td>
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<td>• Photogrammetric mapping of 2D photo data onto a virtual 3D gear</td>
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<td>• Automatic correction of the contact pattern for bevel gears</td>
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<td>Dipl.-Ing. Constantin van Oss, Research Associate, Dr.-Ing. Stefan</td>
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<td>Schumann, Chief Engineer, Prof. Dr.-Ing. Berthold Schlecht, Full</td>
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<td>Professor and Head of Institute of Machine Elements and Machine</td>
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<td>Universität Dresden, Germany</td>
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The Gear Research Center (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.
**P1** Investigation of the electrical impedance of the gear mesh of a spur gear in an industrial gearbox  
**Prof. Dr.-Ing. Eckard Kirchner**, Director, Institute of Product Development and Machine Elements, Technische Universität Darmstadt, Germany

**P2** LUBGEAR – Experimental campaign for aviation gears in loss-of-lubrication  
**Dipl.-Ing. Lorenz Braumann**, Research Engineer, Advanced Drivetrain Technologies GmbH, Vienna, Austria

**P3** PVD deposition of Nb-MoS2 coatings on gear carburized steel  
**Angelo Carvalho, M. Sc.**, Research Assistant, Competence Center in Manufacturing; Aeronautics Institute of Technology, São José dos Campos, Brazil

**P4** Testing and modelling of a 2.5 MW wind turbine gearbox: Influence of lubricant formulation  
**Carlos Fernandes, PhD**, Assistant Professor, INEGI – Institute of Science and Innovation in Mechanical and Industrial Engineering, Porto, Portugal

**P5** A concept for comparison of new and aged lubricants in transmissions of electric vehicles and a method of oil aging on a test rig  
**Timo König, M. Eng.**, Research Assistant, Institute for Drive Technology Aalen, Hochschule Aalen – Technik und Wirtschaft, Germany

**P6** Numerical simulation of low-temperature lubrication in gear models using MPS method  
**Chunhui Wei**, PhD Student, School of Mechanical Engineering, Beijing Institute of Technology, China and INSA – Institut National des Sciences Appliquées de Lyon, Villeurbanne Cédex, France

**P7** Gear geometry, size and material influences not captured in ISO 6336  
**Wim Smet, B. Sc.**, Gear Technology, ZF Wind Power Antwerpen N.V., The Netherlands

**P8** Modelling and analysis of the effect of root modification on load sharing and stress values in spur gears  
**Ali Imre Aydeniz, PhD**, Mechanical Engineering, Istanbul Technical University (ITU), Istanbul, Turkey

**P9** Method for calculating the tooth root nominal stress in worm gear shafts  
**Johannes Gründer, M. Sc.**, Research Assistant, Institute for Chemical-, Material- and Product Development, Nuremberg Institute of Technology, Germany

**P10** Development of optimal design program for planetary gear set macro-geometry using multi-objective optimization algorithm  
**Beom-Soo Kim**, Lab. for Off-Road Equipment and Soil-Machine Systems Design, Department of Biosystems Engineering, Seoul National University, Seoul, Korea

**P11** Developing CAE solutions for robotics gears; Cycloidal and Strain Wave Gear Drives. Leveraging more mature robust technologies from the automotive industry  
**Owen Harris, PhD**, Research Department Manager, Research, Smart Manufacturing Technology, Nottingham, United Kingdom

**P12** Parameter based definition of eccentric cycloid gearings  
**Stefan Landler, M. Sc.**, Research Associate, Institute of Machine Elements, Gear Research Center (FZG), TUM School of Engineering and Design, Technical University of Munich, Garching, Germany

**P13** A novel dynamic modeling method of high-speed thin-rimmed gear transmission  
**Jiayu Zheng, M. Sc.**, PhD student, State Key Laboratory of Mechanical Transmissions, Chongqing University, China

**P14** Classifying plastic beveloid gear quality considering manufacturing errors  
**Bahadir Karba**, PhD candidate, Transmission & Powertrain Design Engineer Lvl III., Research & Development, TR Transmisyon engineering Inc., Ankara, Turkey

**P15** Model based NVH design: E-bike application  
**Dr.-Ing. Herve Mahe**, NVH Master Expert, NVH discipline manager, New Mobility Center, Valeo Transmissions, Amines, France

**P16** Effect of overlap ratio on gear dynamic behavior and noise level  
**Joao Marafona, M. Eng.**, PhD Student, Tribology, Vibrations and Industrial Management Unit, INEGI – Institute of Science and Innovation in Mechanical and Industrial Engineering, Porto, Portugal

**P17** Three-dimensional dynamic contact behaviors of gear pairs with various tooth flank errors  
**Dr. Bing Yuan**, Professor, Xi’an Technological University, China

**P18** The effect of working surface deviation on transmission error in helical gear  
**Dongu Im**, Student/PhD candidate, Researcher, Department of Biosystems Engineering, Design of Off-Road Equipment and Soil-Machine Systems, College of Agriculture and Life Sciences, Seoul National University, Korea

**P19** A study on the efficiency prediction of a gear bearing drive by means of mathematical modelling  
**Bahadir Karba**, PhD candidate, Transmission & Powertrain Design Engineer Lvl III., Research & Development, TR Transmisyon engineering Inc., Ankara, Turkey

**P20** Improvement of the transmission efficiency in electric vehicles by using double staggered helical gears  
**Dr. Ignacio Gonzalez-Perez**, Full Professor, Department of Mechanical Engineering, Materials and Manufacturing, Universidad Politecnica de Cartagena, Spain

**P21** Backlash optimization via compatible gear couples on the assembly lines for planetary gearboxes  
**Bahadir Karba**, PhD candidate, Transmission & Powertrain Design Engineer Lvl III., Research & Development, TR Transmisyon engineering Inc., Ankara, Turkey

**P22** Influence of misalignment of large cylindrical gears on contact pattern in operation  
**Prof. Dr.-Ing. Aleksandar Mulićenović**, Professor, Department for mechanical design, development and engineering, Faculty of Mechanical Engineering, University of Niš, Serbia

**P23** Cross-correlation analysis among tooth profil and helix deviations  
**Yamazaki Daisuke**, Precision Manufacturing Laboratory, Mechanical Engineering, Kyoto Institute of Technology, Japan
5th International Conference on High Performance Plastic Gears 2023
September 13 - 15, 2023, Garching/Munich, Germany

Key topics:
• Carbon footprint assessment of sustainable plastic materials
• Influence of manufacturing on gear quality and load capacity
• Recent calculation methods for load capacity and excitation behavior
• Recent test methods of plastic gears
• Optimizations of plastic gears

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

Conference Board:
Dr.-Ing. Marco Baccalaro, Chassis Systems Control, Gear Development and Test Conception/Realization, Robert Bosch GmbH, Heilbronn, Germany
Ingo Decker, M. Eng., Gear Development, Group Wide Components, Corporate Research & 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

The conference will give you the answers to these questions:
• How can the carbon footprint of plastic gears be assessed and optimized?
• How can plastic gears be recycled?
• How can lubrication improve the performance of plastic gears?
• How can the NVH-behavior of plastic gears be evaluated and optimized?
• How does the manufacturing process impact gear performance and cost?

Further details and the final program can be found here:
www.vdiconference.com/02TA409023

5th International Conference on Gear Production 2023
September 13 - 15, 2023, Garching/Munich, Germany

Key topics:
• Sustainable gear production
• Inline quality inspection for gear production
• Additive manufacturing of gears
• Performance of new gear materials in gear manufacturing
• Hard finishing of high performance gears
• Innovative processes for gear manufacturing

Presidency:
Prof. Dr.-Ing. Thomas Bergs, Full Professor, Laboratory for Machine Tools and Production Engineering (WZL), Chair of Manufacturing Technology, Faculty for Mechanical Engineering, RWTH Aachen University, 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. Karsten Stahl, Full Professor, Institute of Machine Elements, Director, Gear Research Center (FZG), TUM School of Engineering and Design, Technical University of Munich, Garching, Germany

The conference will give you the answers to these questions:
• How do we manufacture high performance gears in the future?
• What are best practices for the additive manufacturing of gears?
• How do we increase sustainability in gear manufacturing?
• Which digital solutions drive gear production?
• What are the innovations in gear metrology?

Further details and the final program can be found here:
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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.

Get the chance to visit innovative laboratory facilities!
Seize the opportunity and visit the nearby test and laboratory facilities at the Gear Research Center (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.

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.

The poster exhibition is combined with a 5-minute talk.
The compact style of presentation called the ‘5-minute rapid’ presentation, will provide you with all information in a clear, succinct manner. Poster presentations are scheduled during the coffee breaks. Presentation times will be announced on-site.

Two gear community nights
Your networking hotspot for the international gear community!
Enjoy the evening reception at the ‘Löwenbräukeller’ as well as another social event at the university. The ‘Löwenbräukeller’ is a restaurant with a long tradition offering modern Bavarian cuisine.
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.
# Program Committee

## Presidency

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## Board of gear excellence

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prof. Dr. Eng. Jože Duhovnik</td>
<td>Full Professor, former Dean and Head of LECAD Group, Laboratory, Faculty for Mechanical Engineering, University of Ljubljana, Slovenia</td>
</tr>
<tr>
<td>Prof. Dr.-Ing. Manfred Hirt</td>
<td>Past President, Research Association for Drive Technology (FVA), Frankfurt/Main; former board of RENK GmbH, Augsburg, Germany</td>
</tr>
<tr>
<td>Prof. Haruo Houjoh</td>
<td>Emeritus Professor, Tokyo Institute of Technology, Japan</td>
</tr>
<tr>
<td>Prof. h.c. Dr.-Ing. Aizoh Kudo</td>
<td>President, Research Institute for Applied Sciences, Kyoto, Japan</td>
</tr>
<tr>
<td>Prof. Dr.-Ing. habil. Heinz Linke</td>
<td>Emeritus Professor, Institute of Machine Elements and Machine Design, Faculty of Mechanical Science and Engineering, Technical University of Dresden, Germany</td>
</tr>
<tr>
<td>Prof. Dr.-Ing. Athanassios Mihalidis</td>
<td>Full Professor, Former Head of the School of Mechanical Engineering, Laboratory of Machine Elements and Machine Design, Aristotle University of Thessaloniki, Greece</td>
</tr>
<tr>
<td>Dr. Michel Octrue</td>
<td>former Senior Gear Expert Mechanical Power Transmissions, CETIM (Technical Center for Mechanical Engineering Industries), Sentis, France</td>
</tr>
<tr>
<td>Prof. Dr.-Ing. Bernd Bauer</td>
<td>Full Professor, Chair of Machine Elements, Gears and Tribology (MEGT), Department of Mechanical and Process Engineering, Rheinland-Pfalzische Technische Universität Kaiserslautern-Landau (RPTU), Kaiserslautern, Germany</td>
</tr>
<tr>
<td>Prof. Ray Snidle</td>
<td>Emeritus Professor of Mechanical Engineering, Cardiff University, United Kingdom</td>
</tr>
<tr>
<td>Dr.-Ing. Toni Weiss</td>
<td>Gear Consultant, ret. from RENK GmbH, Augsburg, now GanaCon – Gear analysis and Consulting, Ingling, Germany</td>
</tr>
</tbody>
</table>

## 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), Germany

**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

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Prof. Dr.-Ing. Oliver Koch, Full Professor, Head of Chair of Machine Elements, Gears and Tribology (MEGT), Department of Mechanical and Process Engineering, Rheinland-Pfalzische Technische Universität Kaiserslautern-Landau (RPTU), Kaiserslautern, Germany

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Dr.-Ing. Franz Vökel, Sr. Vice President R&D Bearings, Schaeffler Technologies AG & Co. KG, Herzogenaurach, Germany

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### International members

<table>
<thead>
<tr>
<th>Name</th>
<th>Position and Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eng. Amir Aboutaleb</td>
<td>Vice President, Technical Division, American Gear Manufacturers Association, Alexandria, USA</td>
</tr>
<tr>
<td>Luc Amar, PhD</td>
<td>Research Engineer, Power Transmissions (TDP), Cetim (Technical Center for Mechanical Engineering Industries), Senlis Cedex, France</td>
</tr>
<tr>
<td>Prof. Bingkui Chen</td>
<td>The State Key Lab of Mechanical Transmissions, Chongqing University, China</td>
</tr>
<tr>
<td>Dr.-Ing. Rolf Doebereiner</td>
<td>Product Line Manager Commercial Vehicles, AVL List GmbH, Graz, Austria</td>
</tr>
<tr>
<td>Prof. Ing. Carlo Gorta</td>
<td>Associate Professor, Department of Mechanical Engineering, Politecnico di Milano, Italy</td>
</tr>
<tr>
<td>Prof. Daisuke Iba</td>
<td>Faculty of Mechanical Engineering, Kyoto Institute of Technology, Kyoto, Japan</td>
</tr>
<tr>
<td>Prof. Ahmet Kahraman</td>
<td>Howard D. Winbigler Professor and Director, Gear and Power Transmission Research Laboratory, Department of Mechanical and Aerospace Engineering, The Ohio State University, Columbus, USA</td>
</tr>
<tr>
<td>Dr.-Ing. Alex Kapelevich</td>
<td>Consultant, AKGears, LLC, Shoreview, Minnesota, USA</td>
</tr>
<tr>
<td>Prof. Dr. Geng Liu</td>
<td>Full Professor, School of Mechanical Engineering, Northwestern Polytechnic University, Director, Shaanxi Engineering Laboratory for Transmissions and Controls, Xi’an, China</td>
</tr>
<tr>
<td>Prof. Dr.-Ing. Aleksandar Miltenović</td>
<td>Professor, Department for mechanical design, development and engineering, Faculty of Mechanical Engineering, University of Niš, Serbia</td>
</tr>
<tr>
<td>Robin Olson, M. Sc.</td>
<td>Director of Applications Engineering, Engineered Gear, Regal Rexnord Corporation, Milwaukee, Wisconsin, USA</td>
</tr>
<tr>
<td>Prof. Dr.-Ing. Jose I. Pedrero</td>
<td>Full Professor, Department of Mechanics, Faculty of Engineering, Universidad Nacional de Educación a Distancia (UNED), Madrid, Spain</td>
</tr>
<tr>
<td>Prof. Dr. Datong Qin</td>
<td>Full professor, Distinguished professor and Honorary Dean of School of Mechanotronics and Vehicle Engineering, Chongqing Jiaotong University, China</td>
</tr>
<tr>
<td>Prof. Dr.-Ing. Philippe Velex</td>
<td>Full Professor, LaMCoS, INS – Institut National des Sciences Appliquées de Lyon, Villeurbanne Cédex, France</td>
</tr>
<tr>
<td>Prof. Wenzhong Wang</td>
<td>School of Mechanical Engineering, Beijing Institute of Technology, China</td>
</tr>
<tr>
<td>Prof. Dr.-Ing. Michael Weigand</td>
<td>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</td>
</tr>
</tbody>
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Telemetrie Elektronik GmbH
Weißer und Grießhaber GmbH
Winkelmann Flowforming

Exhibition & Sponsorship opportunities

Attendees in 2022

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<thead>
<tr>
<th>Function</th>
<th>2022</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experts</td>
<td>46 %</td>
</tr>
<tr>
<td>Project manager</td>
<td>25 %</td>
</tr>
<tr>
<td>Production engineer</td>
<td>17 %</td>
</tr>
<tr>
<td>Project management</td>
<td>7 %</td>
</tr>
<tr>
<td>Others</td>
<td>5 %</td>
</tr>
<tr>
<td>Research and Development</td>
<td>40 %</td>
</tr>
<tr>
<td>University/research institutions</td>
<td>18 %</td>
</tr>
<tr>
<td>Construction and development</td>
<td>17 %</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>
</tbody>
</table>
Please register for (price per person plus VAT):

<table>
<thead>
<tr>
<th>International Conference on Gears 2023</th>
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<tbody>
<tr>
<td>September 13-15, 2023, Garching near Munich, Germany</td>
</tr>
<tr>
<td>(02TA210023)</td>
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</tbody>
</table>

EUR 1,690.-

Participation fee for personal VDI members and members of associated organisations of the International Conference on Gears 2023 save EUR 50.- each conference day

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