

13. Conference on Applied Research in Engineering Sciences



ARC2024

July 03, 2024

Nürnberg, Germany

Email: arc2024-contact@th-nuernberg.de

Conference Schedule

1. General Information

All visitors must register and will receive a conferencing batch. Those who have registered for the luncheon will also receive the token upon registration.

Students who wish to take an examination by presenting their paper and a poster must register at the beginning and end of the conference.

Photos will be taken during the lectures, breaks and the poster session. Participants who do not wish to be photographed must indicate this wish. We have labels available for this purpose.

2. Conference venue

Registration, opening and the paper sessions will take place in the KA building of the Technische Hochschule Nürnberg (OHM):

<https://www.th-nuernberg.de/wie-erreichen-sie-uns/anfahrt/k-standort-kesslerplatz/>

The conference lunch and the poster session will take place in the mensa "Insel Schütt" of the Studierendenwerk Erlangen-Nürnberg (10 min walk from the KA building).

<https://www.th-nuernberg.de/wie-erreichen-sie-uns/anfahrt/pruefungsstandort-mensa-insel-schuetzt/>

3. Guideline for Presentations

For presentations a time frame of 10 min + 5 min discussion is given.

We recommend a Powerpoint presentation in 4:3 format.

Please send your presentation to arc2024-contact@th-nuernberg.de by 28.6.2024 at the latest and bring a laptop or at least a USB stick with the presentation to be on the safe side.

Please prepare for the chairman of your session on a sheet of paper: Short Self-presentation and 3 possible questions about your presentation.

4. Guideline for Poster Presentations

Posters should be created in A1-format, the use of a template is required.

Please bring your poster to the poster presentation area to Mensa "Insel Schütt" by 13:00 at the latest.

Your presence is required during the entire poster session. Posters that have not been collected by 15:00 will be destroyed.

5. After the conference

Proof of attendance at registration is proof of examination performance for students. The ARC2024 team will report your attendance to your student offices after the conference, you do not need to do anything else.

9:00	Registration <i>in front of KA.034</i>							
9:30	Opening Session Prof. Dr.-Ing. Frank Opferkuch KA.034 Welcome Speech Prof. Dr.-Ing. Frank Pöhlau, Dean of Faculty (efi) Welcome Speech Prof. Dr.-Ing. Tilman Botsch, Vice-President Research of OHM Keynote “We pioneer motion - Transforming the Automotive Industry through Research and Innovation” Prof. Dr.-Ing. Tim Hosenfeldt, Senior Vice President, Corporate Research and Innovation & Central Technology, Schaeffler AG							
10:30	Conference photo with all participants <i>in fine weather on the outside steps in the courtyard in front of the KA building</i>							
10:40	Coffee Break <i>in front of KA.034</i>							
	Session I.1 Logistics & Production Bastian Werner KA.117	Session II.1 Mat. & Machine Learning Prof. Dr. Götzelmann KA.118	Session III.1 Materials Prof. Dr. Helbig KA.119	Session IV.1 Power Technologies I Prof. Dr. Uhrig KA.128	Session V.1 Power Technologies II Michael Schmidt KA.130	Session VI.1 Robotics & Measurement Prof. Dr. Germishuizen KA.140	Session VII.1 Software Prof. Dr. Paschedag KA.219	Session VIII.1 Software Prof. Dr. von Hoffmann KA.254
11:00	I.01 Jasmin Hagen Supply Chain Risk Management: A systematic recording of risk types and categories!	II.01 Didem Azgin Integrating Augmented Reality into Electrode Welding: A Conceptual Framework for Enhancing Precision and Safety	III.01 Sabrina A. Schweiger Cultivation of Microalgae and Fungi on Brewer's Spent Grains	IV.01 Max Hertel Fuel Cell Stack Modelling and Validation (A Project Proposal)	V.01 Tom Gaupp Development of a voltage divider for measurements up to 15 kV at a fundamental frequency of 86 kHz, taking parasitic effects into account	VI.01 Xenia Opacak Crash Site Duplication with "Road25im" for Efficient and Safe Accident Measurement within the Context of the German In-Depth Accident Study (GIDAS)	VII.01 Artiom Blinovas Transformer-Based Unsupervised Anomaly Detection in Univariate and Multivariate Time Series	VIII.01 Sebastian Mortag Integration and Verification of an Open Source Fuel Cell Stack Model in Modelica
11:15	I.02 Tamara Kartheininger Navigating Risks: SCRM Implementation in SMEs	II.02 Alexander Gradl Energetic view on laser welding with variable beam guidance	III.02 Nikolas Stadlöder Analysis of WAAM-Printed 17-4 PH Materials Using Thermo-Calc	IV.02 Paul Hüsgen Comparing physics-based approaches for the simulation of lithium-ion batteries	V.02 Florian Glaser Design of a method for the automated creation of energy expansion plans – using linear regression to improve a target value over the expansion period	VI.02 Jonas Bauernfeind Mono gray-scale camera-based self-localization for fully automated vehicles	VII.02 Max Brückner Integration and validation of a Steer by Wire steering model onto a static driving simulator	VIII.02 Melvin Nagy Optimal Open-loop Control for Gust Load Alleviation considering Distributed Constrained Actuation
11:30	I.03 Sandra Frey Strategies for a sustainable transformation at the University Landshut	II.03 Marcel Rinder Efficient Speech Recognition with Spiking Neural Networks: Model Compression and conditional Computation	III.03 Florian Wedler Improving Epoxy Mold Compound encapsulation of SiC power modules	IV.03 Christian Mader High efficient boost PFC compared to a theoretic Totem Pole PFC	V.03 René Helmschrott Development of the Load Profile Generator to Estimate Future Electrical Power Demand at Substation Level	VI.03 Christoph Sell Dynamic Control System Design for an Autonomous Vehicle based on Open Simulation Interface Messages	VII.03 Sacha Colucci Vulnerability Assessment of OPC UA Server Implementations	VIII.03 Furkan Özel eBPF/XDP based Firewall for Industrial Applications
11:45	I.04 Johannes Schindlbeck Developing a Regional Sustainability Performance Monitor for the Greater Augsburg Area	II.04 Lukas Beckendorf Comparative Analysis of Machine Learning Models for Gait Phase Classification Using Pressure-Sensitive Footwear Sensors	III.04 Johannes Wiedmaier Experimental non-ablative laser treatment of 3YSZ surface as preparation method for copper plating on nano silver layers	IV.04 Stephanie Seitz Investigation of Lithium-Ion Battery Behaviour in High-Voltage Environments under External Electric Fields	V.04 Martin Hübner Examination of a modular pure sine inverter for grid connected low-voltage storage systems	VI.04 Konstantin Richter Determination of tire rolling resistance with a pendulum test stand	VII.04 not yet allocated	VIII.04 Michael Reisig Conceptual Design and Prototypical Implementation of a Digital Twin for a Modular Manufacturing System
12:00	I.05 Frank M. Yondou Nya Sustainability in project management	II.05 Markus Hoffmann Comparing CNNs and ViTs as Feature Extractors for Crop-Weed Segmentation	III.05 Gabriel Wildt Verification of the Reproducibility of the Extrusion Process of I-Beams for In-Space Manufacturing	IV.05 Maximilian Hiener Theoretical consideration of charging and discharging cycles of secondary lithium-ion batteries and Analysis of influencing factors on the components	V.05 Christian Götz Investigation of the Electric Powertrain for a Lightweight Vehicle	VI.05 Patricia Viebke Measurement of portafilter espresso machines	VII.05 Jan Feldhoff Virtual collision detection of simulated railway vehicle movements	VIII.05 Julia Ruttmann Social choice concepts in collective constraint optimization
12:15	I.06 Carina Zimmermann A market analysis and comparison of supply chain risk management software tools	II.06 Bernhard Schüller Enhancing Predictive Maintenance of Industrial Compressors through Machine Learning and Advanced Feature Extraction Techniques	III.06 Alex Wolfgramm Characterizing the Impact of Ball Milling on the Structure and Performance of Copper-Based MOF HKUST-1	IV.06 Jonas Lindlmeier Data-driven insights into lithium-ion battery manufacturing using the linear model to analyze the manufacturing process and predict cell quality	V.06 Pascal Hinterberger Method to Determine Impact of Intrawinding Capacitance in High-Voltage Planar Transformers	VI.06 Hanna Grünsner Comparing Certified and Non-Certified Fine Dust Sensors Accuracy	VII.06 Lisa-Marie Geßner Concept and Implementation of a Bus Platooning Approach using SUMO	VIII.06 Sophia Schorer Linear fault detection filter design for time-varying space rocket flights
12:30	Transfer from KA building to Mensa „Insel Schütt“							

12:45	<p>Conference Lunch Mensa "Insel Schütt" , Andreij-Sacharow-Platz 1, 90403 Nürnberg</p>							
13:15	<p>Poster Session Prof. Dr. Olaf Ziemann Mensa "Insel Schütt" Andreij-Sacharow-Platz 1, 90403 Nürnberg</p>							
P.01 Dominik Rose Evaluation of 3D Simulation Environments for Creating Mixed Traffic Scenarios for VRUIDFUL	P.02 Bence Szabo Application of additive manufacturing techniques in workshops for people with disabilities	P.03 Jonas Jörg Lanzl Use of artificial intelligence in production: design and implementation of a modular, software-based IoT gateway	P.04 Lukas Stürmer Determination of the shrinkage of bone cement during curing	P.05 Anna Thuringer Mathematical Modelling and Trajectory Planning for Delta Robots	P.06 Paul Bersiner Developing a cryogenic H2-cooling system for environmentally friendly aviation	P.07 Ramona Mayr Systematic Material Selection of Alternative Materials for the Production of a short fiber-reinforced Ceramic Composite Material	P.08 Ludwig Bellstedt STRIDE-based Threat Modeling in Current Automotive Driver Assistance Systems Research	
P.09 Bernhard Pfeffer Evaluation of Reinforcement Learning Application Approaches in Artificial Intelligence Research Projects in the Area of Mobile Autonomous Systems	P.10 Lasse Pasker Biomimetic Optimisation Options for an Exoskeleton – Use of the problem-driven Approach of Biomimetics	P.11 Patrick Hochholzer Formula Student 48V Application	P.12 Valentin Sagstetter Embedded Edge and Tiny Machine Learning for state state	P.13 Wolfgang Reuter Quantitative Analysis of Layer Relevance in Convolutional Neural Networks Using the Example of Artist and Counterfeit Detection: A Comparison between Classical and Quantum Classical Methods	P.14 Andeas Gallenberger Influence of Pressure during Float Current Analysis	P.15 David Wenninger Development and Investigation of Methods to Reduce the Loop Inductance of Recon gurable Battery Cells	P.16 Lukas Eder Automatic conversion of existing exploits into modules for automated penetration testing frameworks using large language models large language models	
P.17 Lennard Reimers Crash severity prediction for integral vehicle safety	P.18 Luis Hobmeier A Method for Determining ALTP Thermal Product Values Using a Submerging Technique	P.19 Lukas Weiser Development of a practical emission test procedure for agricultural or forestry tractors – in a range up to 37 kW	P.20 Michael Lackermeier Development of a practical emissions test procedure for agricultural or forestry tractors in the range of 37 - 74 kW	P.21 Robert Meyer Development of a practical emission test procedure for agricultural or forestry tractors in a range of 75 to 147 kW	P.22 Alica Steindl Automated surface processing of pressing tools using a robot spindle with an active grinding tool	P.23 Daniel Bachhiesl Utilizing of Heat Pumps for the Transformation of Heating Networks Economic Evaluation, Planning, Implementation, and Operation	P.24 Dominik Kimmerle Development of a Portable Bluetooth Low Energy (BLE) Data Logger for the Acquisition and Evaluation of Biomedical Sensor Data Using the Example of the Polar H10 Chest Strap	
P.25 Felix Baumgartner Bioremediation von Azofarbstoffen	P.26 Maximilian Schmid Hardwareabstraction of the HunterSE platform	P.27 Moritz Bödecker C2X - ConnectMotion GreenLight Assistant	P.28 Nicole Dambacher Automation of simulator-based hover ceiling tests	P.29 Nils Shahi Selection of suitable wire/ bre material for strain basesensor and integration in DREPP structures for additivmanufacturing in space	P.30 Robert Demel Utilizing of Heat Pumps for the Transformation of Heating Networks Economic Evaluation, Planning, Implementation, and Operation	P.31 Sebastian Berger Implementation and Evaluation of a Camera-Based Scene Description Framework with a Multi-Modal Language Model	P.32 Wilken Hemme UAV-based ground observation with LIDAR sensors for wildlife detection	
P.33 Andrea von Lattre-Hertel Basic validation steps of building an Induction Machine FEM model	P.34 Annika Flock Unsupervised clustering of user behavior from collected clickstream data sequences	P.35 Felix Enhuber Affective sound design for UX/UI sounds	P.36 Niklas Pöpel 3D Study of TEG-based Energy Harvesters with Physicsinformed Neural Networks	P.37 Lukas Strohmaier High-Speed Physical True Random Number Generator	P.38 Matthias Schön Advanced Synthesis Algorithms for Dynamic Beamforming Control	P.39 Niklas Ganz Development and Evaluation of a Virtualization Strategy for Vehicle Bus Systems	P.40 Severin Viethen Commutation of Brushless Direct Current Motors	
14:15	<p>Transfer from Mensa „Insel Schütt“ to KA building</p>							

	Session I.2 Logistics & Production Muhammad W. Khan KA.117	Session II.2 Machine Learning Prof. Dr. Schröder KA.118	Session III.2 Materials Prof. Dr. Helbig KA.119	Session IV.2 Measurement Prof. Dr. Kremser KA.128	Session V.2 Power Technologies II Michael Schmidt KA.130	Session VI.2 Robotics Prof. Dr. Pfitzner KA.140	Session VII.2 Software Prof. Dr. Lohbreier KA.219	Session VIII.2 Software Timon Stemmler KA.254
14:30	I.07 Oliver Trepping Self-evaluation and reporting guidelines of a Driving Experience test – a case study using Moosbrugger criteria	II.07 Melanie Pauli Application of Classification-Based Machine Learning Models for the Detection of System Malfunction in Water Softening Plants	III.07 Fabio Gygas Melting Behavior of a Glass Batch Blanket in CFD	IV.07 Jonas Vogl Observation of Methanothermobacter marburgensis with scanning electron microscopy and optical microscopy techniques	V.07 Samir El Awad Simulative optimization of the hydrogen combustion process for stationary gas engines	VI.07 Halim Chebil Enhancing Robotic Precision in Automotive Gripping: Polarimetric 6D Pose Estimation for Transparent Car Glass	VII.07 Florian Goth Robustness of Models for Recognizing the Limbus in Ophthalmological Surgery and Its Importance	VIII.07 Michael Schwimmbeck Forecasting in Augmented Reality guided Surgery using Double Exponential Smoothing
14:45	I.08 Hakan Susar Simulation Environment for Analyzing the Decentralized Control of Consumers: Analysis and Preventive Measures for Cycling Behavior	II.08 Aaron Erhardt Saliency-based Sensorless Position Estimation in PMSM Drives using Signal-Injection and Artificial Neuronal Networks	III.08 Alexander Jaenicke Using a Voronoi-based Method to FE-model Random Chopped Fiber Composites	IV.08 Felix Emmer Validating shear tests as a quantifiable testing measurement for stud welds	V.08 Raphael Gabor Simulation Based Assessment of the Hydro- Pneumatic Compressed Air Energy Storage	VI.08 Magdalena Laubenbacher Risk reduction in collaborative robotics: Development of a safety concept for Robot	VII.08 Elisabeth Hockemeyer Analysis of energy data in household to optimize electricity consumption	VIII.08 - withdrawn -
15:00	I.09 Fernando R. d. Santos Unlocking Innovation through the Integration of Digital Twin and Visual Components	II.09 Markus Gisi Comparative Analysis of Traditional and Transformer-Based Models in Multi-label Classification of Industrial Requirements	III.09 Chiara Warmuth Analysis of the influence of the doffer of a carding machine on the dissolving level and the fiber length of recycled cotton fibers	IV.09 Luca Schneider Methods for determining the voltage edge steepness of power transistors	V.09 Florian Zinsmeister Technological and economic comparison of PEM and AEM electrolysis	VI.09 Jürgen Steinle Safe E/E Concept for an Autonomous Lightweight Vehicle	VII.09 - withdrawn -	VIII.09 Katrin Nehmeier Design and Development of a Customer- Oriented Sales Bot for Deburring Tools Based on the Soar Cognitive Architecture
15:15	I.10 Marco Obermeier Dynamic Electricity Tariffs: Analyzing the Economic Impact on a Real Household in 2023	II.10 Thomas Purschke A Survey of Deep Learning Techniques for Anomaly-Based Intrusion Detection	III.10 Johannes Kober Setup Optimizations of the Polymerization Process during MIP Generation for Biosensor Application	IV.10 - withdrawn -	V.10 Sebastian Kliegl Use of Alternative Biological Fuels in an Offroad Diesel Engine	VI.10 Simon Wald Backdrivable Three-Degree-of-Freedom Ornithopter Shoulder Joint	VII.10 Martina Maierthaler Contribution to soil health through applied engineering: Integration of an autonomous crumb stability test in a soil biology research system	VIII.10 Felix Straub Semi-Autonomous Process Handling for the Crafts Sector Based on a Template Matching Method with a Mobile-Sensory-Captured Point Cloud
15:30	I.11 Abdullah Alali Albik Cybersecurity Requirements in EU Machinery Regulation 2023/1230 and the Cyber Resilience Act and their Implications on European Machinery Manufacturers	II.11 Laura Dietl Inverse Reinforcement Learning for Pedestrian Trajectory Prediction	III.11 Florian Mallmann Perpendicular Preferential Directions Occurring on Thin PP GF20 Plaques	IV.11 Philipp Warter Investigation of approaches for automatic identification and localization of measurement sensors in P&ID plans using computer vision	V.11 Elias Hufnagel Power Cycling with integrated transient thermal analysis of copper sintered SIC Mosfets	VI.11 Simon Wösner Analysis and Evaluation of Control Strategies for Autonomous Mobile Robots	VII.11 Jenny Hofbauer Blue Team Fundamentals: Roles and Tools in a Security Operations Center	VIII.11 Jonas Winkler Enhancing 5G Campus Network Usability: A Software Solution Approach Using Open5GS
15:45	Short Break and Transfer							
16:00	I.12 Niklas Fellner Investigation of the weldability of additively manufactured components made of 316L using PBF-LB and WAAM processes	II.12 Mike Guttmann Research Agenda of Ethical Recommender Systems based on Explainable AI	III.12 Shirin Al-Motori Characterization of various natural rock aggregates for use in radiation shielding concrete	IV.12 Bastian Weißmüller Analysis of a Simulated Infrared Camera Model for Autonomous Driving Research	V.12 Sandra Plötz Frequency response analysis on rotating machines – accuracy of manual versus a semiautomated model parameterization	VI.12 Michaela Hlatky Enhancing Human-Robot Collaboration: A Study on Intuitive Communication Modalities	VII.12 Ivo Ivanov Linear time convex relaxation for truncated least squares problems in computer vision	VIII.12 Julian Stromberger Real-Time Data Integration in an Operation- Independent Simulation Model using a Smart Grid Approach
16:15	I.13 Christoph Langer Investigations on the separation of copper- and aluminum steel compounds	II.13 Philipp Kerler Identification of the functional potentials of AI: A structured literature review	III.13 Felix Bossenmaier Clay 3D Printing of Concrete Formwork	IV.13 Fabian Zak Precision testing and optimisation of sample positioning in correlative microscopy procedures	V.13 Johannes Ziller State space modelling in MATLAB by exporting an ANSYS model of an induction motor with electrodynamic actuators between motor feet and elastic steel frame foundation	VI.13 Shila Rastizahdeh Physicalising and Visualising Sensor Data for Telerobotics in Space using augmented tactile feedback in Augmented Reality	VII.13 Kerstin Leonhardt Definition and analysis of the driving task at rural road intersections based on the traffic situation, segmentation and subtask analysis	VIII.13 Md Moin Uddin MIET: A User-Centric Health Data Profiling Tool
16:30	I.14 Ferdinand Nibler Development of ceramic feeder heads for aluminium casting	II.14 Christian Molitor Elementary investigation of AI Based Force-Torque Controlled Assembly On-the-Fly	III.14 Sabrina Panzer Fluorine-free Sulfonated Polymer for PEM Fuel Cells	IV.14 Philipp Titl Diffraction of Zernike Modes due to Atmospheric Aberration in Telescopes	V.14 Tobias Riedel Construction and research on hydrogen combustion engines - model building	VI.14 Pascal Cambatzu Implementation of an OPC UA Application Programming Interface for Asset Administration Shells based on the BaSyx-Python-SDK	VII.14 Sebastian Lew Conception and modeling for the realization of resource-saving approaches for condition monitoring and quality assurance of production facilities	VIII.14 Jannis Unkrig A Simple and Scalable Approach for 3D Instance Segmentation
16:45	I.15 Elias Sänftl Optimization of the electrosynthesis of copper from a bottom ash digestion	II.15 Denis Trescher Validation of Synthetic Image Datasets using a Neural Network	III.15 Maximilian Strasser Cold spray forming: a novel approach in cold spray additive manufacturing of complex parts using 3D-printed polymer molds	IV.15 not yet allocated	V.15 not yet allocated	VI.15 Pascal Röll Language Models for Utilizing CVEs	VII.15 Mateus Moneta Development and Application of Analytical Equations for the Reduction of Computational Time in Temperature Field Calculation in DED Processes	VIII.15 Markus Zimmerer Development of a software to control the scanning strategy in electron beam-based additive manufacturing
17:00	check-out in front of KA.034							