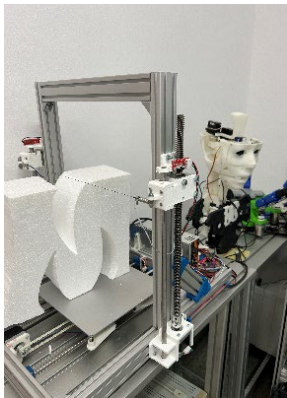






INTELLIGENT MECHATRONIC SYSTEMS LABORATORY

Contact details

Name	Intelligent Mechatronic Systems Laboratory		
Acronym	IMSLab		
Logo			
Address	Muncii Blvd., No. 103-105, Cluj-Napoca, Romania		
Faculty	Faculty of Automotive, Mechatronics and Mechanical Engineering		
Department	Department of Mechatronics and Machine Dynamics		
Telephone	+40264401756		
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Areas of expertise

- ❑ **Hardware-in-the-Loop (HIL) and Rapid Control Prototyping (RCP)**
 - Development and validation using dSPACE platforms
 - SIL/HIL testing environments
 - Real-time system verification and control tuning
- ❑ **Robotics and Autonomous Systems**
 - Soft robotics and adaptive grippers
 - Robotic systems for agricultural and industrial applications
 - Hyper-redundant robotic manipulators
- ❑ **Modeling, Simulation, and CAD/CAE-Based Design**
 - High-fidelity modeling of nonlinear mechatronic systems
 - Simulation-driven design, analysis, and optimization
 - CAD/CAE-based development and virtual prototyping of mechanical and mechatronic systems
- ❑ **Embedded and Real-Time Control Systems**
 - Microcontroller-based and real-time control architectures
 - Advanced control approaches integrating physics-based and data-driven models
 - Integration of sensor systems and distributed control architectures

Team

Assoc. Prof. Dr. Eng. Ciprian Lapusan, Assoc. Prof. Dr. Eng. Calin Rusu, Lecturer Dr. Eng. Ciprian Rad, Lecturer Dr. Eng. Sorin Besoiu, Drd. Eng. Marco Maries, Drd. Eng. Francisc Kadar, Drd. Eng. Vasile Sandru, Eng. Ioan Pintilie, Eng. David Glodean

Representative projects

International Cooperation Framework for Next Generation Engineering Students, period 2022-2025
 Smart HEI-Business collaboration for skills and competitiveness, period 2017-2019
 Advanced mechatronic systems for optimum management and efficiency increase of energy consumption (eSMART), period 2014-2015
 Research regarding advanced control in mechatronic applications, PNII-Idei, period 2007-2010
 Simulation, Control and Testing Platform with Applications in Mechatronics, CEEEX, period 2006-2008
 Research regarding the integration and interfacing process in mechatronics, period 2006-2008

Significant results

Articles in ISI rated journals, in the past 5 years:

Lapusan, C., Negrutiu C.M., Sosa, I., Multi-Criteria Decision Framework for Optimal Robotic System Selection in 3D Concrete Printing, *Buildings*, 16, no. 1, p. 202, 2026

Lapusan, C., Chiorean, R.S. and Matis, R., Optimal Design of 3D-Printed Flexible Fingers for Robotic Soft Gripping of Agricultural Products, *Actuators*, Vol. 14, No. 10, p. 468, 2025

Lemian, D., Bode, F. I., Lapusan, C., Enhancing Supercapacitor Simulation Accuracy Through a Novel Hybrid Modeling Approach, *Applied Sciences*, 15(1), 226, 2024

Lapusan, C., Hancu, O. and Rad, C., Shape Sensing of Hyper-Redundant Robots Using an AHRS IMU Sensor Network, *Sensors*, 22(1), p.373, 2022

Rad, C., Hancu, O., Lapusan, C., Data-driven kinematic model of pneunets bending actuators for soft grasping tasks. *Actuators*, Vol. 11, No. 2, p. 58, 2022

Lapusan, C., Hancu, O., Rad, C., Numerical Shape Planning Algorithm for Hyper-Redundant Robots Based on Discrete Bézier Curve Fitting. *Machines*, 10(10), p.894, 2022

Rusu, C.; Tatar, O., Adapting mechanisms for in-pipe inspection robots: a review, *Applied Sciences*, 12.12: 6191, 2022

Significant solutions:

Matlab-dSpace research platforms for HIL, RCP and SIL applications

Development of hyper-redundant robotic systems for precision agriculture

Development of a soft gripper for agricultural harvesting

Development of a variable-geometry gripper for waste management

Patents: 1 patent

The offer addressed to the economic environment

Research & development	<ul style="list-style-type: none">▪ End-to-end development of custom mechatronic systems▪ Prototyping and validation using HIL/RCP methodologies
Consulting	<ul style="list-style-type: none">▪ Design optimization and system integration▪ Control strategy development and implementation
Training	<ul style="list-style-type: none">▪ MATLAB/Simulink-based modeling and simulation▪ Rapid Control Prototyping techniques▪ Advanced CAD design (SolidWorks)

Last updated April 2026