



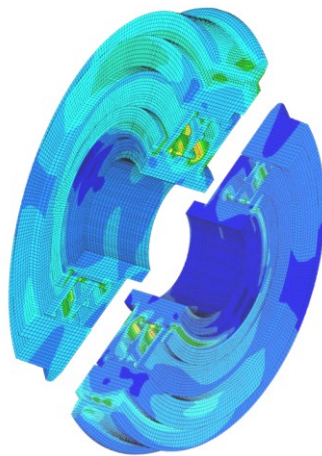
**Alexander Dubček University of Trenčín  
Faculty of Industrial Technologies in Púchov**

**The 30<sup>th</sup> International  
Slovak-Polish Scientific Conference**

**on**

**Machine Modelling and Simulations**

**MMS 2025**



**CONFERENCE PROGRAMME**

**September 2 – 5, 2025**

**Tále, Slovakia**

**Tuesday – September 2, 2025**

11:00 – 15:00 Registration of participants  
12:30 – 14:30 Lunch  
15:00 – 16:00 Opening ceremony  
16:00 – 16:15 Coffee break  
16:15 – 17:45 Invited lectures  
19:00 – 21:00 Dinner

**Wednesday – September 3, 2025**

07:30 – 09:00 Breakfast  
09:00 – 09:15 Sponsor lecture  
09:30 – 10:45 Lectures – Sessions A1, B1, C1  
10:45 – 11:15 Coffee break  
11:15 – 12:30 Lectures – Sessions A2, B2, C2  
12:30 – 14:00 Lunch  
14:00 – 15:15 Lectures – Sessions A3, B3, C3  
15:15 – 15:45 Coffee break  
15:45 – 16:45 Lectures – Sessions B4, C4  
18:45 – 19:00 Official photo  
19:00 – 02:00 Gala evening

**Thursday – September 4, 2025**

07:30 – 09:00 Breakfast  
09:00 – 13:00 Time for free social program  
13:00 – 14:30 Lunch  
14:30 – 15:45 Lectures – Sessions B5, C5  
15:45 – 16:00 Coffee break  
16:00 – 17:15 Lectures – Sessions B6, C6  
17:30 – 18:30 Meeting of Scientific Committee  
19:00 – 22:00 Grill party  
22:00 – 01:00 Disco

**Friday – September 5, 2025**

07:30 – 09:00 Breakfast  
9:00 – 10:00 Lectures – Session A4  
Contest evaluation  
Closing of the conference

## Tuesday – September 2, 2025

### Invited Lectures, 16:15 – 17:45

Chairman: Prof. Darina Ondrušová, Prof. Marek Macko

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***Polyoxymethylene hybrid composites containing alumina oxide: effect of amino polysilsesquioxane on the ageing resistance***

Dorota Czarnecka-Komorowska, Dominika Przelazła, Karolina Wiszumirska, Wiktoria Kanciak, Katarzyna Gawdzińska

***Predicting the creep compliance of short fiber reinforced polymer composites from the matrix creep using an elementary approach***

Bernhard Möginger, Julian Rech, Berenika Hausnerova

***Modelling and Simulation of a Mechatronic System Actuated by Pneumatic Artificial Muscles in Matlab/Simulink***

Vladimír Bulej, Juraj Uriček, František Jozef Legerský, Andrzej Piotrowski, Piotr Boral

## Wednesday – September 3, 2025

### Sponsor Lecture, 09:00 – 09:15

Chairman: Assoc. Prof. Róbert Janík

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***Advanced atmospheric plasma technologies for surface modification of materials and coatings***

RNDr. Richard Krumpolec, PhD.

CEPLANT - R&D centre for Plasma and Nanotechnology Surface Modifications, Masaryk University, Brno

## **Session A1, 09:30 – 10:45 (Presentation contest)**

Chairman: Prof. Alžbeta Sapietová, Assoc. Prof. Tomasz Domański,  
Prof. Jan Krmela, Prof. Michal Bembenek

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### ***Extended numerical analysis of the effect of metering unit inclination on fertilizer dose – simulation results and validation***

Wiktor Jan Łykowski, Łukasz Gierz

### ***Conceptual design of a simulation model for bulk material transport by pipe conveyor***

Bohdana Bobinics, Daniela Marasová

### ***Hybrid executive system for welding processes integrating cam mechanisms and electronic motion profiles***

Karol Wójkowski, Dominik Wilczyński, Dominik Wojtkowiak

### ***Redesign of the tactical water filter FPW-50 through additive manufacturing***

Adam Zabrowarny, Marek Macko

### ***Physical and chemical alterations of NR composite induced by atmospheric-pressure plasma***

Mariana Pajtášová, Silvia Ďurišová, Darina Ondrušová, Róbert Janík, Zuzana Mičicová, Oľga Novosadová, Simona Lokšíková

## **Session B1, 09:30 – 10:45**

Chairman: Assoc. Prof. Ján Vavro, Prof. Grzegorz Jan Domek

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### ***Numerical analysis of deformation of a wind turbine blade with variable geometry controlled by means of centrifugal force***

Jarosław Markowski, Grzegorz Wieczorkiewicz, Paweł Imilkowski, Piotr Długiewicz

### ***Stamping of thick sheets after welding process***

Waldemar Matysiak

### ***Influence of the geometry and support conditions of the steel facing band on the local instability of the sandwich panel***

Jolanta Pozorska, Zbigniew Pozorski

### ***The concept of designing 3D printed parts with improved mechanical properties by splitting part into segments and assembling after printing***

Dominik Wojtkowiak

### ***Assessment of thermal stability and surface morphology of flat belts made of leather***

Piotr Krawiec, Grzegorz Domek, Adam Piasecki, Radomir Majchrowski

### **Session C1, 09:30 – 10:45**

Chairman: Assoc. Prof. Vladimíra Krmelová, Assoc. Prof. Branislav Ftorek

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#### ***Low-Range Rotary Torque Meter with Hall Sensors***

Jakub Bartoszuik, Maciej Bodnicki

#### ***Basic experimental research supporting the modeling of Vacuum Packed Particles using the Discrete Element Method***

Paweł Chodkiewicz, Arthur Bourdin, Robert Zalewski

#### ***Experimental investigations of the load state in a threaded connection***

Kuba Kryszczyński, Dominik Wilczyński, Krzysztof Wałęsa, Krzysztof Talaśka

#### ***Strain measurement using a 3D image correlation system during three-point bending***

Marcin Kubiak, Tomasz Domański, Zbigniew Saternus, Wiesława Piekarska, Krzysztof Talaśka

#### ***Experimental and simulation investigation of a Tuned Mass Damper (TMD) with adjustable inertia for engineering applications***

Igor Kotłowski, Cezary Korab, Krzysztof Twardoch, Bogumił Chiliński

## **Session A2, 11:15 – 12:30 (Presentation contest)**

Chairman: Prof. Alžbeta Sapietová, Assoc. Prof. Tomasz Domański,  
Prof. Jan Krmela, Prof. Michal Bembenek

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### ***Ultrasonic-based active thermography for determining depth detection limits in Onyx composites***

Lucia Deganová, Vladimír Dekýš, Milan Sapieta, Alžbeta Sapietová

### ***Weld pool detection and analysis from images using deep learning methods***

Przemysław Frankiewicz, Jan Pawlik, Michał Bembenek

### ***Changes in properties over time in paper heritage objects – ARTEMISA web application***

Martina Fusková, Jan Krmela, Vladimíra Krmelová

### ***Study of mixing and curing process of elastomeric blends with alternative filler content***

Ivan Labaj, Juliána Vršková, Petra Skalková, Ivan Kopal, Darina Ondrušová, Zuzana Mičicová,  
Slavomíra Božeková

### ***Mechanical properties of polymer composites with walnut shell powder and cellulose***

Juliána Vršková, Ivan Labaj, Petra Skalková, Ivan Kopal, Zuzana Mičicová, Slavomíra Božeková,  
Darina Ondrušová

## **Session B2, 11:15 – 12:30**

Chairman: Assoc. Prof. Andrea Feriancová, Assoc. Prof. Marcin Kubiak

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### ***Study of physical aspects of changes in the morphology parameters of the surface layer after machining using LFV technology***

Piotr Boral, Rafał Gołębski, Adam Gnatowski

### ***Alternative methods for simulating dynamic phenomena in containers for transporting sensitive cargo***

David Cekus

### ***The impact of the functional on the quality of the heat transfer coefficient mapping under fourth kind boundary conditions using swarm algorithms***

Robert Dyja, Maria Zych, Elżbieta Gawrońska

### ***Estimation of the heat transfer coefficient for three ranges of reference values under fourth-kind boundary conditions using swarm algorithms***

Maria Zych, Robert Dyja, Elzbieta Gawronska, Grzegorz Domek

### ***Conceptual design with strength analysis based on the FOPS test for a tubular cover dedicated to the Kubota M135GX-IV tractor***

Łukasz Gierz

## **Session C2, 11:15 – 12:30**

Chairman: Assoc. Prof. Dana Bakošová, Assoc. Prof. Sebastian Uzny

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### ***Comparative wear analysis of Q&P treated AHSS steel***

Michal Krbaťa, Marcel Kohutiar, Milan Jus, Alena Breznická, Pavol Mikuš, Jozef Fekiač, Lucia Kakošová

### ***The effect of fuel content on engine oil life***

Pavol Mikuš, Alena Breznická, Marcel Kohutiar, Michal Krbaťa, Milan Jus, Lucia Kakošová, Jozef Fekiač

### ***The trade-off between strength parameters and residual stresses in modern engineering materials***

Łukasz Urbaniak

### ***Analysis of the preparation and magnetic properties of Fe/SiO<sub>2</sub> soft magnetic composites***

Denisa Olekšáková, Livia Provázková, Lucia Knapčíková, Stephan Schlögl

### ***Enhancing of the progressive materials production process using Tecnomatix Plant Simulation software***

Lucia Knapčíková, Denisa Olekšáková, Maksym Karakai, Christian Plode

### **Session A3, 14:00 – 15:15 (Presentation contest /part)**

Chairman: Prof. Alžbeta Sapietová, Assoc. Prof. Tomasz Domański,  
Prof. Jan Krmela, Prof. Michal Bembenek

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***Fourier transform based identification of spectral properties of nonlinear mechanical systems***

Ján Minárik, Milan Sága, Milan Vaško, Branislav Ftorek, Tomasz Domański

***Research stand for determining the tension force in transport straps***

Maciej Szulc, Dominik Wilczyński, Dominik Wojtkowiak, Krzysztof Talaśka

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***FE analysis of multiaxial fatigue damage prediction of transport machinery frames***

Lenka Jakubovičová, Milan Sága, Milan Vaško

***Concept of numerical modelling and simulation in machine crushing processes***

Jarosław Seńko

***Comparative analysis of the transmissibility functions of passive, Acceleration-Driven Damping (ADD) semiactive, and inerter-based suspension systems and their influence on ISO road random excitation responses***

Grzegorz Waldemar Ślaski, Zbyszko Klockiewicz

### **Session B3, 14:00 – 15:15**

Chairman: Assoc. Prof. Milan Vaško, Assoc. Prof. Krzysztof Talaśka

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***Simulation model of CNC cell***

Milan Jus, Alena Breznická, Pavol Mikuš, Marcel Kohutiar, Michal Krbaťa, Maroš Eckert

***Modeling the influence of carbon black type and loading on the mixing dynamics of rubber blends using a Generalized Regression Neural Network***

Ivan Kopaľ, Juliána Vršková, Ivan Labaj, Marta Harničárová, Jan Valíček

***New method of adjusting flow parameters of axial fans***

Piotr Odyjas, Ivan Kuric, Marek Macko, Damian Pietrusiak, Milan Sága, Andrzej Szczepańczyk, Zbigniew Szczepańczyk, Mariusz Śliwiński, Kamil Urbański, Milan Vaško, Jędrzej Więckowski, Przemysław Moczko

***Modular online system for beam bending monitoring***

Tibor Krenický, Vitalii Romaniuk

***Discrete Element Method in modelling of the lunar regolith***

Damian Pietrusiak, Jakub Wróbel, Przemysław Moczko, Piotr Czyżewski, Dawid Marciniak

### **Session C3, 14:00 – 15:15**

Chairman: Prof. Piotr Boral, Prof. Marek Kočiško

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***Analysis of the anti-slip properties of sidewalks and road surfaces in the area of pedestrian crossings and parking lots***

Konrad Jan Waluś

***Determining the Air-Fuel Ratio (AFR) for gasoline and gasoline-ethanol blends (E5 and E10): Differences in calculation methods and technical and commercial simplifications***

Łukasz Warguła, Daniel Małozieć, Piotr Kaczmarzyk, Bartosz Wieczorek

***Influence of the geometric parameters of connection for utility properties of timing belt***

Dominik Wilczyński, Dominik Wojtkowiak, Krzysztof Wałęsa, Grzegorz Domek, Michał Wilczyński

***Experimental and numerical investigation of a electromagnetic impact damper with variable mass***

Mateusz Żurawski

***Research and properties of porous structures***

Maciej Berdychowski

## Session B4, 15:45 – 17:00

Chairman: Assoc. Prof. Dawid Cekus, Prof. Vladimír Bulej

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***Dynamics simulations of Vacuum Packed Particles Torsional Damper using a modified Bouc-Wen model identified from quasi-static experiments***

Dominik Rodak, Mateusz Żurawski, Robert Zalewski

***Modelling of mechanical properties of thermoplastic elastomer for simulation of belt welding process***

Krzysztof Wałęsa, Krzysztof Talaśka, Dominik Wilczyński

***Study of the dynamic-mechanical properties of polymeric blends for a novel material component in sustainable bulk material transport***

Róbert Janík, Ivan Labaj, Darina Ondrušová, Mariana Pajtášová, Jan Krmela, Daniela Marasová, Olga Novosadová

***Effect of cold plasma on surface and tribological properties of 34CrNiMo6 steel***

Marcel Kohutiar, Michal Krbaťa, Alena Breznická, Pavol Mikuš, Milan Jus, Maroš Eckert, Ingrid Kovaříková

***The effect of processing temperature on the properties of thin TiO<sub>2</sub> films on a steel substrate***

Iveta Papučová, Jana Pagáčová, Jana Šulcová, Andrea Feriancová, Igor Barényi, Marcel Kohutiar, Aleksandra Ewa Nowicka

## Session C4, 15:45 – 17:00

Chairman: Assoc. Prof. Denisa Olekšáková, Assoc. Prof. Michal Krbaťa

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***Alternative fillers in polymers: an expert view on innovation and environmental solutions***

Slavomíra Božeková, Zuzana Mičicová, Darina Ondrušová, Iveta Papučová, Petra Skalková, Ivan Labaj, Juliána Vršková

***Silane modification of bentonite using a microwave system for application in polymer composites***

Zuzana Mičicová, Slavomíra Božeková, Mariana Pajtášová, Petra Skalková, Juliána Vršková, Ivan Labaj

***Effect of cellulose microfibrils physical treatment on mechanical adhesion in elastomer blend***

Andrej Dubec, Ivan Labaj, Petra Dubcová, Juliána Vršková, Dana Bakošová, Alžbeta Bakošová

***Effect of recycled PP/EPDM on the performance of NR-based elastomeric systems***

Petra Skalková, Ivan Labaj, Zuzana Mičicová, Slavomíra Božeková, Juliána Vršková

***The effect of NaOH concentration as stabiliser on the properties of aqueous SiO<sub>2</sub> sols and their xerogels***

Iveta Papučová, Jana Pagáčová, Petr Exnar, Andrea Feriancová

## **Thursday – September 4, 2025**

### **Session B5, 14:30 – 15:45**

Chairman: Prof. Piotr Krawiec, Assoc. Prof. Damian Pietrusiak

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***Effect of manufacturing inaccuracies on the Peaucelier linear mechanism***

Alžbeta Sapietová

***New device for manufacturing highly-filled composites from polymer waste***

Tomasz Klepka

***Strain field determination for additively manufactured thermoplastics using computer vision***

Jaroslav Majko, Ondrej Piroh, Ján Minárik, Milan Vaško, Marián Handrik, Milan Sága, Zbigniew Saternus

***Influence of the thermal load on piezoelectric solids at micro/nano scale***

Miroslav Repka

***Bending of functionally graded micro/nano plates with flexoelectric effect by Moving Finite Element Method***

Ladislav Sátor, Miroslav Repka

### **Session C5, 14:30 – 15:45**

Chairman: Prof. Dorota Czarnecka-Komorowska, Prof. Bernhard Möglinger

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***A note on the Thomas-Fermi equation***

Božena Dorociaková, Rudolf Olach, Zuzana Malacká

***Comparative analysis of extreme value distributions for modeling particulate matter air pollution in Trenčín, Slovakia***

Ivana Pobočíková, Mária Michalková, Daniela Jurášová, Zuzana Sedliačková, Branislav Ftorek

***Analysis of the influence of laser welding parameters on the quality of the lap joint***

Zbigniew Saternus, Wiesława Piekarska, Tomasz Domański, Ján Vavro Jr., Marcin Kubiak, Pavol Čerňava

***Stability of a column loaded with a follower force directed towards the negative pole, taking into account two stiffness discontinuities***

Sebastian Uzny

***Comparison and verification of stress measurement results using the Barkhausen effect during three-point bending***

Tomasz Domański, Wiesława Piekarska, Milan Sága, Zbigniew Saternus, Marcin Kubiak, Milan Vaško

## Session B6, 16:00 – 17:15

Chairman: Assoc. Prof. Tibor Krenický, Assoc. Prof. Przemysław Moczko

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### ***Parameters of the compaction process of aluminium alloy chips after machining***

Krzysztof Talaśka, Łukasz Urbaniak, Dominik Wilczyński, Dominik Wojtkowiak, Marcin Kubiak, Krzysztof Wałęsa

### ***Experimental measurement of defects propagation for a passenger car tire casing under dynamic loading***

Ján Vavro jr., Ján Vavro, Pavol Čerňava, Lukáš Klimek, Miloš Taraba, Tomasz Domański, Zbigniew Saternus, Petra Dubcová

### ***FDM produced PLA prototype car parts – design and tensile properties***

Jan Krmela, Vladimíra Krmelová, Terézia Matejíková, Martina Fusková

### ***Optimized welding of austenitic chromium-nickel steel rollers of food machinery and lines***

Marek Makúch, Jan Krmela, Vladimíra Krmelová

### ***Microscopic and macroscopic examination of structural elements of a knee endoprosthesis made using DMLS technology***

Jakub Lewandowski, Jacek Jackiewicz

## Session C6, 16:00 – 17:15

Chairman: Assoc. Prof. Petra Skalková, Prof. Ján Vavro

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### ***Microwave treatment of kaolinite with organic reagents as a filler for rubber compounds***

Andrea Feriancová, Jana Šulcová, Jana Pagáčová, Iveta Papučová, Beáta Pecušová, Mariana Pajtášová, Andrej Dubec

### ***Characterisation of TiO<sub>2</sub> thin films on various metallic substrates***

Jana Šulcová, Andrea Feriancová, Iveta Papučová, Jana Pagáčová, Jan Krmela, Alexandra Ewa Nowicka

### ***Effect of heat treatment on material properties***

Mariana Janeková, Daniela Košťaliková, Dana Bakošová, Andrej Dubec, Petra Dubcová, Alžbeta Bakošová, Milan Hlavčo

### ***Stress analysis of the bicycle frame***

Daniela Košťaliková, Mariana Janeková, Dana Bakošová, Petra Dubcová, Alžbeta Bakošová, Marek Kuvik

### ***Study of physical and mechanical properties of elastomer systems for a new material element of a pipe conveyor***

Darina Ondrušová, Ivan Labaj, Mariana Pajtášová, Jan Krmela, Róbert Janík, Daniela Marasová

## **Friday – September 5, 2025**

### **Session A4, 09:00 – 10:00**

Chairman: Assoc. Prof. Jana Šulcová, Assoc. Prof. Vladimír Dekýš

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***ESPI interferometry and computational modeling in the analysis of vibration modes and material parameters of polyamide-based composites reinforced with carbon fibers***

Dana Bakošová, Alžbeta Bakošová, Petra Dubcová, Daniela Košťaliková, Andrej Dubec, Mariana Janeková

***The influence of micropurity on the failure of the steel reinforcement in the production process***

Petra Dubcová, Ján Vavro, Jr., Ján Vavro, Andrej Dubec, Alžbeta Bakošová, Dana Bakošová,  
Daniela Košťaliková, Mariana Janeková

***The effect of accelerated weathering tests on the properties of materials in the exterior***

Katarína Moricová, Jana Šulcová, Andrea Feriancová