

PRECISION SYSTEMS and COMPLIANT MECHANISMS Laboratory

Contact details

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Acronym	ProSyMc	
Logo		
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Areas of expertise

Innovative development of mechatronic systems focused on compliant mechanisms for precision systems. Mathematical modelling, synthesis, design, simulation and finite element analysis of microsystems with compliant mechanisms. Virtual reality and development of some interactive applications in the field of compliant mechanisms with special materials. Metrology and quality assurance for engineering products.

Team

Assoc.Prof.Dr.Eng. Simona NOVEANU, Assoc.Prof.Dr.Math. Daniela MARIAN, Lecturer Dr.Eng. Dan NOVEANU, Assist. MSc.Eng. Paul SORESCU, MSc. Eng. Daniel NEDELEA, Assist. MSc. Eng. Daria ORLEA, MSc. Eng. Claudiu TROSNAI, Mrd. Eng. Tudor MOLDOVAN, Mrd. Eng. Romica JURAVLE, Calin Mihai AVRAM, Diana Daria SALAJAN.

Representative projects

International Cooperation Framework for Next Generation Engineering Students, 2022-1-RO01-KA220-HED-000088365, 2023-2025.

Processing Complexity with SES capacities, 621398-EPP-1-2020-1-FR-EPPKA2- KA, 2020-2023.

Competente antreprenoriale si cercetare de excelenta in programele de studii doctorale si postdoctorale, POCU/380/6/13/123927, 2019-2022

Sistem de micromanipulare cu actuatori piezoelectrice și flexibilitate funcțională – SiMFlex, Cod 35/2018, ARUT, 2019-2020.

Smart HEI-Business collaboration for skills and competitiveness, 575660-EPP-1-2016-1-FI-EPPKA2-KA, Erasmus+ Programme of the European Union – Knowledge Alliances, 2017 -2019.

Advancing University Education in Biomedical Engineering and Health Management in Kyrgyzstan, 561894-EPP-1-2015-1-DE-EPPKA2-CBHE-JP, Erasmus Capacity Building in the field of Higher Education, 2016-2019.

Reshaped Partnerships for Competitiveness and Inovation Potential in Mechanical Engineering, 540425-LLP-1-2013-1-FI-ERASMUS-EKA, Erasmus Multilateral Projects, 2013-2015.

Sistem hibrid fes-exoschelet pentru recuperarea brațului la persoanele cu handicap neuromotor, PCCA: 180/2012, 2012-2015.

Development of new generations of stochastic heuristic algorithms, for solving manufacturing scheduling optimization problems, 579/2008 (PN II – IDEI), 2008-2012.

Modelarea, simularea și controlul mini și micromecanismelor compliante, CNCSIS IDEI cod 221/2008, 2008-2011
Dezvoltarea unei familii modularizate de actuatori liniari și rotativi pe baza de aliaje cu memoria formei, CNCSIS IDEI cod 1076, 2007-2009.
Complex Multi-Area Relationships and Applications, Project, within the "Discrete Optimization" Laboratory of the Faculty of Mathematics and Informatics Chisinau, State University of Moldova, 2009.

Significant results

The most representative publications of the past 5 years:

1. Noveanu D., Noveanu S., Lobontiu, N., Ivan, A.I., - *Performance Evaluation of Biocompatible Compliant Microgrippers Fabricated from Biodegradable Materials*, International Conference Interdisciplinarity in Engineering (InterEng), Targu Mures, Romania, (2025).
2. Lobontiu N., Noveanu S., Noveanu D. - *Dynamics of free-fixed planar serial mechanisms with rigid links and flexible hinges*, The Romanian Journal of Technical Sciences. Applied Mechanics, 70/1-3, (2025).
3. Noveanu D., Noveanu S., - *Design and Validation of Elastic Dies for Enhanced Metal Powder*, Materials /ISSN 1996-1944, (2025).
4. Noveanu S., Noveanu D., Ivan, A.I., - *Compliant Gripper for Biological Cells Manipulation*, IEEE International Conference and Exposition on Electric and Power Engineering (EPEI), Iasi, Romania, (2024).
5. Marian Daniela, Ciplea, Sorina Anamaria and Lungu, N., - *Hyers-Ulam stability of a nonlinear partial integro-differential equation of order three*, Open Mathematics, vol. 22, no. 1, pp. 20240017 (2024).
6. Akinola, Richard Olatkunbo, Ali Shokri, Joshua Sunday, Daniela Marian, and Oyindamola D. Akinlabi, - *Comparing the Performance of Two Butcher-Based Block Hybrid Algorithms for the Solution of Initial Value Problems*, Axioms, 13, no. 3: 165 (2024).
7. Noveanu D., Marian D., Noveanu S., - *Applied Mathematics in Compliant Mechanisms*, 17th International Conference on Applied Mathematics and Computer Science, Cluj-Napoca, Romania, July 11 - 13, (2023).
8. Ivan I.A., Noveanu D.C., Gurgu V.I., Despa V., Noveanu S. - *A New Hybrid Stepper Motor, Compliant Piezoelectric Micro-Tweezer for Extended Stroke*, Micromachines, Vol.14, Nr. 6, pp. 1112, (2023).
9. Inoan, D., Marian, D. - *Semi-Hyers-Ulam Rassias stability for an integro-differential equation of order n* . Demonstr. Math., vol. 56, no. 1, pp. 20220198, <https://doi.org/10.1515/dema-2022-0198>. (2023).
10. Ciplea, S.A., Lungu, N., Marian, D., Rassias, T. - *Hyers-Ulam stability of a general linear partial differential equation*. Aequationes Mathematicae, 97, pp. 649–657, <https://doi.org/10.1007/s00010-023-00960-3>. (2023).

Significant solutions:

Applications with compliant grippers, positioning systems, amplification systems of flexible hinges.

Design and fabrication with different materials of micromanipulation cells.

Virtual reality in mechatronic systems with compliant mechanisms.

Implementation, testing and optimization of the mathematical models for mechatronic systems with compliant mechanisms.

Design and fabrication with different materials the tires without air and compliant wipers.

Patents:

1. Noveanu, S., Csibi, I.V., Mandru, D., Noveanu, D., Lungu, I. Minigriper compliant cu actuator piezoelectric, Brevet nr. RO 127385/30.05.2015 OSIM. (2015).
2. Noveanu S., Noveanu D., - Minigriper compliant cu flexibilitate ridicata, cerere brevet A2020 00103 din 26.02.2020 OSIM. (2020).

The offer addressed to the economic environment.

Research & development	Fundamental analyses of mechanisms for mechatronic systems. Advanced studies in the field of synthesis, CAD, and modelling for complex mechanisms. Development and testing validation of compliant mechanisms, focused on micro mechanisms. Advanced studies in the field of mathematical modelling, virtual reality, and smart materials for mechatronic systems with compliant structures. Advanced studies in the quality assurance focused on Metrology for micro factories.
Consulting	Design of products for mechatronic systems and compliant mechanisms with advanced materials. Mathematical modelling and functioning simulation in virtual reality of the precision mechanisms. Quality assurance and metrology of the new products.
Training	Design and modelling of complex mechatronic systems and simulation with SolidWorks. Design, modelling and finite element analysis of compliant mechanisms. Mathematical modelling for the technical systems. Basic courses for classical mechanisms, metrology and quality assurance for products.

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