

MD2025.

International Conference on Machine Design 2025

Programme

11-12 SEPTEMBER 2025

Faculty of Engineering – University of Porto
Porto, Portugal

U. PORTO
FEUP FACULDADE DE ENGENHARIA
UNIVERSIDADE DO PORTO

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Programme

Author name underlined → presenting author

Time	Thursday 11 September 2025	
08:40	MD2025 Opening (Room B032)	
	Session 1: Machine Automation & Testing I (Chair: L. F. M. da Silva, University of Porto, Portugal; A. M. Lopes, University of Porto, Portugal)	
	Room B032	
09:00	PLENARY LECTURE: Design, Fabrication and Control of Soft Robot Actuators <u>Pedro Neto</u> (Mechanical Engineering Department, University of Coimbra, Portugal)	
09:40	Modeling and Simulation of the Dynamics of Robotic Hand Grasping of Multiple Cylindrical Objects by a Discrete Element Method Approach Y. A. Caicedo, <u>L. E. Chiang</u> (Mechatronics Systems Lab, Santiago, Chile)	MD25_1
10:00	Design and Validation of a Custom Apparatus for Cyclic Creep Testing of Pressure-Sensitive Adhesives <u>B. D. Simões</u> (Institute of Science and Innovation in Mechanical and Industrial Engineering (INEGI), Porto, Portugal), E. M. D. Fernandes, E. A. S. Marques, R. J. C. Carbas, S. Maul, P. Stihler, P. Weißgraeber, L. F. M. da Silva	MD25_2
10:20	Developing Two Multiaxial Testing Machines to Measure Multiaxial Strength of Weak Snow Layers <u>J. Schöttner</u> (WSL Institute for Snow and Avalanche Research SLF, Flüelastrasse, Davos Dorf, Switzerland), E. Marques, B. Eggert, M. Walet, R. Carbas, V. Adam, M. Hohl, P. Weißgraeber, P. Rosendahl, M. Piecuch, S. Kraus, F. Rheinschmidt, M. Hedvard, L. F. M. da Silva, J. Schweizer, A. van Herwijnen	MD25_3
10:40	COFFEE BREAK (Coffee Lounge) Session 2: Machine Automation & Testing II (Chair: Luciano Chiang, Mechatronics Systems Lab, Santiago, Chile; R. J. C. Carbas, INEGI, Porto, Portugal)	
	Room B032	
11:00	Motorecycle Model in Cornering Situation <u>Massimo Cavacece</u> (University of Cassino and Southern Latium, Cassino, Italy)	MD25_4
11:20	Hydrodynamic Modeling and Field Evaluation of a Towed Underwater Vehicle <u>A. P. Carboni</u> (Federal University of Santa Catarina, Campus Joinville, Brazil), A. Z. Salvi, T. A. Fiorentin, F. K. Fiorentin, G. P. De Miranda, L. S. T. Matos, L. G. Barcaro, A. C. Fajarra	MD25_5
11:40	Energy minimization in the control of servo-hydraulic systems using dynamics found in planet formation <u>Rodrigo M. C. Bernardo</u> (Mechanical Engineering Department, University of Aveiro, Portugal), Marco P. Soares dos Santos	MD25_45
12:00	Modular Learning Platform for Industrial Automation Using OMRON Systems: A Hands-On Approach to Industry 4.0 Technologies <u>Filipe Pereira</u> (School of Engineering of Porto (ISEP), Polytechnic of Porto, Portugal), Adriano Santos, António Silva, Carlos Felgueiras, and António Ramos	MD25_7
12:20	An Analytical and Experimental Approach for Characterizing Vibration Attenuation Properties of Particle Dampers Systems <u>Felipe Klein Fiorentin</u> (Federal University of Santa Catarina, Campus Joinville, Brazil), Arthur Prieto, Anelize Zomkowski Salvi, Andrea Piga Carboni, Thiago Antonio Fiorentin	MD25_6

12:40	Mechanics of Tire-Terrain Interaction <u>Massimo Cavacece</u> (University of Cassino and Southern Latium, Cassino, Italy)	MD25_9
13:00	LUNCH BREAK (Coffee Lounge)	
	Session 3: Machine Elements & Mechanisms I (Chair: <u>Andrea P. Carboni</u> , Federal University of Santa Catarina, Campus Joinville, Brazil; <u>E. Marques</u> , University of Porto, Porto, Portugal)	
	Room B032	
14:00	PLENARY LECTURE: Computational Approaches for Better Gear Performance and Design <u>Alfonso Fuentes-Aznar</u> (Rochester Institute of Technology: Rochester, New York, US)	
14:40	Fundamental Design of a Tool Holder with an Internal Cooling Channel <u>S. Wakiya</u> (Kanagawa University, Yokohama, Kanagawa, Japan), Y. Nakao	MD25_10
15:00	Hysteresis in Torsion Springs C. Bono, <u>H. Font</u> (ICA, Université de Toulouse, UPS, INSA, ISAE-SUPAERO, MINES-ALBI, CNRS, France), M. Paredes	MD25_13
15:20	Role of Granular Layer Thickness in Impact Absorption <u>B. Panić</u> (University of Ljubljana, Faculty of Mechanical Engineering, Slovenia), S. Avdić, M. Nagode, J. Klemenc, I. Emri, S. Oman	MD25_14
15:40	Geometry Optimization to Improve Helical Springs Reliability: An Approach based on Material Variabilities <u>G. Cadet</u> (ICA, UPS, INSA, ISAE-SUPAERO, MINES-ALBI, CNRS, Toulouse, France), M. Paredes	MD25_12
16:00	COFFEE BREAK (Coffee Lounge)	
	Session 4: Machines I (Chair: <u>Alfonso Fuentes-Aznar</u> , Rochester Institute of Technology, USA; <u>Alireza Akhavan-Safar</u> , Institute of Science and Innovation in Mechanical and Industrial Engineering (INEGI), Porto, Portugal)	
	Room B032	
16:20	Development of an Inertial Test Bench for Brake Pad Particulate Matter Emission Analysis V. G. G. Catão, L. Bernardino, A. S. Zomkowski, F. K. Fiorentin, T. A. Fiorentin, <u>A. P. Carboni</u> (Federal University of Santa Catarina, Campus Joinville, Brazil)	MD25_16
16:40	Control of servo-hydraulic systems using dynamics found in Black Holes <u>Rodrigo M. C. Bernardo</u> (Mechanical Engineering Department, University of Aveiro, Portugal), Delfim F. M. Torres, Carlos A. R. Herdeiro, Marco P. Soares dos Santos	MD25_44
17:00	Benchmarking and Establishment of Design Guidelines for the Development of Alternative Radiator Guards for Off-Road Motorcycles <u>A. F. V. Pedroso</u> (CIDEM, ISEP, Polytechnic of Porto, Portugal), F. J. G. Silva, R. D. S. G. Campilho, Naiara P. V. Sebbe, Rúben D. F. S. Costa, César B. Santos	MD25_18
17:20	Easy Quality Control at Pick & Place <u>A. A. Santos</u> (ISEP-Polytechnic of Porto, Portugal), M. Pinto, I. Azevedo, F. Pereira, A. F. Silva, P. Silva, C. Felgueiras	MD25_19
17:40	Development and validation of an underwater image perception system <u>D. Moreira</u> (INESC TEC, Faculdade de Engenharia, Universidade do Porto, Portugal), J. M. M. Dionísio, J. Bessa, P. Pereira, R.D.S.G. Campilho, A. Pinto	MD25_43
18:00	Leveraging LoRaWAN for Industrial IoT: Opportunities and Challenges <u>G. Mendes</u> (Faculdade de Engenharia da Universidade do Porto, Portugal), D. Sousa, A. M. Lopes	MD25_20
18:20	Guided visit to the AJPU Lab. (room M103)	

Poster 1	Performance of a Split Hopkinson Pressure Bar with a Novel Pneumatic Impactor R. J. C. Carbas (Instituto de Ciência e Inovação em Engenharia Mecânica e Engenharia Industrial (INEGI), Porto, Portugal), C. M. da Silva, A. M. Lopes, E. A. S. Marques, L. F. M. da Silva	MD25_23
Poster 2	Development of Novel Testing Equipment for Mechanical Characterization of Complex Materials E. A. S. Marques (Faculdade de Engenharia, Universidade do Porto, Portugal), R. J. C. Carbas, C. M. da Silva, A. M. Lopes, L. F. M. da Silva	MD25_26
Poster 3	Development of a Unified Specimen for Direct Generation of Cohesive Zone Law Data of Adhesives D. S. Correia (Instituto de Ciência e Inovação em Engenharia Mecânica e Engenharia Industrial (INEGI), Porto, Portugal), E. A. S. Marques, R. J. C. Carbas, L. F. M. da Silva	MD25_27
Poster 4	Development and Evaluation of a Flexible Tool for Hole Hemming of Dissimilar Lightweight Materials M. M. Kasaei (Institute of Science and Innovation in Mechanical and Industrial Engineering (INEGI), Porto, Portugal), E. A. S. Marques, R. J. C. Carbas, L. F. M. da Silva	MD25_17
Poster 5	Hele-Shaw Cell Design for Experimental Analysis of Adhesive Flow P. M. S. Almeida, A. Akhavan-Safar (Institute of Science and Innovation in Mechanical and Industrial Engineering (INEGI), Porto, Portugal), R. J. C. Carbas, E. A. S. Marques, J. Hrachova, H. Leenders, L. F. M. da Silva	MD25_15
Poster 6	7 DoF Parallel Robot Controller Based on Neural Networks and the Model of Hierarchical Complexity A. L. Cunha, F. Silva, S. Leite, A. M. Lopes, A. R. Silva (Faculty of Engineering of the University of Porto, Portugal)	MD25_30
Poster 7	Compact and Cost-Effective Educational Kit to Teach Key Concepts of Industry 4.0 and Industrial Internet of Things (IIoT), Using the FINDER OPTA Smart Programmable Logic Controller (PLC) Filipe Pereira (School of Engineering of Porto (ISEP), Polytechnic of Porto, Portugal), Adriano Santos, António Silva, Carlos Felgueiras, and António Ramos	MD25_8
Poster 8	Study of Adhesive Squeezing Flow using a Modified Hele-Shaw Cell Device P.M.S. Almeida (Faculdade de Engenharia, Universidade do Porto, Portugal), A. Akhavan-Safar, D. Garcia, R.J.C. Carbas, E.A.S. Marques, J. Hrachova, H. Leenders, L.F.M. da Silva	MD25_48
Poster 9	Development of a thermo-electrical setup for testing electric vehicle battery interconnections V.P.N.C. Henriques (Faculdade de Engenharia, Universidade do Porto, Portugal), M.M. Kasaei, R.J.C. Carbas, E.A.S. Marques, L.F.M. da Silva	MD25_49
Poster 10	Automation Workbench to Developing i4.0 Skills I. Azevedo (ISEP-Polytechnic of Porto, Portugal), M. Pinto, F. Pereira, A. A. Santos, A. F. Silva, P. Silva, C. Felgueiras	MD25_36
Poster 11	A High Speed Infrared Camera Array Based Positioning and Its Application to Indoor Robotics STEM Education Tai Oi-Tai (Department of Electronics, Telecommunications and Informatics of University of Aveiro, Portugal), Carla Raquel Castro da Rocha Madureira, Pedro Nicolau Faria da Fonseca, Tam Kam-Weng	MD25_52

Time	Friday 12 September 2025	
	Session 5: Machines II (Chair: Manuel Paredes, ICA, Université, de Toulouse, UPS, INSA, ISAE-SUPAERO, MINES-ALBI, CNRS, France; Mehdi M. Kasaei, Institute of Science and Innovation in Mechanical and Industrial Engineering (INEGI), Porto, Portugal)	
	Room B032	
08:40	PLENARY LECTURE: The Role of Operational Experimentation in the Design of Unmanned Maritime Vehicles João Tasso de Sousa (Head of the Underwater Systems and Technologies Laboratory – LSTS, Faculty of Engineering, University of Porto, Portugal)	
09:20	A Design Method of Rotor Profile of Screw Pump K. Kawasaki (Sanjo City University, Kamisugoro, Japan), M. Nagai	MD25_21
09:40	A Floating Base with Reconfigurable Geometry for a Drone Supporting USV J. Bessa (INESC TEC, Faculdade de Engenharia, Universidade do Porto, Portugal), P. Pereira, D. Moreira, J.M.M Dionisio, R.D.S.G. Campilho, A. Pinto	MD25_22
10:00	Extending Bearing Design Standards: Smearing Risk Assessment via Transient Simulation P. Wingerts Zahn, J. Müller, O. Koch, M. Carstensen (RPTU University of Kaiserslautern-Landau, Kaiserslautern, Germany)	MD25_11
10:20	Optimizing Micro-Geometry Modifications for Enhanced Performance and Durability in Geared Rotary Actuators A. Fuentes-Aznar (Rochester Institute of Technology (RIT), Rochester, NY, USA), I. González-Pérez	MD25_24
10:40	COFFEE BREAK (Coffee Lounge)	
	Session 6: Machine Elements & Mechanisms II (Chair: Adriano Santos, School of Engineering, Polytechnic of Porto, Portugal; R.D.S.G. Campilho, School of Engineering, Polytechnic of Porto, Portugal)	
	Room B032	
11:00	Vibrations of a Small-caliber Weapon System on a Four-wheeled Chassis of a Small Drone N.B. Dang, M. Macko (University of Defence, Brno, Kounicova, Czech Republic), V.V. Bien, B.V. Dung	MD25_47
11:20	Improvement of the production process for machined and bent tubes: Study of stretching in tube bending Bruno Ribeiro, Eurico Seabra (Department of Mechanical Engineering, University of Minho, Guimarães, Portugal), António Lopes	MD25_35
11:40	Efficiency Improvement on Grease Injection Process in Control Cables for the Automotive Industry J. P. P. S. T. Ferreira, R. D. S. G. Campilho (CIDEM, ISEP – School of Engineering, Polytechnic of Porto, Portugal), F. J. G. Silva	MD25_28
12:00	Design of an Automated Equipment with Interchangeable Modules for Electronic Board Testing D. F. A. Neves, R.D.S.G. Campilho (CIDEM, ISEP – School of Engineering, Polytechnic of Porto, Portugal), F. J. G. Silva	MD25_29
12:20	Design and Implementation of a Microwave-Based Angular Displacement Sensor with Analog to Digital Conversion in IoT-Elevator Systems Kam-Weng Tam (Faculty of Science and Technology of University of Macau, China), Chi-Hou Chio, Desen Li, Quan Xue	MD25_51
12:40	Multi Inverted Pendulum Controller Based on Neural Networks and the Model of Hierarchical Complexity A. L. Cunha, F. Silva, S. Leite, A. M. Lopes, A. R. Silva (Faculty of Engineering of the University of Porto, Portugal)	MD25_31
13:00	LUNCH BREAK (Coffee Lounge)	

Session 7: Machine Automation & Testing III

(Chair: Luciano E. Chiang, Pontificia Universidad Católica de Chile, Chile; Filipe Pereira, School of Engineering of Porto (ISEP), Polytechnic of Porto, Portugal)

Room B032

14:00	PLENARY LECTURE: Making Optimization Work for Machine Design—No Black Magic Required	
	<u>Stijn Derammelaere</u> (Department of Electromechanical Engineering, University of Antwerp, Belgium)	
14:40	Compaction System for Packaging Recycling	MD25_32
	D. Meireles, <u>A. A. Santos</u> (ISEP-Polytechnic of Porto, Portugal), A. F. Silva, F. Pereira, P. Silva, C. Felgueiras	
15:00	Multi-injection Mould Design for Automotive Components Using Two Distinct Polymeric Materials	MD25_33
	<u>A. F. V. Pedroso</u> (CIDEM, ISEP, Polytechnic of Porto, Portugal), F. J. G. Silva, R. D. S. G. Campilho, Naiara P.V. Sebbe, Rúben D. F. S. Costa, César B. Santos	
15:20	Study and Design of Automation of the Crutches Assembly Process	MD25_34
	João Cunha, <u>Eurico Seabra</u> (Department of Mechanical Engineering, University of Minho, Guimarães, Portugal), António Lopes	
15:40	Influence of Beam Oscillation on Microstructural Evolution in Laser Welding of DP1000 Dual-Phase Steel	MD25_50
	<u>Eva S.V. Marques</u> (TEMA—Centre for Mechanical Technology and Automation, Department of Mechanical Engineering, University of Aveiro, Portugal), António B. Pereira, Francisco J.G. Silva	
16:00	COFFEE BREAK (Coffee Lounge)	
	Session 8: Machines III	
	(Chair: A. M. Lopes, University of Porto, Portugal; L. F. M. da Silva, University of Porto, Portugal)	
	Room B032	
16:20	Teaching Kit for Collaborative Robotics	MD25_37
	<u>M. Pinto</u> (ISEP-Polytechnic of Porto, Portugal), I. Azevedo, F. Pereira, A. F. Silva, P. Silva, C. Felgueiras, A. A. Santos	
16:40	Event-based imaging for non-contact vibration Measurement	MD25_38
	Francisco Sousa, Francisco Afonso, <u>Pedro Sousa</u> (Faculty of Engineering of the University of Porto, Portugal), Susana Dias, Paulo Tavares, Pedro Moreira	
17:00	Artificial Intelligence-driven Approaches for Robotic Control: Beyond the Classical Methods	MD25_25
	<u>E. M. Silva</u> (INEGI - Instituto de Ciência e Inovação em Engenharia Mecânica e Engenharia Industrial, Porto, Portugal), A. M. Lopes, A. R. Silva	
17:20	Nonlinear Multi-DOF Absorber Based on Nonlinear Springs and Voice-coil Actuators	MD25_40
	Zbyněk Šika (Faculty of Mechanical Engineering, Czech Technical University in Prague, Czech Republic), Karel Kraus, Jan Krivošej, <u>Jakub Švadlena</u> , Petr Beneš	
17:40	Design and Evaluation of a Variable Buoyancy System for AUVs	MD25_41
	<u>A. P. Carboni</u> (Federal University of Santa Catarina, Campus Joinville, Brazil), C.G. Valin, L. G. Barcaro, A. Z. Salvi, Nuno A. Cruz, T. A. Fiorentin, F. K. Fiorentin	
18:00	Current-based control of a tendon-hobbed-pulley thumb-index prosthesis	MD25_42
	Patrícia Gomes, João Nunes, Susana Dias, <u>Pedro Sousa</u> (Faculty of Engineering of the University of Porto, Portugal), Paulo Tavares, Pedro Moreira	
20:00	MD2025 BANQUET (UVA by Calem restaurant)	