
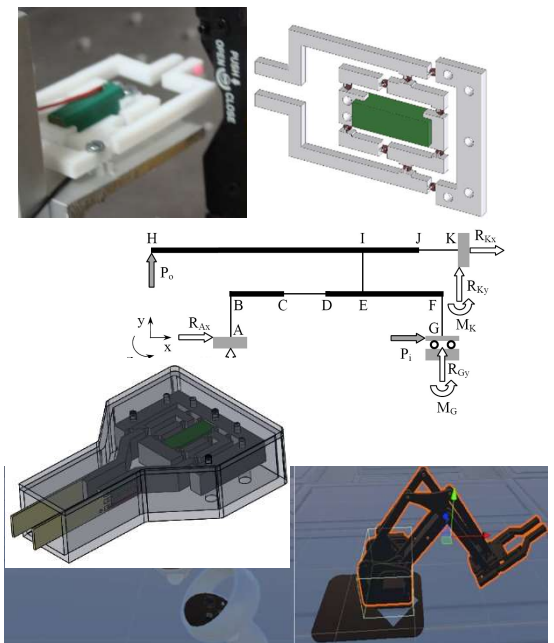


## PRECISION SYSTEMS and COMPLIANT MECHANISMS

### Contact details

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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

**Senior researches:** Assoc.Prof.Eng. Simona NOVEANU; Assoc.Prof.Math. Daniela MARIAN; Lecturer Eng. Dan NOVEANU.  
**Researchers:** Assist. Eng. Paul SORESCU.  
**Master students:** Msc. Eng. Daria ORLEA, Msc. Eng. Daniel NEDELEA.

### 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 piezoelectricsi 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 Innovation 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 si rotativi pe baza de aliaje cu memoria formei, CNCSIS IDEI cod 1076, 2007-2009.**

## Significant results

### The most representative publications of the past 5 years:

1. 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).
2. 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).
3. 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).
4. 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).
5. Noveanu D., Ivan I.A., Noveanu S., - *Influence of the Flexure Hinge Shape on Compliant Gripper Small Displacements* - *The Romanian Journal of Technical Sciences. Applied Mechanics*, Vol. 67, Nr. 1, pp. 97-111, (2022)
6. Noveanu, S., Ivan, A.I., Noveanu, D.C., Rusu, C., Lates, D., - *SiMFlex Micromanipulation Cell with Modular Structure*, *Applied Science* 10, 1-10., [/https://www.mdpi.com/2076-3417/10/8/2861](https://www.mdpi.com/2076-3417/10/8/2861), (2020).
7. Noveanu, S., Rusu, C., Rancea, C., & Lateş, D., - *Research Concerning the End-effectors for SiMFlex Microgripper*. In *IOP Conference Series: Materials Science and Engineering*, 724, Institute of Physics Publishing. <https://doi.org/10.1088/1757-899X/724/1/012055>, (2020).
8. Noveanu, S., Lates, D., Fusaru, L., & Rusu, C. - *A New Compliant Microgripper and Study for Flexure Hinges Shapes*. *Procedia Manufacturing*, 46, 517–524, doi: 10.1016/j.promfg.2020.03.074. (2020).
9. Noveanu, S., Lăpuşan, C., Rusu, C., Rad, C., -*The Flex Mentoring model proposed in the HEIBus project*, *Review of Management & Economic Engineering* 18 (4), 1583-624X. (2019).

### 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.

### 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. Mathematical modelling for the technical systems. Basic courses for quality assurance for products and metrology.