# December 4:

**13:00 – 14:00 Registration**

Venue: Faculty of Mechanical Engineering, Brno University of Technology

Technická 2896/2, Brno, Czech Republic

**14:00 Opening ceremony**

**14:20 – 15:45 Section Avionics**

| time | ID | Authors | Title |
|------|----|---------|-------|
| | | Plenary lecture | |
| 14:15 | - | Luděk Janák, Sr Systems Engineering Supervisor, Honeywell Aerospace Technologies, Flight Systems COE | Development and Certification of Mechatronic Systems for Aircraft Applications: A Crash Course |
| 14:45 | Opportunity for mechatronics - Introduction of Horizon Europe BAANG project: Building Actions in Smart Aviation with Environmental Gains | | |
| 15:00 | 100 | Jan Bajer, Miroslav Hrstka, Zahra Sharif Khodaei, M.H. Aliabadi, Zdenek Hadas | Geometry Optimization of a Highly Flexible Gradient Metamaterial Structure Using a Differential Evolution Algorithm |
| 15:15 | 75 | Vojtěch Zůbek, Jakub Hnidka | Simplified 6DoF Flight Model of the Missile |
| 15:30 | 63 | Vadim Starý, Václav Křivánek | Integrating Mechatronics Principles in Modern Air Defence Systems |

**15:45 – 16:30 Coffee break**

**16:30 – 18:00 Section Modelling**

| time | ID | Authors | Title |
|------|----|---------|-------|
| 16:30 | 90 | Denys Zaikin | Comparison of Three-Winding Transformer Model Extraction Using FEMM and COMSOL Multiphysics® |
| 16:45 | 46 | Muhammad Imran Khan, Badr M. Alshammari | Modeling Quantum Ballistic Transport and Quantum Confinement of Carriers in Advanced 3D FinFET |
| 17:00 | 43 | Daniel Klíč, Martin Minarčík, Aleš Polzer, Jiří Tůma, Jiří Marek, Michal Holub | Digital twin for CNC machine tools design |
| 17:15 | 19 | Matija Hoić, Nenad Kranjčević, Dominik Birt | Design of an active seat suspension based on the Kempe mechanism |
| 17:30 | 80 | Vladimir Skrivanek, Ondrej Rubes, Zdenek Hadas | Modal Properties Tuning Analysis of Dynamic System with Piezoelectric Components |
| 17:45 | 71 | David Grasev, Adolf Jílek | A Novel Approach to Modeling of Compressor Characteristics |

**18:00 – 19:30 Posters & Welcome Drink**

| ID | Authors | Title |
|---|---|---|
| 14 | Igor Halenar, Bohuslava Juhasova, Martin Juhas, Lenka Halenarova | Design of a Smart Condition Monitoring System of Equipment in the Production Process |
| 15 | Lenka Halenarova, Pavol Tanuska, Bohuslava Juhasova, Martin Juhas, Igor Halenar | Design of a Data Collection Layer for Complementary Diagnostic and Condition Monitoring System of a Robotic Workplace |
| 16 | Chi Chen, Kuo-Shen Chen, Stanislav Vechet, Yu-Jun Kuo | An Integrated LCD Quality Assessment Flow based on the Integration of Image Processing, Ergonomics, and Machine Learning |
| 21 | Ľubica Miková, Erik Prada, Michal Kelemen, Ivan Virgala | Modelling a non-holonomic mechatronic system based on the bicycle chassis principle |
| 23 | Martin Juhás, Bohuslava Juhásová, Igor Halenár, Milan Daňo, Lenka Halenárová, Fedor Burčiar | StateFlow as a Tool of the Hybrid X-in-the-Loop Technique in the Model-Based Design Approach to the Control Systems Design in Industrial Automation |
| 25 | Fedor Burčiar, Martin Juhás, Bohuslava Juhásová, Pavel Važan, Igor Halenár, Lenka Halenárová | Automated Production Data Integration and Processing via Simulation Based Digital Twin |
| 30 | Akeel Othman, Dušan Maga, Jaromír Hrad | Energy-Aware Adaptive QoS Algorithm for IoT |
| 40 | Jean Motsch, Yves Bergeon, Vaclav Krivanek | Optimization of Hyperspectral Image Classification Using Monte Carlo-Based Band Reduction |
| 47 | Darina Hroncová, Patrik Šarga, Erik Prada, Ľubica Miková | Complete kinematic analysis of the joint variables of the robot mechanism during the end-effector's movement along a circular path |
| 49 | Joanna Bijak, Grazia Lo Sciuto, Zygmunt Kowalik, Tomasz Trawiński | 2D Finite Element modeling and analysis of single-turn coil configuration in magnetic spring energy harvester |
| 51 | Lukáš Sobotka, Aleš Palkovič, Jiří Teichman, Roman Pechánek | Parametric optimization of the cooling ducts of the PMSM |
| 52 | Jan Laksar, Martin Bělík, Karel Hruška | Additional Losses in the Winding under Higher Frequency Current |
| 55 | Ondrej Majercak, Jaroslav Romancik, Marek Vagas | IoT approach implementation based on flexible and robust Node-RED platform for workplace digitisation increasing |
| 59 | Paweł Dymora, Mirosław Mazurek, Maciej Szuberla | Implementation of artificial intelligence in Internet search |
| 60 | Paweł Dymora, Mirosław Mazurek, Jakub Adamek | Applying artificial intelligence methods to identify selected cybersecurity problems in computer networks |
| 61 | Shreyan Banerjee, Aasifa Rounak, Vikram Pakrashi | Adaptive Linear Control of a Cartpole using Minimum Spiking Neurons trained with Prescribed Error Sensitivity |
| 64 | Josef Casar, Vilem Hanus, Pavel Rehak | Sensors Combinations as a Key for Effective Air Defence |
| 65 | Erika Sujová, Daniela Vysloužilová, Vanessa Prajová, Alžbeta Klimentová | Optimization of the Aluminium Waste Sorting Process by Using Simulation Models |
| 69 | Stanislav Vechet, Jiri Krejsa, Kuo-Shen Chen | Vertical Stabilization of Bipedal Walking Drone PAVO with Proximal Policy Optimization |
| 70 | Petar Gljušćić, Marko Perčić, Saša Zelenika | Autonomous Energy Harvesting – based System for Honeybee Hive Monitoring |

| 88 | Daniel Ferreira, Armando Cordeiro, Luís Rocha, J. Fernando Silva, E. Romero Cadaval, C. Roncero Clemente, Daniel Foito, João F. Martins, V. Fernão Pires | Seven-Level Transformerless Inverter with a Double Boost Controlled Cell |
| --- | --- | --- |
| 89 | Tomasz Haniszewski, Jerzy Margielewicz, Sławomir Bucki, Damian Gąska | The influence of approximating the mechanical characteristics of a hyperelastic vibration amplifier on its dynamic properties |
| 93 | Robert Rakay, Marek Vagas | Usage and added value of IO-Link platform in the context of Industry 4.0 |
| 98 | Jerzy Margielewicz, Damian Gąska, Tomasz Haniszewski, Sławomir Bucki | Selected tools for the analysis of energy harvesters nonlinear dynamics |

**Poster Preparation Instructions**

1.  The maximum poster size is ISO standard A0 size, 84cm wide x 119cm (33in x 47in).

2.  There is no template for posters. However your poster should include:

    - The paper title and all authors at the top of the poster

    - A brief introduction, goals, experimental detail, conclusions, and references; presented in a logical and clear sequence

    - Explanations for each graph, picture, and table

3.  Use easily read type. Suggested minimum font sizes:

    - Title: 36-point type
    - List of authors: 25-point type
    - Body copy should be double-spaced text: 15-point type

4.  Make the poster as clear as possible, limit the text, and give preference to graphs and schemes.

5.  Put the poster up on the board with the corresponding number on December 4 before 5 pm. Supplies for attaching the poster will be available.

6.  The most successful posters are graphically rich presentations of your research that highlight and summarize the main points, with the poster presenter filling in the details in person at the session

# December 5:

**09:00 – 10:30 Sections Mechatronics I**

| time | ID | Authors | Title |
|------|-----|---------|-------|
| 9:00 | 56 | Suliman Badour, Martin Novák | Real-Time Vision-Based Fault Detection System for FDM 3D Printing Using Convolutional Neural Networks |
| 9:15 | 38 | Luca Andrea Mifsud, Kenneth Scerri, Mario Farrugia | Regression Analysis of Factors Affecting Round-Trip Regenerative Braking Efficiency using Real-World Data |
| 9:30 | 99 | Radek Musil, Radim Farana, Robert Rouš, Šimon Bilík | Fuzzy controller tuning methods for typical plant types |
| 9:45 | 37 | Luca Andrea Mifsud, Thor Scicluna, Kenneth Scerri, Mario Farrugia | Experimental Investigation of Downhill Regenerative Braking of Electric Vehicles from CAN Bus Data |
| 10:00 | 62 | Juraj Ďuďák, Daniel Gurín, Matúš Nečas | Design of a device for automatic evaluation of the level of individual perception of sensory stimuli |
| 10:15 | 96 | Huseyin Fatih SEN, Yavuz Selim TASPINAR | Body Performance Analysis with Machine Learning and ANOVA Methods |

**10:30 – 11:00 Coffee break**

**11:00 – 12:30 Section Electrical Devices and Machines**

| time | ID | Authors | Title |
|------|-----|---------|-------|
| 11:00 | 35 | Kusuma Priya Krovi, Jan Bauer | Control Strategy of Buck and Boost Converters using MATLAB Software |
| 11:15 | 101 | Petr Sosna, Zdenek Hadas | Power Optimization of Hybrid Energy Harvestering from Mechanical Vibrations Using Piezoelectric and Electromagnetic Mechanisms |
| 11:30 | 50 | Karel Hruska, Lukas Sobotka, Zdenek Frank, Jan Laksar | Optimal Parameters Choice for Synchronous Reluctance Machines |
| 11:45 | 66 | Patrik Kalaj, Radek Čermák | Iron loss in multiphase machines |
| 12:00 | 91 | Hikaru Suzuki, Katsuhiro Hirata, Noboru Niguchi | Torque Improvement Method for Flux Modulated Motor by Inserting Magnets between Pole Pieces |
| 12:15 | 92 | Kaito Hori, Katsuhiro Hirata, Noboru Niguchi | Bearingless Magnetic-Geared Motor Achieving Both Stable Magnetic Levitation and High Torque |

**12:30 – 13:30 Lunch**

**13:30 – 14:45 Section Measurement**

| time | ID | Authors | Title |
|------|-----|---------|-------|
| 13:30 | 77 | Marek Nowakowski | Operational environment impact on sensor capabilities in special purpose Unmanned Ground Vehicles |
| 13:45 | 102 | Alena Hajkova, Milos Hammer | Application of Modern Approaches to Solving Diagnostic Tasks in Industry |
| 14:00 | 44 | Andrej Potanko, Adam Jelínek, Tomáš Marek, Aleš Polzer, Libor Žák, Michal Holub | Case study of the influence of linearity uncertainty on the applicability and capability of CNC machine tools |
| 14:15 | 45 | Mikuláš Szabari, Jan Berhold, Jan, Vetiška, František Bradáč, Michal Holub, Martin Dix | Case study of Robot Machining at different working space locations |
| 14:30 | 13 | Denis Benka, Gabriel Gaspar, Roman Budjac, Rastislav Elias, Martin Skovajsa | Design and Implementation of the Grouting Process Measurement Device with a Datalogger |

**14:45 – 15:15 Coffee break**

**15:15 – 16:15 Section Robots**

| time | ID | Authors | Title |
|------|-----|---------|-------|
| 15:15 | 74 | Ramy ElMallah, Nima Zamani, Chi-Guhn Lee | Human 0, MLLM 1: Unlocking New Layers of Automation in Language-Conditioned Robotics with Multimodal LLMs |
| 15:30 | 94 | Soňa Michalková, Kryštof Wojnarowský, Šimon Kolenyák, Matěj Kantor, Jakub Arm | Design a Coffee-making Process Unit using Virtual Twin and Virtual Commissioning |
| 15:45 | 54 | Ondrej Vanicek, Michal Chalus, Jindrich Liska | Coverage Path Planning for Robotic Laser Surfacing Applications Based on 3D Scanning |
| 16:00 | 57 | Suliman Badour, Martin Novák | Kinematic Analysis and Torque Dynamics of a 5-DOF Robotic Manipulator for Enhanced Precision and Fault Detection in FDM 3D Printing |

**18:30 Concert – Folk band Okybača**

**19:00 conference dinner**

# December 6:

**09:00 – 10:30 Section Measurement and Monitoring**

| time | ID | Authors | Title |
|------|-----|---------|-------|
| 9:00 | 27 | Lukáš Zdražil, Zdeněk Roubal | Electrical Properties Measurement of Building Materials |
| 9:15 | 39 | Thor Scicluna, Mario Farrugia | Experimental Investigation of an AdBlue® Injection System and Implementation on a Dual-Fuel (Diesel/LPG) Engine |
| 9:30 | 68 | Pavel Krýsl, Martin Jára | Design of current measurement circuit using PCB Rogowski coils for resonant converters |
| 9:45 | 73 | Jan Hejda, Patrik Kutilek, Petr Volf, Marek Sokol, Lydie Leova, Jan Tonner, Markéta Hejsková, Veronika Kotolová, Miroslav Rozloznik, Tommy Sugiarto, Yi-Jia Lin, Kun-Lun Huang, Wei-Chun Hsu | Wearable System for Monitoring the Physical Conditions in Isolated, Confined and Extreme Environments |
| 10:00 | 86 | Diogo Marciano, Mafalda Seixas, Rita Pereira, Armando Cordeiro, Rui Guerreiro, José G. Lopes, V. Fernão Pires, Daniel Foito, Sónia F. Pinto | Improving Safety Roads with LoRa Communication Devices: Features and Limitations |
| 10:15 | 82 | Jeong-Tae Kim, Quoc-Bao Ta, Ngoc-Lan Pham | Integrated monitoring of stress and damage using CNN deep learning of electromechanical impedance responses of CSA sensor |

**10:30 – 11:00 Coffee break**

**11:00 – 12:30 Section Mechatronics II**

| time | ID | Authors | Title |
|------|-----|---------|-------|
| 11:00 | 79 | Snajder Jan, Krejsa Jiri | Automation-Driven Dataset Preparation for Continuous Czech Sign Language Recognition |
| 11:15 | 26 | Daniel Stümke, Simon Peter, Daniel Görges | Ellipse Fitting With a Dual Kalman Filter for an Adaptive Angle Tracking Observer |
| 11:30 | 97 | Denis Benka, Gabriel Gaspar, Veronika Nemlahova, Eduard Nemlaha, Roman Budjac | Proposal of a Remote-Control System for Building Lighting Management |
| 11:45 | 76 | Mario Hirz, Christian Flechl, Nathanael Schachner, Alexander Pommer | Novel concept for automated charging of professional electric vehicle fleets |
| **Plenary lecture** | | | |
| 12:00 | 10 | Jui-Chien Tu, Yun-luang Wang, Jia-Chang Wang, Filip Ksica, Zdenek Hadas | Development of Integrated 3D Printing and Automated Embedding System |

**12:30 Closing ceremony**

**13: 00 lunch**