



Wednesday, 19 June 2024

13:30 **Registration** - Foyer

14:00 **Welcome Session** – Seminar Room 1

14:30 **Keynote Speech**
“Current possibilities and future challenges to support the design process by simulation using the example of rolling bearing applications” Graf-Goller Oliver
 Chair: Concli Franco

15:30 Coffee Break – Foyer

16:00 **Parallel Sessions**

Seminar Room 1

Life and Efficiency of Bearings
 Chair: Koch Oliver

101 – Predicting the behaviour of spherical roller bearings with a detailed multi-body simulation model
Müller Jonathan Irenäus, Koch Oliver

102 – Flows in oil-bath lubricated tapered roller bearings: CFD simulations validated via PIV
Maccioni Lorenzo, Concli Franco

103 – Spherical bearing with tapered hourglass rolling elements for planetary reduction stage applications
Podda Daniele, Pisani Paolo, Cao Lijun, Sartori Sergio, Scaltritti Diego, Clauvelin Jean-Philippe

104 – Experimental comparison of hydrostatic bearing pad geometry optimization approaches under static conditions
Michalec Michal, Foltyn Jan, Svoboda Petr, Křupka Ivan, Hartl Martin

105 – The influence of measurement uncertainties and input parameters on hydrostatic bearing performance: analytical, experimental, and numerical comparison
 Foltyn Jan, Maccioni Lorenzo, Michalec Michal, Concli Franco, Svoboda Petr

106 – Decoupled Sliding-Mode Control for active magnetic Bearings using Particle Swarm Parameter Optimisation
Vennemann Jonah, König Niklas, Nienhaus Matthias

18:00 Aperitif - Foyer

Seminar Room 2

Planning and Control of Robotic and Mechatronic Systems
 Chair: Richiedei Dario, Van Oosterwyck Nick

201 – A collaborative robotics application for the assembly of car rear lamps
Scalera Lorenzo, Lozer Federico, Geerinck Julie, Breda Andreas, Totis Francesco, Polo Fabio, Giusti Andrea, Gasparetto Alessandro

202 – An Excel motion profile optimization (MoPO) tool for industrial positioning applications
Van Oosterwyck Nick, Maes Brecht, De Laet Robbe, Derammelaere Stijn

203 – Inverse dynamics for feedforward control of an underactuated 6-DOF gantry crane
Bettega Jason, Fabris Francesco, Richiedei Dario, Tamellin Iacopo, Alberto Trevisani

204 – Chattering-free sliding mode control for position and attitude tracking of a quadrotor
Gomiero Sara, von Ellenrieder Karl

205 – Adaptive vibration absorption using Internal Model Control approach
 Duarte André J J, Araújo José M, Santos Tito L, Richiedei Dario, Tamellin Iacopo

Seminar Room 5

Artificial Intelligence in Manufacturing and Mechanical Engineering
 Chair: Borgianni Yuri

301 – Artificial intelligence – Insights into the mechanics of biomaterials: Predicting the compressive load of composite sandwich structures
Sheini Dashtgoli Danial, Taghizadeh Seyedahmad, Macconi Lorenzo, Concli Franco

302 – Estimating Colebrook-White friction factor using tree-based machine learning models
Niazkar Majid, Menapace Andrea, Righetti Maurizio

303 – Integrated approach for continuous improvement of robotic garments picking
Pini Fabio, Kähler Olaf, Uray Martina, Llagostera Eugeni, Biagiotti Luigi, Leali Francesco

304 – Automated visual inspection via differentiable physically-based rendering under unknown illumination
Caruso Emanuele, Casarin Sofia, Pfund Thomas, Schupp Florian, Lanz Oswald

305 – Egocentric video-based human action recognition in industrial environments
Bianchi Edoardo, Lanz Oswald

Thursday, 20 June 2024

08:30 **Parallel Sessions**

Seminar Room 1

Cycloidal Speed Reducers
 Chair: Blagojevic Mirko

107 – Torque-to-weight: driving the next electrification wave
Lopez Garcia Pablo, Khorasani Amin, Verstraten Tom

108 – Finite element investigation of torque ripple in roller-cycloidal contact: examining gear ratio, mesh density, and transmitted power dependencies
Fracaroli Lorenzo, Maccioni Lorenzo, Concli Franco, Blagojevic Mirko, Rotini Federico

109 – Loads in the planetary-pinion gear with modification of the tooth profile and eccentricity of the satellites
Tchufistov E.A., Tchufistov O.E., Blagojevic Mirko

110 – The influence of thermal stresses on the load distribution in cycloidal reducers
Blagojevic Mirko, Vasic Milan, Dizdar Samir, Tuka Smajo, Josimovic Milos

Seminar Room 2

Mobile Field Robotics: Recent Achievements in the Aerial, Ground and Marine Domains
 Chair: von Ellenrieder Karl

207 – High Order CBFs for the Safety- critical Control of Coaxial Octorotor UAVs
Mahmoudabadi Parvin, von Ellenrieder Karl, Moroder Matthias, Moroder Moritz

208 – Design and development of an autonomous surface vehicle for supporting underwater navigation
Boccalini Lorenzo, Cavaliere Chiara, Costanzi Riccardo, Di Lorenzo Giovanni, Guerci Matteo, Lisi Michele, Pollini Lorenzo, Ruscio Francesco, Ryals Andrea Dan, Tani Simone

209 – Local path-planning optimisation for an industrial Autonomous Mobile Robot via dynamic obstacle detection
Cecchi Lorenzo, Bucci Alessandro, Topini Alberto, Ridolfi Alessandro, Bonacchi Luigi Bono

210 – Towards robotic pose graph estimation with tree landmarks in perennial orchards
Chang Michael, Camurri Marco

211 – A control barrier function based approach for close inspection with USVs
von Ellenrieder Karl, Camurri Marco

Seminar Room 5

Advancements in Aerospace Technologies
 Chair: Chernoray Valery G.

307 – Research Perspectives for the Near- and Far-future Development of Civil Aviation
Chernoray Valery

308 – The role of advanced experimental methods in aerodynamic evaluation of state-of-the-art turbofan engine components
Vikhorev Valentin Vadimovich

309 – The use of Infrared thermography in Advanced Experimental Investigations of State-of-the-art Turbofan Engine Components
Jonsson Isak

310 – Helicopter drive system featuring additive-manufactured components
Alari Lorenzo, Sartori Sergio, Montagna Federico, Pisani Paolo, Borlin Nicola, Scaltritti, Diego

311 – On and offboard technologies for autonomous UAMs in urban emergency response roles
Rodriguez Acero Patxi Daniel

10:10 **Poster Session** - Foyer

P01 – A novel concept of nested cycloidal drive
Maccioni Lorenzo, Concli Franco

P02 – Influence of geometric deviations in rollers and cycloidal disk on power transmission performances
Rotini Federico

P03 – Model based prediction of optimal ropeways for material transport
Wenin Markus Josef, Patreider Moritz, Brunner Johannes

P04 – Study and optimization of main bearing lubrication system of a direct-drive leitwind wind turbine
Shaq Khan Muhammad, Maccioni Lorenzo, Concli Franco

10:30 Coffee Break – Foyer

10:50 **Parallel Sessions**

Seminar Room 1

Powertrains
 Chair: Gorla Carlo

112 – Multibody Simulation of Gearbox Dynamics using 3D Contact Modeling and measured Tooth Geometries
Grünberger Jürgen, Steiner Wolfgang, Witteveen Wolfgang

113 – Modifications of a Back-to-back Geared Test Rig for a State-of-the-art Analysis of Its Oil Flows
Bonaiti Luca, Gorla Carlo

114 – Advances in spline couplings testing
Mura Andrea, Curà Francesca

115 – Performance Analysis of a Micro Gas Turbine Fed by Ammonia as Fuel with Steam Injection
Fatehi Mohsen, Campaldini Graziano, Ranzani Mossiano

Seminar Room 2

Applied Mechanics and Robotics
 Chair: Scalera Lorenzo

212 – Development of a mechanical device to harvest energy from marine waves
Mura Andrea

213 – Enhancing snowboard design for ollie performance through multibody system dynamics and genetic optimization
Huber Xaver, Zwölfer Andreas, Caillaud Benoit, Rixen Daniel J.

214 – Redundant Hybrid Robots for resilience in future smart factories
Manzardo Matteo, Yan Yicheng, Rojas Rafael Angel, Shahidi Amir, Vidoni Renato, Hüsing Mathias, Corves Burkhard

215 – Methods for high performance phase change actuation
Fonseca Diogo, Neto Pedro

Seminar Room 5

Innovative Engineering Education Part A
 Chair: Orzes Guido

312 – Technology in engineering education: the sustainable enterprise business game
Fontanella Sabrina, Fraccascia Luca, Nonino Fabio, Baldissin Nicola

313 – The certification of an entrepreneurship competence during an interfaculty business challenge
Morselli Daniele, Luppi Elena, Ricci Aurora, Parricchi Monica

314 – Criticism and proposal of a model for the design and rapid set-up of a training course based on 3D printing
Scibilia Sergio, Casalino Giuseppe

315 – A Unity3D-based interactive educational game of compressed air system maintenance
 isik Birkar, Emir Isik Gulbahar, Zilka Miroslav

12:10 Lunch – Foyer

13:45 **Keynote Speech** – Seminar Room 1
“Past, Current and Future Research Topics in Robotics at IGMR, RWTH Aachen University” Corves Burkhard
 Chair: Vidoni Renato

14:40 **Parallel Sessions**

Seminar Room 1

Multi-physics Modeling Approaches for the Simulation of New Generation Propulsion Systems
 Chair: Della Torre Augusto

116 – Development and Application of a CFD Framework for the Simulation of Fully Coupled Electromagnetic and Heat Transfer Process Inside Electric Motors
Montenegro Gianluca, Della Torre Augusto, Zamboni Rachele

Seminar Room 2

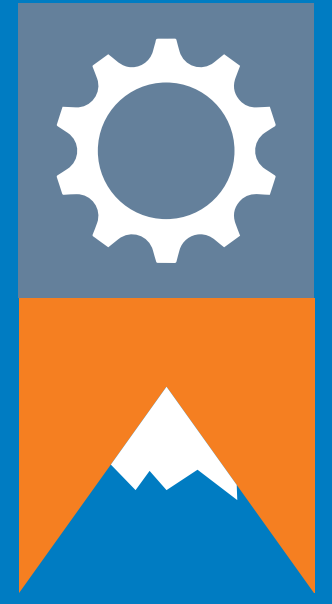
Modelling and Simulations
 Chair: Vidoni Renato

216 – Overview of the analysis and testing of a covering system for a telescope
Dinardo Francesco, Tomasi Matteo, Bursi Alessandro, Vignotto Matteo, Dalla Ricca Edoardo, Giacomazzo Matteo, Bortoluzzi Daniele

Seminar Room 5

Innovative Engineering Education Part B
 Chair: Molinaro Margherita

316 – The role of Nordic entrepreneurship education for technical education
Schild Katharina, Morselli Daniele



Seminar Room 1

117 – A detailed CFD model for the channel-scale analysis of PEM fuel cells: application and validation considering different distributor layouts

Bulgarini Margherita, Della Torre Augusto, Baricci Andrea, Grimaldi Amedeo, Montenegro Gianluca, Marocco Luca, Mereu Riccardo

118 – A multiphysics CFD framework for the simulation of automotive advanced after-treatment systems equipped with heating devices

Della Torre Augusto, Barillari Loris, Sartirana Andrea, Montenegro Gianluca

15:40 Coffee Break – Foyer

16:10 **Parallel Sessions**

Tribology and Materials

Chair: De Pasquale Giorgio, Montenegro Gianluca

119 – CFD insights into gear jet lubrication: exploring objectives, challenges, and methodologies through a literature review

Maccioni Lorenzo, Pagliari Lorenzo, Concli Franco

120 – Simulation of the churning losses of ordinary gears: Lagrangian Smooth Particle Hydrodynamics approach

Della Torre Augusto, Concli Franco

121 – Simulation of the lubrication of high-speed jet-lubricated gears: study of the impact of the oil droplet suspension on the power losses

Concli Franco, Della Torre Augusto

122 – SiToLub – Simulation Tools for the design of safe and sustainable Lubricants

Don Davide, Notarfrancesco Sarah, Pisarova Lucia, Moncho Salvador, Hoffmann Jonas, Borrás Xavier

123 – Digital twin of a tribology test bench: The adjoint gradient computation for parameter identification

Nachbagauer Karin, Eichmeir Philipp, Jech Martin, Vorlaufer Georg

124 – Ice Adhesion Research in Trentino-Alto Adige

Parin Riccardo, Di Novo Nicolò, Bagolini Alwise, Pugno Nicola

18:10 Closing of Parallel Sessions

19:30 **Gala dinner** – Parkhotel Laurin

Seminar Room 2

217 – Shape sensing and damage identification with iFEM on a double bottom structure of a containership

Bardiani Jacopo, Manes Andrea, Giglio Marco, Sbarufatti Claudio

218 – Validation of a wheelset finite element model for static structural analysis and inverse force identification

Bellacci Giovanni, Pugi Luca, Baldanzini Niccolò

Formulations and Applications of Structural and Multibody Dynamics

Chair: Gerstmayr Johannes, Gufler Veit

219 – Improving the Accuracy of the Floating Frame of Reference Formulation for Rotordynamics Applications

Holzinger Stefan, Zwölfer Andreas, Trainotti Francesco, Gerstmayr Johannes

220 – An objective FE-formulation for Cosserat rods based on the spherical Bézier interpolation

Greco Leopoldo, Cammarata Alessandro, Castello Domenico, Cuomo Massimo

221 – Use of lumped mass formulation in the design sensitivity analysis of flexible multibody dynamics

Gufler Veit, Wehrle Erich, Vidoni Renato

222 – Surrogate mechanical model for programmable structures

Pieber Michael, Zhang Zhaowei, Manzl Peter, Gerstmayr Johannes

223 – Deep learning enhanced surrogate models for multibody system dynamics

Manzl Peter, Humer Alexander, Gerstmayr Johannes

224 – Vibrations of an inclined cable with lumped mass

Patreider Moritz, Wenin Markus, Furtmüller Thomas, Adam Christoph

Seminar Room 5

317 – Data Spaces for Leading Future Innovation Processes

Pichler Rudolf, Schellander Martin

318 – Blended Intensive Programmes as effective and innovative solutions to train the engineers of the future

Molinaro Margherita, Orzes Guido, Borgianni Yuri

SME 5.0 – Intelligent, Sustainable and Human-Centred SMEs Part A

Chair: Baalsrud Hauge Jannicke

319 – Sustainable aspects of intermodal transport: A systematic literature review on the current state.

Hoffelner Mario, Woschank Manuel, Jöbstl Lara

320 – The influence of digital transition and industry 5.0 on the success of implementing LARGS paradigms: Exploring European SMEs Challenges

Baalsrud Hauge Jannicke, Zemke Chavez Zuhara, Eshetu Birkie Seyoum, Chengo Kei Sam

321 – Enablers, barriers, and opportunities for the implementation of circular economy practices in small and medium-sized enterprises: An explorative systematic literature review

Olipp Nadine, Woschank Manuel, Kopeinig Jacob

322 – The application of Collective System Design to develop and improve Small and Medium Enterprises

Xu Di, Reich Matt, Cochran David S

323 – Application of Industry 4.0 Technologies for Transparency of Sustainability Data in Multi-Tiered Manufacturing Supply Chains

Kopeinig Jacob, Woschank Manuel

324 – Artificial intelligence in small and medium enterprises: requirements and barriers

Salimbeni Sergio, Grünbichler Rudolf

Friday, 21 June 2024

08:40 **Parallel Sessions**

Seminar Room 1

Material Characterization, Fatigue and Wear

Chair: Mura Andrea

125 – Multi-material fittings with carbon fiber reinforcement from AM process: design and characterization

De Pasquale Giorgio, Ursi Ferdinando

126 – Characterization of compressive behavior of novel bio-inspired additively manufactured composite sandwich structures

Taghizadeh Seyedahmad, Macconi Lorenzo, Concli Franco

127 – Comparison of low-cycle fatigue criteria for the life prediction of AISI 316L

Pagliari Lorenzo, Fraccaroli Lorenzo, Maccioni Lorenzo, Concli Franco

128 – Molecular dynamics simulation of fatigue crack propagation in single crystal Aluminum under cyclic loading

Silani Mohammad, Pagliari Lorenzo, Concli Franco

129 – Presentation of Associazione italiana costruttori organi di trasmissione e ingranaggi (ASSIOT) Federtec

Sartori Sergio

10:20 Coffee Break – Foyer

10:50 **Parallel Sessions**

Infrared Thermography for Industrial Applications

Chair: Curà Francesca Maria

130 – Experimental and numerical wear characterization by means of Active Thermography technique

Curà Francesca Maria, Corsaro Luca, Goti Edoardo

131 – Active thermography for residual stresses identification in gears

Corsaro Luca, Curà Francesca, Sesana Raffaella

132 – Directional thermal diffusivity of additive manufactured thin sheets

Sesana Raffaella, Santoro Luca, Quercio Michele, Canova Aldo, Aiello Alex

133 – Induction thermography for surface crack detection during motion tests

D'Accardi Ester, Dell'Avvocato Giuseppe, Palumbo Davide, Galietti Umberto

12:10 **Closing Session and Awards** – Seminar Room 1

13:00 Lunch – Foyer

Seminar Room 2

SME 5.0 – Intelligent, Sustainable and Human-Centred SMEs Part B

Chair: Rauch Erwin

225 – A qualitative study exploring maintenance policies of compressed air systems in production

Isik Birkan, Zilka Miroslav

226 – Sustainability assessment: a complex many-objective multi-agent multidisciplinary problem

Bataleblu Ali Asghar, Rauch Erwin, Cochran David S

227 – The influence of electric vehicle technologies on environmental sustainability in industrial reporting: A bibliometric study

Ben Ali Marwa, Rauch Erwin

228 – Industry 5.0 and SMEs future work competency fields: A literature review

Zare Leila, Ben Ali Marwa, Rauch Erwin

229 – Multi-objective modeling of additively manufactured bio-composite based on support vector machine regression

Contuzzi Nicola, Morvayova Alexandra, Casalino Giuseppe

Innovative Solutions for Safer and More Sustainable Mobility

Chair: Pugi Luca

230 – Zero-emission heavy-duty trucks in logistics: a systematic review and analysis of relevant adoption parameters

Roman Giacomo, Zadek Hartmut

231 – Study on energy efficiency of an electrified railway line

Kociu Aljon, Berzi Lorenzo, Delogu Massimo, Bartemucci Lorenzo, Pugi Luca

232 – Planning of smart charging infrastructure for electric vehicles: an italian case study

Innocenti Eleonora, Berzi Lorenzo, Kociu Aljon, Pugi Luca, Delogu Massimo

233 – Preliminary Design and Simulation of a Return Current Collector for an Innovative Trambus System

Alessandrini Adriano, Ortenzi Fernando, Cignini Fabio, Gulino Michelangelo Santo, Franci Michael, Berzi Lorenzo, Zazzeri Francesco, Pugi Luca