TECHNICAL UNIVERSITY OF CLUJ-NAPOCA ROMANIA

Research Reports

2024

MINISTRY OF EDUCATION

TECHNICAL UNIVERSITY
OF CLUJ-NAPOCA, ROMANIA

RESEARCH REPORTS

2024

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INTRODUCING THE REPORT

FOREWORD

Scientific research is an inexhaustible source of knowledge, an important resource of society, while constituting an approach to university education as well.

The Technical University of Cluj-Napoca, one of the 12 universities of “advanced research and education" in Romania, aims at engaging itself in producing outstanding scientific results and approaching interdisciplinary and multidisciplinary subjects. Furthermore, it strives to integrate the research results in the exchange of national and international values, to increase its national and international visibility, and also attract and create highly skilled human resources.

Achieving these goals must strengthen its already established position as a university of "advanced research and education", and the recognition of the Technical University of Cluj-Napoca as a center of excellence in scientific research with a high impact on the social and economic environment.

Scientific research, by its creative nature, represents one of the most important methods both in teacher or researcher training and in educating university students in the spirit of innovation, irrespective of study level.

In the Technical University of Cluj-Napoca basic and applied research, as well as innovation are promoted. The research topics cover the fields of engineering, science, and humanities.

Research is conducted at department level, predominantly in over 80 accredited research structures. The new research strategy aims at creating self-sustainable interdisciplinary and multidisciplinary structures capable of outstanding scientific achievements, integrated within a multidisciplinary research institute.

The coordination of the scientific research is performed by academic staff experienced in research, and especially by PhD advisors relying on the broad involvement of the faculty, the young researchers, and the students.

Research teams enjoy the freedom of choosing their research topics, but their activities are in line with the national and international policy comprised within the strategy of research - development – innovation.

The goal of this volume is to present both the research structures existing in the Technical University of Cluj-Napoca as well as the results achieved by these in the past five years. The expected result of the volume is to enhance the cooperation between the research structures of the Technical University and other national and international structures.

Professor Florin-Ioan Oniga PhD

Vice-Rector for Scientific Research

TECHNICAL UNIVERSITY OF CLUJ-NAPOCA ROMANIA

MEMBER OF EUT+ EUROPEAN UNIVERSITY OF TECHNOLOGY

NATIONAL RESEARCH PROJECTS

NEW ADDITIVE TECHNOLOGY TO PRODUCE CUSTOM MEDICAL IMPLANTS WITH CONTROLLED PHYSICAL-MECHANICAL CHARACTERISTICS AND ANTIBACTERIAL PROPERTIES - MediCo

PN-III-P1-1.1-PD-2021-0326

Goal and short description of the project

The primary goal of the MediCo project is to develop a novel additive manufacturing (AM) technology for producing customized maxillofacial implants with controlled physical-mechanical properties and antibacterial bioactivity, made from a titanium-graphene (Ti-Gr) composite, utilizing the selective laser melting (SLM) process (Figure 1).

Context: The elasticity modulus (or Young's modulus) of Ti is approximately three times higher than that of cortical bone, which can lead to bone atrophy due to the stress shielding effect. Therefore, to prevent bone resorption, the elasticity modulus of implants should be as close as possible to that of the adjacent bone, without compromising the mechanical strength. This concept has the potential to expand the field of implant customization, not only from a design perspective but also by adapting and controlling the elasticity modulus of implants according to the patient's age and health status. This means that future Ti-Gr maxillofacial implants could feature tailored physical-mechanical properties that closely match the requirements of the host bone, limiting the stress shielding effect. Moreover, graphene (Gr) has attracted significant attention due to its promising antibacterial and biocompatibility properties, making it suitable for various medical applications such as cancer treatment, drug delivery, biosensing, biological imaging, and serving as a scaffold in tissue engineering. In the context of metal matrix composites, where graphene is used to reinforce the metal matrix, there is growing interest in developing metal-graphene composites. Previous studies have explored Ti-Gr composites (i.e., Ti–2.5%Gr or Ti–5%Gr) sintered using an IPG fiber laser system. Although this pioneering study was limited to a thin layer of Ti-Gr, it demonstrated that laser sintering or laser melting (SLM) could be a viable method for producing Ti-Gr parts, thanks to the rapid heating and cooling phases inherent to this process. However, further optimization of the manufacturing technology for Ti-Gr composites is necessary.

The specific objectives of the MediCo project were:

►WP 1. Developing new composites for SLM.

►WP 2. Optimize the SLM technology for the new Ti-Gr composite.

►WP 3. Validate the SLM technology for Ti-Gr and disseminate the results.

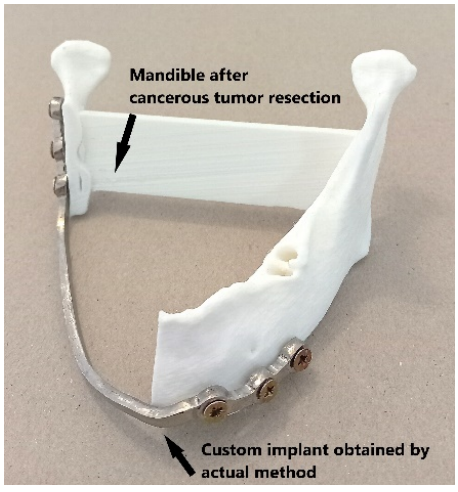

Fig. 1. Mandibular reconstruction developed using Ti-Gr composite and manufactured through the SLM process.

Project implemented by

Technical University of Cluj-Napoca

Implementation period

01.04.2022-31.03.2024

Financed through

The Executive Unit for Financing Higher Education, Research, Development, and Innovation (UEFISCDI)

Project code: PN-III-P1-1.1-PD-2021-0326

Budget: 52,000 euro

Activities

A1. Identification of proper Ti powder and Gr nanoplatelets and prepare the Ti-Gr composites by planetary ball milling.

A2. Preliminary research to investigate the limits of SLM process parameters (laser power, scanning speed, and layer thickness).

A3. Microstructure characterization and evaluation of Ti-Gr samples SLM-manufactured (Figure 2). Methods used were X-ray powder diffraction (XRD), scanning electron microscopy (SEM), and energy dispersive X-ray spectroscopy (EDAX).

A4. Experimental research focused on SLM optimization to control the physical–mechanical characteristics.

A5. Developing a mathematical model to estimate the yield strength and elasticity modulus of Ti-Gr composite.

A6. Establishing the optimal regression model to calculate the yield flexure strength and the elasticity modulus according to process parameters.

A7. Designing of maxillofacial implants. Starting from computed tomography (CT) images, customized maxillofacial implants were designed taking into account aesthetic considerations. To enhance the concept of implant customization from a mechanical perspective, finite element analysis (FEA) was employed to evaluate the performance and behavior of Ti-Gr implants SLM-processed.

A8. Physical tests on maxillofacial implants. To test and validate this new AM technology, the designed implants were SLM manufactured from Ti-Gr composite. These implants were then tested under compression and shock conditions.

A9. Workshop. A workshop was organized to promote the results, with potential strategic beneficiaries in attendance.

Main results

►Mixed Ti-Gr composites with varying graphene concentrations were prepared in the following compositions: Ti-0.5%Gr, Ti-1%Gr, Ti-2.5%Gr, and Ti-5%Gr. Pure Ti powder, consisting of spherical grains with diameters ranging from 15-55 µm, was used in the preparation of these composites.
►To identify the optimal SLM parameters, 40 sets of parameters were configured, leading to the fabrication of over 120 samples made from Ti-Gr composite. The physical-mechanical properties of these samples were determined, with a focus on yield flexure stress, elasticity modulus, Poisson's ratio, elongation at break, porosity level, and surface roughness.

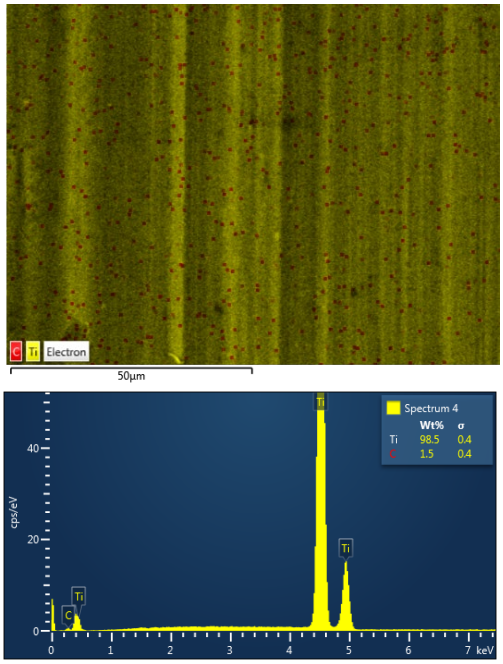

Fig. 2. Chemical composition of the Ti-Gr sample after SLM processing (EDAX investigation).

►The empirical equations developed were validated through experimental results, demonstrating their ability to predict and modify both yield flexural strength and elasticity modulus of Ti-Gr, considering the laser power and scanning speed (see Figure 3).
►In this way, Ti-1%Gr implants can be produced with a reduced elasticity modulus that is 60% lower than that of pure Ti, while the flexural

strength is maintained at similar level (approx. 400 MPa, Figure 3 case Op 5).

►Furthermore, process parameters were optimized to increase the flexural strength, achieving a value four times higher than pure Ti (over 1700 MPa, as shown in Figure 3, case Op 7). This optimization allows for a significant reduction in the weight of Ti-1%Gr implants.

►To demonstrate the feasibility of the method, five maxillofacial implants were designed and SLM-manufactured using Ti-1%Gr composite, as shown in Figure 1 and Figure 4.

► To fully understand the clinical significance, further studies are needed to evaluate the biocompatibility and antibacterial response of Ti-Gr processed by SLM.

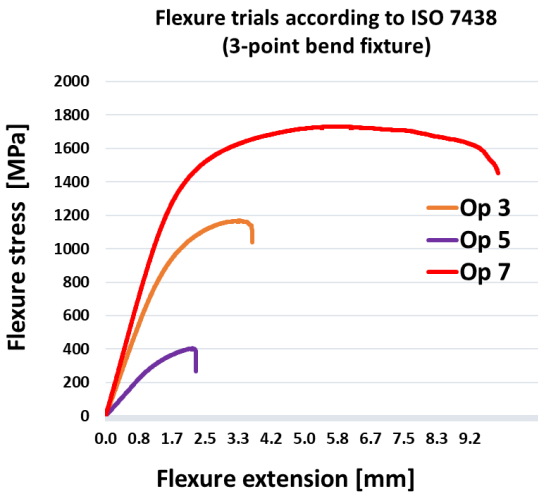

Fig. 3. Representative stress-strain plots obtained for Ti-1%Gr with optimized SLM parameters; Elasticity modulus determined for each optimization case: Op3 - 39 GPa, Op5 - 89 GPa, and Op7 – 119 GPa.

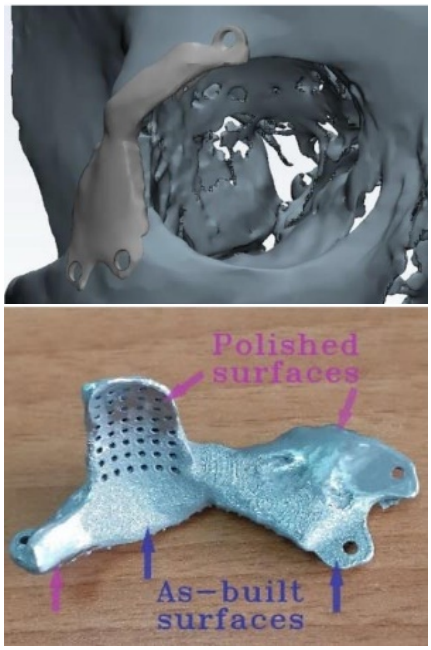

Fig. 4. Facial customized implant designed and fabricated made of Ti-Gr.

Dissemination:

C. Cosma, D. Apostu, C. Vilau, et al., Finite Element analysis of different osseocartilaginous reconstruction techniques in animal model knees. Materials Journal, 2023 (ISI Q2).

C. Nosner, C. Cosma, N. Balc, et al., Design of customized implant SLM manufactured, Int. Conf. Modern Tech. Manufacturing, 2024.

D. Tica, C. Cosma, O. Bodur, et al., Effects of drag finishing on a SLM-manufactured titanium reconstruction plate. Towards Industry 5.0 Springer, 2023.

Patent proposal: *Method for manufacturing customized implants from titanium-graphene composite with controllable mechanical properties through selective laser melting*, inventors, C. Cosma, N. Balc, P. Berce, A00109/18.03.2024, OSIM Bucharest.

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Research center

Additive Manufacturing and Rapid Product Development - AMaRaP

Research Team

Project leader: Lecturer. Dr. Eng. Cosmin COSMA

Mentor: Prof. Dr. Eng. Nicolae BÂLC

IN AND OUT OF VEHICLE THREAT IDENTIFICATION AND MONITORIZATION FOR TRAFFIC SAFETY - INOVSAFE

PN-III-P1-1.1-PD-2021-0247

Goal of the project and short description

The project is meant to advance existing scientific approaches in 2 different directions: extracting relevant road traffic features and data from a single camera sensor and monitoring ego-vehicle state from a single camera sensor coupled with inertial measurement data. The main objective of this project is to design and implement algorithms and solutions for in and out of vehicle threat identification and monitoring to increase traffic safety. The road and ego-vehicle perception will be implemented using computer vision and artificial intelligence. The system can offer relevant data to the driver, in order to prevent hazardous situations that lead to accidents. The project has the objective to implement algorithms that can accurately observe, measure, detect and track the road traffic scene using a single camera. Another objective is to monitor the ego-vehicle state using the same input data and also inertial measurement data in order to detect hazardous scenarios.

Project implemented by

Technical University of Cluj-Napoca

Implementation period

01.04.2022-31.03.2024

Main activities

Phase 1 (April 2022 – Dec 2022):

- Initial prototype of the road traffic perception system. Traffic sensory data acquisition system and ego-vehicle monitoring. Dissemination of results and website for the project.

Phase 2 (Jan 2023 – Dec 2023):

- Perception system using vision and artificial intelligence capable of providing relevant information about the road traffic scene using monocular images and analyzing the ego of the vehicle and the driver. Dissemination of results.

Phase 3 (Jan 2024 – Mar 2024):

- Integration of perception systems in a single demonstrator application. Dissemination of results.

Results

The obtained results will impact the development and implementation of autonomous vehicle or robotic platform control systems, with the most significant impact being the improvement of safety through the prediction of the vehicle's own speed directly from road traffic images. This solution can also be extended to other scenarios, such as an autonomous robot in a factory. Thus, the most significant outcome is the prediction of the vehicle's own speed directly from images, contributing to the estimation of the vehicle's current state and the analysis of driver behavior.

Dissemination:

Conferences:

Razvan Itu, Radu Danescu, “On-Board Estimation of Vehicle Speed and The Need of Braking Using Convolutional Neural Networks”, In Proceedings of the 20th International Conference on Informatics in Control, Automation and Robotics - Volume 1 (ICINCO), 2023, SciTePress, pp. 600-607.

Razvan Itu, Radu Danescu, “Predicting Emergency Braking in Vehicles Using a CNN with Sequential

Image and Velocity Data", 2023 IEEE 19th International Conference on Intelligent Computer Communication and Processing (ICCP 2023), 2023, pp. 41-47.

ISI Journals:

Razvan Itu, Radu Danescu, "Fully Convolutional Neural Network for Vehicle Speed and Emergency Brake Prediction", Intelligent Vehicle Sensing and Monitoring, Sensors, Vol. 24, No. 1, 2024, Art. No. 212.

Razvan Itu, Radu Danescu, "Part-Based Obstacle Detection Using a Multiple Output Neural Network", Sensors, vol. 22, no. 12, p. 4312, Jun. 2022, doi: 10.3390/s22124312

Financed through

The Executive Unit for Financing Higher Education, Research, Development, and Innovation (UEFISCDI)

Project code: PN-III-P1-1.1-PD-2021-0247

Research center

Image Processing and Pattern Recognition Research Center

Research Team

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Mentor: Prof. dr. eng. Radu DĂNESCU

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Decision Support System for Interventional Planning of CTEPH Patients Based on Multi-Scale Modeling and Artificial Intelligence - ModAI-CTEPH

PN-III-P1-1.1-PD-2021-0601

Goal and short description of the project

The goal of the project is to develop a decision support system that assists clinical teams in diagnosing and planning interventions for patients with Chronic Thromboembolic Pulmonary Hypertension (CTEPH). The system combines patient-specific multi-scale cardiopulmonary models with artificial intelligence techniques applied to image-based vascular segmentation and model personalization. By simulating blood flow and assessing the impact of vascular obstructions, the proposed models enables the analysis of different types of stenoses and their virtual removal, offering haemodynamic insights. These tools are designed to support clinical decisions in planning procedures such as pulmonary endarterectomy (PEA) or balloon pulmonary angioplasty (BPA), enabling personalized therapeutic strategies.

Project implemented by

Technical University of Cluj-Napoca

Implementation period

01.04.2022-31.03.2024

Main activities

Stage 1 –Mathematical Modeling
Development of a multi-scale cardiopulmonary simulation framework, integrating a 0D lumped-parameter model of the heart and systemic circulation with a nonlinear 1D model of the pulmonary arteries. Initial segmentation of medical images supported model construction.

Stage 2 – Mathematical Modeling Supported by Artificial Intelligence Algorithms
Integration of AI techniques for model personalization, image segmentation, and extraction of diagnostic features to support patient-specific analysis.

Stage 3 – Clinical Evaluation and Dissemination
Assessing the system's potential for clinical use by analyzing retrospective patient data. Results were shared with the scientific and clinical community through presentations and publications.

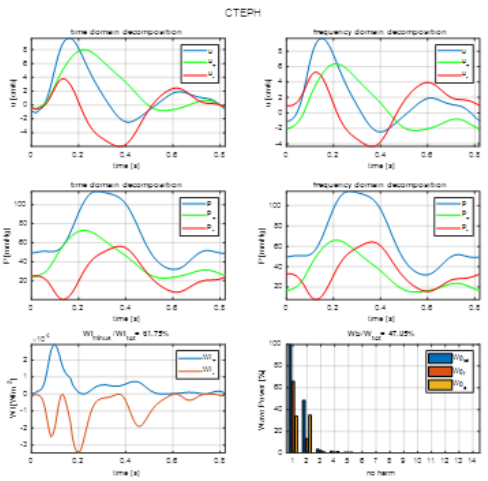
Results

Integrated 0D-1D Cardiovascular Modelling:

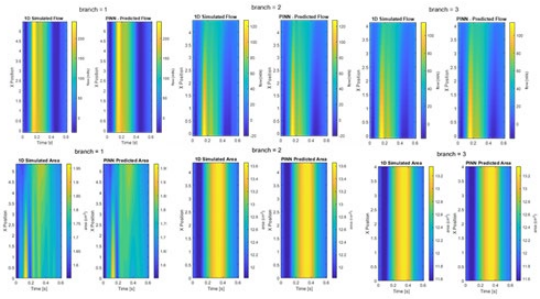
Developed a hybrid model combining a 0D electric-analogue representation of systemic circulation with a 1D image-based model of the pulmonary arteries, enabling detailed blood flow simulations and pressure analysis.

Feature Extraction from Wave Analysis

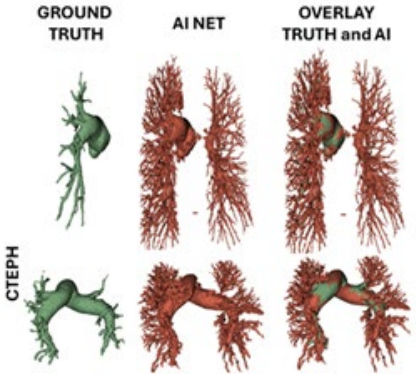
Time- and frequency-domain metrics, such as wave intensity, power of reflected waves or ffr surrogates, were extracted to assess vascular function and support diagnostic interpretation in CTEPH.



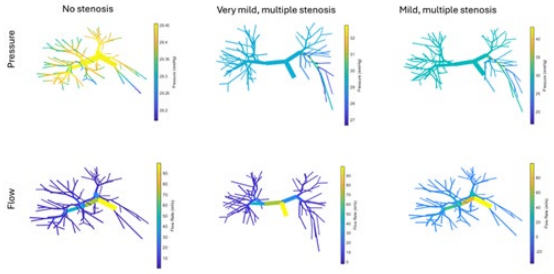
Physics-Informed AI was applied to estimate boundary conditions in 1D models using physical constraints, reducing dependence on limited clinical data.



AI-based Pulmonary Vasculature Segmentation: AI based segmentation of pulmonary vasculature from CT images was implemented to automate the challenging and intricated vascular segmentation process.



Hemodynamics recovery after stenosis removal: The validated 0D-1D coupled model enabled detailed simulation of different stenosis types (ring, web) and their hemodynamic consequences.



By virtually removing these obstructions, the model allowed the simulation of a BPA-like intervention, offering insights into post-procedural flow restoration. This approach demonstrates how patient-specific modelling can support clinical decision-making by predicting the potential haemodynamic improvement following targeted revascularization.

Dissemination:

Workshops & Seminars:

- Numerical modelling (1D blood flow simulation)
- Wave analysis (time & frequency domains)

Clinical Outreach:

- Lecture for medical specialists: Modelling pulmonary haemodynamics in CTEPH

Scientific Conferences & Events:

- MediTech International Conference (2022, 2024)
- Sano Science Day (Poland)

Publications:

- 4 peer-reviewed publications (journal & conference proceedings)

Financed through

The Executive Unit for Financing Higher Education, Research, Development, and Innovation (UEFISCDI)

Project code: PN-III-P1-1.1-PD-2021-0601

Research Team

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ADAPTIVE DEEP LEARNING FOR CROSS-DOMAIN ROBUST MONOCULAR DEPTH PERCEPTION

PN-III-P1-1.1-PD-2021-0783

Goal of the project and short description

Depth estimation plays a crucial role in robotic applications that require environment perception. With the introduction of convolutional neural networks, monocular depth estimation (MDE) methods have become viable alternatives to LiDAR and stereo reconstruction-based solutions. Such methods require less equipment, fewer resources and do not need additional sensor alignment requirements. However, due to the ill-posed formulation of MDE, such algorithms can only rely on learning mechanisms, which makes them less reliable and less robust. The main objective for the project is to create differentiable solutions that incorporate (1) semantic priors, (2) geometric constraints and (3) temporal information as means for generating a better scene understanding. The project will also introduce a set of novel additional adaptive layers, that can be modified according to the scenario, as well as a novel learning mechanisms that enable cross-domain training. We aim at achieving high levels of accuracy and robustness.

Project implemented by

Technical University of Cluj-Napoca

Implementation period

01.04.2022-31.03.2024

Main activities

Stage 1 (2022): Semantic MDE
A1.1 Development of a proper feature extractor, and a proper scene understanding module for semantic MDE
A1.2 Development of a proper learning mechanism from semantic MDE

Stage 2 (2023): Geometric MDE; Temporal MDE
A2.1 Development of stereo-like geometric constraints as network post-processing
A2.2 Development of a differentiable layer that ensures geometric integration
A3.1 Temporal features generation
A3.2 Temporal features integration

Stage 3 (2024): Adaptive MDE
A4.1 Development of a heterogeneous training dataset
A4.2 Development of a novel learning mechanism for adaptive learning
A4.3 Demonstration on real-life images, captured in different scenarios

Results

Improved accuracy of monocular depth estimation on a large set of images.

Improved robustness of monocular depth estimation shown in a variety of scenarios.

Demonstration that monocular depth estimation can be effectively applied on real-life images captured by a drone in unstructured aerial scenarios.

Dissemination:

ISI Journal Articles

V. Miclea and S. Nedevschi, "Dynamic Semantically Guided Monocular Depth Estimation for UAV Environment Perception" in IEEE Transactions on Geoscience and Remote Sensing, vol. 62, pp. 1-11, 2024, Art no. 5605111, doi: 10.1109/TGRS.2023.3345475.

ISI Proceedings Conference Articles

V.C. Miclea and S. Nedevschi, "Temporal Attention for Monocular Depth Estimation in Aerial Scenarios" 2022 International Conference on Electrical, Computer, Communications and Mechatronics Engineering (ICECCME), Maldives,

Maldives, 2022, pp. 1-6, doi: 10.1109/ICECCME55909.2022.9988383.

V.C. Miclea, A. Petrovai and S. Nedevschi, "Semantic Bins for Monocular Depth Estimation in Aerial Scenarios" 27th IEEE International Conference on Intelligent Transportation Systems (IEEE ITSC 2024), Edmonton, Canada, September 2024 - submitted.

A. Petrovai, V.C. Miclea and S. Nedevschi, "Depth-aware Panoptic Segmentation with Mask Transformers and Panoptic Bins for Autonomous Driving" 35th IEEE Intelligent Vehicles Symposium, Jeju Island, Korea, June 2024 - under review.

Workshop Articles at ISI Proceedings Conferences

V.C. Miclea, "Improving Supervised Monocular Depth Estimation for Aerial Scenarios" 2023 IEEE 19th International Conference on Intelligent Computer Communication and Processing (IEEE ICCP), Semantic and Geometric Visual Perception Workshop.

Financed through

The Executive Unit for Financing Higher Education, Research, Development, and Innovation (UEFISCDI)

Project code: PN-III-P1-1.1-PD-2021-0783

Research center

Image Processing and Pattern Recognition Research Center

Research Team

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Mentor: Prof. dr. ing. Sergiu NEDEVSCHI

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https://users.utcluj.ro/~vmiclea/adarde/adarde.html

HYBRID UAV LIDAR AND PHOTOGRAMMETRY FOR DATA FUSION IN CONSTRUCTION AND LAND MONITORING - FLYSURVEY

PN-III-P1-1.1-PD-2021-0145

Goal and short description of the project

The first stage of the project consisted of an extensive investigation process of specialized literature and research regarding the use of LiDAR and Structure-from-Motion (SfM) digital photography technologies.

In the initial sub-stages dedicated to refining and optimizing the DFM model, accuracy analyses of the resulting measurements were conducted by comparing point clouds and digital elevation models against ground-measured points obtained through topographic and geodetic methods and instruments. Implementation in case studies was carried out during this phase by selecting an active landslide site, followed by measurements for developing the designed DFM model, as well as its application in a case study relevant to the construction field.

Project implemented by

Technical University of Cluj-Napoca

Implementation period

01.04.2022-31.03.2024

Main activities

Stage 1: Investigations and preliminary steps for obtaining DFM (digital feature model)
Activity 1.1: Review of specialized literature and available data related to the project's objectives
Activity 1.2: Preparations for equipment acquisition
Stage 2: DFM Development, Accuracy Analysis, and Implementation in Case Studies
Activity 2.1: Acquisition of equipment: UAV platform, sensors, and software
Activity 2.2: Test flights and mission planning, camera and sensor calibration tests
Activity 2.3: Data acquisition tests and processing of LiDAR and photogrammetric deliverables
Activity 2.4: Accuracy analysis of deliverables generated by each sensor
Activity 2.5: Data fusion and development of the Digital Feature Model (DFM) according to the project's methodology

Results

During this stage, the research of a case study was completed in which principles and objectives from the methodology conceived in the Flysurvey project were used. The dissemination of the results was carried out by publishing an article in a WoS indexed journal with an impact factor (IF), ranked in Q1. In stages 2 and 3, the complexity of the research will increase through the acquisition and implementation of modern sensors and technologies (the UAV system / professional drone, the LiDAR sensor, and the DJI P1 RGB sensor), in order to develop and test the innovative DFM methodology, according to the proposal of project.

During the second stage, the results highlight the indispensable advantages of using UAV systems for civil engineering applications while also emphasizing the need for the implementation and fusion of point clouds acquired through LiDAR technology and RGB digital photography.

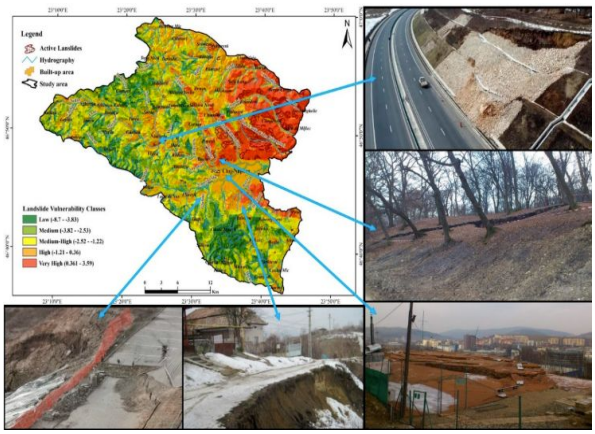

Fig.1. Landslide susceptibility map [4] with relevant hotspots

Fig.2. The UAV system DJI M300 with the P1 sensor (left) and the L1 sensor (right).

Dissemination:

P. Sestras, S. Bilasco, S. Rosca, I. Veres, N. Ilies, A. Hysa, V. Spalevic, S.M. Cimpeanu, **"**Multi-Instrumental Approach to Slope Failure Monitoring in a Landslide Susceptible Newly Built-Up Area: Topo-Geodetic Survey, UAV 3D Modelling and Ground-Penetrating Radar", Remote Sens. 2022, 14(22), 5822; https://doi.org/10.3390/rs14225822

P. Sestras, S. Rosca, S. Bilasco, T.M. Soimosan, S. Nedevschi, "The use of budget UAV systems and GIS spatial analysis in cadastral and construction surveying for building planning", FRONTIERS IN BUILT ENVIRONMENT, aug.2023, Sec. Construction Management, Volum. 9, 2023, DOI: 10.3389/fbuil.2023.1206947

Financed through

The Executive Unit for Financing Higher Education, Research, Development, and Innovation (UEFISCDI)

Project code: PN-III-P1-1.1-PD-2021-0145

Research Team

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Mentor: Prof. dr. ing. Sergiu NEDEVSCHI

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https://paul.sestras.ro/pd_2021/

INNOVATIVE SYSTEM EMBEDDED IN SEATS ON BOARD COMMERCIAL AIRCRAFT TO REDUCE THE TRANSMISSION OF SARS-COV-2 - SAFE

PN-III-P2.-2.1-PED-2021-2265

Goal of the project and short description

The aim of the SAFE project is to develop an experimental demonstrator to demonstrate the functionality of an optimized aircraft seat design concept with personalized protective ventilation and material protection measures to achieve a healthier micro -environment for passengers. The SAFE project has two general objectives : (i) to develop a hardware prototype of a seat with built -in personalized protective ventilation that allows to improve the microclimate around the passenger and (ii) to find the best configurations in terms of efficiency and implementation of an innovative PPV system and protective screens .

Project implemented by

Technical University of Civil Engineering Bucharest - Coordinating Institution

National Institute for Aerospace Research and Development "ELIE CARAFOLI" INCAS Bucharest – Partner 1

Technical University of Cluj-Napoca – Partner 2

Implementation period

24.06.2022-24.06.2024

Main activities

WP1. Definition of requirements and work module:

- T1.1 Definition of work scenarios
- T1.2 Development of user requirements
- T1.3 Development of the system specification and its architecture
- T1.4 Modeling and simulation of the work module

WP2. System design and development:

- Task 1 Development of numerical models for diffusers
- Task 2 Calibration and validation of models
- Task 3 Preliminary selection of the best diffuser models
- Task 4 Numerical models with occupants, passengers, and diffusers
- Task 5 Preliminary simulations

WP3. System integration:

- Task 1 Development of the experimental stand
- Task 2 Integration of thermal mannequins and respiratory circuits
- Task 3 Measurement of pollutant/particle concentrations
- Task 4 Selection of the best system configuration

WP4. Testing, evaluation, and validation:

- Task 1 Defining the testing, evaluation, and validation plan
- Task 2 System testing and demonstrator evaluation
- Task 3 System validation: results and comparisons

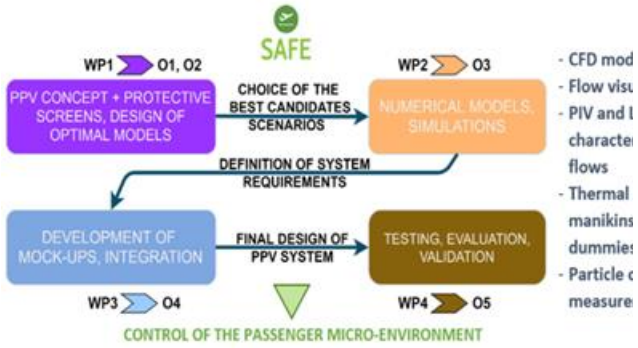
Results

In recent years, several studies have been published indicating a growing interest in studying ventilation methods in airplanes. AIRBUS, as a thematic leader, has initiated within Horizon 2020 - Clean Sky [54] the topic of an improved passenger microenvironment in aircraft, including aspects related to airborne infection transmission and low relative humidity. The idea of passive control with reduced mixing has been approached by introducing a co-flow around a central jet [55]. As shown in [56], a lobed jet with a central blockage zone can dramatically reduce self-induction.

The SAFE project proposes an original concept that explores the possibility of increasing

passenger comfort with humidified air around the face:

1. The protective micro-climate around the passenger's upper body will reduce airborne infections caused by pathogens spread in the aircraft cabin through sneezing, coughing, or breathing from a sick passenger.
2. By humidifying the air from the innovative PPV device, the sensation of excessive dryness and all associated issues during flights will be avoided.
3. The cold sensation caused by excessive skin evaporation will be significantly alleviated.
4. Fresh air will be delivered near the passenger's breathing zone more efficiently.
5. The use of passive nozzle control, through careful selection of nozzles for the personalized ventilation system, will enable reduced mixing between fresh air and the surrounding air.



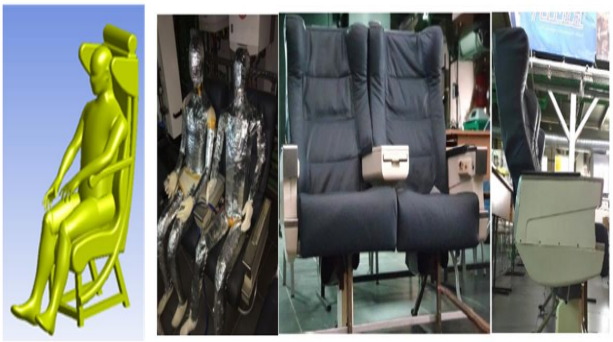


Fig. 11. – Model de scaun de avion si scaune reale de avion in laborator

Dissemination:

Articles in journals indexed by WOS

Florin BODE, Nicolae Vlad BURNETE, Lucian FECHETE TUTUNARU, and Ilinca NASTASE. Improving Electric Vehicle Range and Thermal Comfort through an Innovative Seat Heating System, Sustainability, 15, no. 6: 5534. https://doi.org/10.3390/su15065534, 2023.

Florin BODE, Ilinca NASTASE, Numerical investigation of very low Reynolds cross orifice jet for personalized ventilation applications in aircraft cabins, International Journal of Environmental Research and Public Health, ISSN: 1660-4601; Int. J. Environ. Res. Public Health 2023, 20(1), 740; https://doi.org/10.3390/ijerph20010740, 2023.

Articles in conference proceedings indexed in WoS

Ilinca Nastase, Mihnea Sandu, Paul Danca, Matei Georgescu, Cristiana Croitoru, Considerations on the role ventilation and air conditioning systems during COVID-19 times: source control, ventilation, air distribution, PEPM 2022 conference, IOP Conference Series: Earth and Environmental Science, IOP Publishing

Costin Coşoiu, George Chitaru, Ilinca Nastase, Paul Danca, Matei Georgescu, Florin Bode, Mihnea Sandu, An overview of the airplanes cabin ventilation problems and possible directions for mitigation, EENVIRO 2022 conference, IOP Conference Series: Earth and Environmental Science, IOP Publishing

Paul Danca, Angel Dogeanu, Laurentiu Tacutu, Costin Cosoiu, Ilinca Nastase, Experimental Study of an Innovative Perforated Air Diffuser at Real Scale Conditions, EENVIRO 2022, Bucuresti

Conference presentations

Florin Bode, Titus Joldos, Gabriel Mihai Sirbu, Paul Danca, Ilinca Nastase, Novel air diffuser with increased induction of ambient air for ventilation in vehicles, Sustainable Development in Building and Environment Conference (SUDBE 2023), 14-18th August 2023, Espoo, Finland

Paul Danca, Matei Razvan Georgescu, Florin Bode, Razvan Calota, Costin Ioan Coşoiu, Iinca Nastase, An overview of the airplanes cabin ventilation – Exploring the feasability of Protective Ventilation, KGH, 54 International HVAC R Congress and Exhibition, December 2023

Paul Danca, Matei Razvan Georgescu, Florin Bode, Razvan Calota, Costin Ioan Coşoiu, and Iinca Nastase, Advanced Personalized Ventilation strategies in aircraft cabins for enhanced protection against airborne pathogens, ASHRAE Winter Meeting, Chicago, January 2024

Financed through

The Executive Unit for Financing Higher Education, Research, Development, and Innovation (UEFISCDI)

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Research center

Advanced Flow and Heat Transfer Investigation Group - AtFLOW

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DETECTION OF WATER POLLUTANTS USING FLUORESCENT SENSORS BASED ON CHALCOGENIDE QUANTUM DOT COMPOSITES WITH A SMARTPHONE INTERFACE - DEPOFLU

PN-III-P2-2.1-PED-2021-2421

Goal of the project and short description

The main objective of the project is to develop a portable fluorescent device for detecting and analyzing water contaminants, specifically heavy metal ions. The active material is based on metal chalcogenide quantum dots (QD) with fluorescence in the visible spectral range. The final product of the project is an experimental demonstrator that utilizes two modules for target ion analysis: one for fluorescence intensity and the other for spectral analysis.

Project implemented by

Babes Bolyai University, Cluj-Napoca - Coordinating Institution
Technical University of Cluj-Napoca – Partner 1
SC TEDELCO SRL - Partner 2

Implementation period

24.06.2022-23.06.2024

Main activities

STAGE 1: Design of the detection platform components and preparation of the fluorescent material (23.06.2022 - 30.12.2022)
Objectives/ Activities
Design of the detection chip
Design of the mechanical assembly for integrating the transducer into the measurement system
Improving the detection abilities of ZnS/ZnO-QDs through functionalization
Morpho-structural and luminescent characterization of ZnS/ZnO
Quantification of the detection capacity of ZnS/ZnO-QDs for heavy metals
Design of the transducer interface and the hardware architecture of the measurement platform and the liquid handling hardware

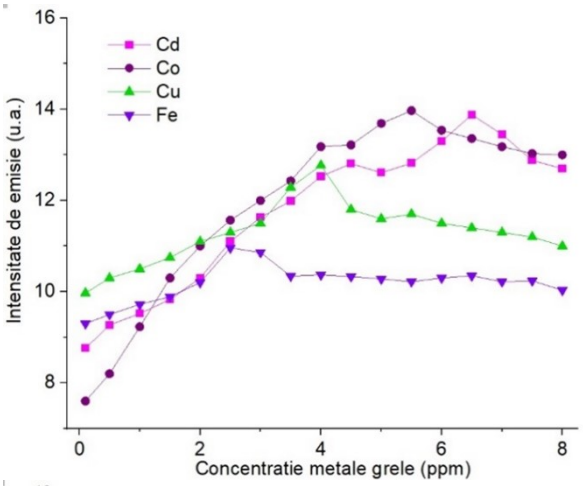
STAGE 2: Development of the detection platform based on fluorescent QD material (31.12.2022 - 29.12.2023)
Objectives/ Activities
Preparation and morpho-structural and luminescent characterization experiments of ZnS/ZnO-QDs Evaluation of the sensitivity and specificity of the detection module ZnS/ZnO-QDs laboratory technology
Design of the embedded system software
Design of signal processing algorithms for processing measurement data version 1
Implementation of the spectrometer communication module and the optimized data processing algorithm corresponding to the optimized chip version 2
Design of the communication model with smartphone/tablet
Software development for mobile application, communication with PC and export to database
Dissemination of results through publications and participation in national/international conferences

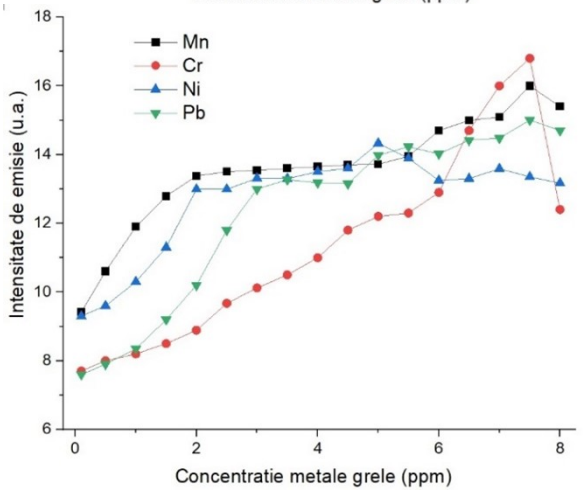
STAGE 3: Testing and validation of the detection platform (30.12.2023 - 20.06. 2024)
Objectives/ Activities
Calibration of the experimental model for pollutant detection
Validation of the measurement platform with PC
Validation of the measurement platform with smartphone/tablet
Testing the experimental model for water

pollutants
Dissemination of results through publications and participation in national/international conferences

Results

Various mechanical configurations were analyzed, forming the basis for designing the mechanical assembly for integrating the transducers. The structure is modular, allowing adjustments to the geometry of the components. For the analysis of the photoluminescent material, a detection chip assembly was designed, consisting of an optical radiation source, a cuvette containing the liquid sample for analysis, and a detector for optical signal analysis. Additionally, the architecture of the measurement platform was designed. The software interface of the transducer is developed for colorimetric analysis of transmittance and reflectance, as well as for spectral measurements. The coordinator prepared various ZnO varieties through precipitation, using different additives (surfactants and salinization agents), obtaining samples with controlled morpho-structural characteristics. A series of luminescent nanopowders (8 samples) and 10 series of colloids (120 samples) were prepared, and the optimal conditions for obtaining structurally pure ZnO were established without requiring an additional calcination step. The characteristics of the obtained materials were analyzed using SEM/TEM, FTIR, XRD, Raman, BET, EPR, and Zeta potential measurements.





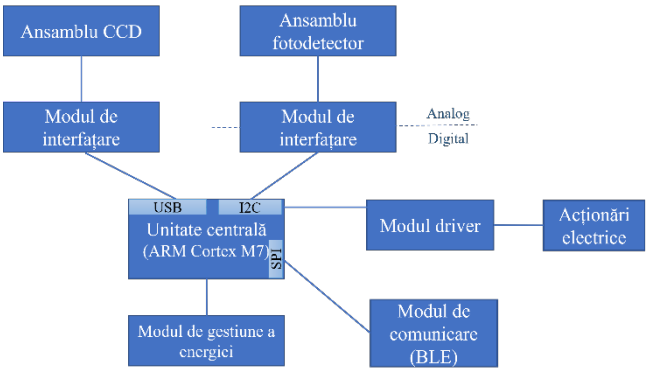


Fig. The hardware architecture of the measurement platform

Dissemination:

INFLUENCE OF DIFFERENT ADDITIVES ON THE MORPHOLOGY, DEFECT STATE AND LUMINESCENCE OF ZnO NANOPARTICLES, I. Perhaita, L. E. Muresan, A. Belcovici, A. Popa, G. Borodi, A. Mesaros, L. Barbu Tudoran, Colloids and Surfaces A: Physicochemical and Engineering

Aspects 684, (2024), 133102. https://doi.org/10.1016/j.colsurfa.2023.133102.

THE EFFECT OF PRECIPITATION CONDITIONS ON THE MORPHO-STRUCTURAL AND OPTICAL PROPERTIES OF SOME ZINC OXIDIC BASED COMPOUNDS, L. E. Muresan, I. Perhaita, A. M. V. Branzanic, C. Sarosi, L. Barbu-Tudoran, G. Borodi, I. Petean, Journal of sol-gel Science and Technology 109,3 (2024) 795-809, https://doi.org/10.1007/s10971-024-06313-z.

ZINC OXIDE NANOSTRUCTURED PLATFORM FOR ELECTROCHEMICAL DETECTION OF HEAVY METALS, A. Belcovici, C.I. Fort, L. E. Muresan, I. Perhaita, G. Borodi, G. L. Turdean, Electroanalysis 35(5), 2023, e202200395.

PREPARING A CA-BI-O SYSTEM BY THE PRECIPITATION METHOD AND STUDYING ITS INTERMEDIATE STRUCTURAL PROPERTIES FOR APPLICATIONS IN WATER TREATMENT, A.I. Cadis, F. S. Rus, J. N. Goncalves, M. Ivanovici, Inorganics 2023, 11, 79. https://doi.org/10.3390/inorganics11020079.

Conferences

THE IMPORTANCE OF OPTIMIZING THE SYNTHESIS CONDITIONS FOR OBTAINING PURE ZNO-NP.
L. E. Muresan, WORLD NANOTECHNOLOGY CONFERENCES 2024, Singapore 18.03-20.03.2024 (prezentare orala).

EFFECT OF SURFACTANTS ON THE LUMINESCENCE OF ZnO NANO PARTICLES, I. Perhaita, L. E. Muresan, L. Barbu-Tudoran, A. Popa, G. Borodi, INTERNATIONAL CONFERENCE ON RADIATION APPLICATIONS, May 29-June 2, 2023, Hellenic Centre of Marine Research, Anavyssos, Greece (poster).

HEAVY METALS EFFECT ON OPTICAL PROPERTIES OF ZINC OXIDIC COMPOUNDS, L. E. Muresan, I. Perhaita, L. Barbu-Tudoran, G. Borodi, INTERNATIONAL CONFERENCE ON RADIATION APPLICATIONS, May 29-June 2, 2023, Hellenic Centre of Marine Research, Anavyssos, Greece (poster).

EFFECT OF Cu2+ ON THE OPTICAL PROPERTIES OF ZINC OXIDE-BASED PHOSPHORS PREPARED IN DIFFERENT SYNTHESIS CONDITIONS, L. E. Muresan, F. S. Rus, I. Perhaita, L. Barbu-Tudoran, G. Borodi, WORLD NANOTECHNOLOGY CONFERENCES 2023 (prezentare orala).

INFLUENCE OF HEAVY METAL IONS ON THE LUMINESCENCE OF ZINC OXIDE-BASED COMPOUNDS
I. Perhaita, L.E.Muresan, C. Sarosi, L. Barbu-Tudoran, G. Borodi, 28th International Symposium on Analytical and Environmental Problems, 14-15. November 2022. (poster)

POROUS CHALCOGENIDE BASED ON ZINC SULFIDE WITH ENHANCED ADSORPTION PROPERTIES
A. I. Cadis, L. E. Muresan, L.C. Pop, L. Barbu-Tudoran, G. Borodi, 28th International Symposium on Analytical and Environmental Problems, 14-15. November 2022. (poster)

ELECTROCHEMICAL DETECTION OF LEAD AT ZINC OXIDE NANOSTRUCTURE BASED MODIFIED ELECTRODE, A. Belcovici, C.I. Fort, L. E. Muresan, I. Perhaita, G. Borodi, G. L. Turdean
28th International Symposium on Analytical and Environmental Problems, 14-15. November 2022. (poster)

HEAVY METALS ELECTROCHEMICAL DETECTION USING ZINC OXIDE NANOPARTICLES, A. Belcovici, L. E. Muresan, I. M Perhaita., G. L.Turdean, ISE Regional Meeting,15-19 August, 2022, Praga, Czech Republic (prezentare orala).

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Project code: PN-III-P2-2.1-PED-2021-2421

Research center

Integrated Circuits and Systems Group - ICSG

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https://depoflu.granturi.ubbcluj.ro/index.html

NEW OPTICAL COHERENCE TOMOGRAPHY BIOMARKERS IDENTIFIED THROUGH DEEP LEARNING FOR RISK STRATIFICATION IN PATIENTS WITH AGE-RELATED MACULAR DEGENERATION - DeLArMaD

PN-III-P2-2.1-PED-2021-2709

Goal of the project and short description

Stage 1 - Initiating the development of DL-based models for momentary and sequential data in patients with AMD, for screening, diagnosis, and assessment of the conversion to the advanced form of the disease.

Stage 2 - Development and interpretation of DL models for momentary and sequential data in patients with AMD. Development of modules for treatment evaluation and formulation of therapeutic recommendations.

Stage 3 - Clinically validated and interpreted DL models for momentary and sequential data in patients with AMD. Development of modules for assessing treatment quality and the injection program from a medical perspective.

Project implemented by

Iuliu Haţieganu University of Medicine and Pharmacy - Coordinating Institution

Technical University of Cluj-Napoca – Partner

Implementation period

23.06.2022-22.06.2024

Main activities

Obj. 1. Training and evaluation of deep learning-based screening (DL): Architectures based on Convolutional Neural Networks (CNN) and Capsule Networks (CapsNet) will be trained to classify Optical Coherence Tomography (OCT) scans of a patient, collected in a single visit, as urgent or non-urgent. This classification will help identify patients who need immediate treatment.

Obj. 2. Training, evaluation, and explanation of DL-based diagnosis as normal or stages of AMD: The models will be trained using patient data, including OCT scans, to diagnose normal conditions and various stages of age-related macular degeneration (AMD) - early, intermediate, or advanced. To collect relevant training data, patients with different stages of AMD will be monitored monthly. The diagnosis should be explained in terms of the presence and progression of known imaging biomarkers.

Obj.3. Training, evaluation, and explanation of DL-based prediction of conversion from intermediate to advanced stage.

Obj. 4: Evaluation of treatment efficacy: Using the trained models for diagnosis and conversion prediction, the response of neovascular AMD (nAMD) to treatment will be monitored. The evaluation method should provide explanations regarding the evolution of imaging biomarkers or other characteristics identified by the models used for Objectives 2 and 3.

Obj.5: Developing a program for anti-VEGF injections: Using trained models for diagnosis and conversion prediction, a model will be developed to predict the progression of AMD (Age-related Macular Degeneration) based on different injection programs. The data will be used to train models capable of anticipating the progression of known or new, highly predictive biomarkers. Based on the trusted model used for decision-making, the model will issue explained recommendations.

Obj.6. Identification of new biomarkers and their causal relationship with AMD. By interpreting the trained models used to achieve objectives 1, 2, 3, and 5, new OCT biomarkers and patterns for AMD progression will be identified.

Results

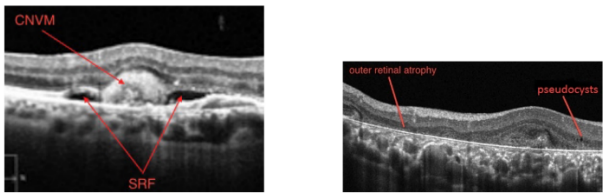
Development of an ontology for AMD.
Identifying the challenges of using AI in clinical settings.
Detecting the severity of diabetic retinopathy from fundus images.
Segmentation of fluid for AMD from OCT images.
Identification of the neovascular membrane using classic image processing methods.
Predicting treatment plans for patients with AMD.
Detection of biomarkers for diabetic retinopathy from OCT.
Automatic detection of images with uncertain annotations.
Creating a 3D model of the blood vessels in the neovascularization area.

$$f_3 : hasDisease.WetAMD \sqcap \exists hasBM.(Type2CNVM \sqcap isAbove.RPE \sqcap \exists hasAdjacentBM.SRF \sqcap \forall hasAdjacentBM.SRF \quad (1)$$

$$f_3 : \exists hasBM.(Exudate \sqcap \exists isLocated.Nasal)$$

$$Type1CNVM \sqsubseteq CNVM \sqcap \exists isBeneath.RPE \sqcap \exists appear.(Fibrovascular \sqcup HemorrhagicPigmentEpithelialDetachment) \quad (2)$$

$$Type2CNVM \sqsubseteq CNVM \sqcap \exists isAbove.RPE \sqcap \exists hasAdjacentBM.SRF \quad (3)$$



$$Pseudocysts \sqsubseteq \exists hasShape.Circular \sqcap \exists hasReflection.hyporeflective$$

Fig. Using the AMD ontology to classify images

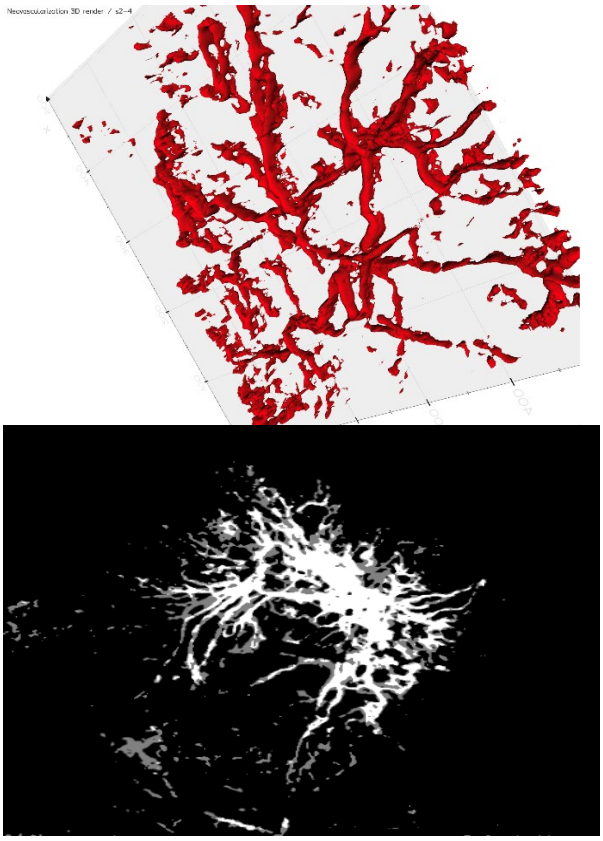


Fig. 3D visualization of the neovascular area and comparison of two scans at different intervals

Dissemination:

- Pop Adrian, Adrian Groza, Damian Ioana, and Simona Delia Nicoara. 3D reconstruction, volume approximation and evolution comparison of neovascularization in Age-Related Macular Degeneration. MEDITECH2024. Springer, 2024 (under review).
- Aron Katona Adrian Groza. FACE: Fact Checker with Explanations. In 24th International Symposium on Symbolic and Numeric Algorithms for Scientific Computing, SYNASC22, 2022. Link
- Lecu Alex, Groza Adrian, and Lezan Hawizy. Extracting causal relations from medical abstracts using fine-tuned LLMs and knowledge graphs. In under review, editor, 6th International Conference on AI in Computational Linguistic, ACLing, 2024. Elsevier.

- Raluca Brehar, Adrian Groza, Ioana Damian, George Muntean, and Simona Delia Nicoara. Age-Related Macular Degeneration Biomarker Segmentation from OCT images. In 24th International Conference on Control Systems and Computer Science, CSCS23, pages 444–451. IEEE, 2023.
- Alexandra Ioana Bucur, George Adrian Muntean, Anca Marginean, and Simona Delia Nicoara. Predicting necessary treatment plans for patients with Age-Related Macular Degeneration using characteristics derived from optical coherence tomography B-scans. In Int. Conf. on Intelligent Computer Communication and Processing, ICCP23. IEEE, 2023.
- Adrian Ciu and Anca Marginean. Self-healing model from uncertain data. In Int. Conf. on Intelligent Computer Communication and Processing - in review, 2024. Link
- Loredana Coroama and Adrian Groza. Evaluation Metrics in Explainable Artificial Intelligence (XAI). In Teresa Guarda, Filipe Portela, and Maria Fernanda Augusto, editors, Advanced Research in Technologies, Information, Innovation and Sustainability, ARTIIS'22, pages 401–413, Cham, 2022. Springer Nature Switzerland.
- Ioana Damian, George-Adrian Muntean, Larisa-Bianca Galea-Holhos, , and Simona-Delia Nicoarˇa. Advanced ImageJ Analysis in Degenerative Acquired Vitelliform Lesions Using Techniques Based on Optical Coherence Tomography. Biomedicines, 11(5):1382, 2023.

Financed through

The Executive Unit for Financing Higher Education, Research, Development, and Innovation (UEFISCDI)

Project code: PN-III-P2-2.1-PED-2021-2709

Research center

Intelligent Systems Group - ISG

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SMART DEVICE FOR AVOIDING PARALLEL RESONANCES TO THE SWITCHING OF CAPACITIVE COMPENSATORS IN UNBALANCED AND HARMONIC POLLUTED THREE-PHASE NETWORKS – Smart-Q Switching

PN-III-P2-2.1-PED-2021-4309

Goal of the project and short description

The scope of the project is: developing and testing a smart device (Smart-Q Switching) to avoid parallel resonances to the switching of capacitive compensators in unbalanced and harmonic-polluted three-phase networks.

Using the knowledge generated by fundamental research for transition to a higher level of technological maturity (demonstrator and technology validated in the laboratory).

Increasing the capacity of Research Organizations participating in the project to generate laboratory-validated solutions for technologies and services and to provide them to industry.

Project implemented by

Politehnica University Timișoara - Coordinating Institution
Technical University of Cluj-Napoca – Partner 1
S.C. ICPE S.A. - Partner 2

Implementation period

27.06.2022-27.06.2024

Main activities

Stage 1 – The technical documentation achievement, related to the experimental model, process analysis, and control-command systems (2022).

Stage 2 – Development of the experimental model, process analysis, and control-command systems (2023).

Stage 3 – Experimental model testing and optimization (2024).

Results

Stage 1 Results – The technical documentation achievement, related to the experimental model, process analysis, and control-command systems (2022).
Stage 2 Results – Development of the experimental model, process analysis, and control-command systems (2023).

The experimental model was designed to be compact and, at the same time, accessible for possible interventions needed during the testing stage. Thus, two shelves were used within a rack. The first shelf contains the intelligent device consisting of NI cDAQ 9178 hardware and compatible C-series modules for the acquisition of currents and voltages, respectively, the control of the industrial relays that connect the capacitor batteries, the power supply, and current transformers.

The second shelf contains the batteries of single-phase capacitors that form a three-phase compensator in Y connection (STAR), respectively, a compensator in DELTA connection.

Stage 3 – Results

Within the project, an experimental model for a reactive power compensator was created that simultaneously fulfills the functions of reactive power compensation (power factor improvement) in electrical networks and load balancing on the three phases of the network.

The control-command solution of this experimental model is based on NI technology and the LabVIEW graphical programming program, as it provides the possibility of avoiding parallel harmonic resonances when connecting capacitor banks.

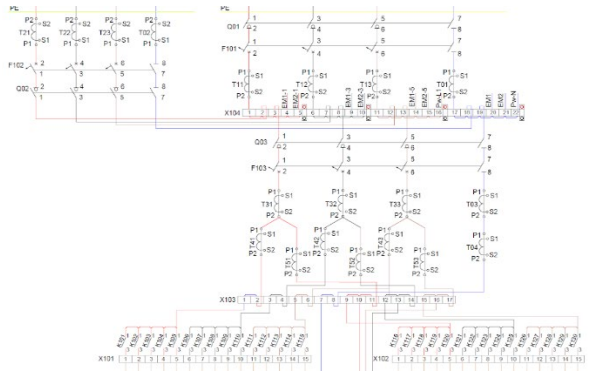

Fig. Power circuits of the experimental model

Fig. Experimental model set-up

Dissemination:

Miron, Anca; Cziker, Andrei C.; Ungureanu, Ștefan; Beleiu, Horia Gh; Dărab, Cosmin P.,"Reactive Power Compensation at Industrial Consumers: Romanian Study Case", EPE 2022, 12th International Conference and Exposition on Electrical and Power Engineering, Iaşi, Romania, October 20-22, 2022. DOI:10.1109/EPE56121.2022.9959800

Pavel, Tudor; Micu, Dan Doru; Pavel, Sorin; Beleiu, Horia G; Ungureanu, Stefan, "Contributions to the Optimization of the Electrical Power Distribution in the Station Centru From Cluj, in the Context of Updating Its Medium Voltage Network", EPE 2022, 12th International Conference and Exposition on Electrical and Power Engineering, Iaşi, Romania, October 20-22, 2022. DOI: 10.1109/EPE56121.2022.9959802

D. F. Niste, A. Miron, Ş. Ungureanu, A. C. Cziker, H. G. Beleiu and M. Misaros, "Research on Identifying Parallel Resonance in Power Networks using Artificial Neural Networks," 2023 10th International Conference on Modern Power Systems (MPS), 21-23 Iunie 2023, Cluj-Napoca, Romania, 2023, pp. 01-06, doi:10.1109/MPS58874.2023.10187583.

A. Miron, A. C. Cziker, C. P. Dărab, Ş. Ungureanu and H. G. Beleiu, "Reactive Power Compensation at Consumers Using Fuzzy Logic Control," 2023 10th International Conference on Modern Power Systems (MPS), Cluj-Napoca, Romania, 2023, pp. 1-6, doi: 10.1109/MPS58874.2023.10187471.

A. Miron, A. C. Cziker, Ş. Ungureanu, H. G. Beleiu and C. P. Dărab, "Power Quality Prediction at Consumers Using a Hybrid Knowledge-Based Approach," 2023 IEEE International Smart Cities Conference (ISC2), 24-27 sept 2023, Bucharest, Romania, 2023, pp. 1-7, doi: 10.1109/ISC257844.2023.10293729

Miron, A.; Cziker, A.C.; Beleiu, H.G. Fuzzy Control Systems for Power Quality Improvement—A Systematic Review Exploring Their Efficacy and Efficiency. Applied.Sciences. 2024, volume 14, pp. 1-30, 4468. https://doi.org/10.3390/app14114468, WOS:001245470000001

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Project code: PN-III-P2-2.1-PED-2021-4309

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Project website:
https://sites.google.com/view/smart-q-switching

OPTIMIZATION AND VALIDATION OF A SPECIALIZED SOFTWARE USED FOR CALCULATING THE THERMAL PERFORMANCE OF THE BUILDING ENVELOPE COMPONENTS, DEVELOPED BASED ON AERIAL AND TERRESTRIAL THERMOGRAPHY METHOD - THERMOG

PN-III-P2-2.1-PED-2021-4137

Goal of the project and short description

In the development phase of the energy audit documentation, a significant volume of calculations is generated when evaluating the thermal performance of the building envelope elements. The number of distinct elements of a standard building, e.g. types of exterior walls whose thermal performance is influenced by the position of the wall on the building height, by the geometric dimensions of the elements, by the existence of various types of door and windows openings, leads to an increased variety of thermal performances that should be assessed. For the energy auditing and expertise activity, several computer programs are available, programs that can determine the energy consumptions of buildings requiring as entry data the thermal performance of the building envelope elements. These thermal performances are given with varying degrees of accuracy, usually in the current field of the element without considering the linear thermal bridges.

Project implemented by

Technical University of Cluj-Napoca - Coordinating Institution
"Gheorghe Asachi" Technical University, Iasi – Partner 1
Technical University of Civil Engineering Bucharest - Partner 2
Politehnica University of Timișoara – Partner 3

Implementation period

04.07.2022-03.07.2024

Main activities

Main Objective

The project's main objective consists in developing and providing a calculation methodology and an associated software to be used in the assessment and thermal rehabilitation activity of existing building stock, in the structural and energy expertise activity of buildings, as well as in assessing a new building's energy performance before the reception phase.

The project's objective also addresses the need to train the workforce with the right skills that can ensure the development of nearly zero energy consumption and zero emission building stock.

Project Activities

Phase 1 - The preparatory phase: Identifying the current state of calculation methodologies used in determining the thermal performance of buildings and identification of the case studies (31.12.2022)

Phase 2 - Development, integration and validation phase: Defining the calculation methodology and theoretical substantiation of the algorithm. Defining and validating the THERMOG program. (31.12.2023)

Phase 3 - Dissemination and demonstration phase: Completion of research activities using the results obtained in the previous phase. Dissemination of project results. (03.07.2024)

Results

Development of the calculation methodology and the associated algorithm.
THERMOG software development.
Development of the software user manual.

Preparation of patent documentation.
Dissemination of results at 7 national and international conferences and publication of 5 scientific articles in ISI Q1 and Q2 international journals.

Fig. The location of the thermographically analyzed buildings

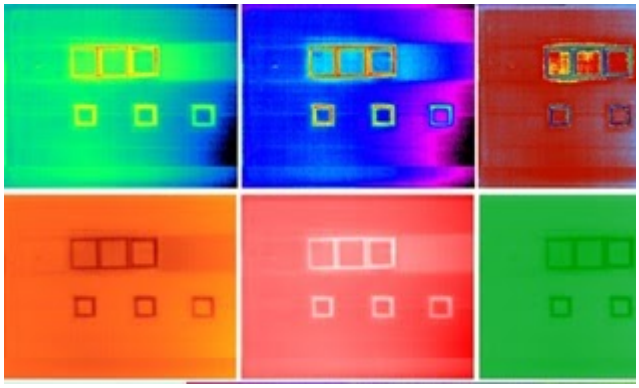

Fig. Representation of the analyzed façade using different color palettes

Dissemination:

Ligia MOGA, Teodora ȘOIMOȘAN, Ioana MOLDOVAN, Mihai RĂDULESCU, Adrian RĂDULESCU, Ionuţ IANCU, Building envelope thermal assessment using aerial and terrestrial thermography,
A XXII-a ediţie a conferinţei de cercetare în construcţii, economia construcțiilor, arhitectură, urbanism şi dezvoltare teritorială, 27-28 octombrie 2022, Universitatea Tehnică din Cluj-Napoca

Ligia MOGA, Teodora ȘOIMOȘAN, Ioana MOLDOVAN, Mihai RĂDULESCU, Adrian RĂDULESCU, Ionuţ IANCU, Aerial and Terrestrial Thermography Used for Assessing the Thermal Performance of the Building Envelope. Thermog Project, Questions 2022 - Building Change in Architecture, 10th Anniversary Edition. International Architecture Conference, 27-28 octombrie 2022, Universitatea Tehnică din Cluj-Napoca

Ionuţ IANCU, Ligia MOGA, Thermal bridge assessment at industrial buildings, The 8th Conference of the Sustainable Solutions for Energy and Environment, EENVIRO 2022, 16-20 octombrie 2022, Universitatea Tehnica de Constructii Bucuresti.

Ligia MOGA, Teodora ȘOIMOȘAN, Ioana MOLDOVAN, Mihai RĂDULESCU, Adrian RĂDULESCU, Ionuţ IANCU, Application of aerial and terrestrial thermography for determining the building envelope thermal performance, XXIInd SGEM GeoConference – “Green Sciences for Green Life”, The International Multidisciplinary Scientific Conferences on Earth and Planetary Sciences SGEM, 6-9 decembrie 2022, Viena, Austria,Vol. 22, Iss. 6.2, (2022), DOI:10.5593/sgem2022V/6.2/s26.50

Ligia MOGA, Teodora ȘOIMOȘAN, Ioana MOLDOVAN, Mihai RĂDULESCU, Adrian RĂDULESCU, Ionuţ IANCU, Challenges and Considerations in Building Thermographic Analysis: A Comprehensive Review, XXIIInd SGEM GeoConference – “Green Sciences for Green Life”, The International Multidisciplinary Scientific Conferences on Earth and Planetary Sciences SGEM, 28-1 decembrie 2023, Viena, Austria.

Cristina MARINCU, Dan DANIEL, Ligia MOGA, Case study on the thermal performance analysis of well insulated buildings, C70-2023 Tradition and Innovation 70 Years of Higher Education in Civil Engineering in Transilvania, 8-11 November 2023, Universitatea Tehnica din Cluj Napoca, Cluj-Napoca

Maxineasa Sebastian George, Dorina Isopescu, Baciu Ioana Roxana, Moga Ligia, Rapid assessment of linear thermal transfer coefficients, CIBv2023 - International Scientific

Conference Civil Engineering and Building Services, 2-3 November 2023, Braşov

Ligia MOGA, Mihai Rădulescu, Adrian Rădulescu, Ioan MOGA, Leveraging Infrared Thermography for Building Envelope Performance Evaluation: Insights from the THERMOG Project, The 1st International Online Conference on Buildings - Advances in Building Planning, Design, Construction, and Operation, 24-26 October 2023

Ligia MOGA, Ioan MOGA, Teodora ȘOIMOȘAN, Ioana MOLDOVAN, Mihai RĂDULESCU, Adrian RĂDULESCU, Ionuţ IANCU, Infrared thermography application for in-situ determination of the building envelope thermal performance, 13th Nordic Symposium on Building Physics (NSB-2023) 12/06/2023 - 14/06/2023 Aalborg, Denmark, Journal of Physics: Conference Series, Volume 2654, DOI 10.1088/1742-6596/2654/1/012122

Cristina MARINCU, Dan DANIEL, Ligia MOGA, Investigating the influence of building shape and insulation thickness on energy efficiency of buildings, Energy for Sustainable Development, Volume 79, April 2024, 101384, https://doi.org/10.1016/j.esd.2024.101384

Paulo SANTOS, David ABRANTES, Paulo LOPEZ, Ligia MOGA, The Relevance of Surface Resistances on the Conductive Thermal Resistance of Lightweight Steel-Framed Walls: A Numerical Simulation Study, Appl. Sci. 2024, 14(9), 3748; https://doi.org/10.3390/app14093748

Financed through

The Executive Unit for Financing Higher Education, Research, Development, and Innovation (UEFISCDI)

Project code: PN-III-P2-2.1-PED-2021-4137

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ADVANCED SUPERVISION AND CONTROL SYSTEM FOR OPTIMIZING THE OPERATION OF WASTEWATER TREATMENT PLANTS

PN-III-P2-2.1-PED-2021-1147

Goal of the project and short description

The present project aims to apply existing knowledge to develop a demonstrative model. This model consists of a Supervision and Optimization Control System (ASCOS) capable of connecting to the SCADA system of wastewater treatment plants to optimize effluent quality and energy consumption.

The project implementation relies on a hierarchical control system structure, where, in addition to the existing SCADA system components at the process monitoring and control level, an additional supervision and optimization layer is introduced.

At the lower level, the local control level, the wastewater treatment plant operates through multiple PID control loops. The supervision level will implement an automatic tuning procedure using a parameter planning technique for the PID controllers and a model parameter estimation method for the optimization algorithms.

Project implemented by

Technical University of Cluj-Napoca - Coordinating Institution
Research and Development Institute for Environmental Protection Technologies and Equipment, S.C. ICPE S.A., Bistrița – Partner

Implementation period

27.06.2022-26.06.2024

Main activities

Stage 1
Analysis of the SCADA system of the wastewater treatment plant, development and implementation of the SCADA–ASCOS–ICTI communication interface, preliminary experimental tests, and development of the ASCOS structure. *(Deadline: 31/12/2022)*

Stage 2
Development and implementation of the control, supervision, and optimization system. *(Deadline: 31/12/2023)*

Stage 3
Experimental testing and validation of the ASCOS system. *(Deadline: 26/06/2024)*

Results

To maintain a **clean and safe environment**, it is essential that **wastewater treatment plants (WWTPs)** meet the required **water quality standards** for effluent discharged into the environment. While increasingly advanced **treatment technologies and equipment** have been developed to achieve this, ensuring their efficiency also requires **sophisticated automation, control systems, and strategies**. From this perspective, developing a **demonstrative model** for an **optimization and supervision system** that ensures effluent quality **while optimizing energy consumption** is crucial.

The **ASCOS system**, developed within **project 686PED/2022**, is a **software product** running on a **dedicated computer**, either locally or remotely, capable of connecting to the **SCADA system** of a WWTP through interface tools. The computer runs a **supervision and control application** developed in **Matlab**. The system follows a **hierarchical control structure** with **two levels**:

1. **Process Control Level**
2. **Optimization and Supervision Level**

The **supervision level** monitors the **performance of control loops** at the process level. If deviations from set performance thresholds occur, the system **automatically updates the PID controller tuning parameters** by triggering a **self-tuning procedure**.

The **optimization level** implements a **Model-Based Predictive Control (MBPC) technique**,

using as inputs the **organic matter concentrations and/or nitrogen compound concentrations** in the effluent. Based on these values, it generates setpoints for the **process control loops**.

Test results have confirmed the advantages of the **ASCOS system**:

Flexibility in use

Improved effluent quality performance

Increased process efficiency through **energy consumption reduction**

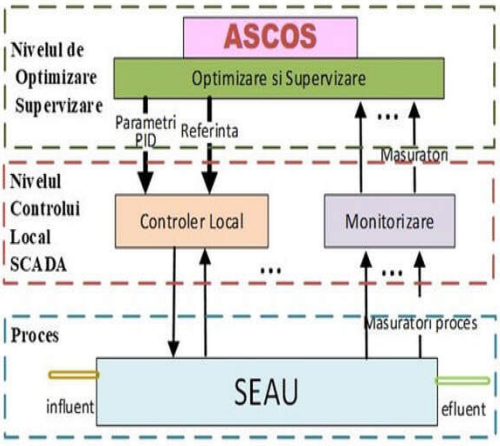

Figura 1. Structura generală a sistemului

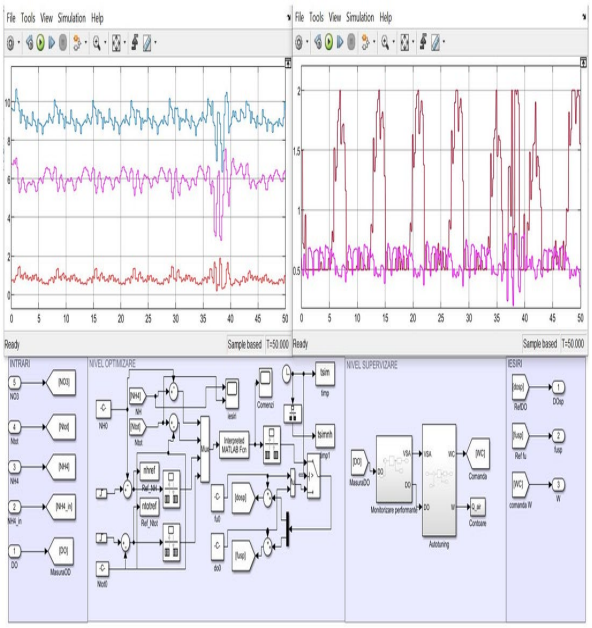

Figura 2. Vizualizare semnale în platforma ASCOS

Dissemination:

1. Ioana Nașcu, Wenli Du, Ioan Nașcu, " *An Auto-tuning method for aeration control in activated sludge wastewater treatment processes* ", IEEE 2022 International Conference on Electrical, Computer, Communications and Mechatronics Engineering (ICECCME 2022), Male, 16-18 nov.2022

2. Erwin Hegedus, Cristina Muresan, Ioan Nașcu et al. " *Optimal Fractional Order PID based on a Modified Ziegler-Nichols method* ", IEEE 2022 International Conference on Electrical, Computer, Communications and Mechatronics Engineering (ICECCME 2022), Male, 16-18 nov.2022

3. Ioana Nașcu, G. Harja, Ioan Nașcu, " An Auto-tuning method for alternating aeration control in activated sludge processes", IEEE 2023 27th International Conference on Circuits, Systems, Communications and Computers (CSCC), Rhodes, Greece, 19-22 iul.2023, IEEE Catalog Number: CFP23B16-ART, ISBN: 979-8-3503-3759-4
[2]

4. Ioana Nașcu, Wenli Du, Ioan Nașcu, " Aeration Optimization and Control for Wastewater Treatment Processes", 33rd European Symposium on Computer Aided Process Engineering (ESCAPE33)), Athens, Greece, 18-21 June 2023, Computer Aided Chemical Engineering, Vol 52, pp 1637-1642, ISSN 1570-7946, DOI 10.1016/B978-0-443-15274-0.50260

5. Ioana Nașcu, Nikolaos A. Diangelakis, Yan-Shu Huang, Zoltan K. Nagy, Isabela Birs, Ioan Nașcu, "Multiparametric Model Predictive Control Strategies for a Rotary Tablet Press in Pharmaceutical Industry", 2023 IEEE Conference on Systems, Man, And Cybernetics, Oahu, USA, 1-4 Oct 2023

Financed through

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Project code: PN-III-P2-2.1-PED-2021-1147

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HYBRID MICROGRID WITH RENEWABLE ENERGY SOURCES AND OPTIMIZED OPERATING COST, INTEGRATING ENERGY MANAGEMENT METHODS BASED ON SOLAR POWER PREDICTION - HELIoS

PN-III-P2-2.1-PED-2021-0544

Goal of the project and short description

The hybrid renewable energy microgrid with low operation cost, integrating energy management methods based on solar predictions (HELIoS) project aims to improve an existing microgrid that uses multiple types of renewable energy resources by adding "smart" management methods to reduce the cost of energy production. These new management methods are based on "day-ahead" scheduling, achieved using a smart method combined with real-time control and photovoltaic power prediction algorithms.

Project implemented by

Technical University of Cluj-Napoca – Coordinating Institution

West University of Timisoara - Partner

Implementation period

24.06.2022-23.06.2024

Main activities

Stage 1:

➢ A1.1. Development of the local radiometric measurement system and implementation of the data acquisition system.

➢ A1.2. Development of the processing unit for cost prediction and optimization.

➢ A1.3. Testing for validation of the solar radiation measurement and data acquisition system, as well as the data processing unit.

➢ A1.4. Development and implementation of a predictive algorithm for forecasting PV power based on satellite data.

➢ A1.5. Development and integration of an optimization method to minimize costs using Mixed Integer Linear Programming (MILP) in the context of uncertainties related to energy production from renewable sources.

➢ A1.6. Dissemination of partial results.

Stage2:

A2.1. Development and implementation of a predictive algorithm for forecasting PV power based on satellite data – completed.

➢ A2.2. Development and integration of an optimization method to minimize costs using Mixed Integer Linear Programming (MILP) in the context of uncertainties related to energy production from renewable sources – completed.

➢ A2.3. Testing and validation of predictive algorithms for PV power forecasting.

➢ A2.4. Integration and testing of PV power forecasts in the cost optimization method using MILP.

➢ A2.5. Development and integration of metaheuristic optimization methods for cost minimization under uncertainties in renewable energy production, using PV power forecasts.

➢ A2.6. Testing and validation of metaheuristic optimization methods on a microgrid.

➢ A2.7. Development and implementation of an hourly PV power prediction algorithm based on locally acquired data.

➢ A2.8. Testing and validation of the hourly PV power prediction algorithm.

➢ A2.9. Development and integration of a real-time correction algorithm based on hourly PV power prediction.

➢ A2.10. Testing and validation of the real-time correction algorithm for metaheuristic optimization methods.

➢ A2.11. Development and integration of the Stochastic-Dynamic cost optimization method for handling uncertainties in renewable energy production, using both advanced and hourly PV power predictions – partially completed.

➢ A2.12. Dissemination of partial results by submitting articles for publication in WOS-indexed journals.

➢ A2.13. Dissemination of partial results through participation in scientific events.

Stage3:

➢ A3.1. Development and integration of the Stochastic-Dynamic cost optimization method for handling uncertainties in renewable energy production, using both advanced and hourly PV power predictions – completed.

➢ A3.2. Testing and validation of the Stochastic-Dynamic optimization method on a microgrid.

➢ A3.3. Establishment and implementation of internal testing procedures for new energy management techniques using cost optimization under uncertainties in renewable energy production, within the Renewable Energy Laboratory of CO-UTCN, for different operating scenarios.

➢ A3.4. Testing and validation of the newly developed smart microgrid for various operating scenarios to achieve TRL 4.

➢ A3.5. Dissemination of results by submitting articles for publication in WOS-indexed journals.

➢A3.6. Dissemination of results through participation in scientific events.

Results

- solar radiation intensity measurement station;
- data processing unit;
- an algorithm for advance prediction of PV power based on satellite data;
- an optimization method for cost minimization using Mixed Integer linear programming;
- a test report for validating the PV power advance prediction algorithm;
- a test report for integrating forward PV power prediction into the optimization method;
- three metaheuristic optimization methods;
- a test report for metaheuristic optimization methods;
- an algorithm for predicting PV power at the hourly level;
- test report for validating the PV power prediction algorithm at the hourly level;
- a correction algorithm;
- a test report for the correction algorithm;
- a personalized optimization method;
- a test report for the stochastic-dynamic method;
- test specifications for testing energy management methods;
- a test report for the newly developed smart microgrid;
- Patent application registered with OSIM;
- papers submitted to WOS indexed journals;
- participation in conferences and scientific events;

Dissemination:

V. Voicu, D. Petreus, E. Cebuc and R. Etz, "Industrial IoT (IIOT) Architecture for Remote Solar Plant Monitoring," 2022 21st RoEduNet Conference: Networking in Education and Research (RoEduNet), 2022, pp. 1-4, doi: 10.1109/RoEduNet57163.2022.9921045

N. Stroia, D. Moga, D. Petreus, A. Lodin, V. Muresan, M. Danubianu, “Integrated Smart-Home Architecture for Supporting Monitoring and Scheduling Strategies in Residential Clusters”. Buildings, 2022, 12, 1034. https://doi.org/10.3390/buildings12071034

V. Voicu, D. Petreus and R. Etz, "Solar Irradiance Nowcasting using IoT with LSTM-RNN," 2022 IEEE 28th International Symposium for Design and Technology in Electronic Packaging (SIITME), Bucharest, Romania, 2022, pp. 82-86, doi: 10.1109/SIITME56728.2022.9988085.

Sergiu-Mihai Hategan, Marius Paulescu, "Analysis and calibration of GFS solar irradiation forecasts for Timisoara", TIM-22 Physics Conference, West University of Timisoara, 23-25 November 2022. AIP Conf. Proc. 3181, 020006 (2024) https://doi.org/10.1063/5.0215356

Petreus D, Patarau T, Szilagyi E, Cirstea M. Electrical Vehicle Battery Charger Based on Smart Microgrid. Energies. 2023; 16(9):3853. https://doi.org/10.3390/en16093853

Eniko Szilagyi, Dorin Petreus, Marius Paulescu, Toma Patarau, Sergiu-Mihai Hategan, Nicolae Alexandru Sarbu, Cost-effective energy management of an islanded microgrid, Energy Reports, Volume 10, 2023, Pages 4516-4537, ISSN 2352-4847,

https://doi.org/10.1016/j.egyr.2023.10.088.
Hategan S-M, Stefu N, Paulescu M,(2023) Calibration of GFS Solar Irradiation Forecasts: A Case Study in Romania. Energies 16(11), 4290. https://doi.org/10.3390/en16114290

Hategan S-M, Stefu N, Paulescu M (2023) An Ensemble Approach for Intra-Hour Forecasting of Solar Resource. Energies 16(18), 6608. https://doi.org/10.3390/en16186608

Daniel P. Hiris, Octavian G. Pop, Alexandru Dobrovicescu, Mircea C. Dudescu, Mugur C. Balan, Modelling of solar assisted district heating system with seasonal storage tank by two mathematical methods and with two climatic data as input, Energy, Volume 284, 2023, https://doi.org/10.1016/j.energy.2023.129234.

Octavian G. Pop, Alexandru Dobrovicescu, Alexandru Serban, Mihaela Ciocan, Anass Zaaoumi, Daniel P. Hiris, Mugur C. Balan, “Analytical modelling of food storage cooling with solar ammonia-water absorption system, powered by parabolic trough collectors”. MethodsX, Volume 10, year 2023, https://doi.org/10.1016/j.mex.2023.102013.

E. Szilagyi, D. Petreuş, T. Pătărău, N.A. Sarbu, "Energy Management System for an Islanded Microgrid using Stochastic Dynamic Programming under Uncertainty," 2023 IEEE 29th International Symposium for Design and Technology in Electronic Packaging (SIITME), Craiova, Romania, 2023

E. Szilagyi, D. Petreuş, T. Pătărău, N.A. Sarbu, "Stochastic Dynamic Programming Based Optimal Energy Management for an Islanded Microgrid," 2023 International Conference on Optimization of Electrical and Electronic Equipment (OPTIM) & 2023 Intl Aegean Conference on Electrical Machines and Power Electronics (ACEMP), Istanbul, Turkey, 2023

N. A. Sarbu, D. Petreus, T. Patarau, E. Szilagyi, "Day-Ahead Cost Optimization of an Islanded Microgrid: A Practical Approach," 2023 International Conference on Optimization of Electrical and Electronic Equipment (OPTIM) & 2023 Intl Aegean Conference on Electrical Machines and Power Electronics (ACEMP), Istanbul, Turkey, 2023

N. A. Sârbu and D. Petreuș, "Model Development for an Islanded Microgrid," 2023 46th International Spring Seminar on Electronics Technology (ISSE), Timisoara, Romania, 2023, pp. 1-6, doi: 10.1109/ ISSE57496. 2023.1 01683 45.

V. Voicu, D. Petreus, Radu Etz "Internet of Things System for Solar Resource Monitoring," 2023 International Conference on Optimization of Electrical and Electronic Equipment (OPTIM) & 2023 Intl Aegean Conference on Electrical Machines and Power Electronics (ACEMP), Istanbul, Turkey, 2023

V. Voicu, D. Petreus, E. Cebuc and R. Etz, "Data Acquisition System for Forecasting Applications of Photovoltaic Power Production," 2023 22nd RoEduNet Conference: Networking in Education and Research (RoEduNet), Craiova, Romania, 2023, pp. 1-4, doi: 10.1109/ RoEduNet 60162. 2023.10274911.

Paulescu M, Hategan S-M, Paulescu E, Sabadus A, Dughir C (2023) “A multi-model approach to nowcasting colun shadow” In Proc. of 40th European PV Solar Energy Conference (EUPVSEC 2023)

N. A. Sârbu and D. Petreuș, "Model Development for an Islanded Microgrid," 2023 46th International Spring Seminar on Electronics

Technology (ISSE), Timisoara, Romania, 2023, pp. 1-6, doi: 10.1109 /ISSE57496.2023. 101 68345.

D. P. Hiris, M. C. Dudescu, A. Pocola and M. C. Balan “The impact of cogeneration plant and a storage tank in a district heating system”, IOP Conference Series: Materials Science and Engineering, Volume 1290, XXIIIrd National Conference on Thermodynamics with International Participation 11/05/2023 - 13/05/2023 Galati, Romania. DOI 10.1088/1757-899X/1290/1/012017.

Mihaela Ciocan, Alexandru Serban, Alexandru Dobrovicescu, Daniel P Hiris, Mircea C. Dudescu, Mugur C Balan, “Comparative assessment of high efficiency flat solar thermal collectors’ performances”, XXIIIrd National Conference on Thermodynamics with International, IOP Conf. Series: Materials Science and Engineering doi:10.1088/1757-899X/ 1290/ 1/012013

Nicolae Alexandru Sarbu, Dorin Petreus, Eniko Szilagyi, "Practical Solutions for Microgrid Energy Management: Integrating Solar Forecasting and Correction Algorithms", Energy Reports. Under Review.

Sabadus, A.; Stefu, N.; Paulescu, M. Evaluating Outdoor Performance of PV Modules Using an Innovative Explicit One-Diode Model. Energies 2024, 17, 2547. https:// doi. org/ 10. 3390 / en 17112547

Sergiu-Mihai Hategan, Nicoleta Stefu, Dorin Petreus, Eniko Szilagyi, Toma Patarau, Marius Paulescu, Short-term forecasting of PV power based on aggregated machine learning and sky imagery approaches, Energy, Volume 316, 2025, 134595, ISSN 0360-5442, https:// doi.org/ 10.1016 / j.energy. 2025.134595.

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Project code: PN-III-P2-2.1-PED-2021-0544

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SIMULTANEOUS ELEMENTAL MICROANALYTICAL METHOD FOR ENVIRONMENT AND FOOD CONTROL USING PASSIVE SAMPLING COUPLED WITH MINIATURIZED INSTRUMENTATION BASED ON PLASMA MICROTORCH OPTICAL EMISSION SPECTROMETRY - MULTIPASS

PN-III-P2-2.1-PED-2021-0151

Goal of the project and short description

The main objective of the MULTIPASS project is to develop new microanalytical methods as TRL4 for the simultaneous determination of priority hazardous elements (Pb, Cd, Hg) and other elements (As, Sb, Se, Cu, Zn) in environment and food microsamples using a fully miniaturized laboratory experimental model based on direct liquid micro sampling SSETV-µCCP-OES in tandem with DGT device for in-situ and ex-situ preconcentration and analyte separation.

Project implemented by

National Institute for Research and Development in Optoelectronics INOE2000, Cluj-Napoca – Coordinating Institution

Babes Bolyai University Cluj-Napoca - Partner 1

Technical University of Cluj-Napoca - Partner 2

Implementation period

27.06.2022-26.06.2024

Main activities

The duration of the project is 24 months, in two stages, and is carried out in partnership by Research Institute for Analytical Instrumentation Cluj-Napoca (CO-ICIA), Babes-Bolyai University Cluj-Napoca (P1-UBB) and Technical University Cluj-Napoca (P2-UTCN). The first stage is intended to increase the technological maturity of the SSETV-µCCP-OES system at TRL4 by in-situ and ex-situ DGT preconcentration. The preconcentration and spectral detection will be optimized in such a way as to develop simultaneous multielement methods. Analytical performances will be compared with traditional methods based on inductively coupled plasma optical emission spectrometry, graphite furnace atomic absorption and thermal desorption atomic absorption spectrometry. The second stage is dedicated to the development and validation of DGT-SSETV – µCCP - OES microanalytical methods compared to traditional methods and European Commission requirements for official control laboratories.

Results

Obtained results – Stage 1

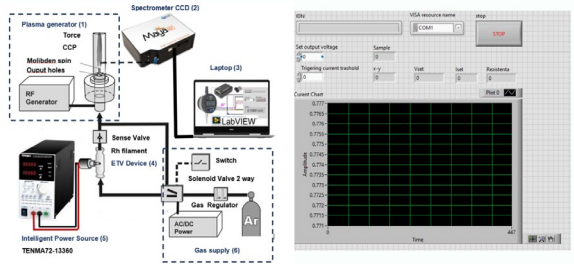
- Testing and optimization of the working conditions for in-situ and ex-situ preconcentration of Hg, Pb, Cd, As, Sb, Se, Cu and Zn using the DGT devices
- Optimization report of the working conditions for DGT-SSETV-µCCP-OES equipment for Zn, Cd, Cu, Hg and Pb determination
- Development of specialized software to control the thermal program of the Rh filament (electrothermal evaporation of Zn, Cd, Cu, Hg and Pb)
- DGT-SSETV-µCCP-OES experimental model developed at TRL4

Obtained results – Stage 2

- Optimization report of the working conditions for DGT-SSETV-µCCP-OES equipment for As, Sb and Se determination
- Experimental report on the improvement of analytical performance for DGT-SSETV-µCCP-OES methods with and without DGT sampling
- Comparative study of analytical performance of DGT-SSETV-µCCP-OES with traditional

methods, GFAAS, TDAAS, ICP-OES and European Legislations
- Specialized software to control the thermal program of the Rh filament (electrothermal evaporation of As, Sb and Se)
- Participation at scientific events – 8 participations at national si international condeference: 6 poster presentations and 2 oral presentation
- 3 papes published / submitted at WoS indexed journals

Obtained results – Stage 3
- Microanalytical methods developed for environmental samples (DGT-SSETV-µCCP-OES) TRL4
- Microanalytical methods developed for food samples (DGT-SSETV-µCCP-OES) TRL4
- Developed analytical methods based on DGT and classical methods for comparison with (DGT-SSETV-µCCP-OES)
- 2 Standard operating procedures based on DGT-SSETV-µCCP-OES
- VP on intellectual property rights for industrial research
- National patent application
- 3 Participation at scientific events – international conferences
- 5 papers published at WoS indexed journals with IF>3



Dissemination:

Eniko Covaci, Zsofia Sandor, Bogdan Simion Angyus, Marin Senila, Tiberiu Frentiu. Optical emission spectrometry by electrothermal vaporization in a capacitively coupled plasma microtorch as a specific detector in simultaneous multielemental passive sampling by diffusive gradients in thin films (DGT-SSETV-µCCP-OES): Preliminary studies on the optimization of working parameters. Conferința Națională de Chimie, ediția XXXVI, secțiunea Chimie anorganică, chimie-fizică și analitică, Călimănești-Căciulata, 04–07 octombrie 2022

Zsofia Sandor, Eniko Covaci, Bogdan Simion Angyus, Marin Senila, Tiberiu Frentiu. Microanalytical method for monitoring of toxic elements in surface waters using passive sampling in diffusive gradients in thin films and detection by capacitively coupled plasma microtorch optical emission spectrometry with electrothermal vaporization (DGT-SSETV-µCCP-OES). Conferința Națională de Chimie, ediția XXXVI, secțiunea Chimie anorganică, chimie-fizică și analitică, Călimănești-Căciulata, 04–07 octombrie 2022 – Poster

Simion Bogdan Angyus, Marin Senila, Tiberiu Frentiu, Michaela Ponta, Maria Frentiu, Eniko Covaci. In-situ Diffusive Gradients in thin-films passive sampling coupled with ex-situ small-sized electrothermal vaporization capacitively coupled plasma microtorch optical emission spectrometry as green and white method for the simultaneous determination of labile species of toxic elements in surface water. Talanta, 2023, 259, numar articol 124551, DOI: 10.1016/j. talanta. 2023.124551 (IF 6.1)

Simion Bogdan Angyus, Marin Senila, Eniko Covaci, Michaela Ponta, Maria Frentiu, Tiberiu Frentiu. Simultaneous determination of Cd, Pb, Cu and Zn as total and labile fraction in soil using small-sized electrothermal vaporization capacitively coupled plasma microtorch optical emission spectrometry after diffusive gradients in thin-films passive accumulation. Journal of Analytical Atomic Spectrometry, accepted 2023, DOI: 10.1039/D3JA00258F (IF 3.4)

Marin Senila, Metals and metalloids monitoring in water by passive sampling: A review, Reviews in Analytical Chemistry, accepted 2023, DOI: 10.1515/revac-2023-0065, (IF 4.3)

M. Senila, M.A. Resz, L. Senila, I. Torok, Application of Diffusive Gradients in Thin-films (DGT) for assessing the heavy metals mobility in

soil and prediction of their transfer to Russula virescens, Science of The Total Environment, 2024, 909, 168591 (FI = 9.8)

M. Senila, E. Kovacs, Use of diffusive gradients in thin-film technique to predict the mobility and transfer of nutrients and toxic elements from agricultural soil to crops—an overview of recent studies, Environmental Science and Pollution Research, 2024 (FI = 5.8).

M. Senila, E.A. Levei, T. Frentiu, C. Mihali, S.B. Angyus, Assessment of mercury bioavailability in garden soils around a former nonferrous metal mining area using DGT, accumulation in vegetables, and implications for health risk. Environmental Monitoring and Assessment, 2023, 195, 1554 (FI = 3.0)

M. Senila, M.A. Resz, I. Torok, L. Senila, Nutritional composition and health risk of toxic metals of some edible wild mushrooms growing in a mining area of Apuseni Mountains, Western Carpathians, Journal of Food Composition and Analysis, 2024, 128, 106061 (FI = 4.3)

M. Senila, O. Cadar, T. Frentiu, L. Senila, S.B. Angyus, Diffusive Gradients in Thin-films as passive sampling tool for the measurement of labile species in fractionation analysis of metals (Fe, Mn, Cu, Zn and Pb) in beer, Microchemical Journal, 2024, 198, 2024, 110195 (IF = 4.8)

S. Cadar, D. Petreuș, T. Pătărău and E. Szilagyi, "Design of a Flat Coil Electrothermal Vaporization Device for Inductively Coupled Plasma Optical Emission Spectrometry," 2024 47th International Spring Seminar on Electronics Technology (ISSE), Prague, Czech Republic, 2024, pp. 1-6, doi: 10.1109 /ISSE61612 .2024. 1060 3806.

S. Cadar, D. Petreus, T. Patarau and E. Szilagyi, "Comparative analysis of two types of filaments with COMSOL for electrothermal process," 2023 IEEE 29th International Symposium for Design and Technology in Electronic Packaging (SIITME), Craiova, Romania, 2023, pp. 255-260, doi: 10.1109/SIITME59799.2023.10431145.

Sergiu Cadar, Dorin Petreus, Toma Patarau, Eniko Szilagyi, Bogdan Angyus and Frentiu Tiberiu, Optimization of the electrothermal evaporation process based on intelligent control of the power source, 14TH INTERNATIONAL CONFERENCE Processes in Isotopes and Molecules, 19-22 September 2023, Cluj-Napoca, Romania.

Financed through

The Executive Unit for Financing Higher Education, Research, Development, and Innovation (UEFISCDI)

Project code: PN-III-P2-2.1-PED-2021-0151

Research center

Renewable Energy Research Group - GCER

Research Team for TUCN

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INNOVATIVE AND SAFE ROBOTIC SYSTEM FOR IMPROVED PATIENT-ORIENTED TREATMENT OF LIVER CANCER - ENHANCE

PN-III-P2-2.1-PED-2021-2790

Goal of the project and short description

The goal of ENHANCE is to develop a safe parallel robotic system for the treatment of liver cancer with the help of two automatic instruments and with the help of a modular master-slave control, up to the technological maturity level TRL 4. The starting point of the project is the parallel robotic system ProHep - LCT currently at TRL 3. Mechanical improvements will be made to provide the optimal, singularity-free operational workspace of the robotic system (and to provide consistent positioning accuracy). Furthermore, a new master-slave control system will be developed based on a modular architecture (to ensure continuous delivery) that uses functionality from the current control system (at TRL 3) and other additional advanced functions. Development at TRL 4 for the improved ProHep-LCT parallel robotic system could create opportunities to develop new therapeutic approaches in cancer management.

Project implemented by

Technical University of Cluj-Napoca - Coordinating Institution
Iuliu Haţieganu University of Medicine and Pharmacy Cluj-Napoca - Partner

Implementation period

24.06.2022-24.06.2024

Main activities

(O1) Critical analysis of the ProHep-LCT parallel robotic system based on the definition of the performance parameters required to achieve the technological maturity level TRL4.
(O2) Optimizing the ProHep-LCT parallel robotic system to achieve the optimal operational workspace with collision avoidance and superior precision, correlated with the medical task.
(O3)Development of a Master-Slave modular control system with improved functionality compared to existing ones to ensure patient safety and ergonomics.
(O4) Experimental testing and validation of the ProHep-LCT parallel robotic system

Results

Results stage 1:
Medical protocol for the ProHep-LCT robot
Report on mechanical optimization parameters for the ProHep-LCT robot to achieve TRL4
Control and GUI Optimization Parameters Report for the ProHep-LCT Robotic System

Results stage 2:
Report on singularity-free workspace modeling with collision avoidance of the ProHep-LCT robotic system
Optimized CAD build version of the mechanical structure
Optimized experimental model
3 enhanced control modules based on modular control architecture
Modular GUI
A modular master-slave control system

Results stage 3:
3 test and validation reports for the control modules
Test and validation report for modular master-slave control system
Test and Validation Report for the ProHep-LCT Robotic System

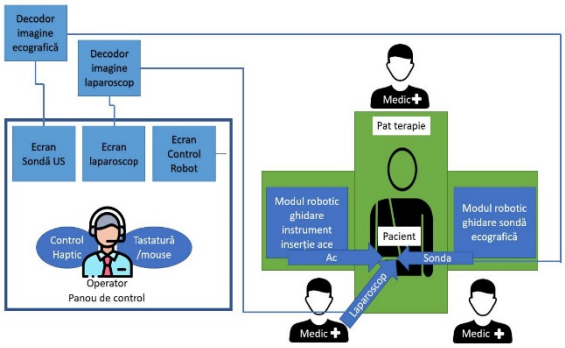

Fig. Equipment Placement Layout

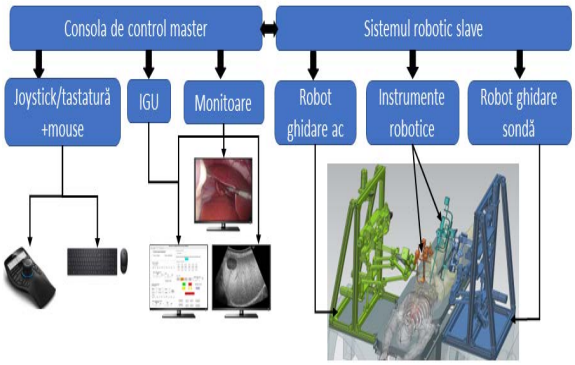

Fig. The Master-Slave Control Architecture of the ProHep-LCT robot

Dissemination:

Tucan P.; Vaida, C.; Horvath, D.; Caprariu, A.; Burz, A.; Gherman, B.; Iakab, S.;Pisla, D., Design and Experimental Setup of a Robotic Medical Instrument for Brachytherapy in Non-Resectable Liver Tumors, Cancers, 14(23), 5841;https://doi.org/10.3390/cancers14235841, 2022, Work indexed ISI Q2-FI:5.6

Gherman, B., Horvath, D., Mois, E., Vaida, C., Graur, F., Burz, A., Popa, C., Tucan, P ., al Hajjar, N., Pusca, A., Pisla, D., Development of a force feedback control for robotic assisted liver cancer treatment, In: Doroftei, I., Nitulescu, M., Pisla, D., Lovasz, EC. (eds) Proceedings of SYROM 2022 & ROBOTICS 2022. IISSMM 2022. Mechanisms and Machine Science, vol 127. Springer, Cham. https://doi.org/10.1007/978-3-031-25655-4_25, Springer Nature book chapter

Pisla, D.; Crisan, N.; German, B.; Andras, I.; Tucan, P.; Radu, C.; Pusca, A.; Vaida, C.; Al Hajjar, N, Safety Issues in the Development of an Innovative Medical Parallel Robot Used in Renal Single-Incision Laparoscopic Surgery, J. Clin. Med., 12, 4617; https://doi.org/10.3390/jcm12144617, 2023, ISI Q2 Indexed Paper, FI:3.9<

I. Lie; M. Taru; A. Fodor; O. Nicoara; P. Farcau; C. Radu; M. Lupsor-Plato; H. Stefanescu, B. Procopet; Multiparametric ultrasound evaluation of liver fibrosis, steatosis, and viscosity in patients with chronic liver disease Medical Ultrasonography, Paper accepted for publication ISI-Q3 (IF 1.7)

E. Moiș; N/A. Hajar; S. Moldovan; V. Nechita; D. Valean; C. Puia; L. Furcea; A. Chicken; C. Iancu; C. Popa; F. Zacharie; I. Russian; F. Graur, Microscopic positive resection margins after oncological resection for gastric adenocarcinoma: prognostic factors and long-term survival, Annali Italiani di Chirurgia, Paper accepted for publication ISI-Q4 FI:0.7

B. Gherman, C. Radu, A. Caprariu, N. Al Hajjar, C. Vaida, A. Ciocan, P. Tucan, E. Mois and D. Pisla, On the Stiffness Modeling of the ProHep-LCT Robotic Needle Insertion Instrument, Advances in Service and Industrial Robotics. RAAD 2023. Mechanisms and Machine Science, vol 135. Springer, Cham. https://doi.org/10.1007/978-3-031-32606-6_29. Presented, published, indexing ISI Proceedings

B. Gherman, A. Ciocan, A. Caprariu, P. Tucan, C. Radu, C. Vaida, A. Pisla, A. Horsia, N. Al Hajjar And D Piss. On the design optimization of a parallel robotic system for liver cancer treatment, Advances in Mechanism and Machine Science. IFToMM WC 2023. Mechanisms and Machine Science, vol 148. Springer, Cham. https://doi.org/10.1007/978-3-031-45770-8_52. Presented, published, indexing ISI Proceedings

D. Pisla, B. Gherman, P. Tucan, A. Pisla, A. Cailean, C. Vaida, On the Accuracy Assessment of a Parallel Robot for the minimally invasive cancer treatment , Paper presented at Z-ASTR 2023 and being published in the Journal of Engineering Sciences and Innovation Presented , being published

Accuracy and repeatability of a parallel robot for personalised minimally invasive surgery, Doina Pisla, Paul Tucan, Damien Chablat, Nadim Al Hajjar, Andra Ciocan, Alexandru Pusca, Adrian Pisla, Corina Radu, Grigore Pop & Bogdan Gherman, In: Pisla, D., Carbone, G., Condurache, D., Vaida, C. (eds) Advances in Service and Industrial Robotics. RAAD 2024. Mechanisms and Machine Science, vol 157. Springer, Cham. https://doi.org/10.1007/978-3-031-59257-7_20. ISI Proceedings

Development of a Virtual Reality Simulator for a Robotic-Assisted Laparoscopic Surgery, F. Covaciu, B. Gherman, G. Rus, C. Vaida, I. Zima and D. Pisla, Paper presentet at 2024 IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR), Cluj-Napoca, Romania, 2024, pp. 1-6, doi: 10.1109/AQTR61889.2024.10554158 ISI Proceedings

Multiparametric ultrasound evaluation of liver fibrosis, steatosis, and viscosity in patients with chronic liver disease, I. Minciuna; M. Taru; A. Fodor; O. Nicoara; P. Farcau; C. Radu; M. Lupsor-Platon; H. Stefanescu, B. Procopet; Med Ultrason. 2024 Feb 7. doi: 10.11152/mu-4327. Epub ahead of print. PMID: 38537184. Q3 (IF 1.7)

The control architecture of a spherical robot for Minimally Invasive Surgery, G. Rus, N. Al Hajjar, P. Tucan, I. Zima, C. Vaida, C. Radu, D. Jucan, D. Chablat, T. Antal, D. Pisla, in press Springer ISI Proceedings

Financed through

The Executive Unit for Financing Higher Education, Research, Development, and Innovation (UEFISCDI)

Project code: PN-III-P2-2.1-PED-2021-2790

Research center

Research Center for Industrial Robots Simulation and Testing - CESTER

Research Team

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COLLABORATIVE MAPPING OF VINEYARDS WITH AUTONOMOUS ROBOTS - VinEye

PN-III-P2-2.1-PED-2021-3120

Goal of the project and short description

The major challenges in the vineyards are related to the *diseases* which affect the grapevine in different phases of its maturity. The *detection* of the malformations in the grape usually is done visually. Unless these diseases are detected in time, they can produce massive damage to up to 70-80 per cent of the entire wine production in a year. Thus, early detection of the malformations in the plant is crucial for the entire yearly wine production.

Some early-stage research works are focusing on aerial observation of the vineyard, however, they lack the close proximity observation which is usually available from ground-level robots. This project proposal aims to demonstrate the *potential* of fusing aerial and ground-level images in a common topological map for vineyard state evaluation. The *fusion* of different images captured from different view-point and scales is non-trivial, however, our in-house camera homography estimation algorithms can cope with this as suggested in our previous publications.

The *impact* of the VinEye project is multifold: environmental (optimization of viticultural activities), social (makes the everyday labour easier), economic (reduces losses) and scientific (omnidirectional heterogenous image fusion and detection). This will be ensured by the interdisciplinary project team formed by experts in the machine learning and robotics fields with support from a local R&D vineyard center in validation and consultancy from the local DIH hub in the agronomical robotics field.

Project implemented by

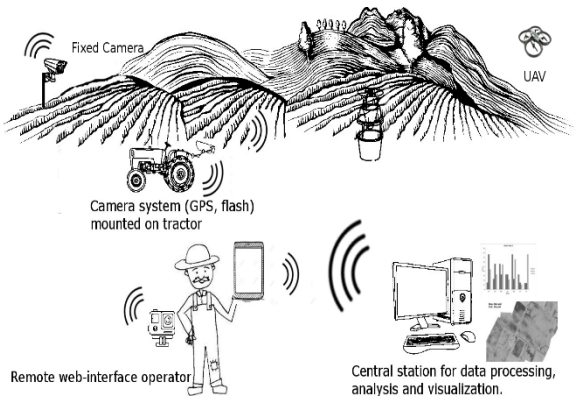
Technical University of Cluj-Napoca - Coordinating Institution
Babes Bolyai University – Partner 1
University of Agricultural Sciences and Veterinary Medicine of Cluj-Napoca – Partner 2

Implementation period

30.06.2022-30.06.2024

Main activities

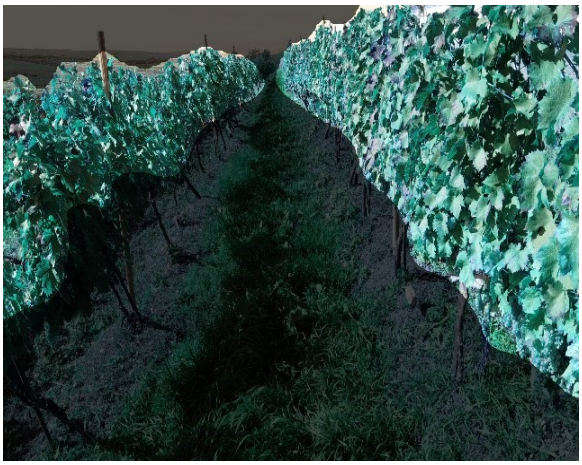
Phase 1: Fused map creation designs, develops, and tests the fusion techniques
Phase 2: Disease detection designs, develops, and tests the VDD techniques.
Phase 3: Case study requirement specifications, testing and validation in real conditions.



Results

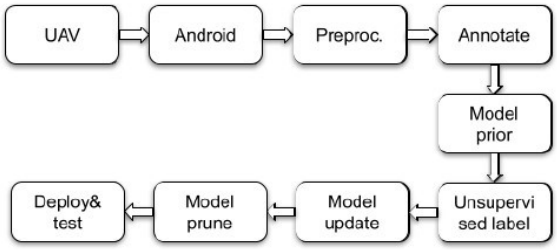
Phase 1: Fused map creation with autonomous ground and aerial robots

Ground and aerial robot for monitoring



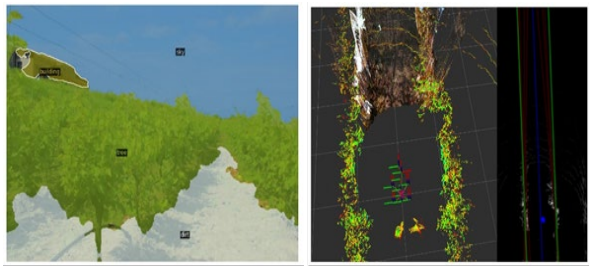
Primary interest of region

VDD marked by human specialists

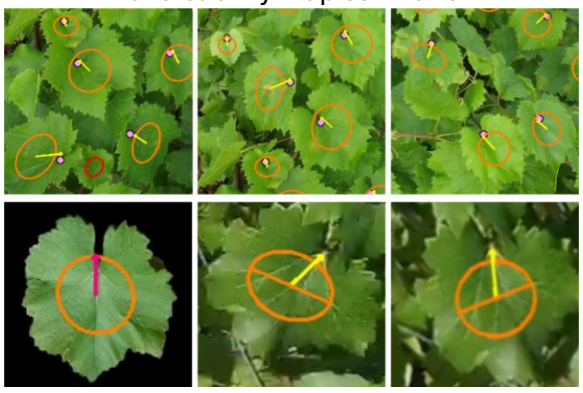


Processing pipeline

VDD detection output results



Traversability map estimation



Leaf orientation analysis for data augmentation

Phase 2: Vine Disease detection

Phase 3: Case study

Project team working on case study

Dissemination:

Benjamin Kelenyi, Victor Domsa, Levente Tamas, SAM-Net: Self-Attention based Feature Matching with Spatial Transformers and Knowledge Distillation, Expert Systems With Applications, 2023.

Szilard Molnar, Barna Keresztes and Levente Tamas, Feature Pyramid Network based Proximal Vine Canopy Segmentation, IFAC PAPERSONLINE, 22nd World Congress of the International Federation of Automatic Control (IFAC), Yokohama, JAPAN, 2023.

Szilard Molnar, Levente Tamas, Variational autoencoders for 3D data processing, ARTIFICIAL INTELLIGENCE REVIEW, Volume 57, Issue 2, 2024, DOI10.1007/s10462-023-10687-x

Sucala P.S., Tamás L., Traversability Map Estimation for Agricultural Robots, 2024 IEEE International Conference On Automation, Quality And Testing, Robotics,

Levente Tamas; Stefan Gubo; Tibor Lukić, Vine Diseases Detection Trials in the Carpathian Region with Proximity Aerial Images, 2024 IEEE 22nd World Symposium on Applied Machine Intelligence and Informatics (SAMI)
Alexandru Pop; Tamas, Levente; Generative Adversarial Training for Volumetric Next-Best View Estimation on 3D Data, ISR2023 conference

Kelényi, Benjamin; Tamas, Levente: D3GATTEN: Dense 3D Geometric Features Extraction and Pose Estimation Using Self-Attention, IEEE Access journal, 2023

S Molnár, L Tamás: Close proximity aerial image for precision viticulture. A review. Journal of Plant Diseases and Protection 132 (1), 57, 2025

Financed through

The Executive Unit for Financing Higher Education, Research, Development, and Innovation (UEFISCDI)
Project code: PN-III-P2-2.1-PED-2021-3120

Research center

ROBOTICS AND NONLINEAR CONTROL - ROCON

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http://rocon.utcluj.ro/~levente/?page_id=568

AN INNOVATIVE MODULAR REHABILITATION ROBOT FOR THE EFFICIENT THERAPY OF LOWER LIMB MOTOR DEFICIT – Hope2Walk

PN-III-P2-2.1-PED-2021-3430

Goal of the project and short description

Hope2Walk aims to develop, test and validate (at TRL 4) an experimental model for the treatment of monoparesis of the lower limb in the form of a new product consisting of an innovative robotic system integrating two robotic modules, internal and external sensors and improved control.
The main objectives of the project:
(O1) Defining a new medical protocol for the medical recovery of bedridden patients with motor deficits in the lower limbs, with emphasis on patient-centered therapeutic strategies including individual joint mobilization, combined movements of the lower limb, multiple strategies of HRI and FES
(O2) A performance-based critical analysis of the RAISE robotic system and its independent modules, identifying the specific improvements required to move from TRL3 to TRL 4 technology maturity level for the experimental model, including the ability to use the ankle module separately.
(O3) Development of the complete RAISE robotic system including integration into the clinical environment, individual modules for specific patient needs, assistive HRI functionality and FES integrated into the robot control system.
(O4) Development of an interactive and patient-centered user interface with the ability to perform various exercises, configure the electrical stimulation system, and a patient database with progress monitoring tools.
(O5) Experimental testing and validation of the Hope2Walk robotic system at the technological maturity level TRL4 based on the medical protocol by demonstrating under the supervision of medical personnel the performance of each module in terms of functionality and the potential to achieve motor recovery of the lower limb of bedridden patients.

Project implemented by

Technical University of Cluj-Napoca - Coordinating Institution

Iuliu Haţieganu University of Medicine and Pharmacy Cluj-Napoca - Partner

Implementation period

24.06.2022-24.06.2024

Main activities

Stage 1-2022: Critical analysis and optimization of the experimental model of the RAISE robot

Stage 2-2023: Integration of electrical stimulation equipment, assistive control functions and artificial intelligence agents for enhanced personalized treatment

Stage 3-2024: Development of the optimized experimental model. Testing and validating the RAISE robotic system for TRL4

Results

Results stage 1:
KPIs required for TRL4
Validated solution for robot frame with connection to recovery bed
Medical protocol for robotically assisted recovery of the lower limb
Results stage 2:
FES and torque-based control solution
External sensor system mounted on the patient's body
Protocol for new therapy schemes with the integration of new functionalities
Set of artificial intelligence agents integrated into the robotic system

Results stage 3:
1 decision algorithm and 1 user interface
The experimental model of the RAISE robot
1 RAISE robotic system validation report
1 optimized model of the RAISE robot

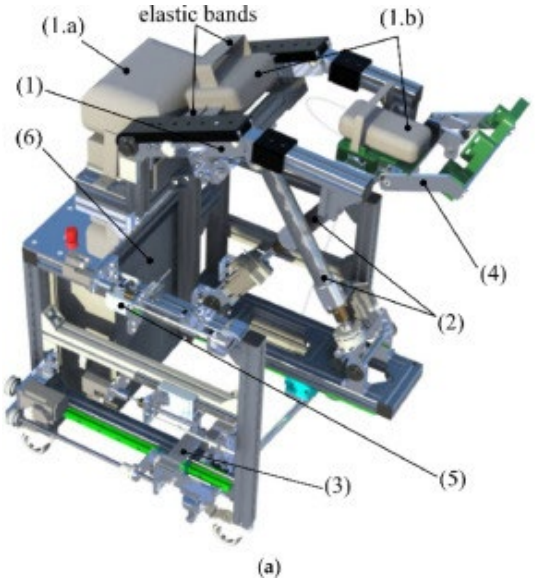

Fig. RAISE (Leg-Up) Experimental model

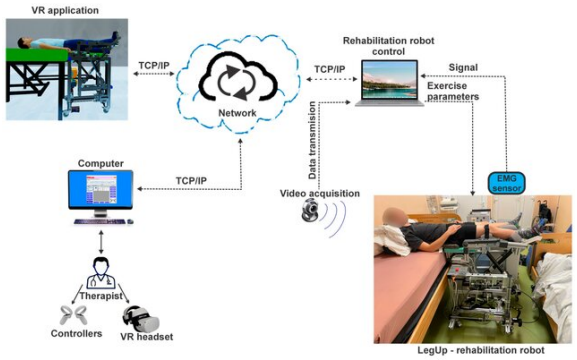

Fig. Pre-clinical testing of the robot

Dissemination:

I. Nadas, B. Gherman, P. Tucan, G. Carbone, A. Pisla, T. Antal, D. Pisla, *Inverse Dynamic Modeling of a Parallel Robot for Lower Limb Rehabilitation*. In: Doroftei, I., Nitulescu, M., Pisla, D., Lovasz, EC. (eds) Proceedings of SYROM 2022 & ROBOTICS 2022. IISSMM 2022. Mechanisms and Machine Science, vol 127. Springer, Cham. https://doi.org/10.1007/978-3-031-25655-4_19

Tohanean, N.; Tucan, P.; Vanta, O.-M.; Abrudan, C.; Pintea, S.; Gherman, B.; Burz, A.; Banica, A.; Vaida, C.; Neguran, D.A.; Ordog, A., Tarnita D., Pisla D.. *The Efficacy of the NeuroAssist Robotic System for Motor Rehabilitation of the Upper Limb—Promising Results from a Pilot Study*. J. Clin. Med. 2023, 12, 425. https://doi.org/10.3390/jcm12020425, ISI Q2, Factor impact:4,1

Fagarasan, C.; Cristea, C.; Cristea, M.; Popa, O.; Pisla, A. *Integrating Sustainability Metrics into Project and Portfolio Performance Assessment in Agile Software Development: A Data-Driven Scoring Model*. Sustainability 2023, 15, 13139. https://doi.org/10.3390/su151713139, ISI Q2, Factor impact: 4

Caprariu, A., Tucan, P., Vaida, C., Pisla, A., Gherman, B., Pisla, D. (2023). *Design Optimization of RAISE Parallel Robot for Lower Limb Rehabilitation*. In: Okada, M. (eds) Advances in Mechanism and Machine Science. IFToMM WC 2023. Mechanisms and Machine Science, vol 147. Springer, Cham. https://doi.org/10.1007/978-3-031-45705-0_3

Tucan, P., Gherman, B., Pisla, A., Horsia, A., Vaida, C., Pisla, D. (2023). A Singularity-Free Approach for Safe Operation of a Parallel Robot for Lower Limb Rehabilitation. In: Petrič, T., Ude, A., Žlajpah, L. (eds) Advances in Service and Industrial Robotics. RAAD 2023. Mechanisms and Machine Science, vol 135. Springer, Cham. https://doi.org/10.1007/978-3-031-32606-6_17

Tucan, P., Gherman, B., Tohanean, N., Antal, T., Vanta, O., Vaida, C., Pisla, D. *On the Control Architecture and Functional Validation of the Control System for a Lower Limb Rehabilitation Robot*. In: Doroftei, I., Kiss, B., Baudoin, Y., Taqvi, Z., Keller Fuchter, S. (eds) 25th International Symposium on Measurements and Control in Robotics. ISMCR 2023. Mechanisms and Machine Science, vol 154. Springer, Cham. https://doi.org/10.1007/978-3-031-51085-4_11

Iosif Birlescu, Nicoleta Tohanean, Calin Vaida, Bogdan Gherman, Debora Neguran, Alin Horsia,

Paul Tucan,Daniel Condurache, Doina Pisla, *Analysis and modeling of a parallel robotic system for lower limb rehabilitation with predefined operational workspace*, Mechanism and Machine Theory, Vol. 198. Journal Q1, impact factor 4,5

Tiberiu Antal, *Algorithm for Obtaining Balanced Specific Sliding Coefficients at the Points Where the Meshing Stars and Ends for External Spur Gears*, In: Pisla, D., Carbone, G., Condurache, D., Vaida, C. (eds) Advances in Service and Industrial Robotics. RAAD 2024. Mechanisms and Machine Science, vol 157. Springer, Cham. https://doi.org/10.1007/978-3-031-59257-7_32 ISI proceedings

Calin Vaida, Gabriela Rus, David Lupu, Bogdan Gherman, Paul Tucan, Daniel Horvath, Jose Machado, Doina Pisla, *Assessment of Different Biosignals with Potential Benefits in Robotic Assisted Neuromotor Rehabilitation*. In: Costin, HN., Magjarević, R., Petroiu, G.G. (eds) Advances in Digital Health and Medical Bioengineering. EHB 2023. IFMBE Proceedings, vol 109. Springer, Cham. https://doi.org/10.1007/978-3-031-62502-2_10

Florin Covaciu, Bogdan Gherman, Adrian Pisla, Calin Vaida, Paul Tucan, Gabriela Rus, Iuliu Nadas, Doina Pisla, *The Use of Virtual Reality in Lower-Limb Robotic Rehabilitation*. In: Machado, J., et al. Innovations in Mechatronics Engineering III. ICIENG 2024. Lecture Notes in Mechanical Engineering. Springer, Cham. https://doi.org/10.1007/978-3-031-61575-7_19

Doina Pisla, Paul Tucan, Nicoleta Tohanean, Iosif Birlescu, Cristian Abrudan, Alin Horsia, Bogdan Gherman, Adrian Pisla, Jose Machado, Calin Vaida, *Design Improvement of a Parallel Robot for Lower Limb Rehabilitation*. In: Romdhane, L., Mlika, A., Zeghloul, S., Chaker, A., Laribi, M.A. (eds) Robotics and Mechatronics. ISRM 2024. Mechanisms and Machine Science, vol 158. Springer, Cham. https://doi.org/10.1007/978-3-031-59888-3_21

Financed through

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Project code: PN-III-P2-2.1-PED-2021-3430

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Research Center for Industrial Robots Simulation and Testing - CESTER

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Optimization through Regularized Dynamical Systems - ORDYS

PN-III-P1-1.1-TE-2021-0138

Goal and short description of the project

This project aims the analysis of regularized dynamic systems associated with convex and non-convex optimization problems, respectively with monotone inclusion problems, with a special emphasis on the study of the asymptotic behavior of the generated trajectories. At the same time, this project aims to formulate and study inertial algorithms obtained by discretizing regularized dynamical systems in order to solve complexly structured (constrained), convex and non-convex optimization problems. The Tikhonov regularization term introduced in these dynamical systems/algorithms allows us -beside obtaining strong convergence of the generated trajectories/sequences- an a-priori control to which equilibrium our trajectories/sequences converge. In our results we chose this solution to be the minimum norm equilibrium, which is the projection of zero to the solution set, but our analysis can be implemented in order to obtain the projection of an arbitrary element from the space to the solution set.

Project implemented by

Technical University of Cluj-Napoca

Implementation period

02.05.2022-30.04.2024

Main activities

Obj1. Monotone inclusions and structured optimization problems treated by Yosida regularization, Moreau envelope and Tikhonov regularization.

Obj2. Splitting algorithms for convex optimization problems with constraints.

Obj3. Regularization techniques for non-convex optimization.

Results

In this project we managed to obtain some remarkable results in the context of Tikhonov regularization both in the continuous case and in the discrete case. More specifically we managed to achieve strong convergence to the minimum norm minimum of the objective function and fast convergence for potential energy, velocity and gradient. Then for the approximation of the zeros of a maximally monotone operator we used the Yosida regularization of the operator, but also the Tikhonov regularization and obtained the strong convergence of the trajectories generated by a dynamic system to the minimum norm zero of the operator. In the discrete case we introduced a simple proximal algorithm (paper A3) which, in addition to strong convergence to the minimum of the minimum norm, gives us an arbitrary rate of convergence for the potential energy and velocity. Moreover, we introduced a Nesterov-type algorithm with two Tikhonov regularizations to obtain the minimum norm minimum of a smooth function (paper A6). In A9, we have obtained some strong convergence results for composite convex optimization problems. We consider that the results presented in the above-mentioned works are the most significant results of the project. The results were included in 14 scientific papers, of which 8 have been published/accepted, 5 are in the evaluation process and 1 papers are close to completion. I presented a part of the results at conferences in the country and abroad, and through research internships spent at the University of Vienna, together with the members of the project R.I. Bot and E.R. Csetnek, we laid the foundations for future research within the project. The impact of the results obtained within the project will be a significant one, considering that our articles are intensively cited since the unpublished (archive) stage (over 100 citations). Indeed cf Google Scholar, A1 already has 8 citations, A2 already has 24 citations A3 has 6 citations, A4 has 14 citations, A5 has 7 citations, A6 has 9 citations and A7 has 33 citations. We believe that the other papers will

also be intensively cited, the results being of significant impact for the optimization community but also for researchers in related fields such as machine learning or image processing.

Dissemination:

A1. Szilárd Csaba László: A Forward–Backward Algorithm With Different Inertial Terms for Structured Non-Convex Minimization Problems, Journal of Optimization Theory and Applications, 198, 387–427 (2023)

A2. Szilárd Csaba László: On the strong convergence of the trajectories of a Tikhonov regularized second order dynamical system with asymptotically vanishing damping, Journal of Differential Equations, 362, 355-381 (2023)

A3. Szilárd Csaba László: On the convergence of an inertial proximal algorithm with a Tikhonov regularization term, Communications in Nonlinear Science and Numerical Simulation under review 2023

A4. Radu Ioan Boț, Ernö Robert Csetnek, Szilárd Csaba László: On the strong convergence of continuous Newton-like inertial dynamics with Tikhonov regularization for monotone inclusions, Journal of Mathematical Analysis and Applications, 530(2), Article 127689 (2024)

A5. Szilárd Csaba László: Solving convex optimization problems via a second order dynamical system with implicit Hessian damping and Tikhonov regularization, Computational Optimization and Applications, 90, 113–149 (2025)

A6. M. Karapetyants, Szilárd Csaba László: A Nesterov type algorithm with double Tikhonov regularization: fast convergence of the function values and strong convergence to the minimal norm solution, Applied Mathematics and Optimization 90, 17 (2024)

A7. H. Attouch, Szilárd Csaba László: Convex optimization via inertial algorithms with vanishing Tikhonov regularization: fast convergence to the minimum norm solution, Mathematical Methods of Operations Research 99, 307–347 (2024)

A8. Ernö Robert Csetnek, M. Karapetyants: Second Order Dynamics Featuring Tikhonov Regularization and Time Scaling , Journal of Optimization Theory and Applications, 202, 1385–1420 (2024)

A9. Szilárd Csaba László: A proximal-gradient inertial algorithm with Tikhonov regularization: strong convergence to the minimal norm solution, Optimization Methods and Software, under review 2024

Financed through

The Executive Unit for Financing Higher Education, Research, Development, and Innovation (UEFISCDI)

Project code: PN-III-P1-1.1-TE-2021-0138

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AUTOMATIC AND COMPUTER AIDED DIAGNOSIS OF ABDOMINAL TUMORS, THROUGH ADVANCED MACHINE LEARNING TECHNIQUES, IN MEDICAL IMAGES - ACADTUM

PN-III-P1-1.1-TE-2021-1293

Goal of the project and short description

Develop a software system for computer aided and automatic diagnosis of the abdominal tumors based on multiple image modalities, involving both conventional and deep learning techniques.

- Develop advanced image analysis and classification methods in order to attain maximum performance regarding the automatic diagnosis of some important abdominal malignant tumors, based on medical images.
- O2. Compare the performances of the conventional and deep learning techniques in multiple situations, within various types of medical images of abdominal tumors.
- O3. Diagnose the incipient tumors and the preneoplastic stages through appropriate methods.
- O4. Sustain the research activity of the young researchers (young PhD students).

Project implemented by

Technical University of Cluj-Napoca

Implementation period

12.05.2022-10.05.2024

Main activities

Stage 1 (May 12, 2022 - December 31, 2022).
The design of the software system for the automatic and computer aided diagnosis of the abdominal tumors. Preliminary experiments and results.
Stage 2 (January 1, 2023 - December 31, 2023).
The implementation of the software system for the automatic and computer aided diagnosis of the abdominal tumors.
Stage 3 (January 1, 2024 - May 10, 2024).
Installation of the software system at the beneficiary, its testing in real conditions and integration into clinical practice.

Results

In the context of the ACADTUM research project, the research team developed and experimented with advanced computerized methods for the automated and computer aided diagnosis of the abdominal tumors, based on medical images of various types: ultrasound (US), computer tomography (CT), magnetic resonance images (MRI). Aiming to perform abdominal tumor recognition and segmentation within medical images, representative Convolutional Neural Networks (CNN) based techniques, original CNN architectures, as well as CNN combinations, at classifier and decision level, were considered. Original conventional techniques, based on advanced texture analysis methods, were experimented as well, being compared, respectively combined with the deep-learning methods. Important steps have been performed to automatically detect the renal tumors' evolution stages, respectively the pre-neoplastic states, in the case of liver cancer. The best performing techniques were integrated within the ACADTUM software system, destined for the automatic and computer aided diagnosis of abdominal tumors. The automatic recognition and segmentation methods led to a superior performance when being assessed on CT and MRI images. However, the value of the ultrasound imaging based medical examination techniques

should not be ignored, being known that ultrasonography represents a non-invasive, low-cost, safe medical investigation method, suitable for disease evolution monitoring.

Dissemination:

D. Mitrea, R. Brehar, S. Nedevschi, M. Platon-Lupsor, M. Socaciu, R. Badea, “Hepatocellular Carcinoma Recognition from Ultrasound Images Using Combinations of Conventional and Deep Learning Techniques", Sensors (ISI, Q2), Vol. 23, No. 5, pp. 1-29, https://www.mdpi.com/1424-8220/23/5/2520

D. Mitrea, R. Brehar, R. Itu, S. Nedevschi, M. Socaciu, R. Badea, "Pancreatic Tumor Recognition from CT Images through Advanced Deep Learning Techniques", IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR 2024), Cluj-Napoca, May 16-18, 2024 (ISI Proceedings).

D. Mitrea, R. Brehar, C. Mocan, S. Nedevschi, M. Socaciu, R. Badea, “Hepatocellular carcinoma recognition from ultrasound images by fusing convolutional neural networks at decision level”, The 46th International Conference on Telecommunications and Signal Processing (TSP 2023), 12-14 July 2023 (ISI Proceedings)

R. Brehar, D. Mitrea, S. Nedevschi, T. Moisoiu, F.I. Elec, M. Socaciu, “Kidney Tumor Segmentation and Grade Identification in CT Images”, 2023 IEEE 19th International Conference on Intelligent Computer Communication and Processing (ICCP), Cluj-Napoca, 26-28 Oct 2023 (ISI Proceedings)

D. Mitrea, V. Timu, V. A. Florian, C. Mocan, S. Nedevschi, M. Socaciu, R. Badea, “Liver tumor segmentation from Computed Tomography images through Convolutional Neural Networks”, The 2023 9th International Conference on Systems and Informatics (ICSAI 2023), 16-18 Dec 2023, Changsha, China, Proceedings, pp. 291-296, http://81.68.97.198/submission_icsai/ICSAI-2023-Proceeding.pdf.

D. Mitrea, S. Nedevschi, M. Socaciu, R. Badea, “Deep Learning Techniques for Liver Tumor Recognition in Ultrasound Images”, book chapter in the book titled “Deep Learning - Recent Findings and Researches”, IntechOpen (https://www.intechopen.com/online-first/deep-learning-techniques-for-liver-tumor-recognition-in-ultrasound-images)

D. Mitrea, R. Brehar, S. Nedevschi, M. Socaciu, R. Badea, "Hepatocellular Carcinoma recognition from ultrasound images through Convolutional Neural Networks and their combinations", International Conference on Advancements of Medicine and Health care through Technology, MediTech 2022, Cluj-Napoca, 20-22 Oct 2022, IFMBE Proceedings (IFMBE, volume 102), pp. 3-11, Springer, https://link.springer.com/chapter/10.1007/978-3-031-51120-2_1

R. Brehar, D. Mitrea, S. Nedevschi, M. Socaciu, T. Moisoiu, F. Elec, "Kidney Tumor Stage Identification in CT Images", IEEE journals (under assessment)

European Patent:

D. Mitrea, R. Brehar, R. Itu, A.-V. Florian, M. Socaciu, T. Moisoiu, “Improving the Performance of Abdominal Tumors Diagnosis within Medical Images through the Combination of Conventional and Deep Learning Techniques”, proposal submitted to European Patent Office (EPO)

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Project code: PN-III-P1-1.1-TE-2021-1293

Research center

Image Processing and Pattern Recognition Research Center

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INNOVATIVE PROCEDURE FOR SETTING AND CHECKING THE DIGITAL RELAYS WITHIN TRANSFORMER STATIONS AVAILABLE FOR INJECTING THE ELECTRICAL ENERGY PRODUCED BY PHOTOVOLTAIC PARKS INTO THE NATIONAL POWER SYSTEM - SETRDPF

PN-III-P2-2.1-PTE-2021-0066

Goal of the project and short description

The project aims to develop procedures for testing protection performance through functional tests carried out by secondary current injection, in order to verify the correctness of the specified settings.

Additionally, the project develops procedures for checking and modifying the characteristics of the digital relay. For digital relays, based on sampling at voltage and current inputs, the shape of the operating characteristics is fixed through logic. For validation purposes, it is appropriate to ensure that the specified setting is correctly configured.

Project implemented by

ELECTROPLUS SRL - Coordinating Institution

Technical University of Cluj-Napoca – Partner

Implementation period

21.06.2022-20.06.2024

Main activities

Stage 1 – 20.12.2022

Adapting the implementation techniques of conventional relays by developing testing and setting procedures for digital relays, through primary current injection or secondary current injection.

1.1. Development of testing procedures for digital relays using secondary current injection equipment. Studies and elaboration of digital relay testing methods – ELECTROPLUS SRL;

1.2. Development of testing procedures for digital relays in the Erris ERIF-2000-000Y-1636 laboratory, part of partner P1, "Electrical Energy Quality Diagnosis Laboratory," through primary current injection generated by simulation of the real network – TECHNICAL UNIVERSITY OF CLUJ-NAPOCA;

1.3. Modeling and simulation of software setting or resetting techniques for commissioning digital relays integrated in protection systems within electrical panels of transformer stations in Wind Parks – TECHNICAL UNIVERSITY OF CLUJ-NAPOCA.

Stage 2 – 20.12.2023

Integration of the testing and monitoring team for digital relays, part of protection systems within electrical panels of transformer stations in Wind Parks, into the existing PRAM laboratory at ELECTROPLUS SRL.

2.1. Experimental development, within the PRAM laboratory of the project coordinator, of testing, setting, and resetting procedures for digital relays through secondary current injection – **ELECTROPLUS SRL**;

2.2. Development of procedures for performing functional tests in the testing laboratory – **ELECTROPLUS SRL**;

2.3. Experimental development, within the Electrical Energy Quality Diagnosis Laboratory of partner P1, of testing procedures for digital relays through primary current injection – **TECHNICAL UNIVERSITY OF CLUJ-NAPOCA**;

2.4. Dissemination through the publication of scientific papers presenting the research results – **TECHNICAL UNIVERSITY OF CLUJ-NAPOCA**;

2.5. Dissemination and participation in national or international scientific conferences – **TECHNICAL UNIVERSITY OF CLUJ-NAPOCA**.

Stage 3 – 20.06.2024

Validation of testing and monitoring procedures for digital relays in the substations where ELECTROPLUS SRL has performed installation and commissioning of the protection system, and where contractual obligations include maintenance of the protection system.

3.1. Experimental tests through secondary current injection in the substations where ELECTROPLUS SRL has installed and commissioned the protection system – **ELECTROPLUS SRL**;

3.2. Experimental tests through primary current injection in the substations where ELECTROPLUS SRL has installed and commissioned the protection system – **TECHNICAL UNIVERSITY OF CLUJ-NAPOCA**;

3.3. Dissemination and participation in national or international scientific conferences – **TECHNICAL UNIVERSITY OF CLUJ-NAPOCA**.

Results

Adaptation of the implementation technique for conventional relays by developing testing and setting procedures for digital relays using primary or secondary current injection led to the development of procedures for setting, resetting, and testing digital relays used in electrical panels of transformer stations in Photovoltaic Parks, achieved through:

- Developing testing procedures for digital relays using secondary current injection equipment;
- Developing methods for resetting digital relays;
- Developing procedures for testing digital relays in the Erris laboratory, ERIF-2000-000Y-1636, equipped at the Technical University of Cluj-Napoca, using primary current injection generated in simulation of real network conditions;
- Modeling and simulating software-based setting or resetting techniques, intended for commissioning digital relays used in protection systems within electrical panels of transformer stations in Wind Parks.

Dissemination:

Mircea Buzdugan, “About a Mitigation Method of Conducted Electromagnetic Interference”, CANDO EPE 2023, 6th International Conference AND workshop in Óbuda on Electrical and Power Engineering, October 19-20, 2023, Budapest, Hungary.

Mircea Buzdugan, “Considerations about the measurement of electromagnetic emissions”, ICREPQ’23, 21th International Conference on Renewable Energy and Power Quality, Madrid, Spain, 24-26 May 2023.

Horia Balan, Liviu Neamt, “Integrated Test Platform for Multi-Level Modular DC-AC Converters (MMC) for Total Harmonic Distortion Reduction (THD)”, .

Journal of Multidisciplinary Engineering Science and Technology (JMEST), ISSN: 2458-9403, Vol. 11, Issue 1, January – 2024.

Petros Karaisas, University of West Attica, Horia Balan, Technical University of Cluj-Napoca, “Design and Simulation of a Small Wind-Hydro Power Plant”, Journal of Multidisciplinary Engineering Science and Technology (JMEST), ISSN: 2458-9403, Vol. 11, Issue 2, February – 2024

Financed through

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Project code: PN-III-P2-2.1-PTE-2021-0066

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INERTIAL ENERGY STORAGE DEVICE FOR LOCAL ELECTRICAL MICROGRIDS PROTECTION - DISEP

PN-III-P2-2.1-PTE-2021-0639

Goal of the project and short description

The objective of the project is the development of a prototype of an inertial device for energy storage and electromagnetic protection of the local electrical network and the validation in relevant operating conditions of this device with additional protection capabilities, which will be able to develop a power of P = 2kW, the discharge time being at least td = 10 min. The innovative character is related to the realization of an inertial device which, in addition to the energy storage function, ensures permanent protection against voltage peaks and against parasitic electrical elements. The new product, intended for subsequent introduction into manufacturing at the project coordinator ICPE SA whose object of activity is technological research and development, is addressed to banks, medical units, the information storage sector, etc., will be designed for powering IT equipment, for example in special laboratories, units of strategic interest, therefore aiming at the protection and rapid storage of data. As a result of the project, positive technological effects (development of an innovative technology for efficient and non-polluting energy storage) and significant economic effects are estimated, ICPE SA thus being able to expand its research capacity, at the same time diversifying its range of products adapted to the new requirements of performance and efficiency, thus assimilating the results of research and development carried out by project partners ICPE-CA and UTCN.

Project implemented by

ICPE SA Bucharest - Coordinating Institution

National Institute for Research and Development in Electrical Engineering ICPE – CA Bucharest (ICPE-CA) – Partner 1

Technical University of Cluj-Napoca – Partner 2

Implementation period

22.06.2022-21.06.2024

Main activities

Phase 1 – Elaboration of the solution, design and realization of the experimental model, design of the prototype of the system

Act 1.1 – Study of the existing experimental model and the presentation of the existing constructive solutions on the market in the field of energy storage systems using the flywheel principle

Act 1.2 – Elaboration of the solution for the realization of the prototype of the inertial system for energy storage

Act 1.3 – Optimization study and prototype design of inertial energy storage system

Act 1.4 – Dissemination of information

Phase 2 – Realization of prototype energy storage system in the flywheel and specific test stand

Act 2.1 – Design of test stand and work devices

Act 2.2 – Realization of test stand and working devices

Act 2.3 – Realization of a prototype energy storage system in the flywheel

Act 2.4 – Reference development of the energy storage system in the flywheel

Phase 3 – Prototype testing of the energy storage system in the flywheel

Act 3.1 – Prototype testing of the energy storage system in the flywheel

Act 3.2 – Functionality demonstration and prototype validation

Act 3.3 – Demonstration of the functionality and validation of the prototype

Act 3.4 – Patents

Results

Within the third and final stage of the Disep project, the development of a product for both energy storage and protection of local micro-grids was finalized. The product is aimed at banks, medical units, data centers, laboratories, strategic interest units that require special security measures (against accidental fluctuations in the voltage of the power supply network as well as against parasitic disturbances including sabotage/espionage). The market potential of the product in the targeted market segment is significant, especially in a fragmented geopolitical context, with the EU aiming to strengthen the security of energy supply to its member states, based on political and economic commitment and reciprocal cooperation.
The invention solves a technical problem that consists in the creation of an inertial device that, in addition to the energy storage function, provides permanent protection against voltage peaks and parasitic elements by galvanically isolating the power supply circuit of this micro-grid from the industrial power grid. The objective of the DISEP project was fully achieved, within the framework of this project a prototype of an inertial flywheel system was designed, tested and validated, which uses a flywheel with a moment of inertia J = 2,3 kg*m^2 and a mass m = 170 kg, and at a maximum speed n_{max} = 10000 rpm, achieves the following charging (inertial storage) – discharging (by electric power delivery) parameters, established by the project: maximum acceleration time to n_{max}: ta_{max} = 30 [min], minimum discharge time: td_{min} = 10 [min], electric power delivered: Pd_{min} = 2000 [W].
The innovative product developed by the ICPE SA coordinator together with the project partners, the National Institute for Research-Development for Electrical Engineering Icpe-CA, Bucharest (ICPE-CA) and the Technical University of Cluj-Napoca (UTCN), will generate significant technological and economic effects and ICPE SA will thus expand its research capability and diversify its range of products adapted to new performance and efficiency requirements, assimilating the R&D results of the project partners.

Fig. Disep prototype development (TRL6)

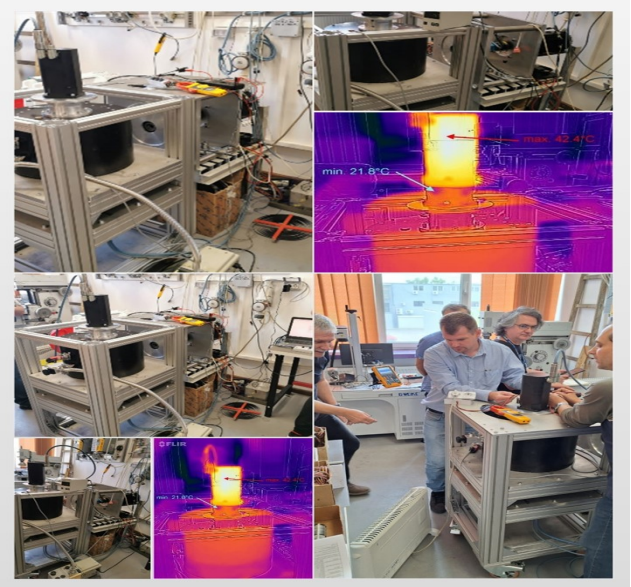

Fig. Testing and validation of the Disep prototype (TRL6)

Dissemination:

In the third stage of the project, the patent application was filed at the State Office for Inventions and Trademarks and registered with the OSIM registry under number A/00273 of 28.05.2024. The application requests the grant of a patent with the title: "INERTIAL DEVICE WITH TWO FLYWHEELS IN CONTRAROTATIVE MOTION FOR ENERGY STORAGE AND PROTECTION OF SPECIAL CONSUMERS"

Nicolae TĂNASE, Cristinel ILIE, Marius POPA, Lucian DEMETER, Dragoș OVEZEA, with the title "Inertial energy storage system. Applicative extension", in vol. 13/2023 of the International Journal of Mechatronics and Applied Mechanics IJOMAM 2023 E-ISSN: 2559-6497

Radu Andrei MARŢIŞ, Jurca Florin, Răzvan Inte, Claudia Steluţa MARŢIŞ, Nicolae TĂNASE, Lucian Nicolae DEMETER, Flywheel Energy Storage System Technologies: A Review and Prototype Development with Optimization Strategies, 13th IEEE International Conference and Exposition on Electrical and Power Engineering (EPEi 2024)"), October 17-19, 2024, Iaşi, Romania.

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Project code: PN-III-P2-2.1-PTE-2021-0639

Research center

CENTER OF APPLIED RESEARCHES IN ELECTRICAL ENGINEERING FOR SUSTAINABLE DEVELOPMENT - CCAIEDD

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DEEP LEARNING BASED 3D PERCEPTION FOR AUTONOMOUS DRIVING - DeepPerception

PN-III-P4-PCE-2021-1134

Goal of the project and short description

The aim of this project is to develop new computational models for 3D perception, with applications in the field of Autonomous Mobile Systems, based on artificial vision and especially on deep learning techniques. 3D perception is the process of organizing, identifying, interpreting and understanding sensory information, represented in the form of a 3D point cloud, associated activities include semantic segmentation of the 3D point cloud, object detection and representation through 3D cuboids, object tracking and motion forecast. The main problems to be solved are: multiple redundancy at the level of the sensory system; the use of artificial intelligence algorithms and solutions based on deep learning; multiple redundancy at the algorithmic level; independent perception solutions for each type of sensor; fusion of geometric, semantic, motion and thermal data at different levels of granularity. Based on the study of the current state and the experience gained, we propose the following objectives: innovative key technologies for perception based on deep learning; independent 3D perception solutions based on deep learning; solution based on multi-sensory fusion at different levels of granularity; configuring a demonstration vehicle for data acquisition, testing, comparison and evaluation.

Project implemented by

Technical University of Cluj-Napoca – Coordinating institution

Implementation period

02.06.2022-31.12.2024

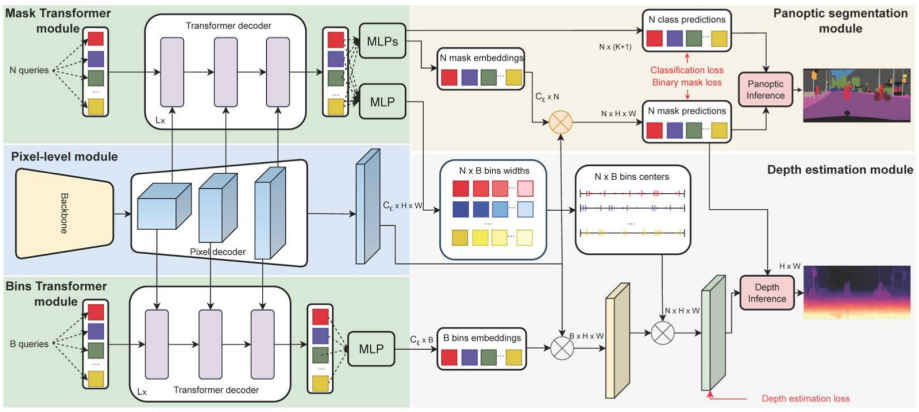
Main activities

- **Phase 1**: Studies, experiments, evaluations and initial design specifications covering objectives O1, O2, O3, O4, O5 as well as dissemination and management activity
- Act 1.1 Building extensive training sets including representation format standardization, format transformation, augmentation for underrepresented classes (O1 - A1.1)
- Act 1.2 The study, experimentation, evaluation of 3D perception methods based on LiDAR sensors and the proposal of an initial design specification (O2 - A2.1, A2.2)
- Act 1.3 The study, experimentation, evaluation of some camera-based 3D perception methods and the proposal of an initial design specification (O3 - A3.1, A3.2)
- Act 1.4 The study, experimentation, evaluation of 3D perception methods based on low-level multi-sensor fusion and the proposal of an initial design specification (O4 - A4.1)
- Act 1.5 Design and development of the experimentation and evaluation environment (O5 - A5.1)
-
- **Phase2**: 3D perception models and their evaluation on simple scenarios covering objectives O1, O2, O3, O4, O5 as well as dissemination and management activity
- Act.2.1 Completing the construction of extensive training sets including representation format standardization, format transformation, augmentation for poorly represented classes. (O1- A1.1, A1.2, A1.3)
- Act.2.2 Refinement of specifications, design, implementation and evaluation on simple scenarios of a 3D perception method based on LiDAR sensors. (O2 - A2.1, A2.2, A2.3)

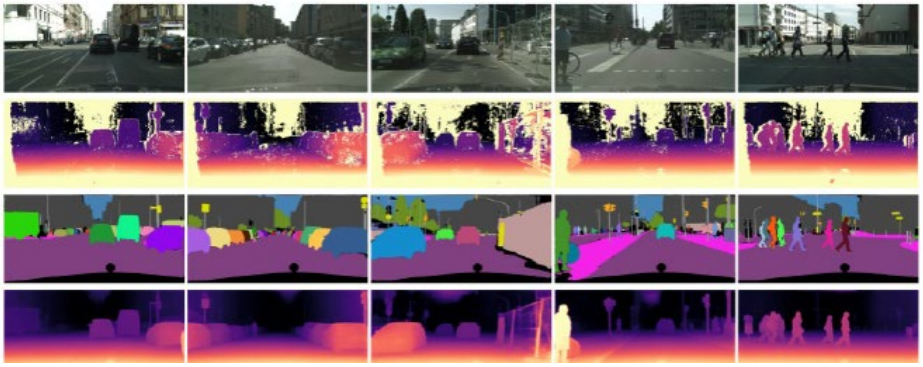
- Act.2.3 Refinement of specifications, design, implementation and evaluation on simple scenarios of a 3D perception method based on video camera. (O3 - A3.1, A3.2, A3.3, A3.4)
- Act.2.4 Specification refinement, design, implementation and evaluation on simple scenarios of a 3D perception method based on low-level multi-sensor fusion. (O4 - A4.1, A4.2)
- Act.2.5 Refinement of the specifications and completion of the development of the environment for experimentation, evaluation and comparison. (O5 - A5.1, A5.2, A5.3)
- Act.2.6 Management and dissemination year 2.
- **Phase3**: 3D Perception Models and Their Evaluation in Complex Scenarios Covering Objectives 02, 03, 04, 05, as well as Dissemination and Management Activities
- Act.3.1 Evaluation of the 3D perception method based on LIDAR sensors in complex scenarios and its refinement (O2-A2.2, A2.3).
- Act.3.2 Evaluation of the 3D perception method based on video cameras in complex scenarios and its refinement (O3-A3.1, A3.2, A3.3, A3.4).
- Act.3.3 Evaluation of the 3D perception method based on low-level multi-sensor fusion in complex scenarios and its refinement (O4-A4.1, A4.2).
- Act.3.4 Integration of solutions into the evaluation environment and real-time performance evaluation (O5-A5.2, A5.3)
- Act.3.5 Management and dissemination year 3

Results

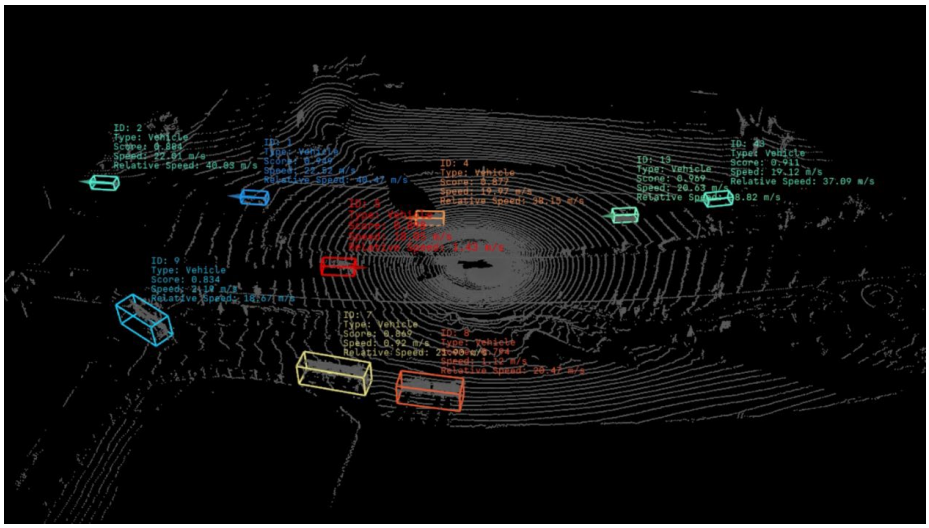
The estimated results of this project are:
-LiDAR-based 3D point cloud perception solution.
-Camera-based 3D point cloud perception solution.
-Multi-sensor based solutions for enhanced 3D perception.
-The solutions will be deployed and compared on an experimental vehicle.
-The results were published in ISI journals and presented at conferences.



The depth-aware panoptic segmentation network performs panoptic mask classification and detection, as well as mask-level depth prediction



Quantitative results on Cityscapes - DVPS. Top to bottom: input image, depth ground truth, panoptic segmentation prediction and depth prediction



The qualitative result of 3D object detection and tracking from LiDAR point clouds:
The original image, the panoptic segmentation image, the depth image, and the tracked objects.

3D perception from RGB images:
The original image, the panoptic segmentation image, the depth image, and the tracked objects.

Dissemination:

Papers in ISI Journals

H. Florea, S. Nedevschi, “TanDepth: Leveraging Global DEMs for Metric Monocular Depth Estimation in UAVs”, IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, JAN. 2025

V. C. Miclea, S. Nedevschi, “Dynamic Semantically Guided Monocular Depth Estimation for UAV Environment Perception”, IEEE Transactions on Geoscience and Remote Sensing, 62,5605111, pp. 1-11, 2024

V. Chiciudean, H. Flora, Z. Blaga, R. Beche, F. Oniga, S. Nedevschi, Data Augmentation for Environment Perception with Unmanned Aerial Vehicles, IEEE Transactions on Intelligent Vehicles, 2024

Z. Blaga, S. Nedevschi, “Semantic Segmentation of Remote Sensing Images with Transformer-Based U-Net and Guided Focal-Axial Attention”, IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, 2024

Z. Blaga, S. Nedevschi, “Improving Counting Accuracy in Post-Disaster Visual Question Answering for Remote Sensing”, submitted to IEEE Transactions on Geoscience and Remote Sensing, 2024

D.S. Bacea and F. Oniga, "Single Stage Architecture for Improved Accuracy Real-Time Object Detection on Mobile Devices", published in Image and Vision Computing, Vol 130, 2023, FEB

S. Deac, S. Nedevschi, “C3AFnet: Improving Anchor Free 3d Object Detection through additional Objects’ Center Context and Class-aware Attention”, submitted to Image and Vision Computing.

Conference Papers

D.S. Bacea, F. Oniga, ECF-YOLOv7-tiny: Improving feature fusion and the receptive field for lightweight object detectors, Winter Conference on Applications of Computer Vision (WACV), Feb 28 – Mar 4 Tucson, Arizona, 2025, pp. 1577 - 1586 (A type conference)

A. Petrovai, V.C. Miclea, S. Nedevschi, “Depth-aware Panoptic Segmentation with Mask Transformers and Panoptic Bins for Autonomous Driving”, Proceedings of 2024 IEEE ITSC, Edmonton, Canada September 24-27, 2024.

V.C. Miclea, A. Petrovai, S. Nedevschi, “SemBins: Semantic Bins for Monocular Depth Estimation in Aerial Scenarios”, Proceedings of 2024 IEEE ITSC, Edmonton, Canada September 24-27, 2024.

V. Chiciudean, H. Florea, F. Oniga and S. Nedevschi, “Localization and Change Detection Through Aerial Environment Perception”, Proceedings of 2024 IEEE ICCP, October 17-19, 2024.

Z. Blaga, S. Nedevschi, “Improving VQA Counting Accuracy for Post-Flood Damage Assessment”, Proceedings of 2024 IEEE ICCP, October 17-19, 2024.

O. Morar, A. Petrovai, ”Training-free Open-vocabulary Segmentation of Aerial Drone Images using Foundation Models”, Proceedings of 2024 IEEE ICCP, October 17-19, 2024.

V.-C. Miclea, S. Nedevschi, "SemanticAdaBins - Using Semantics to Improve Depth Estimation based on Adaptive Bins in Aerial Scenarios", Proceedings of 2024 IEEE International Conference on Electrical, Computer, Communications and Mechatronics Engineering (ICECCME), Noe. 4-6, 2024.

A. Petrovai, S. Nedevschi, “MonoDVPS: A Self-Supervised Monocular Depth Estimation Approach to Depth-aware Video Panoptic Segmentation”, Proceedings of 2023 IEEE Winter Conference on Applications of Computer Vision, (WACV), Waikoloa Hawaii, Jan 3-6, 2023, pp. 3076-3085 (A type conference)

M.P. Muresan, R. Danescu, S. Nedevschi, “Multi-Object Tracking, Segmentation and Validation in Thermal Images”, Proceedings of IEEE Intelligent Vehicles Symposium, Anchorage, Alaska, SUA, 04-07 June, 2023

V. Chiciudean, R. Beche, Z. Blaga, F. Oniga and S. Nedevschi, “Static Mesh Enrichment with Dynamic Entities for Training Sets Generation”, Proceedings of 19th 2023 IEEE ICCP, 24-26 October, 2023

P. Cobarzan, C. Golban, S. Nedevschi, “Accuracy vs speed trade-offs in multi-frame LiDAR-based linear correction for visual odometry”, Proceedings of 19th 2023 IEEE ICCP, 24-26 October, 2023

S. Bacea, F. Oniga, “Road Marking Real-Time Detection with a Single Stage Object Detector”, Proceedings of 19th 2023 IEEE ICCP, 24-26 October, 2023

A. Petrovai, S. Nedevschi, “Exploiting Pseudo Labels in a Self-Supervised Learning Framework for Improved Monocular Depth Estimation”, Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), New Orleans, USA, June 19-24, 2022, pp. 1578-1588 (A* type conference)

C.P. Cobarzan, C.C. Golban, S. Nedevschi, “Noise tolerance of linear vs non-linear LiDAR based ego-motion drift correction methods”, Proceedings of 2022 IEEE ICCP, 22-24 September, 2022, pp. 183-188

B. Maxim, S. Nedevschi, “aSDF: Reconstructing Real-Time Signed Distance Fields with Enhanced Attention”, Proceedings of 2022 IEEE ICCP, 22-24 September, 2022, pp. 189-207

H. Florea, S. Nedevschi, “Survey on Monocular Depth Estimation for Unmanned Aerial Vehicles using Deep Learning”, Proceedings of 2022 IEEE ICCP, 22-24 September, 2022, pp. 319-326

Financed through

The Executive Unit for Financing Higher Education, Research, Development, and Innovation (UEFISCDI)

Project code: PN-III-P4-PCE-2021-1134

Research center

Image Processing and Pattern Recognition Research Center - IPPRRC

Research Team TUCN

Project coordinator: Prof. Dr. Eng. Sergiu Nedevschi

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Prof. Dr. Eng. Florin Oniga
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NANOSTRUCTURED HYBRID ARCHITECTURES WITH TUNABLE MAGNETO-LUMINESCENT PROPERTIES - Nano-Mag@LU

PN-III-P4-PCE-2021-1561

Goal of the project and short description

Hybrid systems, incorporating magnetic and luminescent properties into single-entity nanostructures, have shown great potential in a variety of biotechnological and environmental applications, such as multimodal MRI contrast agents, drug delivery carriers, magnetic hyperthermia for cancer therapy, biochemical separation, and pollutants' removal and sensing. Much of this potential is due to the properties that can be summed up or that can synergistically arise when the architecture's components are closely in contact at nanometric scale. The current project addresses the identification and understanding of the relationship between magnetic and luminescent properties in bifunctional hybrid systems and further the elaboration of new magneto-luminescent architectures with tailored properties and functionalities for biomedical applications.

Project implemented by

Technical University of Cluj-Napoca – Coordinating institution

Implementation period

02.06.2022-30.09.2024

Main activities

O1. Nano-sized magnetic or luminescent particles – chemical synthesis and characterization.

O2. Mag@Lu-Sys: core-shells and multilayers heterostructures – chemical elaboration and characterization.

O3. Development of new magneto-luminescent hybrid systems with predefined properties and functionalities based on the understanding of synergism - antagonism relationships between their physical properties.

Dissemination:

Articles

Insight into synthesis and characterisation of Ga0.9Fe2.1O4 superparamagnetic NPs for biomedical applications Amalia Mesaros, Alba Garzón, Mircea Nasui, Rares Bortnic, Bogdan Vasile, Otilia Vasile, Florin Iordache, Cristian Leostean, Lelia Ciontea, Josep Ros, Ovidiu Pana, *Scientific Reports*, 2023, *13*, 18175 https://doi.org/10.1038/s41598-023-45285-y

Enhancing the photocatalytic activity and luminescent properties of rare-earth ions doping CeO2 nanoparticles Dana Toloman, Adriana Popa, Ramona Bianca Sonher, Rares Bortnic, Traian Marinca, Ioana Perhaita, Miuta Filip, Amalia Mesaros- *Applied Sciences 14(2) (2024) 522 (Q1)* https://doi.org/10.3390/app14020522

A straightforward approach for the chemical growth of luminescent Eu3+-doped Gd2O3 thin films, R.B. Sonher, M. Nasui, G. Borodi, L.E. Muresan, T. F. Marinca, A. Mesaros, submitted to the Journal of Analytical and Applied Pyrolysis, Manuscript no. JAAP-D-24-01268

Procedeu chimic de obținere a filmelor subțiri cu structură spinelică de GaFe2O4, M. Năsui, R. B. Șonher, M. Gabor, L. Ciontea, A. Z. Mesaros, patent application no. A/00540/ 18.09.2024

Conference

Chemical design of magnetoelectric GaFexOy epi taxial thin films, M. Nasui, R. B. Sonher, T. Petrisor Jr., E. Ware, L. Ciontea, A. Mesaros, E-MRS Spring

Meeting, Strasbourg (France), 27.05-31.05.2024 - oral presentation

Growth of Gd2O3 and Eu3+- doped Gd2O3 thin films obtained by chemical solution deposition, E-MRS Spring Meeting, Strasbourg (France), 27.05-31.05.2024 - poster presentation

Chemical design of Ga0.9Fe2.1O4 system as nanoparticles and thin film Amalia Mesaros, Mircea Nasui, Rares Bortnic, Otilia Ruxandra Vasile, Bogdan Stefan Vasile, Lelia Ciontea, Ovidiu Pana,
E-MRS Spring meeting, Strasbourg (France), 29.05-02.06.2023 - oral presentation

Chemical growth of GaFexOy thin films - unravelling the effect induced by the processing parameters on the final stoichiometry A. Mesaros, M. Năsui, R. B. Sonher, T. Petrisor Jr, A. Miclaus, E. Ware, L. Ciontea, O. Pană, *Processes in Isotopes and Molecules – International Conference, Cluj-Napoca*, 19-22 Septembrie 2023 – oral presentation

Rare-earth ions doping CeO2 nanoparticles – insight into the correlation structure-morphology-photocatalytic activity A Mesaros, R. Bortnic, M. Năsui, T. Marinca, A. Popa, D. Toloman *Processes in Isotopes and Molecules – International Conference, Cluj-Napoca*, 19-22 Septembrie 2023 – Poster

Epitaxial growth of complex functional oxide thin films by chemical solution methods,, M. Nasui, A. Mesaros, R. B. Sonher, T. Petrisor Jr., E. Ware, M.S. Gabor, L. Ciontea, T. Petrisor, *Surfaces and Coatings Research eConference* 31 mai-1 iunie 2023- virtual – invited talk

Flexible strategy of epitaxial oxide thin films by chemical solution deposition, M. Nasui, R. B. Sonher, T. Petrisor Jr., E. Ware, L. Ciontea, A. Mesaros, Metallurgy, *Metals and Corrosion Research eConference MetalCorr-eCon2023*, 19-20 iunie 2023 virtual- invited talk

8. *Superparamagnetic Ga0.9Fe2.1O4 nanoparticles for biomedical applications*, - A. Mesaros, M. Năsui, T. Marinca, B. S. Vasile, O. Pana, ICPAM 14*, Dubrovnik, Croatia*, 8-15 Septembrie 2022 – *poster presentation*

Financed through

The Executive Unit for Financing Higher Education, Research, Development, and Innovation (UEFISCDI)

Project code: PN-III-P4-PCE-2021-1561

Research center

Center of Superconductivity, Spintronics and Surface Science – C4S

Research Team for TUCN

Project coordinator for TUCN: Assoc. Prof. Dr. Amalia Mesaros

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Assoc. Prof. Dr. Eng. Traian Marinca
Assist. Prof. Dr. Eng. Ramona Bianca Sonher
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IMPLEMENTATION OF DISTRIBUTED LEDGER TECHNOLOGIES IN INTERNAL ORGANIZATIONAL WORKFLOWS AND SUPPORT APPLICATIONS FOR COOPERATION AMONG INSTITUTIONS IN THE FIELD OF NATIONAL SECURITY – DLT-AI SECSPP

PN-IV-P6-6.3-SOL-2024-2-0312

Goal of the project and short description

The aim of the project is to strengthen national security by developing and implementing an advanced platform for handling multimedia data, using Distributed Ledger Technology (DLT) and artificial intelligence.

Project implemented by

Technical University of Cluj-Napoca – Coordinating Institution
The Ministry of National Defense through the Research Agency for Military Equipment and Technologies – Partner 1
ZA Cloud SRL – Partner 2

Implementation period

16.09.2024 - 15.09.2026

Main activities

Generation of new technological solutions in response to the specific requirements of public authorities.

Configuration of a DLT system to facilitate efficient and centralized data management.

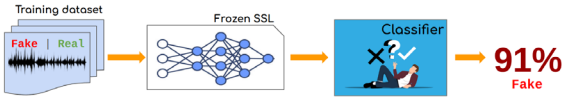
Integration of DLT mechanisms with AI technologies to optimize data processing and transaction management.

Implementation of an infrastructure for risk analysis, leveraging the combined capabilities of DLT and AI.

Development of AI models for the conversion and analysis of multimedia data in various languages, in compliance with GDPR regulations.

Results

Audio deepfake detection and model attribution system: highly accurate audio deepfake detection and model attribution systems based on pretrained SSL features and light classifiers. The model is able to generalise to real-world deepfakes across different domains: political scams, entertainment, publicity stunts. It is also language agnostic.



Dissemination:

David Combei, Adriana Stan, Dan Oneață, Nicolas Muller, Horia Cucu, ”Unmasking real-world audio deepfakes: A data-centric approach”, under review at Interspeech 2025

Adriana Stan, David Combei, Dan Oneață, Horia Cucu, ”TADA: Training-free Attribution and Out-of-Domain Detection of Audio Deepfakes”, under review at Interspeech 2025

Nicolas Muller, Piotr Kawa, Wei Choong, Adriana Stan, Aditya Tirumala, Karla Pizzi, Alexander Wagner, Philip Sperl, ”Replay Attacks Against Audio Deepfake Detection”, under review at Interspeech 2025

Financed through

The Executive Unit for Financing Higher Education, Research, Development, and Innovation (UEFISCDI)

Project code: PN-IV-P6-6.3-SOL-2024-2-0312

Research center

Intelligent Systems Group - ISG

Research Team for TUCN

Project coordinator for TUCN: Prof. Dr. Eng. Adrian Groza

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Assoc.Prof. Dr. Eng. Anca Marginean
Assoc.Prof.Dr. Eng. Adriana Stan
Research Assist. Ioana Cheres
Programmer Porfire Rares Vasile
Programmer Boros Bogdan Tiberiu
Programmer Combei David-Gabriel
Programmer Vaida Calin
Technical manager Rancea Camelia-Nadia

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Project website:
https://users.utcluj.ro/~agroza/projects/sol

THE RoSSA SYSTEM – EXTENSION OF THE INFORMATIONAL SOLUTION AND DEVELOPMENT OF THE ELECTRO-OPTICAL SYSTEM; DEVELOPMENT OF ROMANIAN CAPABILITIES FOR SPACE DOMAIN AWARENESS – RoSSA2

PN-IV-P6-6.3-SOL-2024-2-0220

Goal of the project and short description

The project aims to expand and improve the current space surveillance system (ROSSA) through a series of technological upgrades and strategic integrations. This initiative directly addresses the growing need for monitoring and analyzing space objects, reflecting a commitment to ensuring the safety and sustainability of space activities at both national and international levels.

The ROSSA2 project targets the development of new sensors and the enhancement of existing capabilities within the ROSSA system, in order to increase the accuracy and efficiency of space object detection. ROSSA2 focuses on mobile sensors and introduces key services such as satellite maneuver detection, collision avoidance, re-entry tracking, conjunction analysis, RFI detection, and the development and updating of national catalogs for space objects and near-Earth objects (NEOs). The project also explores solutions for managing space object fragmentation.

Project implemented by

Romanian Space Agency (ROSA) - Coordinating Institution
Technical University of Cluj-Napoca – Partner 1
Astronomical Institute of the Romanian Academy – Partner 2
Romanian Academy Cluj-Napoca Branch – Cluj-Napoca Astronomical Observatory – Partner 3
Institute of Space Science, INFLPR – Partner 4
GMV Innovating Solutions – Partner 5
RARTEL SA – Partner 6

Implementation period

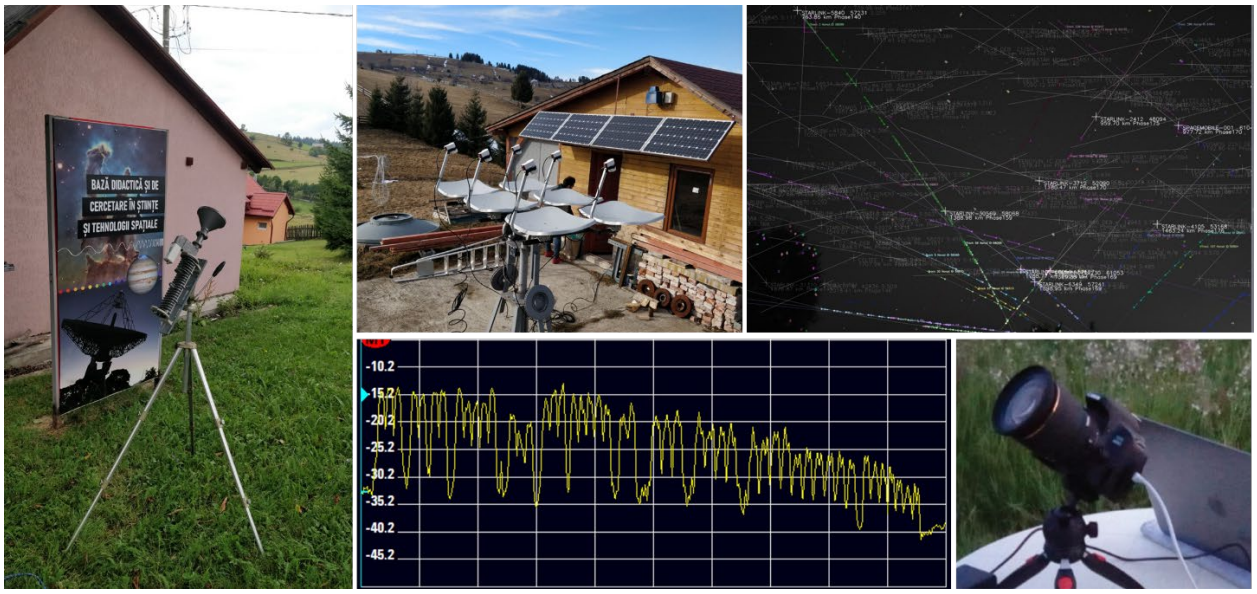
29.07.2024 - 20.07.2027

Main activities

- Development and integration of a sensor system with improved performance in terms of mobility, automation, and daytime operation.
- Analysis and evaluation of the space situation to ensure long-term resilience and security of space infrastructure.
- Testing and implementation of the national catalog of space objects.
- Development of an autonomous collision avoidance system using artificial intelligence/machine learning.
- Trials regarding the detection of satellite operator maneuvers for collision avoidance.
- Development of an initial re-entry service for space objects entering the atmosphere.
- Analysis regarding the development of a space object fragmentation service.
- Testing and validation of new sensors and services in national and international contexts, such as the ROSSA and EUSST networks.

Results

The ROSSA2 project will contribute to enhanced space surveillance by developing advanced sensors and innovative solutions. Expected outcomes include increased accuracy in orbital monitoring, improved detection and prevention of collisions, and enhanced security of space infrastructure.



Dissemination:

Radu Danescu, Razvan Itu, Attila Fuzes, Dan Moldovan, Vlad Turcu, "Observation strategy for objects on decaying orbits", 9th European Conference on Space Debris, Bonn, Germany, 1 - 4 Apr. 2025.

Financed through

The Executive Unit for Financing Higher Education, Research, Development, and Innovation (UEFISCDI)

Project code: PN-IV-P6-6.3-SOL-2024-2-0220

Research center

Centre of competence for wireless Intra-SATellite Technologies - IntraSAT-Tech

Research Team for TUCN

Project coordinator for TUCN: Assist. Prof. Dr. Eng. Andra Pastrav

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Prof. Dr. Eng. Radu Danescu
Prof. Dr. Eng. Emanuel Puschita
Prof. Dr. Eng. Tudor Palade
Assist. Prof. Dr. Phys. Paul Dolea
Assist. Prof. Dr. Eng. Razvan Itu
Assist. Prof. Dr. Eng. Cristian Codau
Assist. Dr. Eng. Rares Buta
Assist. Research Attila Fuzes

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Project website: https://rossa2.rosa.ro/

TECHNICAL UNIVERSITY OF CLUJ-NAPOCA ROMANIA

MEMBER OF EUT+ EUROPEAN UNIVERSITY OF TECHNOLOGY

INTERNATIONAL RESEARCH PROJECTS

DATA-DRIVEN RESIDENTIAL ENERGY CARRIER-AGOSTIC DEMAND RESPONSE TOOLS AND MULTI-VALUE SERVICES – DEDALUS

HORIZON-CL5-2022-D4-01

Goal and short description of the project

In the European Union, households represent 27,4% of the final energy consumption. The residential loads often contribute significantly to seasonal and daily peak demand. To support this variation, and avoid interruption in power supply, utility companies need to increase their energy generation. Within this context, flexible consumption can play a pivotal role in the residential sector as it offers enormous energy demand flexibility, mainly due to the immense thermal energy storage and power management capabilities of the buildings. However, matching electricity supply and demand at all times is becoming increasingly challenging, highlighting the need for greater flexibility in the electricity system. Residential demand response can reduce the need for fossil fuel power plants and facilitate the integration of renewable energy into the electric grid by providing increased stability and management. DEDALUS aims at designing, developing and demonstrating a multi-value energy carrier-agnostic micro (home/apartment)-to macro (building & district-scale) participatory Demand Response (DR) ecosystem. Main goals are: (a) facilitate and scale up residential energy consumers massive participation to DR, and (b) adapt to a variety of different mono-carrier (electricity, heat) or multi-carrier synergetic scenarios (electricity vs heat and natural gas) at building/district scale, while strengthening social interactions within respective communities.

The DEDALUS Consortium intends to deploy:

- a Social Science Framework for multi-dimensional incentives and nudging interventions tools,
- AI-based individual/building/districts consumers clustering and segmentation algorithms,
- Open APIs for DR-ready smart appliances,
- Energy Data Space adaptation for extended DR interoperability and privacy-preserving DLT/Blockchain Data Governance and flexibility coordination,
- Digital Twins for consumers-aware DR flexibility planning,
- Comfort-based flexibility models and tools for serviced apartments for elderly people,
- Flexibility management tools for building and physical/virtual districts energy communities, based on pre-aggregation and shared DR assets,
- Optimal aggregation of flexible energy assets for district heating and decentralized power2heat
- Business Sandbox with novel sharing economy social innovation-based business models.

DEDALUS solutions are being validated by 5 Front Runners full-scale pilots and replicated by 2 Multipliers in 7 countries, deployed at the interplay of energy, and non-energy (comfort/healthcare, ageing, social innovation) sectors, and operated by different stakeholders (social housing operators, building operators, aggregators, energy communities, retailers/suppliers, DSOs/District Heating Network operators). Capacity building and blueprints will support policy makers and regulators to enable market take-up and EU-wide replication of residential DR.

Project implemented by

COORDINATOR: ENGINEERING INGEGNERIA INFORMATICA SPA

PARTNERS: TECHNICAL UNIVERSITY OF CLUJ-NAPOCA, ETHNICON METSOVION POLYTECHNION, FUNDACION CARTIF, UNIVERSITA POLITECNICA DELLE MARCHE, ARCELIK A.S., COMSENSUS, OURPOWER, GREEN-

POINT, BLUEPRINT, FAELLESBO, NEOGRID, EUROPEAN GREEN CITIES, HERON, DOMX, ISTITUTO PER SERVIZI DI RICOVERO E ASSISTENZA AGLI ANZIANI, DYNAME SRL, CENTRE INTERNACIONAL DE METODES NUMERICS EN ENGINYERIA, PRODUCTORA ELECTRICA URGELLENCA,
ROMUR, CENTRICA, SMART INNOVATION NORWAY, FONDAZIONE ICONS

Implementation period

01.05.2023-30.04.2026

Main activities

• Use social sciences and humanities-based tools and methodologies to design an innovative concept for participatory, multi-value, and energy carrier-agnostic residential demand response.

• Build on and improve current data-driven models, algorithms, and flexible assets. Adapt end-user multi-value energy consumption models, beyond consumption user profiling.

• Deliver new demand-response algorithms, models, and ICT-based services for residential buildings, covering different commodities, stakeholders and the whole value chain.

• Demonstrate, validate, and replicate DEDALUS solutions through pilots located in seven countries across Europe and operated by different stakeholders.

• Explore and validate new business models for the sharing economy and social innovation. These will combine the cost socialization of demand-response infrastructure and the cost reduction of unit demand response among many B2B and B2C stakeholders.

Results

Business level

- 15% increase in the energy efficiency of the pilot buildings, and cheaper energy bills for residents thanks to DR
- 15% Cost reduction of the overall energy system
- >25% Reduction of demand response transaction costs after 5 years

Technological level

- 12 Smart residential asset types ready for demand response after 3 years
- >=7 New aggregation models and data-driven services
- >=2 Digital twins to facilitate consumer activation and market participation

Social level

- 45% Increased share of energy consumption data by active consumers after 5 years
- 15-20% Increased share of aggregated flexibility achieved by piloted assets
- >18-20% Carbon emission reduction in the areas of the 7 pilots

Dissemination:

L. Toderean, M. Daian, T. Cioara, I. Anghel, V. Michalakopoulos, E. Sarantinopoulos & E. Sarmas, Heuristic based federated learning with adaptive hyperparameter tuning for households energy prediction, Nature Scientific Reports volume 15, (2025) WoS Q1

V. R. Chifu, T. Cioara, C. D. Anitei, C. B. Pop, I. Anghel, L. Toderean, A federated learning model with the whale optimization algorithm for renewable energy prediction, Computers and Electrical Engineering, Volume 123, Part D, 2025, WoS Q1

G. Antoesi, T. Cioara, I. Anghel, I. Papias, V. Michalakopoulos, E. Sarmas, Hybrid Transformer Model with Liquid Neural Networks and

Learnable Encodings for Buildings' Energy Forecasting, Energy and AI, 2025, WoS Q1

L. Toderean, T. Cioara, I. Anghel, E. Sarmas, V. Michalakopoulos, V. Marinakis, Demand response optimization for smart grid integrated buildings: Review of technology enablers landscape and innovation challenges, Energy and Buildings, Volume 326, 2025, WoS Q1

D. Mitrea, T. Cioara, I. Anghel, L. Toderean, Evolutionary game for incentivizing social cooperation of prosumers in transactive energy communities, Energy and Buildings, Volume 327, 2025, WoS Q1

C. Pop, T. Cioara, V. Chifu, I. Anghel, F. Bellesini, Electric vehicles coordination for grid balancing using multi-objective Harris Hawks Optimization, Energy Reports, Volume 12, 2024, WoS Q2

G. Antonesi, T. Cioara, I. Anghel, I. Salomie, M. Bertoncini, An Energy Consumption Forecasting Tool for Buildings Based on Multivariate Deep Neural Network Model, IEEE MetroLivEnv 2024, June 12-14, 2024, Chania - Crete, Greece.

D. Mitrea, V. Chifu, T. Cioara, I. Anghel and C. B. Pop, Social Factors in P2P Energy Trading Using Hedonic Games, in IEEE Access 2024 WoS Q2

O. Marin, T. Cioara, L. Toderean, D. Mitrea, I. Anghel, Review of Blockchain Tokens Creation and Valuation. Future Internet 2023, WoS Q2

D. Mitrea, L. Toderean, T. Cioara, V. Chifu, I. Salomie, I. Anghel, M. Bertoncini, V. Croce, Matching Mechanisms for Buildings Energy Flexibility Orders in P2P Local Markets, IISA 2023, Volos, Greece, 10-12 July 2023

L. Toderean, V. R. Chifu, T. Cioara, I. Anghel and C. B. Pop, Cooperative Games Over Blockchain and Smart Contracts for Self-Sufficient Energy Communities, in IEEE Access, vol. 11, 2023 WoS Q2

G. Antonesi, T. Cioara, L. Toderean, I. Anghel, C. De Mulder, A Machine Learning Pipeline to Forecast the Electricity and Heat Consumption in a City District. Buildings 2023, 13, 1407. WoS Q2

D. Mitrea, T. Cioara, I. Anghel, Privacy-Preserving Computation for Peer-to-Peer Energy Trading on a Public Blockchain. Sensors 2023, WoS Q2

O. Marin, T. Cioara, I. Anghel, Blockchain Solution for Buildings' Multi-Energy Flexibility Trading Using Multi-Token Standards. Future Internet 2023, 15, 177. WoS Q2

Financed through

Funded by the European Union's Horizon Framework Programme under the Grant Agreement number: 101103998

Research center

Distributed Systems Research Laboratory - DSRL

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DESIGN AND EVALUATION OF TECHNOLOGICAL SUPPORT TOOLS TO EMPOWER STAKEHOLDERS IN DIGITAL EDUCATION – EMPOWER

HORIZON-CL2-2021-TRANSFORMATIONS-01

Goal and short description of the project

Children with neurodevelopmental disorders face increased challenges at school, where they are called on to utilise and maximise their skills in settings that have not been designed with their particular needs in mind. To address this issue, the EU-funded EMPOWER project seeks to facilitate the educational experience of these children by capitalising on the advantages provided by the digital age. To that end, it will create an innovative platform involving various relevant stakeholders with the aim of improving these students' executive function and emotional self-regulation, skills considered key in helping them derive maximum benefits from their education. The new concept will be tested across schools to validate the significance of technology-augmented education and enable the transition to inclusive educational environments.

Project implemented by

UNIVERSITAT DE VALENCIA - Coordinator
Partners: Technical University of Cluj-Napoca
STICHTING RADBOUD UNIVERSITEIT, NL
UNIVERSITATEA BABES BOLYAI, RO
HOGSKULEN PA VESTLANDET, NO
AUTISME-EUROPE AISBL, BE
INESC ID - INSTITUTO DE ENGENHARIADE SISTEMAS E COMPUTADORES, INVESTIGACAO E DESENVOLVIMENTO EM LISBOA, PT
Iscte - Instituto Universitário de Lisboa, PT
ITDATA TELECOM SRL, RO

Implementation period

01.10.2022-30.09.2025

Main activities

WP1 - Project Management and Coordination
Provide efficient management and administration of all aspects of the project, while fulfilling all legal and European
Commission (EC) requirements, as the mandatory consortium agreement.
Establish a management structure to ensure efficient communication, internally and with the EC.

WP2 - Framework for digital education
Identify the needs of assessment and interventions to be implemented in the digital platform for children with NDD
from stakeholders. This will feed the start of the first three EMPOWER iterations.
Specify in detail the behaviour assessment requirements in the school context
Design and develop the psychological content according to the needs of children with NDD from stakeholders

WP3 - Platform development
To create the Educational Platform that will be the engine of all the project iterations.
To integrate all the complex emerging technologies that will support the platform performance.
To adapt and maintain the educational platform and guarantee its reliability (proper functioning) and engagement
(usability) while connecting with other WP for reaching all the project objectives

WP4 - Platform algorithms
Interpret and analyse the data provided by WP4 to allow the delivery of the functionality defined in WP 2
Deliver these algorithms in a fast and agile manner; in particular to release initial versions quickly and to refine these
throughout the lifetime of the project in line with the project development cycle

WP5 - Ethics of technology in education
Specify and operationalize the conceptual framework that will be used to guarantee the adherence to basic principles
and requirements for responsible, trustworthy and human supporting research

Share, apply and evaluate this framework with stakeholders and in close interaction consortium members
Monitor and evaluate adherence to the principles and requirements in research, development, application and evaluation
during the project's research

WP6 - Platform impact

Investigate the effectiveness of the platform in assessing cognitive and emotional characteristics of children with NDDs
in an ecological context
Investigate innovative capabilities at schools and the possibilities for scaling up the platform
Establish the key features of children with NDDs that might be important when developing interventions

WP7 Dissemination and Exploitation

WP8 - Ethics requirements

Results

D1.5 Appointment of the Ethics Board

This deliverable is to appoint an Ethics Board that will oversee the activities in the project, and be involved, in particular, in tasks T5.1-5.5

D2.1 Common framework for game development

This deliverable describes the game development process, including the
theoretical background, the description of standardized tasks which led to game development, the common framework used and the process which it guided, illustrations used for game development, content adaptation and appendix.

D2.3 Conceptual Development Protocol of EMPOWER Platform and Games

This deliverable includes the Protocol on how to develop educational technological platforms This protocol will present in detail all the necessary steps of the conceptual development of the psychological and educational contents of the platform. It is part of WP2.

D3.2 Platform features and abilities

This deliverable will reflect detailed descriptions of all the features and abilities of the platform

D3.3 Wearables Module

This deliverable provides detailed information on the implementation of the Wearables module.

D3.4 Eye-tracking module

System components needed to get eye-tracking data from devices to be used as an input for the platform games, as well as interfaces with WP4.

D4.2 Initial Algorithms

A report on the initial algorithmic development demonstrating the ability to identify relevant aspects as defined in D4.1 from sensors used on the platform in WP3

D5.1 Ethics Evaluation and Improvement

A report that specifies the first observations and experiences of WP researchers and stakeholders while using the ethical framework, as well as the recommended additions and improvements.

D5.2 Exchange of experiences, expectations, and concerns (improved framework specifications)

The following report, produced by Work Package 5, documents "the exchange of experiences, expectations, and concerns as expressed by Work Package researchers and stakeholders during the first auditing session"
(Empower, 2021) of the Empower Project.

D7.1 Website and Social Media Channels

Project website and social media accounts

D7.2 Dissemination plan and Annexes

This document describes the communication and dissemination strategy of EMPOWER project.

Discover the thrilling lineup and anticipated launch dates of EMPOWER project's latest games

Results from the FOCUS GROUP interviews

Dissemination:

Serge Thill, Vicky Charisi, Tony Belpaeme, Ana Paiva, From Modelling to Understanding Children's Behaviour in the Context of Robotics and Social Artificial Intelligence, 14th International Conference on Social Robotics (ICSR'22),

https://doi.org/10.48550/arXiv.2210.11161

Marcos L. P. Bueno & Serge Thill, Datasets for Artificial Intelligence in Education: The Case of Children with Neurodevelopmental Disorders, Lecture Notes in Networks and Systems

Cristina Costescu, Carmen David, Adrian Roșan, Paula Ferreira, Aristides Ferreira, Lucia Vera & Gerardo Herrera, Mushroom Hunters: A Digital Game for Assessing and Training Sustained Attention in Children with Neurodevelopmental Disorders, Lecture Notes in Networks and Systems

EMPOWER– digital educational platform for assessment and training of executive functions of children with neurodevelopmental disorders Authors Adrian Roșan, Cristina Costescu, Carmen David, Viorel Savu, National Conference "Psychology in the age of digitalization" (2023 2-4 June Constanta, Romania)

The use of technology-based tasks for measuring executive functions and emotion regulation in children – a theoretical synthesis Authors: Viorel Savu, Cristina Costescu, Carmen David, Adrian Roșan, National Conference "Psychology in the age of digitalization" (2023 2-4 June Constanta, Romania)

Development of digital games for executive functions and emotional regulation strategies: presentation of research results based on the focus group method. Authors: Cristina Costescu, Paula Alexandra Nunes Da Costa Ferreira, Carmen David, Adrian Roșan, Ana Margarida Veiga Simão, Diana Teixeira Stilwell and Diogo Ferreira Domingues, National Conference "Psychology in the age of digitalization" (2023 2-4 June Constanta, Romania)

Financed through

Funded by the European Union's Horizon Framework Programme under the Grant Agreement number: 101060918

Research center

Computer Graphics and Interactive Systems Laboratory - CGIS

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SEARCH, IDENTIFICATION AND COLLECTION OF MARINE LITTER WITH AUTONOMOUS ROBOTS - SEACLEAR

H2020-ICT-2019-2

Goal and short description of the project

SeaClear — short for SEarch, identificAtion and Collection of marine Litter with Autonomous Robots — is a Horizon-2020 funded project that contributes to solving, with the help of robots and artificial intelligence, one of the most important environmental problems: ocean litter. The oceans tens of millions of tons of waste, with approximately 94% located on the seafloor. Before SeaClear, collection efforts had focused mostly on surface waste, with only a few local efforts to gather underwater waste, always using human divers. The project developed a mixed team of unmanned underwater, surface, and aerial robots to find and gather underwater litter. On the software side, SeaClear brought together state-of-the-art technologies from the fields of machine learning, perception and control, manipulation, aerial and marine robotics.

Project implemented by

Delft University of Technology - Coordinator
Partners:
REGIONALNA AGENCIJA DUNEA, HR
Fraunhofer CML, DE
Hamburg Port Authority, DE
Subsea Tech SAS, FR
Technical University of Cluj-Napoca, RO
Technical University of Munich, DE
University of Dubrovnik, HR

Implementation period

01.01.2020-31.12.2023

Main activities

The SeaClear system operates as follows:

1. A surface vessel scans the sea bottom, marking any large debris that it finds

An unmanned surface vehicle, the SeaCat from SubseaTech, scans the area of interest of the sea bottom using a multibeam echosounder, which produces a 3D bathymetry map of the bottom. This serves as a reference map to which all other information about litter will be added. Some large litter like tires or pipes may already be detectable from the bathymetry data, in which case this litter is already marked on the map.

https://youtu.be/h8f6IGPewvQ

2. In clear water, a drone searches for litter from the air

When the water is sufficiently transparent, an unmanned aerial vehicle (UAV or drone) searches for litter from the air. Larger litter pockets are expected to be identifiable in this way, and inform the more detailed search using the underwater

robot in the next step. The drone can also be used to monitor for traffic.

https://youtu.be/Ao4tMGwKlOw

3. An observation robot searches for litter underwater

A small unmanned underwater vehicle (UUV) called MiniTortuga is deployed from the USV and performs close-up targeted scans of the sea bottom to find smaller litter. To this end, it uses a camera and a forward-looking sonar. Identified litter is placed on the reference map. Deep-learning methods for machine vision are used to detect the litter, and combined with advanced system-theoretic and robotic software for robot positioning, control, and mapping.

https://youtu.be/NgfZ1riJjAE

4. A second underwater robot collects the litter

A larger brother of the observation UUV, called the Tortuga, goes to each piece of litter on the map and grabs it with a gripper that is custom-made to interface with the Tortuga. This gripper is equipped with a suction device that will help with picking up litter in difficult circumstances, such as when it is lying among plants. Each piece of litter is reacquired with high accuracy using computer vision techniques and then picked up. Advanced motion planning and visual servoing control techniques are deployed for this purpose.

https://youtu.be/ST_h9Zp5u04

5. Litter is collected in a basket

A basket is deployed from the USV, and the collection UUV Tortuga takes each piece of litter to deposit it in the basket for transportation to the shore. The basket opening is specially designed to interface effectively with the gripper, and to prevent floating litter to escape back into the water.

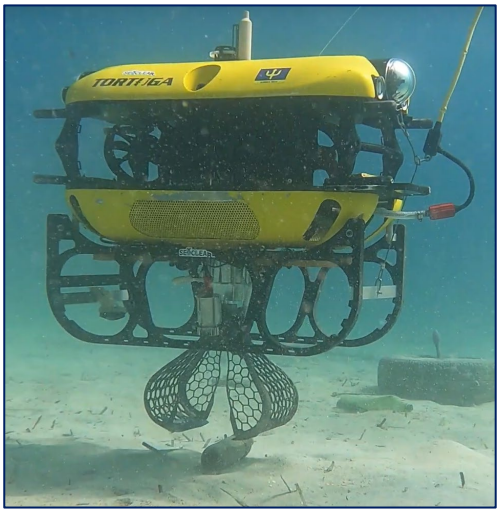
https://youtu.be/vz9V3-VUBFI

Results

The SeaClear robotic system has been successfully validated in pilot tests in Marseille, France, and in public demonstrations in two very different use-cases. The first was an industrial port in Hamburg, Germany, and the second -- in and around Dubrovnik, Croatia -- combined a touristic area around Lokrum Island and an aquaculture location in Bistrina Bay.

View of Observation ROV MiniTortuga's camera and "lawnmower" mapping trajectory:

Collection ROV Tortuga gathering litter:



Hamburg demo: http://youtu.be/hN5XB1t_TDc
Dubrovnik demo: http://youtu.be/IP8S3rx5Cto

For technical deliverables, see seaclear-project.eu/results/public-deliverables

Dissemination (selection of journal articles)

J. Weston, D. Tolić and I. Palunko. Application of Hamilton–Jacobi–Bellman Equation/ Pontryagin's Principle for Constrained Optimal Control. Journal of Optimization Theory and Applications, January 2024.

B. Kelenyi and L. Tamas. D3GATTEN: Dense 3D Geometric Features Extraction and Pose Estimation Using Self-Attention. IEEE Access 11:7947-7958, 2023.

I. Lal, I.C. Morarescu, J. Daafouz and L. Busoniu. Optimistic planning for control of hybrid-input nonlinear systems. Automatica 154:111097, 2023.

I. Nakić, D. Tolić, Z. Tomljanović and I. Palunko. Numerically efficient H∞ analysis of cooperative multi-agent systems. Journal of the Franklin Institute 359(16):9110-9128, 2022.

T. Beckers, L.J. Colombo and S. Hirche. Safe trajectory tracking for underactuated vehicles with partially unknown dynamics. Journal of Geometric Mechanics 14(4):491-505, 2022.

T. Santejudean and L. Busoniu. Online learning control for path-aware global optimization with nonlinear mobile robots. Control Engineering Practice 126:105228, 2022.

M. Rosynski and L. Buşoniu. A Simulator and First Reinforcement Learning Results for Underwater Mapping. Sensors 22(14):5384, 2022.

P. Bevanda, M. Beier, S. Kerz, A. Lederer, S. Sosnowski and S. Hirche. Diffeomorphically Learning Stable Koopman Operators. IEEE Control Systems Letters 6():3427-3432, 2022.

A. Lederer, Z. Yang, J. Jiao and S. Hirche. Cooperative Control of Uncertain Multiagent Systems via Distributed Gaussian Processes. IEEE Transactions on Automatic Control 68(5):3091-3098, 2023.

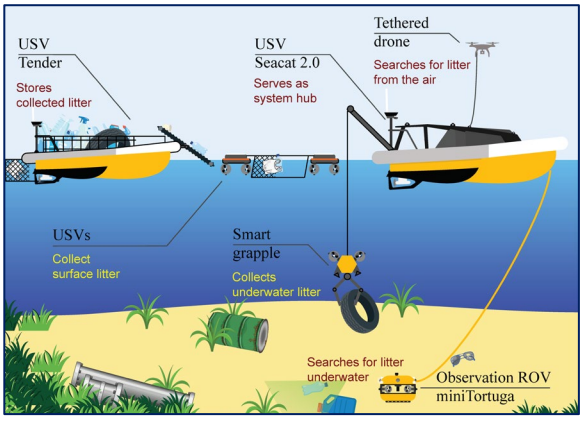
A. Ilioudi, A. Dabiri, B.J. Wolf and B. De Schutter. Deep Learning for Object Detection and Segmentation in Videos: Toward an Integration With Domain Knowledge. IEEE Access, 2022.

P. Bevanda, S. Sosnowski and S. Hirche. Koopman operator dynamical models: Learning, analysis and control. Annual Reviews in Control 52:197-212, 2021.

Financed through

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 871295.

Follow-up project SeaClear2.0



SeaClear2.0 (Scalable Full-Cycle Marine Litter Remediation in the Mediterranean: Robotic and Participatory Solutions, seaclear2.eu) improves on the SeaClear system by enabling it to search for deeper litter, in darker waters, and pickup larger, heavier litter items. Several fully new robots are being developed: a large grapple for litter pickup, a team of surface collectors, and a smart tender for litter deposition. Methodology and software are also being overhauled, and the project has a significant component of public empowerment and participation. The project budget is around 9 million EUR, cofunded by the EU via the European Climate, Infrastructure and Environment Executive Agency (CINEA) under grant agreement no. 101093822. In addition to the original SeaClear consortium, the new project also involves DAnchor Israel, IsoTech Cyprus, TecnoSub Spain, Venice Lagoon Plastic Free Italy, and Veolia France.

Concept video: https://youtu.be/IXa-gmOA7EY

Research center

Robotics and Nonlinear Control – ROCON,
http://rocon.utcluj.ro/

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SMART GRID-EFFICIENT INTERACTIVE BUILDINGS – EVELIXIA

HORIZON-CL5-2022-D4-02

Goal and short description of the project

EVELIXIA project aims to realize **Buildings as Active Utility Nodes** (BAUNs), rendering the EU Building stock as:

- ✓ **Energy efficient**;
- ✓ **Connected**, by facilitating two-way communication between the grid and the occupants, capitalizing on flexible technologies;
- ✓ **Smart**, by utilizing analytics supported by sensors and controls to co-optimize efficiency, flexibility, and occupant preferences;
- ✓ **Flexible**, shifting or modulating energy use according to occupant needs, while considering utility signals.

Project implemented by

CENTRE FOR RESEARCH AND TECHNOLOGY HELLAS – CERTH, GR - **Coordinator**
Partners:
TECHNICAL UNIVERSITY OF CLUJ-NAPOCA, RO
RINA CONSULTING SPA, IT
COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES, FR
FUNDACION CIRCE CENTRO DE INVESTIGACION DE RECURSOS Y CONSUMOS ENERGETICOS, ES
UBITECH ENERGY, BE
ELLINIKI ENERGEIAKIS OIKONOMIAS, GR
and other 29 partners

Implementation period

01.10.2023-30.09.2027

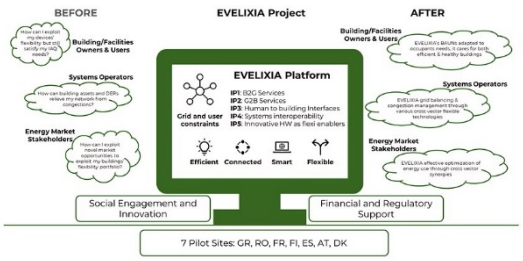
Main activities

1. Deliver a data and model-driven platform, offering B2G and G2B services, ensuring effective planning, operation, and maintenance of flexible assets for transforming buildings into active utility nodes (BAUNS)
2. Incorporate WEB3 technologies to collect and organize energy services and users into a federated blockchain based identity framework. This will improves the resilience and removes single points of failure existing in centralized systems, while simplifying and streamlining human to building interfaces.
3. Deliver novel cost-effective building level hardware technologies for increasing energy efficiency and systems coupling flexibility potential
4. Demonstrate and assess the sustainability of B2G solutions and user acceptance in seven pilot sites with exemplar buildings in terms of economic, environmental and social performance, which act as active utility nodes.
5. Enable the federation of heterogeneous data sources originating from multiple vendors, multiple vectors and devices through the EVELIXIA interoperability abstraction services.
6. Generate and validate sustainable business models targeting the uptake of B2G and G2B services in flexibility markets and attract financiers 'interest for the future transactive energy ecosystem.
7. Enhance the inclusiveness of the build environment by delivering an open innovation ecosystem fostering:
   - ✓ Cooperation and knowledge sharing between different stakeholders
   - ✓ Behavior changes
   - ✓ Impact maximization and geographical reach of EVELIXIA

Results

- ✓ More energy efficient building stocks supported by an accurate understanding of buildings' performance in Europe and of related evolutions.
- ✓ Long term (after 2030) energy savings that can be triggered by EVELIXIA >=80 GWh/y

- ✓ Building stocks that effectively combine energy efficiency, renewable energy sources and digital and smart technologies to support the transformation of the energy system towards climate neutrality
- ✓ Support building digitalization: >2.8 M m^2 of floor area per year of EU building stock
- ✓ Higher buildings' performance with lower environmental impacts through increased rates of holistic renovations
- ✓ Support building stock decarbonization – Long-term GHG reductions triggered by EVELIXIA >25 ktCO2eq/y
- ✓ Higher quality, more affordable built environment preserving climate environment and cultural heritage ensuring better living conditions.



Dissemination:

[1] A.G. Berciu, T. Farkas, A. Ceclan, L. Czumbil, Ș. Ungureanu, Dan D. Micu, „Energy Efficiency: From Desire to an Integrated Management Solution", IEEE Conference on Technologies for Sustainability (SusTech), ISBN: 979-8-3503-9434-4, Portland, USA, April 14-17, 2024, DOI: 10.1109/SusTech 60925.2024. 10553562.

[2] Y. Li, S. Su, M. Zhang, Q. Liu, X. Nie, M. Xia, Dan D. Micu, "Multi-Agent Graph Reinforcement Learning Method for Electric Vehicle on-Route Charging Guidance in Coupled Transportation Electrification", IEEE Transactions on Sustainable Energy, IF 8.6, 15(2), 2024, DOI: 10.1109/TSTE.2023.3330842.

Financed through

The project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement n° 101123238.

Research center

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NETWORK OF EXCELLENCE IN DIGITAL TECHNOLOGIES AND AI SOLUTIONS FOR ELECTROMECHANICAL AND POWER SYSTEMS APPLICATIONS - DiTArtIS

HORIZON-WIDERA-2021-ACCESS-03-01

Goal and short description of the project

The project is built around two challenging research topics, aligned to the Horizon Europe Pillar 2 (Global Challenges and European Industrial Competitiveness)/Climate, Energy and Mobility and Digital, Industry and Space clusters and to the Romanian national smart specialization.

The goal of the mentorship program is to accelerate the personal and professional development of young researchers, inside and outside the consortium. This will be achieved by providing the young researchers with guidance, advice and feedback from mentors with more experience.

The goal of the mentorship program is to accelerate the personal and professional development of young researchers, inside and outside the consortium.

Project implemented by

Technical University of Cluj-Napoca – Coordinator
Partners: TECHNISCHE UNIVERSITEIT EINDHOVEN, NL
University of VAASA, FI
UNIVERSITAT POLITECNICA DE VALENCIA, ES
SIEMENS INDUSTRY SOFTWARE SRL
Typhoon HIL, NOVI SAD, RS

Implementation period

01.10.2022-30.09.2025

Main activities

Research strategy

Topic R1: Digital Transformation for green energy transition

RS1. Flexible and adaptable AI & digital solutions for renewable-based electrical energy sources, storage, and smart household and building equipment and devices integration in smart building, houses and nanogrids;

RS2. AI-based demand side management (DSM) architecture based on virtual energy community and living labs in compliance with the national and European regulations and markets;

Topic R2:AI and digital solutions for EMS and PS

RS3. AI-based electrical machines and drives (design, analysis, control, testing)

RS4. Data driven condition monitoring and predictive maintenance in EMS

Mentorship program

Target group 1: at least 18 young researchers coming from UTC and twinning partners interested in developing their career path.

Target group 2: at least 6 young researchers coming from other countries (including third countries) interested in international mobility in European countries.

Target group 3: highly skilled researchers from UTC and twinning partners (6 to 8 mentors)

interested in supporting in guiding career development and/or integration of young researchers in the research teams.

Training program

First event: A one-day workshop on Introduction to Artificial Intelligence.
A half a day workshop on Research data management and Open science.
Second event: One-day workshop, focused on Digital Twin, as a central concept in digital transformation.
A half-day workshop on Management of Technology transfer & Innovation and Entrepreneurship
Third event: Training module on Cybersecurity and Resilience of Digital Energy Systems Training Module.
Training module on AI Applied to the Design Optimization of Electrical Machines, Drives and Solid-State Transformers.
A half-day training workshop in the development of business models for enabling scaling-up and market replication of digital solutions in smart power systems.
Fourth event: A one-day workshop addressing Advanced tools for condition monitoring and fault diagnosis of electromechanical devices
A workshop on Entrepreneurship and industrial marketing.

Results

D1.1 Dissemination communication and exploitation plan
D1.2-DMP
D1.3-Project-website-version-1
D1.4 Templates for marketing materials
D2.1 First report on twinning and networking activities
D3.1 First report on the mentoring activities
D4.1 First year training report

Financed through

Funded by the European Union's Horizon Framework Programme under the Grant Agreement number: 101079242

Research center

Center of Applied Researches in Electrical Engineering for Sustainable Development –

CCAIEDD

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HOLISTIC APPROACH TOWARDS EMPOWERMENT OF THE DIGITALIZATION OF THE ENERGY ECOSYSTEM THROUGH ADOPTION OF IOT SOLUTIONS - HEDGE-IoT

HORIZON-CL5-2023-D3-01

Goal and short description of the project

HEDGE-IoT proposes a novel Digital Framework which aims to deploy IoT assets at different levels of the energy system (from behind-the-meter, up to the TSO level), to add intelligence to the edge and cloud layers through advanced AI/ML tools and to bridge the cloud/edge continuum introducing federated applications governed by advanced computational orchestration solutions. The HEDGE-IoT Framework will upgrade the RES-hosting capacity of the energy systems, unleash a previously untapped flexibility potential, leveraging on IoT solutions and will increase the resilience of the grid towards the digitalization of the energy sector, and the advancements in IoT standardization. The multi-dimensional framework of HEDGE-IoT comprises the following pillars:

- The Technology Facilitator Pillar will exploit computational sharing by offloading applications on the grid edge, towards providing a set of AI/ML federated learning and swarm computing applications adopting containerization, microservices and serverless computing approaches. The interconnectivity of the different IoT/edge/fog and cloud layers will implement computational, data and information sharing, assuring privacy preservation.
- The Interoperability Pillar, leverages on, adapts, evolves, and validates cutting edge interoperable architectures, in order to design and develop the HEDGE-IoT Energy-Data-Space (EDS)- aligned scalable middleware, which is proposed for the seamless integration of IoT infrastructure, federated-edge and cloud distributed platforms in a trustworthy manner, employing trust and sovereignty traits, applying semantic interoperability methodologies and integrating different energy vectors, such as electricity mobility and heating.
- The Standardization Pillar will enable all involved platforms, systems, tools and actors to seamlessly communicate and exchange data in standardized formats using well-known and widely used standards. Interaction with relevant standardization bodies and EU initiatives will be established.
- The Digital Energy Ecosystem Enabling Pillar will ensure that HEDGE-IoT will facilitate the increased integration of RES towards increased resilience. Liaisons with EU initiatives for IoT and digitalization will be established, and the engagement of stakeholders will be ensured by addressing IoT ethics and cultivating trust among end-users, promoting inclusivity. Scalability and replicability studies will be performed, assessing the impact of the HEDGE-IoT solutions and connections with innovators and SMEs will be established through an Open Call mechanism, strengthening the existing value chains.

Project implemented by

COORDINATOR: EUROPEAN DYNAMICS LUXEMBOURG SA
PARTNERS: TECHNICAL UNIVERSITY OF CLUJ-NAPOCA, RWTH AACHEN, DST, ICCS, INESC TEC, TNO, TAMPEREEN KORKEAKOULUSAATIO SR, VTT, TRIALOG, CYBERETHICS, STATE GRID SA, INTERNATIONAL DATA SPACES EV, ELIA TRANSMISSION BELGIUM, HRVATSKI OPERATOR PRIJENOSNOG SUSTAVA D.D., CLUSTER VIOOIKONOMIAS KAI PERIVALLONTOS DYTIKIS MAKEDONIAS, F6S, SOCIAL OPEN AND INCLUSIVE INNOVATION ASTIKI MI KERDOSKOPIKI ETAIREIA, ABB, ENERVA OY, JARVI-SUOMEN ENERGIA OY, DIMOSIA EPICHEIRISI ILEKTRISMOU ANONYMI

ETAIREIA, DIACHEIRISTIS ELLINIKOU DIKTYOU DIANOMIS ELEKTRIKIS ENERGEIAS AE, INDEPENDENT POWER TRANSMISSION OPERATOR SA, ELLINIKO HRIMATISTIRIO ENERGEIAS, HARDWARE AND SOFTWARE ENGINEERING EPE, QUE TECHNOLOGIES KEFALAIOUCHIKI ETAIREIA, ARETI, APIO, ACEA ENERGIA SPA, VOLKERWESSELS ICITY B.V., ARNHEMS BUITEN BV, STICHTING VU, COOPERATIVE ELECTRICA DO VALE DESTE CRL, REN - REDE ELECTRICA NACIONAL SA, MC SHARED SERVICES SA, ELES DOO SISTEMSKI OPERATER PRENOSNEGA, ELEKTROENERGETSKEGA OMREZJA, ELEKTRO GORENJSKA PODJETJE ZA DISTRIBUCIJO ELEKTRICNE ENERGIJE DD, OPERATO DOO, SVEUCILISTE U ZAGREBU FAKULTET ELEKTROTEHNIKE I RACUNARSTVA, INSTITUT JOZEF STEFAN, KONCAR

Implementation period

01.01.2024-30.06.2027

Main activities

To achieve its vision, HEDGE-IoT considers the adoption of an Incremental Minimum Viable Product approach. The proposed validation methodology will go through incremental stages. A full development cycle is implemented in each phase:

Phase 1 - Specification & Technologies adaptation M1-M18: The HEDGE-IoT development processes will start by collecting insights through users' / stakeholders' activities, as well as based on the analysis of the project's demos. The outcome of this activity is a set of relevant requirements. Technology deployment, asset assessment and exploratory experimentation will be carried out through proof-of-concepts and early technologies probes and will be used for investigating and determining problems and opportunities for data value generation. Hence, the HEDGE-IoT concept will be gradually fine-tuned, while reference architecture and blueprints will be consolidated to drive developments in all core technologies. At the end of the phase the initial Evaluation process will identify potential limitations and drawbacks.

Phase 2 - Product Integration & Fine Tuning M19-M28: Based on feedback from Phase 1, the developments and requirements will be refined, and a 2nd implementation of technological components will be released. This phase will focus on the delivery of technological enablers and their deployment on the demo sites. A demo validation campaign will take place, based on the intermediate release and further development of building blocks and technology enablers. Beyond full deployment of technology, standardization efforts to match data governance structures with a KPI collection and benchmark analysis will be performed.

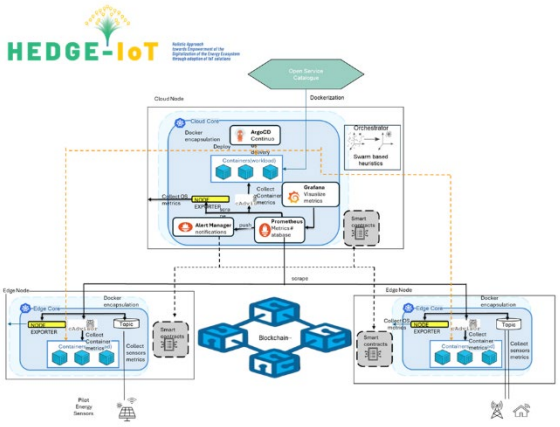
Phase 3 - Product Assessment & Market Uptake M29-M42: This phase will consider the evaluation results of Phase 2 and utilize them to enable the refinement of component and system level technology consolidation, through scalability-driven functionality enhancements. Overall, the final version of the HEDGE-IoT system will have been established and a final validation will be carried out focusing on: scalability and replicability analysis and delivery of the necessary benchmarks to perform business validation and impact assessment based on regulatory, social, and techno-economic assessment of each demo.

Results

The HEDGE-IoT Framework will be implemented, showcased and validated in a set of 6 diverse Large-Scale field Demonstrators in 6 European countries, featuring versatile geographic, climatic, regulatory and social conditions. Results will be evaluated, and solutions will be replicated across sectors and geographies proving the interoperability scalability and effectiveness of the distributed IoT-enabled Digital Solution in different environments.

The most important key exploitable results of the project will be: (i) A service orchestrator to facilitate computational sharing between the cloud and edge levels, (ii) A set of AI/ML tools for edge and cloud levels towards optimized planning, operation, resilience of interconnected assets, (iii) A set of IoT solutions deployed across the energy system offering intelligence at the edge level, (iv) An open App Repository to

populate edge/cloud and fog level AI/ML tools for energy stakeholders, (v) A set of semantic and ontology standards, for IoT-enabled grid digitalization, (vi) A concrete dissemination and communication plan including clustering activities and synergies with relevant European initiatives / projects and (vii) Best practices from demonstration of innovative solutions for the digitalization of energy system.



Dissemination:

L. Toderean, M. Daian, T. Cioara, I. Anghel, V. Michalakopoulos, E. Sarantinopoulos & E. Sarmas, Heuristic based federated learning with adaptive hyperparameter tuning for households energy prediction, Nature Scientific Reports volume 15 (2025) WoS Q1

I.R. Martin, T. Cioara, G. I. Arcas, I. Anghel, M. Bertoncini, Knowledge Graph Model for Computing Continuum over Smart Grid, IISA 2024, Grand Arsenali, Chania, Crete, Greece, July 17-19, 2024

G.I. Arcas, T. Cioara, I. Anghel, Whale Optimization for Cloud–Edge-Offloading Decision-Making for Smart Grid Services. Biomimetics 2024, 9, 302. WoS Q1

I.R. Martin, G. I. Arcas, T. Cioara, Reinforcement-Learning-Based Edge Offloading Orchestration in Computing Continuum. Computers 2024, 13, 295.

G.I. Arcas, T. Cioara, I. Anghel, D. Lazea, A. Hangan, Edge Offloading in Smart Grid. Smart Cities 2024, 7, 680-711. WoS Q1

V.R. Chifu, T. Cioara, C. Pop, H. Rusu, I. Anghel, Deep Q-Learning-Based Smart Scheduling of EVs for Demand Response in Smart Grids. Appl. Sci. 2024, 14, 1421. WoS Q1

Financed through

Funded by the European Union's Horizon Framework Programme under the Grant Agreement number: 101136216

Research center

Distributed Systems Research Laboratory - DSRL

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BLUEPRINT FOR NET-ZERO APARTMENT-BLOCK NEIGHBORHOODS - NZC Pilot Cities Programme

NZC-H2020-202209

Goal and short description of the project

NetZeroCities is part of the Horizon 2020 Research and Innovation Programme in support of European Union's Green Deal. NetZeroCities has been designed to help cities overcome the current structural, institutional and cultural barriers they face in order to achieve climate neutrality by 2030.

NetZeroCities supports the EU's Mission of "100 Climate-Neutral and Smart Cities by 2030" launched as part of the Horizon Europe programme. The project works as a service-oriented platform supported by world-class practitioners. It helps European cities by providing them with the support and solutions they need to achieve climate neutrality in a socially inclusive way.

New and existing tools, resources and expertise are developed and promoted into a one-stop platform accessible to all cities through an online portal. Dedicated services are designed to support cities that are part of the EU's Mission "100 Climate-Neutral and Smart Cities by 2030". In addition, NetZeroCities supports a series of Pilots to help drive rapid learning about how to achieve climate neutrality at city scale, and runs a Twinning Learning programme to enable peer-learning.

Project implemented by

Cluj-Napoca City Hall - Lead Organisation
Consortium Partners:
Technical University of Cluj-Napoca
Transylvania Energy Cluster
Cluj Metropolitan Area
Babeș-Bolyai University
Transilvania IT Association
Urbannect Association
Romanian Order of Architects Transylvania Branch

Implementation period

01.06.2023-31.05.2025

Main activities

WP1 Toolkit for enhancing Climate Neutral Communities
Developing a toolkit for enhancing Climate Neutral Communities in high density multi-apartment neighborhoods.

WP2 Urban planning toolkit for climate neutrality
Developing an urban planning toolkit for achieving climate neutrality in high density multi-apartment neighborhoods

WP3 New local public policy tools to support climate neutral districts
Developing new local public policy tools to support the transition of high density multi-apartment neighborhoods to climate neutral districts Developing new local public policy tools to support the transition of high density multi-apartment neighborhoods to climate neutral districts, based on the deliverables from WP2

WP4 Communication, Dissemination and Scalability
Communication, Dissemination and Scalability This working package is aimed at promoting and providing scalability and integrative view of the results of the pilot projects and their transferability to other urban areas with similar challenges.

WP5 Project Management
The objective of this work package consists in ensuring a correct, transparent, smooth

and efficient overall project planning, coordination, control, monitoring and assessment.

Results

Early outcome

- ✓ Evidence-based substantiation of climate neutrality interventions Capacitated local ecosystem Central role held by condominiums in implementing any climate-neutrality policies at neighborhood level
- ✓ More affordable transport by EV
- ✓ Institutionalized systems for implementing and monitoring climate neutral policies
- ✓ Planning framework for accelerating the transition to climate neutrality
- ✓ Improved effectiveness and efficiency of multi-level governance for climate neutrality
- ✓ Improved visibility
- ✓ Innovative, data-based decision-making process
- ✓ Better informed citizens

Later Outcome

- ✓ Lower energy costs for households
- ✓ Savings for local budget
- ✓ Encourage more trips by public transport

- ✓ Cost of interventions is significantly reduced
- ✓ Reduce flight to suburbs by improving quality of living spaces in existing neighborhoods

- ✓ Increased innovation and technological progress

Dissemination:

Mission in Progress: Climate-neutral And Smart Cities Conference 2023, Brussels, 2023

Financed through

Funded by the European Union's Horizon 2020 Framework Programme, EIT Climate KIC HBV under the Initiative NZC-H2020-202209

Research center

Electric Mobility Applied Research Center - EMARC

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https://clujnapoca2030.ro/resources/

HOLISTIC & GREEN AIRPORTS -OLGA

H2020 - LC-GD-2020-1

Goal and short description of the project

hOListic & Green Airports (OLGA) is a Horizon 2020 project that aims to reduce the environmental impact of the aviation sector. It develops innovative and sustainable solutions to reduce CO2 emissions, optimize energy efficiency, preserve biodiversity, and improve air quality and waste management while involving the entire aviation value chain. **The ambition is to accelerate and move faster than the EU 2050 Climate Neutrality objective in achieving sustainable airports**. OLGA airports are committed to the ACI Europe "Net-Zero 2050" pledge, and the partners support the forthcoming "Destination 2050" roadmap for a net-zero European aviation sector.

The OLGA Project brings together a diversified consortium of 41 partners and 17 third parties, ranging from large and small airports, airlines and the aviation industry, to public authorities, researchers and innovative start-ups.

Project implemented by

AEROPORTS DE PARIS SA - **Coordinator**
Partners:
TECHNICAL UNIVERSITY OF CLUJ-NAPOCA, RO
SEA MILAN AIRPORTS, IT
AIT GMBH, AT
IFP ENERGIES NOUVELLES, FR
AIRPORT REGIONS COUNCIL, BE
ENVISA SAS, FR
CLUJ AIRPORT, RO
ZAGREB AIRPORT, CR
AIR FRANCE SA, FR
ARC, BE
L - UP SAS, FR
SNAM S.P.A., IT
BUREAU VERITAS EXPLOITATION, FR
UNIVERSITY OF ZAGREB, CR
SERVICE TECHNIQUE DE L'AVIATION CIVILE, FR
RINA, IT
and other partners

Implementation period

01.10.2021 - 30.09.2026

Main activities

WP 1 – Baseline and impact assessment

Objectives: This work package ensures the relevance, quality and reliability of impact assessments across the project. It will support the replication process to assess the environmental impacts of green airport solutions for landside transport, airside transport, terminal and energy.

WP 2 – Transport landside, access and multimodal

Objectives: This work package is responsible for developing and demonstrating the integration of a decision support tool for planning city bus transport electrification with the software solution for airports and gravitational areas. It will also create and integrate a transport decision support platform that will include new tools and traffic optimization mechanisms.

WP 3 – Transport airside

Objectives: This work package aims to demonstrate the implementation of decarbonized solutions across the entire value chain airside. From energy transition of ground handling (electrification of the fleet of service vehicles, use of alternative fuels like H2 or SAF, installation & optimization of charging infrastructures) to the reduction of aircraft emissions (Green Taxiing, environmental monitoring of aircraft apron, reduction of the use of APU unit) this work package aims to assess & develop the new technologies available to cope

with emission reduction & carbon neutrality objectives for the airside activities.

WP 4 – Terminal area

Objectives: This work package is responsible for improving energy efficiency at the airport, bringing environmental innovations in lighting in a terminal, on aircraft stands, and in pre-boarding bridges where thermal discomfort is strongly noticed. It will develop methodologies to achieve environmentally friendly construction and deconstruction processes.

WP 5 – Energy and hydrogen

Objectives: This work package is responsible for developing guidelines to turn the airport in H2 Hub into H2-powered aircraft operations. In addition, it will (i) demonstrate green H2 production and use in airports through the design and installation of a green H2 plant, (ii) promote Sustainable Aviation Fuels (SAF), showcasing their use on AF flights, and (iii) valorize local organic wastes towards biomethane production for its use in local buses through the design, installation and monitoring of a biomethane "pilot" system.

WP 6 – Cross-cutting aspects

Objectives: This work package is responsible for developing a methodology that will allow real-time emissions and air quality assessment with a fully integrated monitoring and modelling platform hence improving air quality. It will identify the contribution of airport-related emission sources to local urban air quality, including sustainable aviation fuel implementation.

WP 7 – Communication and dissemination

Objectives: This work package is responsible for creating public awareness about the project's outputs and contribution to sustainable, smart mobility and (in)direct benefits. It will disseminate project results to the audience that can add additional value to the project's impact and initiate exchanges with other projects, groups and stakeholders to enhance the coherence and efficiency of innovation.

WP 8 – Exploitation and technology transfer

Objectives: This work package is responsible for optimizing the use of results and ensuring technology transfer to users (airport community). It will define an exploitation strategy and roadmap for the results generated by OLGA and build a coherent action plan for implementation & impact during and after the project.

WP 9 – Project management and common IT framework

Objectives: This work package is responsible for achieving the project's strategic aims and objectives through clear milestones. It will provide contractual, legal and financial management for the consortium and ensure the quality of the work and the deliverables, data management and IT integration.

WP 10 – Ethics requirements

Objectives: This work package is responsible for overseeing data processing relevancy and technical and organizational measures for implementing and safeguarding the rights of data subjects and research participants. It will describe anonymization/pseudonymization techniques, all relevant authorizations & actions.

Results

OLGA's initiatives include CO2 reduction, air quality improvement, and biodiversity preservation, engaging the entire airport and aviation value chain. These sustainable impacts will be felt on local, national, and European scales, addressing societal, environmental, and economic dimensions. OLGA unites a wealth of expertise from airports, airlines, handlers, industry, research institutions, and Small and Medium Enterprises (SMEs) to tackle the complex climate challenge. Their solutions focus on efficient and carbon-neutral airport and airline operations, sustainable logistics, smart energy and mobility, intermodal passenger and freight transport, emission and air quality assessments, green construction, and circular end-of-life solutions.

- ✓ Smart Innovative Lighting - task in progress
- ✓ Improved energy consumption at airport passenger pre-boarding bridge - task in progress

- ✓ Solar installation on passenger bridge - task in progress
- ✓ Biodiesel for Heavy-duty Vehicles - task completed
- ✓ BiodiversIT - task in progress
- ✓ Dynamic apron lighting - task in progress
- ✓ Air Quality Source Apportionment Study - task in progress
- ✓ Airport Equipment Reuse (Decommissioning and Upcycling) - task in progress
- ✓ Sustainable aviation fuel (SAF) - task in progress
- ✓ Reducing taxiing times on arrival & departure - task in progress
- ✓ Feasibility study for the multi-energy station air side - task completed

Dissemination:

[1] Ioan-Tudor Oargă, Gabriel Prunean, Bogdan Ovidiu Varga, Dan Moldovanu and Dan Doru Micu, Comparative Analysis of Energy Efficiency between Battery Electric Buses and Modular Autonomous Vehicles, Appl. Sci. 2024, 14(11), 4389; https://doi.org/10.3390/app14114389

[2] Dan Moldovanu, Florin Mariașiu, Bogdan Ovidiu Varga, Adela Ioana Borzan, Horațiu Cărăușan, Dan Doru Micu, Analysis of the modes of operation of an electric vehicle on energy consumption, 2023 10th International Conference on Modern Power Systems (MPS), 979-8-3503-2682-6/23, IEEE, DOI: 10.1109/MPS58874.2023.10187463

[3] Horațiu Cărăușan, Bogdan Ovidiu Varga, Dan Moldovanu, Florin Mariașiu, Gabriel Prunean, Ioan-Tudor Oargă, Dan Doru Micu, Energy Efficiency Assessment of Sustainable Public Transport Solutions: a Comparative Analysis Fuel Cell vs Battery in Real Life Scenarios, 2023 58th International Universities Power Engineering Conference (UPEC), 979-8-3503-1683-4/23, IEEE, DOI: 10.1109/UPEC57427.2023.10294682

Financed through

OLGA project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement n° 101036871.

Research center

Energy Transition Research Center – EnTReC
https://entrec.utcluj.ro/

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EO PLATFORM SUPPORTING CRITICAL RAW MATERIALS INDUSTRY IN EUROPE – GOLDENRAM

HORIZON-CL4-2023-RESILIENCE-01

Goal and short description of the project

The GoldenRAM project is developing an Earth Observation Platform which deploys the latest advances in IT, Cloud and AI technologies. The platform is designed to facilitate the exchange of accurate information on Raw Materials in Europe and partner countries to support mining companies, stakeholders in the mining industry, and the general public. It will utilize AI and Natural Language Processing alongside advanced AI "knowledge packs" to streamline complex computational workflows.

The GoldenRAM platform contributes to Europe's CRM ambitions by providing Earth Observation-based tools to a variety of stakeholders in the mining industry such as mining companies, non-governmental organisations, and EU Member States, creating a platform for improved cooperation along the CRM value chain and between the EU and partner countries.

Project implemented by

TEKNOLOGIAN TUTKIMUSKESKUS VTT OY Finland - Coordinator
Partners:
Technical University of Cluj-Napoca
OPT/NET BV, NL
BUNDESANSTALT FUER GEOWISSENSCHAFTEN UND ROHSTOFFE, DE
GEOLOGIAN TUTKIMUSKESKUS, FI
EFTAS FERNERKUNDUNG TECHNOLOGIETRANSFER GMBH, DE
And other 7 partners

Implementation period

01.01.2024-31.12.2026

Main activities

Exploration

- EO Mineral Mapping
- Drill Core Mineral Mapping
- Mineral Prospectivity Mapping
- Mapping Secondary Raw Materials Deposits

Production, Operations & Safety

- Open Pit and TSF Dam Stability Monitoring
- Tailings Storage Facility Monitoring
- Volume Change Monitoring

Environment

- Integrated Monitoring of Environmental Impacts
- Ground Water Level and Discharge Monitoring

Prospecting, Reporting & Exploitation

Mineral Resources Mapping in Ukraine

Technologies

AI Natural Language Processing
Engage with geospatial data via natural language queries.
AI Knowledge Packs
Modules streamlining data operations, enabling efficient handling and analysis of diverse datasets for informed decision-making.
Satellite Sensing
Satellite data offers numerous benefits, significantly improving operations, environmental monitoring, and exploration efforts.
Aerial Sensing
Drone imaging systems enabling mineral exploration and vegetation health monitoring, production, operation and safety applications.
Proximal Sensing
Enable the simultaneous mapping of rare earth minerals and their host minerals in drill core

samples, as well as calibrate and demonstrate novel data products.

Results

The platform will be demonstrated in 6 field trials, creating a compelling value proposition for implementation across the mining value chain and improving the responsible and sustainable supply of CRMS.

Abrud, Romania (Cupru Min) Cupru Min S.A.
Abrud is the only producer in Romania, whose main activity is the extraction of non-ferrous ores, the preparation of copper ores and the valorization of copper concentrate and precious metals.

Aitik, Sweden (Boliden)
World's most productive open-pit Cu mine. Exploration, operation in open pits, closure of depleted areas, and active as well as closed tailing areas.

Barroso, Portugal (Savannah)
High-grade, low-iron lithium project, the biggest spodumene lithium discovery in Western Europe in recent years, and valid for sufficient lithium production for approximately 0.5 million vehicle battery packs per annum.

Kevitsta, Finland (Boliden)
Kevitsa is a multi metal mine operating in Northern Finland with activities in exploration, operation in open pits, closure of depleted areas, and active as well as closed tailing areas.

Sokli, Finland (Sokli)
Sokli represents a test site for mineral prospectivity mapping, drill core mapping and a site for integrated monitoring of environmental impacts.

Ukrainian Shield, Ukraine (GIUA)
Provides the G-RAM platform with access to the databases and electronic maps of critical minerals' occurrence with detailed characteristics and geospatial information as well as areas of mining activity and wastes accumulation sites (tailings and dumps) in Ukraine.

Financed through

Funded by the European Union's Horizon Framework Programme under the Grant Agreement number: 101138153

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DEMONSTRATION OF INNOVATIVE FUNCTIONAL FOOD PRODUCTION SYSTEMS BASED ON A MORE SUSTAINABLE VALUE CHAIN OF MARINE AND FRESHWATER RAW MATERIALS FOR CONSCIENTIOUS EUROPEAN CONSUMERS – NOVAFOODIES

HORIZON-CL6-2022-FARM2FORK-02-two-stage

Goal and short description of the project

NOVAFOODIES is an interdisciplinary project bringing together partners from **Europe, Israel and China,** with complementary backgrounds to interact closely in a synergistic manner to deliver the expected results, research outputs and **six key objectives**. NOVAFOODIES aims to provide consumers with **new functional and traceable products of marine and freshwater origin,** produced with more sustainable processes without compromising sectoral competitiveness.

Project implemented by

IDENER RESEARCH & DEVELOPMENT AGRUPACION DE INTERES ECONOMICO - Coordinator
Partners: Technical University of Cluj-Napoca
UNIVERSITA DEGLI STUDI DI GENOVA, IT
UNIVERSITAET ROSTOCK, DE
FUNDACION CENTRO TECNOLOGICO ACUICULTURA DE ANDALUCIA, ES
UNIVERSITY COLLEGE CORK - NATIONAL UNIVERSITY OF IRELAND, CORK, IE
and other 23 partners.

Implementation period

01.05.2023-30.04.2026

Main activities

1. Integrated Multi-Trophic Aquaculture (IMTA) with 7 case studies in Europe, Israel, and China. IMTA is acknowledged as a promising solution to improve the sustainability and efficiency of aquaculture, as it ensures that wastes and by-products are valued.

2. Cultivation of macroalgae in earthen pounds and in liquid wastes for obtaining high-value products, demonstrating the microalgal commercial potential as a novel protein source, while promoting novel products for human consumption.

3. Microwave-assisted algae drying, bacterial-based algae-decomposition process, extraction of functional components from fish and valorization of fisheries discards for improving the nutritious value of human food products.

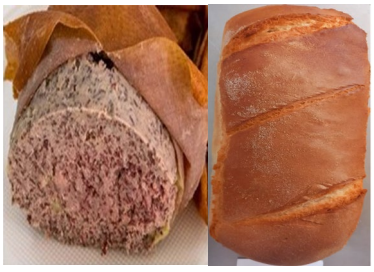
4. Environmental, economic and logistics optimization of processes, and traceability systems implementation to collect and monitor aquaculture data.

5. Development of functional food for human consumption based on biomass

6. Development of NOVAFOODIES marketplace platform and App for end-users.

Results

Energy bar and smoothies based on fish hydrolysate



Sausage and gluten bread based on Gracilaria

Hamburgers, liver paté and gluten bread based on *Alaria esculenta*

Fig. 1. Functional foods based on biomass developed by TUCN team

Fig. 2. Sensory studies on functional foods

The NOVAFOODIES project is entering the experimental phase of **digital traceability** at its pilot sites: Aqua de Ma – University of Genoa (Italy) and Kefalonia Fisheries (Greece).

Dissemination:

1. A.Peter, C. Nicula, L. Mihaly Cozmuta, A. Uivarasan, P. Costin, C. Todorean, N. Buda, A. Maries, S. Kraan, A. Mihaly Cozmuta. Exploring the inclusion of *Alaria aesculenta* in all hamburger's components and their consumers' impact. II Feira do Mar, 6-8 Sept., 2024 -Sagres

2.A. Mihaly Cozmuta, S.Gite, A. Uivarasan, L. Mihaly Cozmuta, A. Peter, C. Nicula. Influence of fish hydrolysate enriched energy bars on consumer acceptability. INTERNATIONAL SCIENTIFIC SYMPOSIUM "Young Researchers and Scientific Research in Life Sciences" for Bachelor, Master and Ph.D. Students. 21-22 November 2024, Timisoara.

3. A. Uivărășan, S.Kraan, B. Mihalescu, L. Mihaly Cozmuța, A. Peter, C. Nicula, A. Mihaly Cozmuța. Sensory Impact of Seaweed-Enriched Hamburgers: The Role of *Alaria esculenta.* 2025 Multidisciplinary Conference on Sustainable Development, 15-16 May 2025, Timisoara.

Financed through

Funded by the European Union's Horizon Framework Programme under the Grant Agreement number: 101084180

Research center

Center of Scientific Research of Environment, Food and Health Safety- Physical-Chemical Analysis - CCESMAS

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RENEWABLE ENERGY-BASED POSITIVE HOMES – RENplusHOMES

HORIZON-CL5-2022-D4-01

Goal and short description of the project

As the urgency to combat climate change intensifies, REN+HOMES takes the lead in developing a universal methodology for positive energy homes and residential districts. This approach addresses the crucial role that buildings play in energy consumption and carbon emissions. Due to the significant impact of buildings on emissions, there is an increasing focus on positive energy buildings (PEBs).

REN+HOMES aims to contribute to a sustainable transition by not only reducing carbon emissions but also addressing resource scarcity and energy poverty. In this respect, stakeholders are involved through education and participation programs. Our goal is to establish a universal approach for developing positive energy homes and residential districts. This facilitates the transition to climate-neutral and energy-positive residential buildings.

Project implemented by

RINA CONSULTING SPA - **Coordinator**
Partners:
TECHNICAL UNIVERSITY OF CLUJ-NAPOCA
ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS, EL
ELLINIKO INSTITOUTO PATHITIKOU KTIRIOU, EL
COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES, FR
GREENFLEX, FR
and 16 more partners

Implementation period

01.06-2023-30.11.2026

Main activities

Hardware solutions

HW#1 - Industrialized panel with recycled materials

HW#2 - Prefabricated wall panels with PV/with greenery

HW#3 - Wireless Internet of Things (IoT) for structural monitoring

HW#4 - Niagara platform and Building Management Systems (BMS)

HW#5 - Low-power, wide-area network (LPWAN) infrastructures

HW#6 - Geothermal wall system

HW#7 - Drainage water heat recovery (DWHR)

HW#8 - BIPV system using recycled cells

HW#9 - Heat controlled Metal Hydrides H2 Storage (HY2 System)

Software solutions

SW#1 - Building Dynamic Energy Assessment tool (BDEA)

SW#2 - INTEMA (Forecasting)

SW#3 - VERIFY-B (LCALCC)

SW#4 - Green Factor Tool

SW#5 - TCQi – building design and operation.

SW#6 - Resilient Construction Site (RCS)

SW#7 - Cognitive IoT Framework for Building Energy Optimization (CBEO)

Results

REN+HOMES will demonstrate its revolutionary technical solutions and methodologies at four demo sites situated in **Austria, Spain, Estonia, and Romania**. These demonstrators will showcase the potential of positive energy buildings (PEB) in reducing energy consumption

and environmental impact, both in new constructions and renovation projects.

Fig. Innsbruck (Austria)- Young living apartment blocks

Fig. La Garriga (Spain) - Private apartment blocks

Fig. Cluj (Romania) - Renovation of students accommodations

At the TUCN pilot site, Marasti Student Campus, three hardware solutions were implemented: the Geothermal Wall, the BIPV system that uses recycled cells and a performant energy consumption monitoring system.

All these solutions could be scaled up to the entire Campus, thus beginning the process of transforming the Student campus into a Green and Positive Energy one.

Dissemination:

1. Timea Farkas, Andrei Ceclan, Levente Czumbil, Dan D. Micu, "Sustainable Future in a University Campus: A Comprehensive CO2 Emissions Analysis and Action Plan", 7th International Conference on Smart Energy Systems and Technologies, SEST 2024, Torino, Italia, 10-12 September 2024, https://ieeexplore.ieee.org/document/10694227

2. G. Berciu, E. Dulf, D. Jurj, L. Czumbil, Dan D. Micu, "Energy Pulse: Competitive and Accessible Application for Monitoring Electricity Consumption", Springer Proceedings in Mathematics and Statistics, pp. 107-117, 2024, DOI: 10.1007/978-3-031-56492-5_8.

3. Mircea N. Lancranjan; Alexandru Muresan; Dacian I. Jurj; Alexandru Berciu; Alexis Polycarpou; Levente Czumbil; Dan D. Micu, "Overview of Load Disaggregation Models, Methods and Hardware", 59th International Universities Power Engineering Conference (UPEC), Dublin, Ireland, 02-06 September 2024, DOI 10.1109/UPEC61344.2024.10892437

Financed through

The project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement n° 101103450.

Research center

Energy Transition Research Center - EnTReC

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BIO INSPIRED GEOTECHNICAL APPLICATIONS TO LAUNCH PAN-EUROPEAN SOLUTIONS – BIGALPS

HORIZON-EIC-2022-TRANSITION-01

Goal and short description of the project

BIGALPS is an EIC Transition project with the primary objective of advancing bio-cementation technology to revolutionize soil stabilization practices. The project builds upon previous results obtained through Advanced-ERC grant- BIOGEOS and Proof-of-Concept (POC) ERC grant – CEBREWA developed at EPFL, Switzerland. With BIGALPS the technology goes European thanks to the international consortium.
Bio-cementation is an innovative nature-inspired soil improvement technique, based on the metabolic activity of microorganisms to produce calcium carbonate (CaCO3) that binds the soil particles together. This technique offers a sustainable, nonpolluting and cost-effective alternative to traditional soil improvement techniques which rely usually on introducing chemicals in soils.

Project implemented by

Technical University of Cluj-Napoca – Coordinator
INSTITUT NATIONAL DE RECHERCHE POUR L'AGRICULTURE, L'ALIMENTATION ET L'ENVIRONNEMENT, FR – Partner
ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE, CH

Implementation period

01.10.2023-30.09.2026

Main activities

WP1 - Management and coordination

Manage and monitor BIGALPS and ensure that the project technological and business objectives are met with high quality, in time and within the approved budget through efficient coordination and risk management.

WP2 - Business model development, adaption, and initial validation

Provide a concrete pathway for market uptake of the bio-cementation technology

Achieve an attractive and realistic business plan and investment proposition for future investors.

WP3 - Technology transfer and design of production units

To design production units for two different European markets (Romania and France),

Provide the engineering design of the soil treatment for each of the three pilot projects

WP4 - Technology maturation and adaptation for erosion – Pilot project France, PP1

a. Mature & validate the technology and assessing bio-cementation as a means to increase resilience of critical infrastructure to erosion.

b. Develop a business case and live-showcase the technology to potential future market up-takers

WP5 - Technology maturation and adaptation for landslide and foundation base – Pilot projects Romania, PP2, PP3

a. Mature & validate the technology for 2 major soil stability problems – foundation soil improvement and slope stability

b. Develop a business case and live-showcase the technology to potential future market up-takers

WP6 - Technology and business adaptation based on end user experience

a. Provide an analysis of the technical performance and economical costs incurred during the pilot projects and identify margins for potential improvement,

b. Validate the readiness of numerical models for bio-chemo-hydraulic processes in real geosystems,

c. Establish a set of guidelines and protocols for the technology implementation based on lessons learned, market needs and the regulations.

WP7 - Exploitation and Dissemination for scientific, social impact and market uptake

a. To enable and ensure the two-way communication about BIGALPS and its results to multiple audiences (stakeholders (public entities, private companies, etc.)) and show the impact and benefits of BIGALPS solution,

b. To enable use and uptake of results of BIGALPS and maximise the impact of EU funded research.

Results

Demonstration of the technology in real environment

In particular, 3 pilot sites in France and Romania will demonstrate the diversity of problems that the technology can address, the way it adapts to meet specific and local and regional needs and further reveal the R&D- and business model-related challenges to scale it up and commercialize it. The technical milestones will be pursued with the goal of demonstrating the technology for 3 specific soil stability problems: erosion, landslides and foundation soil improvement.

The proposed activities aim to exercise in real-life situations the applications of the developed technology of bio-cementation. Hence, they will fall under the typical commercial processes and paths to simulate future transactions spanning from product acquisition and production establishment to project design, execution and quality control.

Pilot Project 1 - Country of implementation: France, Focus: Erosion

Pilot Project 2 - Country of implementation: Romania, Focus: Landslide

Pilot Project 3 - Country of implementation: Romania, Focus: Foundation Soil Improvement

Dissemination:

Between the 27th to 29th of March 2024, the BIGALPS project was promoted at a prestigious event in Aix-en-Provence, France, focused on safeguarding systems against maritime and river floods.

Financed through

The project has received funding from the European Union's Horizon research and innovation program under grant agreement n° 101113081 and from Swiss Confederation.

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MODULAR AXIAL FLUX MOTOR FOR AUTOMOTIVE – MAXIMA

HORIZON-CL5-2022-D5-01

Goal and short description of the project

MAXIMA aims to create a low-cost modular permanent magnet axial flux electrical machine with improved performance, and with a low environmental impact that caters specifically to the needs of the automotive market.

To achieve this, MAXIMA will develop an advanced multiphysics design procedure that includes new thermal management concepts. A digital twin will also be built to develop an optimal control strategy to operate the electrical machine up to the limit.

The end-of-life of the electrical machine will also be considered, with a focus on recycling the permanent magnet made from critical raw materials. MAXIMA will conduct a life cycle assessment for every solution, analyzing its impact throughout the lifecycle, with the goal of minimizing the environmental impact.

Project implemented by

ECOLE NATIONALE SUPERIEURE D'ARTS ET METIERS, FR - Coordinator
Partners:
Technical University of Cluj-Napoca
NIDEC PSA EMOTORS, FR
UNIVERSITAT POLITECNICA DE CATALUNYA, ES
HOGANAS AB, SE
And other 6 partners

Implementation period

01.02.2023-31.01.2027

Main activities

WP1 – Project Management
The Work Package 1 aims to ensure high-quality research and streamline development activities across partners, while meeting time, budget, and quality targets.

WP2 - Requirements and specifications
The goal of Work Package 2 is to determine the types of electric vehicles and their typical usage patterns in the primary market.

WP3 – Electrical machine design
The primary aim of this work package is to design and virtually evaluate a modular axial flux electric machine, taking into consideration the integration of power electronics, drive system, and thermal management at the sub-system level.

WP4 – Digital Twin for optimal control
The main goal of Work Package 4 is to develop a Digital Twin that can predict the performance of prototypes and optimize their control strategy.

WP5 – Magnetic Materials and Manufacturing/Recycling Processes for mass production
Work Package 5 focuses on ferromagnetic materials such as Electrical Steel, Soft Magnetic Composites, and Permanent Magnets, along with their associated manufacturing and recycling processes for axial flux electrical machines.

WP6 – Life cycle management
Life cycle management is a cross-cutting activity. It involves the assessment of environmental impacts associated with the project's developments in a collaborative approach with project partners throughout various phases of the project.

WP7 – Drive prototypes Assembly and Testing
There are four primary objectives of this work package. The first objective is to conduct experimental verification of whether the targets, key performance indicators and requirements expressed in the project, and materials resources management & cost are met. The second objective is to assess the simulation tools used and developed by comparing them with the

experimental results. The third objective is to evaluate the mass production process flow. Finally, the dismantling and recycling concepts of the electrical machine and materials will be practically assessed.

WP8 – Communication, Dissemination & Exploitation

Results

- MAXIMA aims to design and manufacture two prototypes, one with a power output of 60 kW and the other with 120 kW, to cater to the specific market targeted by MAXIMA, as well as to accommodate the modular concept of the electrical machine system.
- The motor, including its cooling system, is capable of sustaining continuous power densities of over 23 kW/litre and 7 kW/kg, or continuous torque densities of over 50 Nm/litre and 20 Nm/kg.
- A decrease of 20% in losses incurred during typical vehicle operation.
- A 60% decrease in the utilization of scarce resources.
- An energy consumption reduction of 2% achieved through the utilization of optimal electrical machine control during driving cycles.
- The unit cost of a complete motor, when produced at mass production levels of 100,000 units per year, is projected to be below €6 per kilowatt (kW).
- A recyclability rate of over 60% for Critical Raw Materials achieved through repurposing Permanent Magnets without extracting individual rare elements.
- A framework that outlines best practices, requirements, and key considerations for assessing the environmental impacts of an electrical machine, with a specific focus on ecodesign.

Dissemination:

Butnariu, B., Rebhaoui, A., Ințe, R. A., Jurca, F.N., Jannot, X., Marțiș, C.S., Influence Of Slot/Pole Combinations On The Performance Of Dual-Rotor Axial-Flux Surface-mounted Permanent Magnet Electric Motor for Automotive Applications, Elektro 2024, Zakopane, Poland.

Butnariu, B., Rebhaoui, A., A.Inte, R., N. Jurca, F., Deac, I., & S. Martis, C. (2024). Design of an Axial Flux Machine with Distributed Winding for Automotive Applications: Comparison of Different Rotor Structures. 13th IEEE International Conference and Exposition on Electrical and Power Engineering, Iaşi, Romania

Financed through

Funded by the European Union's Horizon Framework Program under the Grant Agreement number: 101096097

Research center

Center of Applied Researches in Electrical Engineering for Sustainable Development –

CCAIEDD

Research Team

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ENERGY TRANSITION AUDITS TOWARDS DECARBONIZATION - EnTRAINER

LIFE21-CET-AUDITS-ENTRAINER

Goal and short description of the project

EnTRAINER aims to introduce a paradigm shift from conventional energy audits to a new, holistic and complete methodology of "Energy Transition Audits" (ETA). With this new approach, the main focus is to provide a multi-benefit scheme and a complete action plan towards full decarbonization of the audited sites. The holistic methodology of **EnTRAINER** includes training elements, in the form of 2 accredited courses for energy auditors and energy experts and 1 course for company staff. It also includes a sophisticated web-portal, with 4 new and upgraded tools, freely offered to energy professionals, and a training platform and knowledge hub that will allow a continuous interaction and knowledge sharing between participants.

Project implemented by

The Aristotle University of Thessaloniki - Coordinator
Partners:
The University of Western Macedonia, GR
The Polytechnic University of Valencia, ES
Technical University of Cluj-Napoca
The CasaClima Agency, IT
Servelect, RO
BEON, ES

Implementation period

01.12.2022-30.11.2025

Main activities

The specific project objectives are listed below:

1. To propose the transformation of conventional industrial Energy Audits (EA) into energy transition audits, paving the way to reach 100% decarbonization.

2 To derive a methodology that can be adapted to the needs of each sector.

3. To enhance the skills of energy auditors to move further from conventional EA into the proposed one, which would better appeal to top managers and decision makers.

4. To go beyond conventional energy efficiency action plans and simple quantification of energy and costs savings, by proposing a roadmap for decarbonization, including short-, medium- and long-term measures.

5. To perform 80 initial energy audits (energy scans) in relevant industrial energy intensive sites

6. To perform 40 direct detailed energy transition audits in relevant industrial energy intensive sites in the 4 participating countries, and thus shift the paradigm of doing conventional audits in performing energy transition audits with complete decarbonization action plans.

7. To trigger other 40 indirect energy transition audits, done by the project trained auditors, all in industrial energy intensive sites.

8. To focus on specific types (i.e., identified by the relevant NACE code) of industries in each country, which are energy intensive, e.g., sites/industries with relevant energy use of more than 500 toe/year (approx. 1500 tons/year of equivalent CO2 emissions). The ambition is to identify and materialize decarbonization action plans and reach zero total equivalent CO2 emissions up to 2030 – 2050.

9. To adopt the multiple benefit approach of energy audits, in order to successfully promote energy efficiency projects after the audit is conducted.

10. To design, accredit with 2 ECTS (EQF level 6), and deliver 4 specialized training/educational courses in the 4 participating countries, targeting Energy Auditors (i.e., energy transition auditors)

11. To improve the knowledge and skills of at least 240 Energy Auditors, attending the above specialized courses.

12. To design, accredit with 5 ECTS (EQF level 6), and deliver 4 specialized training/educational courses in the 4 participating countries, targeting Energy Experts.

13. To improve the knowledge and skills of at least 240 Energy Experts, benefiting from the above courses and from the EnTRAINER knowledge sharing hub.

14. To design and deliver 4 hands-on short-term trainings, targeting different staff categories, in the 4 participating countries.

15. To improve the skills and knowledge of at least 400 company staff members, through the above trainings and by engaging with the knowledge sharing hub.

16. To trigger at least 1.58 GWh/year primary energy savings.

17. To trigger 1.72 GWh/year renewable energy generation

18. To trigger 16 M Euro Investments in sustainable energy within the project's lifetime

19. To integrate 2 new tools to the upgraded M&T&V and Develop 2 new additional sophisticated and advanced tools to be used in the energy transition audits, and available from the project's web portal.

20. To introduce through the project's web portal, a knowledge sharing hub, where different stakeholders can bring their expertise and lessons learned

21. To involve authorized energy auditors in this process, in order to trigger the replication of the energy transition audits, using auditing tools, knowledge sharing hubs and education and training programs.

22. To focus on the relation between the energy transition auditors and the clients' people, from top decision makers to energy managers and other relevant professionals, using instruction, education and behavior changing instruments, knowledge sharing hubs and interactive communication during the energy transition audits implementation.

23. To reveal and highlight not only the direct energy savings and CO2 reduction benefits, but also the other multiple benefits of energy efficiency

Results

D.2.1 Holistic Energy Transition Audit Methodology

D2.2 Decarbonization roadmap

D3.1 Report on engagement of the clients and initial energy scans

D3.2 Report on performed detailed Energy Transition Audits

D 4.1 Energy Transition Audit Guidelines

D 4.3 Online tools

D 5.1 Accredited Training programmes in Energy Transition Audits

D6.1 Portfolio of Dissemination Material and Activities

Financed through

EnTRAINER has been funded by the Environment and Climate Action (LIFE) programme under the Grant Agreement No 101076424

Research center

Energy Transition Research Center - EnTReC

Research Team

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MOBILITY JUSTICE FOR ALL: FRAMING SAFER, HEALTHIER AND HAPPIER STREETS - JUST STREETS

HORIZON-MISS-2022-CIT-01

Goal and short description of the project

JUST STREETS is an international Horizon Europe project focusing on (re)developing streets that are sustainable, safe, and inclusive for all citizens. Scheduled from January 2024 to June 2027, it aims to link inclusive streets with supporting climate neutrality goals.

32 international partners collaborate to empower 12 cities in transforming existing streets into just, equal, and human-centered spaces for active mobility – subsequently sharing critical implementation learnings with interested cities from across Europe. JUST STREETS is not only about change; it is about a transformative and systemic shift in perspective when planning and designing public space in cities.

Project implemented by

FONDAZIONE LINKS - LEADING INNOVATION & KNOWLEDGE FOR SOCIETY - **Coordinator**
Partners:
Technical University of Cluj-Napoca
UNIVERSITEIT VAN AMSTERDAM, NL
POLITECNICO DI TORINO, IT
IT-UNIVERSITETET I KOBENHAVN, DK
HOGSKULEN PA VESTLANDET, NO
And other 21 partners

Implementation period

01.01.2024-30.06.2027

Main activities

Focus on Citizens

The project focuses on (re)developing streets shaped by active mobility that are both: sustainable and inclusive for all citizens. Realizing this shift from streets for the exclusive use by cars towards street space for more active modes of mobility will be led by prioritizing the needs and visions of social groups often under-represented in urban planning. This includes particularly women, migrants, the elderly, children, LGBTQI+ individuals, and people with disabilities.

Climate impact

Inclusiveness is not an isolated goal. Instead, JUST STREETS will be fostering resilient communities and resilient cities – as all its objectives help neighborhoods to move towards their climate neutrality goals.

WP1 - JUST COLLABORATE: Project Management and Coordination
WP2 - JUST ENGAGE: Framing active users' mobility needs and envisioning innovative solutions.
WP3 - JUST IMPROVE: Data analysis and measurement
of risks
WP4 - JUST CHANGE: Pilots and followers in action.
WP5 - JUST EVALUATE: Evaluation and impact assessment.
WP6 - JUST SHARE: Dissemination, communication, policy recommendation and exploitation.

Results

Implementation Experience

We will be supporting street transformations in 12 European cities, focusing on changing existing streets into just spaces for active mobility. As you can imagine, this will generate lots of hands-on experience. We are happy to share our learnings.

Challenges and Failures

From ‘best practice’ to what’s best for you to learn. While we are happy to share learnings, we will not shy away from addressing challenges we

experienced and failures we had to deal with. We'd rather not see you repeat mistakes already made elsewhere.

Financed through

Funded by the European Union's Horizon 2020 Framework Programme, under the Grant Agreement no 101104240

Research center

Road Traffic and Traffic Security Research laboratory - RTTS

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EPISTEMOLOGY IN SCIENCE, TECHNOLOGY, ENGINEERING, ARTS, AND MATHS -EPISTEAM

HORIZON-MSCA-2022-SE-01

Goal and short description of the project

EpisTeaM is a MSCA Staff Exchange project forming an interdisciplinary network of researchers building an innovative impact on knowledge construction

EpisTeaM aims to develop a team proposing an epistemology that is located within a genealogy of thinking that understands epistemology and technology as a mode of technē (technical practices that influence the way in which knowledge construction takes place), that possesses an irreducible political and social dimension.

Project implemented by

Technological University of Dublin – Coordinator
EU Partners:
Universidad Politécnica de Cartagena
Technical University of Cluj-Napoca
Darmstadt University
Technological University of Riga
Technological University of Cyprus
Technological University of Troyes
GSI Helmholtzzentrum fur Schwerionenforschung - Germany
APO 33 - France
Cluj Innovation Park - Romania
Instead Technologies for Helping People - Spain
Stitching BALTAN – Nederlands
Non-EU Partners:
Washington University – Seattle, US
University of Sarvajani – Surat, India

Implementation period

01.11.2023-31.10.2027

Main activities

WP1 — Digital Studies and Epistemology

This WP will study the impact of (digital) technology on human knowledge production.

WP2 — Digital Perception and Built Reality

This WP will explore the relationship between technology and the perception of the built environment.

WP3 — Sensing the Body

Sensing the body (Lead by UPCT) will study the current relationship between technology and human beings from the individual body perspective, based on the analysis of physiological signals that give rise to individual emotions and cognition, from interfacing the body with a prosthetic approach.

WP4 — Techné and the Experiment

This WP involves a historical analysis of the relationship between the techniques, technics and technologies of the experiment

Results

- International online seminar “Sensing the body” – UPCT
- International online seminar “Epistemic Crisis” – TUDublin
- 3rd ECT Lab Conference Cyprus 2023: Speculative Enquiries: Aesthetic, Ethical, and Epistemic Technologies
- 4th ECT Lab Conference Cluj 2024: Transdisciplinary Perspectives on AI: Extended Reality Alternative Histories, Current Practices and Possible Futures

Dissemination:

- 2 Peer-reviewed articles
- 1 Book “Speculative Enquiries” – 2023 ECT Lab Proceedings

Financed through

Funded by the European Union's Horizon Framework Program under the Grant Agreement number: 101129655

Research center

Future Living environments and Urban eXperiments Laboratory – FLUX Lab

Research Team

Project leader for TUCN: Assoc. Prof. Ph.D. Arch. Silivan Moldovan

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https://ectlab.eu/project/episteam/

MANAGING COGNITIVE DECLINE THROUGH THEATRE THERAPY, ARTIFICIAL INTELLIGENCE AND SOCIAL ROBOTS DRIVEN INTERVENTIONS - engAGE

AAL-CP-2021-8-159-engAGE

Goal and short description of the project

The engAGE project aimed to combat and slow down cognitive decline progression and to support the wellbeing of older adults with mild cognitive impairment through an integrated platform that provides services for: (1) holistic monitoring of the ability to conduct activities of daily living and wellbeing using Internet of Things (IoT) devices, (2) machine learning (ML) for detecting the potential cognitive decline and (3) social robot driven interventions using coaching and cognitive stimulation. engAGE contributes to improving the quality of life for older people and their caregivers by developing solutions that allow the detection and management of cognitive decline which constitute nowadays both a technical and societal challenge. The project was primarily focused on older people with mild cognitive impairment (MCI), aiming to improve their quality of life and well-being, allowing them to preserve their identity, to reduce stress, memory loss, or communication challenges. The innovation of engAGE lies in the integration of several advanced technologies to improve the care and monitoring of seniors with MCI: remote patient monitoring using IoT devices, incorporating ML techniques for cognitive assessment, cognitive stimulation through the Pepper robot in care centers and social inclusion through communication and support at home through a dedicated platform.

Project implemented by

Technical University of Cluj-Napoca – Coordinator
Partners: IRIS Robotics, Romania
Karde, Norway
Tellu, Norway
HUG, Switzerland
IRCCS INRCA Istituto Nazionale di Riposo e Cura per Anziani, Italy

Implementation period

01.12.2021 - 30.09.2024

Main activities

WP1 was primarily focused on engAGE technology and services development and integration. Four core services were developed by the technical partners: the Monitoring, Self-Reporting and Big Data Processing Service, ML-based Cognitive Decline Assessment Service, the Social Robot Coaching and Cognitive Stimulation Service and the Communication Platform and Intelligent Personalization Service. These services underwent multiple iterations with a strong emphasis on end-user-oriented design, incorporating feedback from co-creation phase, lab testing in controlled environment and finally the proof-of-concept trials. The initial version of the integrated engAGE prototype was followed by a subsequent release of the 2nd version and by the final version after the real-world trials closure. The prototype and the associated services were dynamically refined and enhanced during the lab and proof of concept trials lifetime.

WP2 was focused on co-creation, conceptual and end-user experience design. End-user partners defined target groups, scenarios, and use cases through interviews and workshops with end-users organized in Switzerland, Italy and Norway. The conceptual architecture of the engAGE platform, service interactions, and technological stacks were specified, and the user experience design was incrementally gathered using mockups of the envisioned prototypes. The ethical standards and data management plan

have been defined, monitored and refined during the project lifetime.

WP3's focus was on the evaluation of engAGE integrated prototype in the project trials. Close collaboration between end-user partners and technical partners enabled the translation of user needs and controlled environment/proof of concept study trial findings into dynamic prototype improvements. The code of conduct and the recruitment protocol have been shaped pre-trials allowing for a defining a clear validation plan. Evaluation activities of the first prototype have been carried out in-lab, in controlled environments, covering usability, functionality, and installation checks. The proof-of-concept study in real settings took place in Italy, Switzerland and Norway from month 18 to 32. The feedback from these trials was provided to the technical partners constantly for technological improvement.

WP4 focused on dissemination and commercial exploitation activities related to the engAGE product. We established a project website and maintained active social media profiles, regularly updating them with new posts, publications, and relevant information for public dissemination while seeking to connect with ecosystems and other research projects. We used a multi-channel dissemination strategy, which involved identifying target audiences, tailoring messages, and planning specific activities synchronized with the partners profiles. Additionally, we formulated a results exploitation plan. The business partners developed a commercialization plan with alternative business models that have been refined and improved considering the trials results and the final prototype.

WP5 was focused on the coordination activities of the project. The activities were done mainly by the coordinator but with the help of technical, end-users, and business partners. We have released the guidelines for project quality and control that defined the framework for risk management and assuring high quality for technical reporting. We have managed the interaction with EU project officers consolidating the technical and financial results and providing reports as well as the midterm review questionnaire and final project report. Finally, an advisory board has been set up and its members have been informed about the progress of the project and feedback from their side has been received.

Results

(1) Monitoring, Self-Reporting and Big Data Processing Service (MSRBD) - holistic and non-invasive monitoring of older adults with MCI using easy-to-collect variables on their ability to conduct ADL, perceived health, and wellbeing state.

(2) ML-based Cognitive Decline Assessment Service (MLCDA) - analyze and corelate by means of ML algorithms the information acquired by different engAGE services on the older adult with the goal of determining insights onto the cognitive state and potential decline.

(3) Social Robot Coaching and Cognitive Stimulation Service (SRCCS) - aims to provide personalized brain training in day care centers by employing the Pepper social robot as a tool to address important areas for a healthy brain, such as socialization, drama, and storytelling, etc.

(4) Communication Platform and Intelligent Personalization Service (CPIP) - dashboards to show care status information concerning the cognitive baseline, ADL monitoring, self-reporting, and cognitive decline assessment and to enable interaction and communication of all types of interested actors with the system.

Dissemination:

Web of Science indexed journals:

Chifu, V.R.; Pop, C.B.; Demjen, D.; Socaci, R.; Todea, D.; Antal, M.; Cioara, T.; Anghel, I.; Antal, C. Identifying and Monitoring the Daily Routine of Seniors Living at Home. Sensors 2022, 22, 992 WoS Q2.

Chifu, V.R.; Pop, C.B.; Rancea, A.M.; Morar, A.; Cioara, T.; Antal, M.; Anghel, I. Deep Learning, Mining, and Collaborative Clustering to Identify Flexible Daily Activities Patterns. Sensors 2022, 22, 4803. WoS Q2.

Chifu, V.R.; Cioara, T.; Pop, C.B.; Anghel, I.; Demjen, D.; Salomie, I. Identification of Daily Living Recurrent Behavioral Patterns Using Genetic Algorithms for Elderly Care. Appl. Sci. 2022, 12, 11030 WoS Q1

Florea, A.-I.; Anghel, I.; Cioara, T. A Review of Blockchain Technology Applications in Ambient Assisted Living. Future Internet 2022, 14 WoS Q2

Antonesi, G.; Rancea, A.; Cioara, T.; Anghel, I. Graph Learning and Deep Neural Network Ensemble for Supporting Cognitive Decline Assessment. Technologies 2023, 12, 3. WoS Q1.

Rancea, A.; Anghel, I.; Cioara, T. Edge Computing in Healthcare: Innovations, Opportunities, and Challenges. Future Internet 2024, 16, 329. WoS Q2

Conference proceedings papers:

I. Anghel, T. Cioara, I. Salomie, A. Rancea, R. Bevilacqua, G. Amabili, F. Barbarossa, E. Maranesi, L. Gosetto, J. Guebey, M. A. Trabelsi, A. I. Marin, I. D. Dasca, T. Grimstad, E. Øverby, A. Solberg, L. T. Boye, Cognitive decline management through theatre therapy, artificial intelligence, and social robots, 2023 IEEE 19th International Conference on Intelligent Computer Communication and Processing (ICCP 2023), 26-28 October 2023, Cluj-Napoca, Romania, IEEE Proceedings.

Amabili, G.; Maranesi, E.; Felici, E.; Margaritini, A.; Barbarossa, F.; Marin, A.; Anghel, I.; Bevilacqua, R. A Robot to Guide Group-Therapy against Cognitive Decline: an Italian Pilot Study, 33rd IEEE International Conference on Robot and Human Interactive Communication, IEEE RO-MAN 2024, 26-30 August, California, SUA, IEEE Proceedings

Burlacu, M; Anghel, I. A Platform for Enhanced Remote Care and Support for Older Adults, 2024 IEEE 20th International Conference on Intelligent Computer Communication and Processing Cluj-Napoca, Romania, 17-19 October 2024, IEEE Proceedings.

Financed through

EngAge project has received funding from the European Commission and UEFISCDI

Research center

Distributed Systems Research Laboratory – DSRL

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METHODOLOGICAL STUDY ON THE DEVELOPMENT POTENTIAL OF MICROGRIDS AND THE INTEGRATION OF RENEWABLE ENERGY IN NORTH AFRICA - MiDiNA

COFUND-LEAP-RE-MiDiNA

Goal and short description of the project

The MiDiNA project aims to elaborate a multidisciplinary study to sustain the implementation of MGs to improve power supply and RESs integration in the context of African countries. Beginning with a building-scale MG, the study will first focus on the optimal technoeconomic sizing with the objective to secure off-grid operation and on-site meteorological and consumer specificities. The objective is then to demonstrate that resilient control solutions will ensure the effectiveness of this concept under critical conditions.
In this project, several original and innovative actions will be implemented. In first step, synthesis work will be carried out for the constitution of a database of techno-economic models of the different MG components to be considered for the project. These models will concern both the most recent component technologies such as Li-ion batteries, photovoltaic panels, vertical axis wind turbines, power converters, etc., but also older and widely proven components, such as the classic lead-acid batteries, or even second-life batteries, which are of very significant economic interest. Using accurate on-site data of representative arid regions will lead to original sizing solutions for building integrated MG. Based on these modelling and realistic information collected, techno-economic sizing solutions will be proposed for a building, while considering the on-site specificities.

Project implemented by

Coordinator**:** Nantes Université (NU) – France

Partners:

- Technical University of Cluj-Napoca
- M'sila University (MU) – Algeria
- Sidi-Mohamed BenAbdellah University (USMBA)- Morocco
- Morocco Université Mohammed V de Rabat (UM5R) - Morocco
- Aouina Kamel (KA-SE) –Algeria

Implementation period

01-04-2024 - 31-03-2026

Main activities

Electricity coverage in North African countries is among the most advanced in Africa. However, in recent years energy demand has been increasing with the growing economic development as well as the increasing use of high energy-consuming loads like Heating Ventilation, and Air Conditioning loads to handle extreme weather conditions. To cope with this increase in energy needs, grid operators resort to load shedding by switching of non-essential load equipments. Load shedding reduces consumers comfort and impacts the economic development of these countries. Besides, there is a strong political commitment to exploit the abundant renewable energy sources (RESs). This willingness is motivated by the need to meet the increasing energy demand and to reduce fossil fuel utilization. The development of this concept represents a huge challenge as it gathers multiple considerations with both technical and socio-economical aspects. Therefore, the MiDiNA project aims to elaborate a multidisciplinary study to sustain the implementation of MGs to improve power supply and RESs integration in the context of African countries. The study will explore the deployment of these solutions at a neighborhood scale using a cooperative energy management between off-grid MGs. In addition, this project also has a social dimension as it aims to assess the social acceptance aspect. It includes also a projection study on the economic growth of MGs and several policy guidelines. The project objectives are structured into 4 work packages:

WP1: Making technological choices and optimal techno-economic dimensioning for a building scale MG considering meteorological and consumers specificities.
WP2. Development of resilient control techniques to demonstrate that MGs solutions can ensure service continuity under critical conditions.
WP3. Design of cooperative energy management strategies for a district-scale off-grid MGs cluster.
WP4. Evaluating societal acceptance of MGs and their role in economic development of targeted countries. Guidelines measures will be prepared in collaboration with a local grid operator.
The transfer of knowledge can be achieved at different levels: (i) knowledge transfer between senior and junior researchers, (ii) knowledge transfer in both methodological and experimentation aspects. (iii) The project actions foresee students training as well as awareness-raising actions for the civil society on the role of MGs.

Results

The project explores the benefits of MG technologies to support the deployment of eco-friendly RE sources to secure power supply at the small and medium-sized scale communities in North Africa. It can contribute to develop their energy sector and to achieve a sustainable energy mix that supports their low-carbon development strategies while enhancing economic and energy security.

Dissemination:

S. Ferahtia, A. Houari, T. Cioara, M. Bouznit, H. Rezk, A. Djerioui, Recent advances on energy management and control of direct current microgrid for smart cities and industry: A Survey, Applied Energy, Volume 368, 2024, 123501, ISSN 0306-
2619, https://doi.org/10.1016/j.apenergy.2024.123501. **WOS Q1, IF 10.1, ZONA ROSIE**

D. Mitrea, T. Cioara, I. Anghel, L. Toderean, Evolutionary Game for Incentivizing Social Cooperation of Prosumers in Transactive Energy Communities, Energy and Buildings, **WoS Q1, IF 6.6**, **ZONA ROSIE,** ACCEPTED, 2024. Pre-print: https://dx.doi.org/10.2139/ssrn.4864720Â

A.A Pop, R. Inte, C. Oprea, M. Ruba, A Passive Battery Management System for Lead-Acid battery, CISTEM 2024 Conference, ACCEPTED, Conference Internationale en Sciences et Technologies Electriques au Maghreb - Sciencesconf.org

A.A Pop, S. Breban, M. Ruba, V. Maier, A. Constantinescu, T.Cioara, I. Anghel, Technical and socio-economic perspectives for microgrid control and cooperation, CISTEM 2024 Conference, ACCEPTED, Conference Internationale en Sciences et Technologies Electriques au Maghreb - Sciencesconf.org

Ridha Benadli, Azeddine Houari, Nadia Ait-Ahmed, Saad Motahhir, Adrian Augustin Pop, Soumia El Hani, Robust integral super-twisting controller for enhanced photovoltaic integration with hybrid battery and supercapacitor storage in DC microgrid, Results in Engineering,Volume 24,2024,103009,ISSN 2590-1230,https://doi.org/10.1016/j.rineng.2024.103009. https://www.sciencedirect.com/science/article/pii/S2590123024012647

Financed through

The project has received funding from the **European Commission under the Horizon Europe Partnership** scheme and from UEFISCDI national agency.

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Assoc. Prof. Dr. Eng. Stefan Breban
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https://www.leap-re.eu/midina/

Positive Energy Communities Led by Citizens - PERSIST

COFUND – DUT - PERSIST

Goal and short description of the project

PERSIST identifies the most relevant participation archetypes to develop decarbonization scenarios for an optimized flexible and participative Energy System.

Project implemented by

Coordinator: Hochschule Luzern
Partners:
Technical University of Cluj-Napoca
Hogskolen I Ostfold
Rigas Tehniska Universitate
Universidad del Pais Vasco/ Euskal Herriko Unibertsitatea
Universidade de Coimbra
SmartCity Alliance

Implementation period

01-03-2024 - 31-12-2026

Main activities

Empirical research on the establishment of PED, energy flexibility, energy transition. Impact assessment and identification of conditions for the expansion and transferability of PED

Development of tools, methodologies, specifications and protocols

Solution transfer and replication

Results

Energy transition action plan for developing countries

Impact monitoring and evaluation protocol and framework

Recommendations on improving the efficiency and effectiveness of public funding supporting investment in sustainable energy for consumers

Energy efficiency guidelines for PEDs

Recommendations for demonstrating PED

Roadmap to excellence in energy culture

Tools and methods for expansion and reproduction of PEDs

Financed through

The project has received funding from the European Commission under the Horizon Europe Partnership scheme and from UEFISCDI national agency.

Research center

Energy Transition Research Center - EnTReC

Research Team

Project leader for TUCN: Assoc. Prof. Stefan Cirstea, PhD

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ROMANIAN NATIONAL QUANTUM COMMUNICATION INFRASTRUCTURE - RoNaQCI

DIGITAL-2021-QCI-01-DEPLOY-NATIONAL

Goal and short description of the project

RoNaQCI proposes the deployment of a 1500+ km QCI network including 6 metropolitan networks in the cities of Bucharest, Iasi, Cluj-Napoca, Timisoara, Craiova and Constanta.
The project includes activities for deployment of advanced production-grade quantum systems and networks combining the best of quantum and classical security devices, explicitly including testing the interface between the QCI's space and terrestrial systems, activities for training and education of, as well as dissemination and communication to a large number of potential users, activities for demonstrating, testing and exploiting the first long-distance quantum communication national and metropolitan networks in Romania.

Project implemented by

NATIONAL UNIVERSITY OF SCIENCE ANDTECHNOLOGY POLITEHNICA BUCHAREST - Coordinator
Partners:
Agentia ARNIEC/RoEduNet, RO
Technical University Gheorghe Asachi of Iasi, RO
Technical University of Cluj-Napoca, RO
and 20 another RO partners

Implementation period

01.01.2023-30.06.2025

Main activities

The project represents a key step towards implementing state-of-the-art quantum technology (QT) with the aim to approach and mitigate major challenges raised by the digital era, among which the most prominent are secure communication and enhanced computing capability based on the laws of quantum physics. Moreover, the project is perfectly aligned to the Digital Europe Programme, as its primary objective consists in building and deploying a secure quantum communication infrastructure in Romania that is intended to serve as the local backbone of a future “quantum Internet” on a wider EU scale.

The specific objectives of the projects are:

O1. Deploy advanced national quantum systems and networks (RoNaQCI)

O2. Test, monitor and integrate RoNaQCI with classical communication infrastructure

O3. Develop advanced use cases tailored around strategic interests in exploiting RoNaQCI, linking Public Authorities, Governmental entities, Universities, Research Institutes and Private Companies

O4. Upskill to create a large number of trained users based on specific profile and particular interests

O5. Participate in EU-wide design and development efforts anticipating the Quantum Internet

Results

The project will accomplish the deployment of advanced QKD networks (RoNaQCI) in the form of a single, unified, national terrestrial backbone with a number of 16 QKD links, covering over 1350km (see Fig. 1 - Implementation), 6 metropolitan terrestrial networks (in Bucharest, Cluj-Napoca, Iasi, Timisoara, Craiova and Constanta – see below) with a total sum of 19 terrestrial QKD links and 1 free-space QKD link all of them integrated and operating with existing communication networks. The project tests and integrates QC technologies at multiple levels and

will also exploit RoNaQCI addressing advanced use cases blending quantum and classical communications by combining QRNG and QKD with classical communication protocols using also post quantum algorithms. More explicitly, the project will develops software for: a) monitoring of QKD networks (used firstly on RoNaQCI) including functional, performance and usage parameters; b) employing QRNG devices in signing X.509 security certificates (at UPB, UB, UBB, UTCN, UAIC, TUIasi, UPT, UVT, UCv, CMU and IFIN-HH); c) employing QKD and post-quantum algorithms in VPNtunnelled traffic (all 19 metropolitan qkd links will benefit and this will assure all the use cases involved); d) employing QKD and post-quantum algorithms in SSH traffic as well as other scenarios in distributed computing (UPB-IFIN-HH, UCv-ClusterPower and TUIasi-Imago-Mol).

Dissemination:

Ardelean, SM., Udrescu, M. & Stangaciu, V. Easy to integrate API for accessing true random numbers generated with IDQ's Quantis Appliance. SoftwareX 27, 101841 (2024).

Guţoiu, R.A., Tănăsescu, A. & Popescu, P.G. Simple exact quantum search. Quantum Inf Process 23, 356 (2024).

Popa, AB. & Popescu, P.G. Optimal key forwarding strategy in QKD behaviours. Nature Sci Rep 14, 13977 (2024).

Ciobanu, BC., Perju Verzotti, L. & Popescu, P.G. Optimal and scalable entanglement distribution over crossbar quantum networks. Nature Sci Rep 14, 11714 (2024).

Popa, AB., Ciobanu, BC., Iancu V., Pop F. & Popescu, P.G. SkySwapping: Entanglement resupply by separating quantum swapping and photon exchange, Future Generation Computer Systems 158, (2024).

Popa, AB. QGP-VPN: QKD enhanced VPN solution for general-purpose encrypted communications, 22nd RoEduNet Conference: Networking in Education and Research (RoEduNet), Craiova, Romania, pp. 1-6, (2023).

Perju Verzotti, L., Ciobanu, BC. & Popescu, P.G. Optimal quantum network decongestion strategies. Nature Sci Rep 13, 9834 (2023).

Financed through

Funded by the European Union's Digital Framework Programme under the Grant Agreement number: 101091562

Research center

Cellular and Wireless Communications Research Laboratory - CWL

Research Team

Project leader for TUCN: Prof. Dr. Eng. Tudor Palade

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SUSTAINABLE ACT FOR CONSTRUCTION MARKET: A NEW PERSPECTIVE ON PASSIVE SEISMIC PROTECTION - STF4SW

ERANET-M-3-STF4SW

Goal and short description of the project

The project proposes an innovative method to enhance structural performance by using shear-thickening fluids (STF) for vibration damping and impact absorption in structures, particularly under dynamic loads or earthquakes. The method is presented as an efficient and viable solution for the rehabilitation of existing structures, including heritage buildings, where traditional solutions may be costly and invasive.

The project brings together multidisciplinary teams from three countries, collaborating to achieve the proposed objectives by continuously contributing expertise and innovation. The project consortium comprises research teams from three countries: Romania, the Czech Republic, and Turkey.

The project aims to advance the technological readiness level (TRL) of this innovation from TRL2 (experimental level) to TRL5 (demonstration in relevant conditions), providing an innovative and viable structural rehabilitation solution for vibration absorption.

Project implemented by

Coordinator: Kalekim (Türkiye)
Partners:
Technical University of Cluj-Napoca
University of Pardubice (Czech Republic)
Czech Technical University in Prague (Czech Republic)
Červenka consulting (Czech Republic)

Implementation period

01-06-2024 - 31-05-2027

Main activities

Development and Testing of STF: Shear-thickening fluids will be developed and characterized.

Material Characterization Tests: The mechanical performance of STF will be analyzed under dynamic loads (impact, low-frequency, and high-frequency).

Numerical calculations and simulations: the material properties obtained from tests will be introduced in computational programs, in order to observe their effects on the structure.

Implementation as a Rehabilitation Technique: STF will be applied to reinforced concrete (RC) specimens to evaluate its efficiency as a vibration damping system.

Results

- Numerical simulations.
- Material testing using RMN techniques.

Dissemination:

- Consortium meeting.

Financed through

The project has received funding from the European Commission under the Horizon Europe Partnership scheme and from UEFISCDI national agency.

Research center

COMPUTATIONAL MODELING AND ADVANCED SIMULATION IN STRUCTURAL AND GEOTECHNICAL ENGINEERING

Research Team

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Project website: Actiune durabila pentru piata constructiilor: O noua perspectiva asupra protectiei seismice pasive

New care pathways for supporting TRANSitional CARE from hospitals to home using AI and personalized digital assistance - TransCare

THCS 1449 – ERANET 80/2024

Goal and short description of the project

The main goal of TransCare is to address the open challenges and necessities for the health and care systems by adapting, scaling, and evaluating a technology-assisted transitional care solution based on Internet of Things (IoT) monitoring, Machine Learning (ML) and digital assistance to a larger number of patients and considering the specific contexts of different healthcare systems in Europe (NO, IT, RO) as well as various types of comorbidities. To achieve the challenging goal, we will pursue the following support objectives: (O1) Study how the care pathways will need to be re-designed for allowing the integration and usage of the technology in different hospital and healthcare settings providing the necessary knowledge for care relocation form hospital to home; (O2) Adapt and scale the developed IoT, ML & digital assistance solution for transitional care considering the specificity of the different contexts in which the trials will be conducted; (O3) Setup and conduct longitudinal trials to assess the potential of the technology to reduce the rate of rehospitalization within 30 days relieving the pressure on health and care facilities, aiming to establish a clinically validated value proposition for the technology; (O4) Study the value-based payment models in the target countries to provide guidelines for shared payment responsibilities (national or local government, insurance companies, patients), and quality metrics focused on patient outcomes that can incentivize hospitals and healthcare providers to invest in avoiding readmissions; (O5) Dissemination of the findings and key stakeholders' engagement through a multi-channel dissemination strategy.

TransCare seeks to improve transitional care: (i) effectiveness by providing the IoT infrastructure for remote monitoring of patient's data and adherence to treatment, (ii) efficiency by offering digital assistance based virtual communication and coordination for proactive and personalized intervention freeing up healthcare providers time (iii), timely care due to AI-driven proactive detection of lack adherence post-discharge leading to better outcomes, and more efficient care pathways and (iv) safety and equity of the process. Additionally, TransCare will help build the essential knowledge required for redesigning of patient care pathways to facilitate the seamless integration of technology within various healthcare environments considering healthcare providers' roles and responsibilities payment models and hospital incentivization.

Project implemented by

TECHNICAL UNIVERSITY OF CLUJ-NAPOCA, ROMANIA – COORDINATOR
KARDE AA, NORWAY
TELLU AS, NORWAY
ISTITUTO NAZIONALE DI RICOVERO E CURA PER ANZIANI, ITALY
INSTITUTUL INIMII" NICULAE STANCIOIU" CLUJ-NAPOCA, ROMANIA
FARSUND KOMMUNE, NORWAY

Implementation period

01/05/2024 - 30/04/2027

Main activities

TransCare will augment transitional care pathways by developing and integrating IoT, ML and digital assistance technologies with a view of improving patient outcomes and quality of care. The envisioned platform targets the integration of IoT devices for remote patient monitoring (RPM) of daily life activities/vital signs through non-intrusive wearable devices, AI models for offering support to healthcare professionals in identifying problems leading to rehospitalization and digital assistance solutions for personalizing the post-

discharge follow-up and intervention. Tellucare's remote patient monitoring service will be adapted for the TransCare platform, while for digital assistance Karde's Memas service will act as a communication and information resource bank and retrieval service to be used by discharged patients, carers and family. Additionally, a ML-based post discharge analytics service will be developed based on the deep-learning architectures for predicting and correlating heart rate during physical activities like running, walking, swimming or cycling, for a specific patient.

The TransCare overall strategy of the work plan is based on in three subsequent stages:

Phase 1 (M1 to M12) – the aim is to lay the foundation for the subsequent phases by identifying challenges, adapting technological solutions, and developing a functional platform prototype. The setup of the trials protocol and framework will ensure that the project is ready to move forward with testing and evaluating the platform's effectiveness in addressing the identified healthcare systems challenges.

Phase 2 (M12 to M24) – implementing transitional care pathways knowledge, recruiting users, defining roles and responsibilities, installing solution devices, and starting the trials evaluation. This phase aims to gather data and insights to assess the platform's performance in real-world settings and evaluate its impact on improving transitional care outcomes.

Phase (M24 to M36) – deals with running and finalizing the trials, data analysis, and validation of the project hypothesis. It involves finalizing the technology platform, developing exploitation plans, documenting replication requirements, and providing an overview of the achieved results. This phase ensures that the project outcomes are consolidated, and the groundwork is laid for potential future implementation and scaling of the technology platform for transitional care.

Results

TransCare aims to produce new knowledge, and tools for the transformation of the hospital-to-home transitional process, thus filling current knowledge gaps to ICT technology adoption and care paths redesign. Moreover, TransCare is promoting the transfer of technology and successful practices from previous Ambient Assisted Living (AAL) projects to diverse healthcare systems in Europe, at a larger scale, validating their effectiveness in different contexts and with various comorbidities by setting up trials with a higher number of patients to provide evidence that supports the adoption of this solution and its potential to reduce the need for hospital readmissions.

The main TransCare outcome will be an integrated technology for managing the transitional care of patients from hospital to community care or at home to reduce rehospitalization rates for patients with chronic diseases, addressing the challenge of a growing number of patients admitted to hospitals or other healthcare facilities.

A second outcome of the project will be a set of guidelines for re-designing the care paths for patients to consider the utilization of the novel technology developed in different care settings and national contexts. The guidelines will consider the specific circumstances and healthcare systems of the countries where the trials are conducted, defining the roles and responsibilities of healthcare providers, caregivers, and patients to improve coordination.

Dissemination:

Web of Science indexed journals:

Rancea, A.; Anghel, I.; Cioara, T. Edge Computing in Healthcare: Innovations, Opportunities, and Challenges. Future Internet 2024, 16, 329. WoS Q2

Conference proceedings papers:

Burlacu, M; Anghel, I. A Platform for Enhanced Remote Care and Support for Older Adults, 2024 IEEE 20th International Conference on Intelligent Computer Communication and Processing Cluj-Napoca, Romania, 17-19 October 2024, IEEE Proceedings.

Financed through

TransCare project has received funding from the UEFISCDI / European Commission

Research center

Distributed Systems Research Laboratory – DSRL

Research Team

Project leader for TUCN: Prof. Dr. Eng. Ionut Anghel

Members:

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Prof. Dr. Eng. Ioan Salomie
Assoc. Prof. Dr. Eng. Cristina Pop
Assoc. Prof. Dr. Eng. Viorica Chifu
Assoc. Prof. Dr. Eng. Anca Hangan
Assist. PhD student Eng. Dan Mitrea
Assist. PhD student Eng. Liana Toderean
Assist. PhD student Eng. Alexandru Rancea
Assist. PhD student Eng. Mircea Antonesi

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TECHNICAL UNIVERSITY OF CLUJ-NAPOCA ROMANIA

MEMBER OF EUT+ EUROPEAN UNIVERSITY OF TECHNOLOGY

UTCN RESEARCH AND INNOVATION CONFERENCE - POSTER SESSION

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Team

Prof. Eng. Adrian Groza, Prof. Eng. Radu Razvan Slavescu, Assoc. Prof. Eng. Anca Marginean, Assoc. Prof. eng. Emil Chifu, Lecturer Cristina Feier, Lecturer Roxana Szomiu, Lecturer Istvan Attila Csaszar, Phd. students: Cheres Ioana, Alexandru Lecu, Adrian Pop, Andrei Dumitras, Iacob Liviu, George Bara, Emil Stetco, Virgil Puiac, Prof. Dr. Eng. Ioan Alfred Letia

Areas of expertise

Machine learning: We know how to torture data to make a full confession. We master various torture instruments: CNN, RNN, GNN, SVM, PCA, Gradient Boosting Trees.

Knowledge graphs: We know how to interleave deep learning with knowledge graphs. We know how to build domain ontologies.

Natural Language Understanding – We know how to analyze text to support precise reasoning and question answering. We know how to adapt and fine tune language models to specific problems.

Agentic AI - We know how: to use encoded images for sequences or volumes of images; to combine text with images; to learn from labelled or unlabeled images with contrastive learning, ViT, or Diffusion Models; to put ML to a diet: with ablation studies, knowledge distillation, few-shot learning,

Explainable Artificial Intelligence – We like white box machine learning, transparency and AI ethics

Significant Activity and Results

DLT-AI SECSPP - Distributed Ledger Technologies Implementation in Internal Organizational Workflows and Support Applications for Cooperation among National Security Institutions, PN-IV-P6-6.3-SOL, nr. 20341/2024, 2024-2026.

DeLArMaD - New Optical Coherence Tomography Biomarkers Identified with Deep Learning for Risk Stratification of Patients with Age-related Macular Degeneration, PED616, 2022-2024. https://users.utcluj.ro/~agroza/projects/delarmad/

1. “Where artificial intelligence stands in the development of electrochemical sensors for healthcare applications-A review", A. Cernat, A. Groza, Mi. Tertis, B. Feier, O Hosu-Stancioiu,C. Cristea, TrAC Trends in Analytical Chemistry DOI: https://doi.org/10.1016/j.trac.2024.117999, 2024

2. "A Qualitative Evaluation of ChatGPT4 and PaLMs Response to Patients Questions Regarding Age-Related Macular Degeneration", Muntean, G., Marginean, A., Groza, A., Damian, I.et al., Diagnostics Vol. 14, Iss. 14, DOI: 10.3390/diagnostics14141468, 2024.

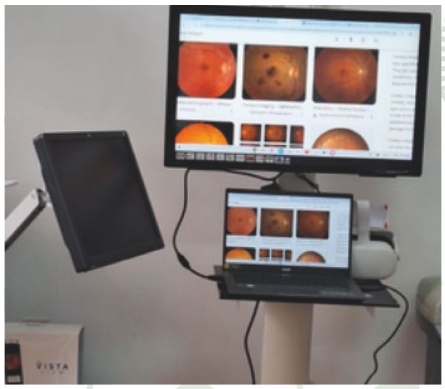
3. "The Predictive Capabilities of Artificial Intelligence-Based OCT Analysis for Age-Related Macular Degeneration Progression ", Muntean, G.A.; Marginean, A.; Groza, A.; Damia, et al. Diagnostics Vol. 13, Iss. 14, DOI: 10.3390/diagnostics13142464, 2023.

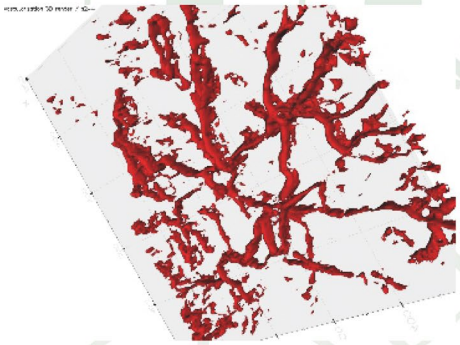
4. "Artificial Intelligence for Personalised Ophthalmology Residency Training", Muntean, G., Groza, A, Marginean, et all., Journal of Clinical Medicine Vol. 12, Iss. 5, DOI: 10.3390/jcm12051825, 2023.

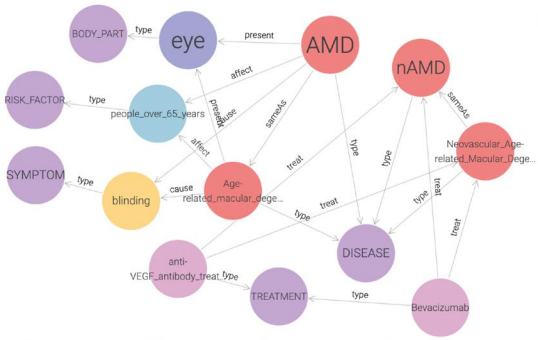
5. V. Mercea, A.Paraschiv, D. A. Lacatus, A. Marginean, D. Besliu-Ionescu: A Machine Learning Enhanced Approach for Automated Sunquake Detection in Acoustic Emission Maps. Solar Physics 298, 4, 2023

6. "Predicting Visual Acuity in Patients Treated for AMD", Marginean, B., Groza, A., Muntean, G., Nicoara, S. D., Diagnostics MDPI, Vol. 12, Iss. 6, pp. 1504, 2022

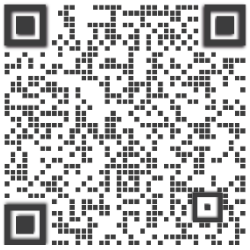
7. "Agents that argue and explain classifications of retinal conditions", Groza, Adrian and Toderean, Liana and Muntean, George Adrian and Nicoara, Simona Delia, Journal of Medical and Biological Engineering Springer, Vol. 41, Iss. 5, pp. 730--741, DOI: 10.1007/s40846-021-00647-7, 2021







Contact details:

Name: **Distributed Systems Research Laboratory**		
Acronym: DSRL		
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Team

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Areas of expertise

The Distributed Systems Research Laboratory has rich history of exploration and innovation, with significant contributions to the academic community, with a track record of publishing over 50 papers in esteemed journals and presenting at prestigious international conferences in recent years. Additionally, the laboratory has taken a leadership role in over 10 European projects, serving as coordinators and/or leading specific work packages or tasks. Expertise in:

Artificial Intelligence and Big Data Analysis: advanced AI techniques, including transformer models, deep neural networks, large language models, and reinforcement learning, to support decision-making and perform predictive analytics.

Distributed and scalable data management: distributed databases, IoT data management, data processing frameworks, scalable storage systems

Blockchain and P2P markets: use of blockchain technology to enable decentralized, privacy-preserving and secure markets including the design and implementation of smart contracts, thrustless transaction mechanisms, and tokenized ecosystems.

Cloud, Fog, and Edge Computing: Orchestration and workload offloading between cloud and edge, federated models, distributed deployment, container management

Significant Activity and Results

1. Partner & Task Leader, HORIZON-CL5-2023-D3-01-15, https://hedgeiot.eu/, Supporting digital transformation with AI-IoT solutions for edge- cloud platforms in the energy ecosystem / 2023-2026

2. Partner & Task Leader, HORIZON- CL5-2022-D4-01, https://dedalus-horizon.eu/, Developing data-driven, carrier-agnostic demand response tools for energy efficiency and multi-value services / 2023-2026

3. Coordinator, 76 PHE-2025 PN-IV-P8-8.1-PRE-HE-ORG-2024-0194, Supporting the green and digital transformation of the energy ecosystem and enhancing its resilience through the development and piloting of AI-IoT Edge-cloud and platform solutions / 2025-2026

4. Consortium Coordinator & WP Leader, THCS2023, https://www.thcs-transcare.eu/, New care pathways for supporting Transitional Care from hospitals to home using AI and personalized digital assistance, Transforming Health and Care Systems / 2024-2027

5. Consortium Coordinator & WP Leader, AAL-2021, https://engage-aal-project.eu/, Managing Cognitive Decline through theatre therapy, Artificial Intelligence and social robots Driven interventions / 2021-2024

6. Consortium Coordinator & WP Leader, AAL-2019, Social robot-based solution for elders' Care management and coaching after discharge from Hospital to Home / 2020-2023

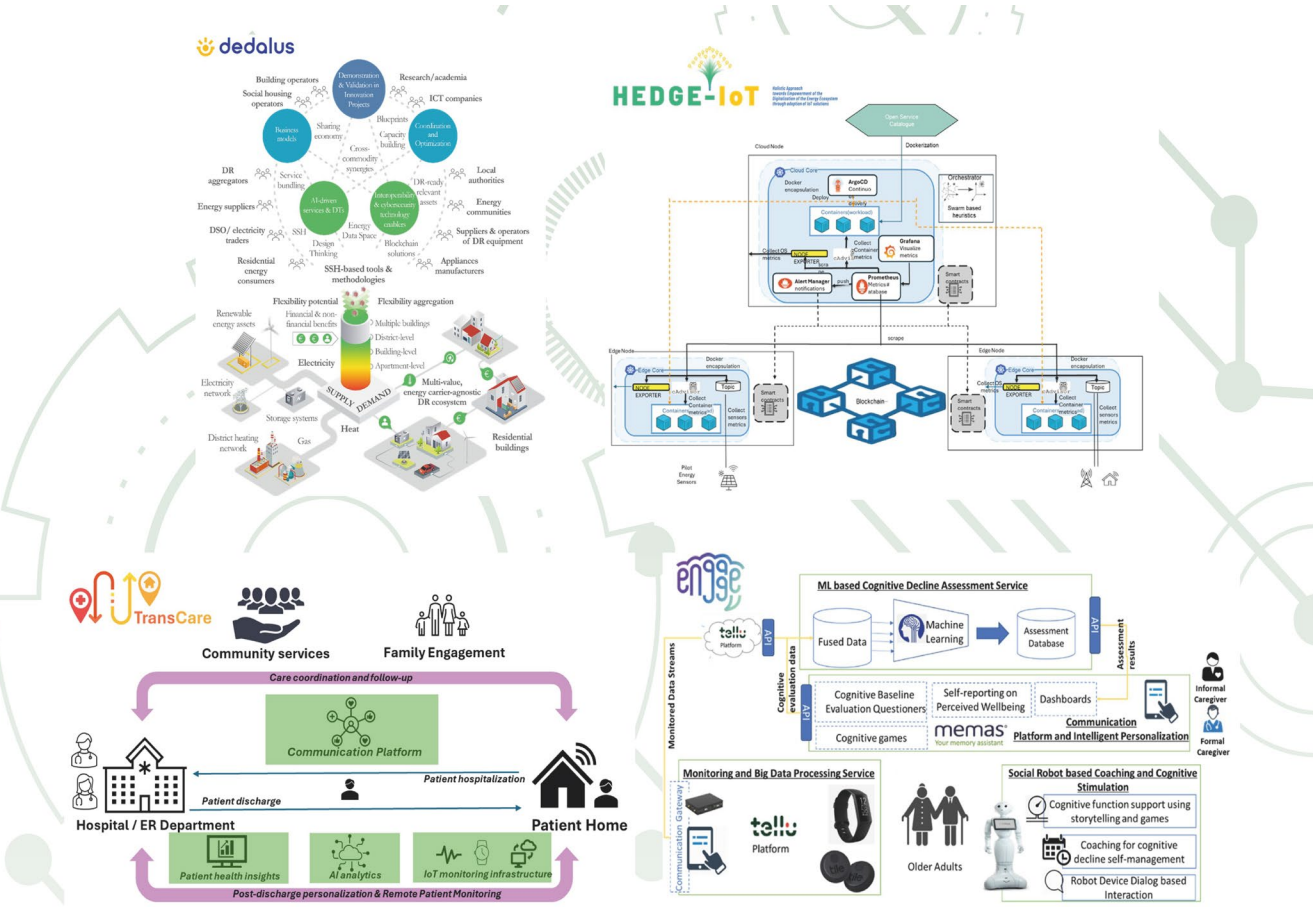
7. L. Toderean, T. Cioara, I. Anghel, E. Sarmas, V. Michalakopoulos, V. Marinakis, ”Demand response optimization for smart grid integrated

buildings: Review of technology enablers landscape and innovation challenges”, Elsevier Energy and Buildings, Volume 326, 2025, 115067, ISSN 0378-7788 WoS Q1 RED ZONE

8. D. Mitrea, T. Cioara, I. Anghel, L. Toderean, Evolutionary game for incentivizing social cooperation of prosumers in transactive energy communities, Elsevier Energy and Buildings, Volume 327, 2025, 115057, WoS Q1 RED ZONE

9. S. Ferahtia, A. Houari, T. Cioara, M. Bouznit, H. Rezk, A. Djerioui, ”Recent advances on energy management and control of direct current microgrid for smart cities and industry: A Survey”, Elsevier Applied Energy, Volume 368, 2024, 123501, ISSN 0306-2619, WoS Q1 RED ZONE

10. D. Mitrea, V. Chifu, T. Cioara, I. Anghel, C. B. Pop, Social Factors in P2P Energy Trading Using Hedonic Games, in IEEE Access 2024 WoS Q2 YELLOW ZONE



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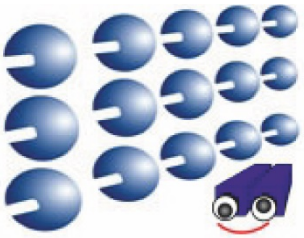

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Team

Prof. Dr. Eng.: Sergiu Nedevschi, Radu Danescu, Florin Oniga, Assoc. Prof. Dr. Eng.: Tiberiu Mariţa, Raluca Brehar, Mihai Negru, Ion Giosan, Delia Mitrea, Assist. Prof. Dr. Eng.: Cristian Vancea, Robert Varga, Vlad Miclea, Andra Petrovai, Razvan Itu, Mircea Muresan,
Phd. students: Bogdan Maxim, Zelia Blaga, Horatiu Florea, Radu Beche, Attila Fuzes, Vivian Chiciudean, Andrei Baraian.

Areas of expertise

Image processing and pattern recognition: Color, grayscale and 3D image processing; Automatic annotation.

Sensorial perception: Probabilistic and Deep Learning based techniques for object detection, classification and tracking from 2D and 3D sensors.

Advanced driving assistance and Autonomous mobile systems: Environment perception and representation; Risk assessment; Autonomous vehicles; Autonomous drones.

Medical image analysis: Segmentation; Recognition; Prediction; Structured reporting; Ultrasonography; CT; MRI.

Significant Activity and Results

1. SenseMaking - Development of a distributed autonomous response for Humanitarian Assistance and Disaster Relief (HADR), in particular, all-domain wildfire response, funded by Lockheed Martin (2022-2024)

2. DeepPerception, "Deep Learning Based 3D Perception for Autonomous Driving", code: PN-III-P4-PCE-2021-1134, (2022-2024), https://cv.utcluj.ro/deepperception/

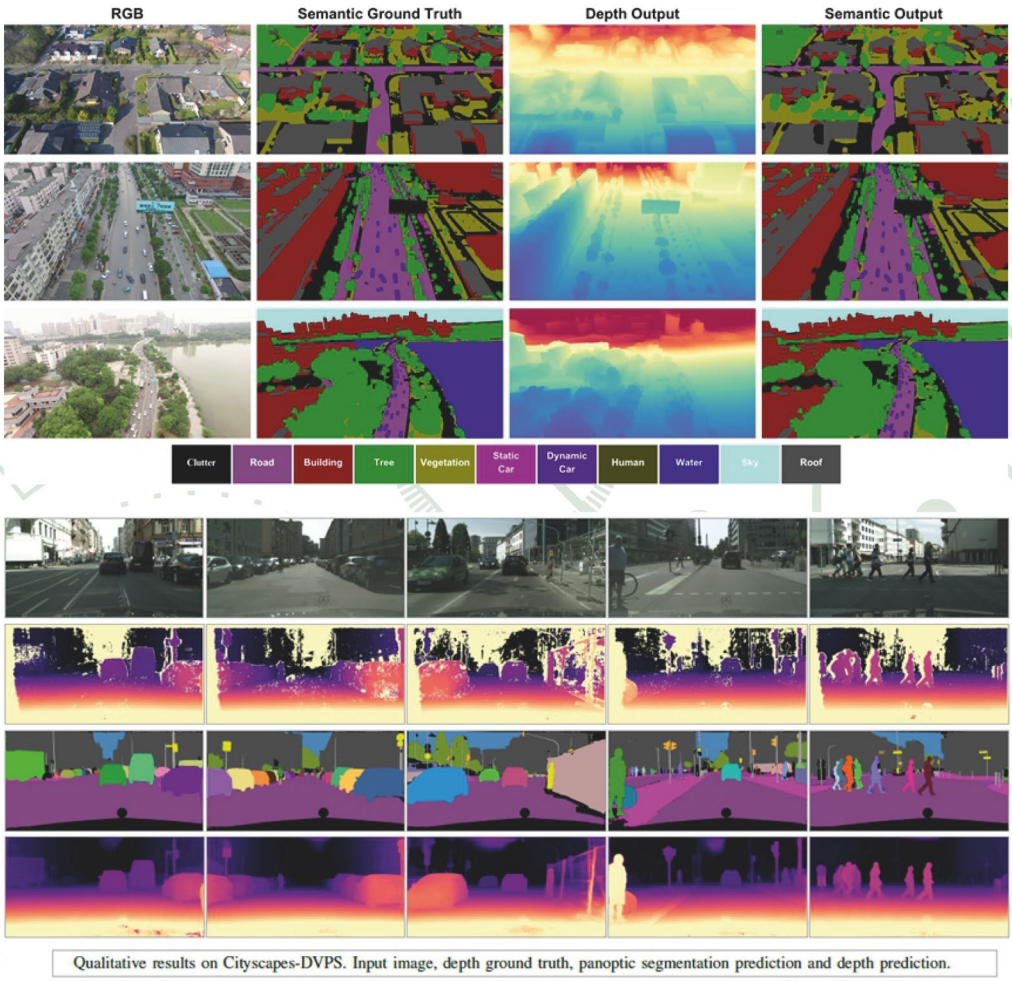
3. H. Florea, S. Nedevschi, “TanDepth: Leveraging Global DEMs for Metric Monocular Depth Estimation in UAVs”, in IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, 2025

4. Z. Blaga, S. Nedevschi, “Semantic Segmentation of Remote Sensing Images with Transformer-Based U-Net and Guided Focal-Axial Attention”, IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, Vol 17, pp. 18303-18318, Nov. 2024

5. V.-C. Miclea, S. Nedevschi, “Dynamic Semantically Guided Monocular Depth Estimation for UAV Environment Perception”, IEEE Transactions on Geoscience and Remote Sensing, Vol. 62, AN:5605111, pp. 1–11, 2024.

6. V. Chiciudean, H. Flora, Z. Blaga, R. Beche, F. Oniga, S. Nedevschi, Data Augmentation for Environment Perception with Unmanned Aerial Vehicles, IEEE Transactions on Intelligent Vehicles, 2024

7. R. Danescu, R. Itu, A. Fuzes, V. Turcu, “Increasing the accuracy of real time wide field of view space surveillance by grid based combination of multiple calibration results”, ADVANCES IN SPACE RESEARCH, 73(3), pp. 2098-2118, FEB 2024



Qualitative results on Cityscapes-DVPS. Input image, depth ground truth, panoptic segmentation prediction and depth prediction.

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Areas of expertise

High performance graphical processing and visualization, parallel and distributed processing on cloud infrastructures, interoperability of HPC platforms, interactive application development, software platforms and applications for spatial data processing and visualization,visual analytics, Virtual and Augmented Reality application development, machine learning based satellite data classification, interdisciplinary research in the domains of Earth Sciences and Earth Observations. Physiological data acquisition and processing.

Significant Activity and Results

1. CHEMINOVA - “Novel technologies for on-site and remote collaborative enriched monitoring to detect structural and chemical damages in cultural heritage assets” - HORIZON-RIA (2024-2027), https://cheminova.eu/

2. EMPOWER - “Design and evaluation of technological support tools to empower stakeholders in digital education”, HORIZON-RIA (2022-2025), https://project-empower.eu

3. AITECH - “Cercetare de excelență în domeniul inteligență artificială și date masive” (Research of excellence in the field of artificial intelligence and massive data), Tip proiect: PNCDI III, Proiecte de finanţare a excelenţei în CDI, Contract 38 PFE/2021 (2021-2024), https://aitech.utcluj.ro

4. CLOUDUT – "Cloud Cercetare UTCN-CLOUDUT", Project type: Cloud and Massive Data Infrastructures, Competitiveness Operational Program 2014-2020, Contract 235/2020 (2020 - 2022), https://cloudut.utcluj.ro

5. CERES - "Modul software de clasificare a asteroizilor din imagini satelitare utilizand invatare automata" (Software method for classifying asteroids from satellite images by machine learning). Proiect PN III (2020-2022), https://cgis.utcluj.ro/ceres/

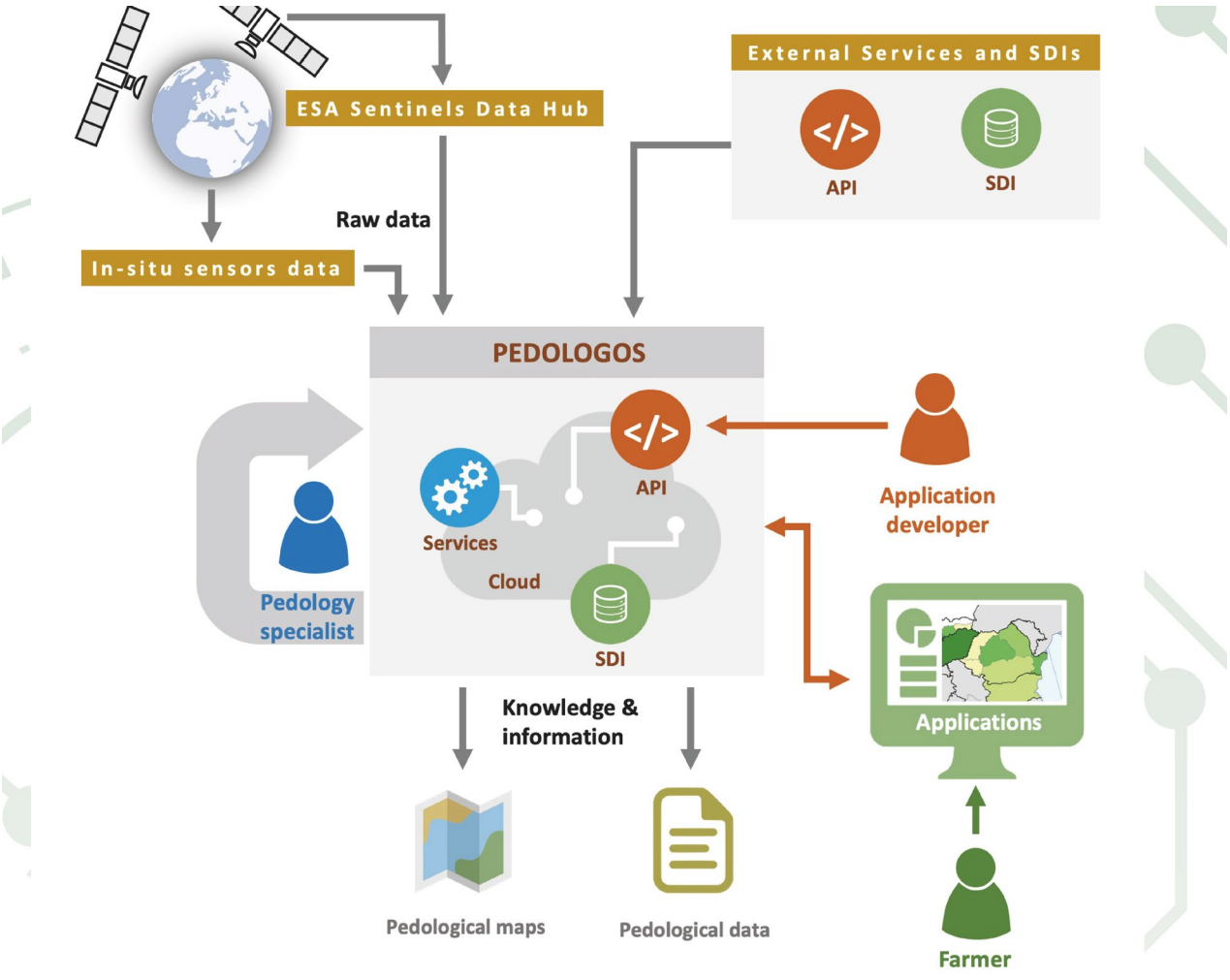
6. Are Dæhlen, Ilona Heldal, Abdul Rehman, Qasim Ali, Jozsef Katona, Attila Kővári, Teodor Stefanut, Paula Da Costa Ferreira, Cristina Costescu, “Towards More Accurate Help: Informing Teachers how to Support NDD Children by Serious Games and Eye Tracking Technologies”, Proceedings of the 2024 Symposium on Eye Tracking Research and Applications, pp. 1-7, 2024.

7. Dumitru R.G., Gorgan D., “3D Object Recognition using Enhanced Slicing”. In 2023 IEEE 19th International Conference on Intelligent Computer Communication and Processing (ICCP), pp. 163-170, 2023.

8. Barbu, B.,Nandra C., “A Neural Network Solution for Logic Circuit Identification and Classification”, 2024 IEEE 20th International Conference on Intelligent Computer Communication and Processing (ICCP), pp.1-8, 2024.

9. Bacu, V., Nandra, C., Sabou, A., Stefanut, T., Gorgan, D. “Assessment of Asteroid Classification Using Deep Convolutional Neural Networks”. Aerospace 2023, 10(9), 752. (2023)

10. Gorgan, D., “High Performance Computing Infrastructure in Technical University Research”. In 2022 IEEE 18th International Conference on Intelligent Computer Communication and Processing (ICCP), pp. 263-271, 2022.



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Team

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PhD Students: Cristian Lungu, Octavian Hasna, Florin Macicasan, Vlad Topan, Vasile Suciu, Lucian Cristea, Andrei Mihalca, Loredana Dan, Samuel Dolean, Vlad-Andrei Negru, Andrei-Cristian Rad, Alex-Mihai Lapusan, Diana Falamas, Andrei Herczeg, George Gabor

Areas of expertise

Fundamental theoretical aspects:
Data analytics and processing methods for data with multiple complexities; learning models for natural language understanding and reasoning with large language models; computational neuroscience; explainability and bias reduction in language models; identifying and mitigating adversarial attacks on learning models.
Practical approaches:
Natural language understanding: language model reasoning, multi-task and multilingual models, topic extraction, sentiment analysis, contradiction detection, semantic role labeling, semantic parsing, intent detection and slot filling
Graph analysis: community detection
Heterogenous data (IoT): preventive maintenance, failure prediction, user profiling, forecasting, smart driving, real-time sensors data processing, generating artificial data
Computational neuroscience: methods and models for brain activity identification and characterization (functional networks construction and analysis, spike sorting, burst detection, symbolic analysis, microstate analysis, LFP, and EEG data analysis).

Significant Activity and Results

1. “Electrolux AB - Recipe Importer I+II”, international project with third parties (company Electrolux Italy), (2021-2023) UTCN id 31229/28.10.2021 (31229/28.10.2022)

2. „VOITA – Sistem informatic integrat de Voice to Text Analytics” - SMIS 156387, PTI POC/1033/1/3/, 2023

3. “Appliance Data Analysis”, international project with third parties (Electrolux Italy), 7981/27.03.2019, (2019-2020), (2021-2023)

4. ROBIN - “Robotii si Societatea: Sisteme cognitive pentru Roboti Personali si Vehicule Autonome”, PNCDI III, (2018-2020)

5. Vlad-Andrei Negru, Vasile Suciu, Alex-Mihai Lăpuşan, Camelia Lemnaru, Mihaela Dînşoreanu, Rodica Potolea. Assessing language models' task and language transfer capabilities for sentiment analysis in dialog data. Computer Speech & Language, Volume 89, 2025, 101704, ISSN 0885-2308

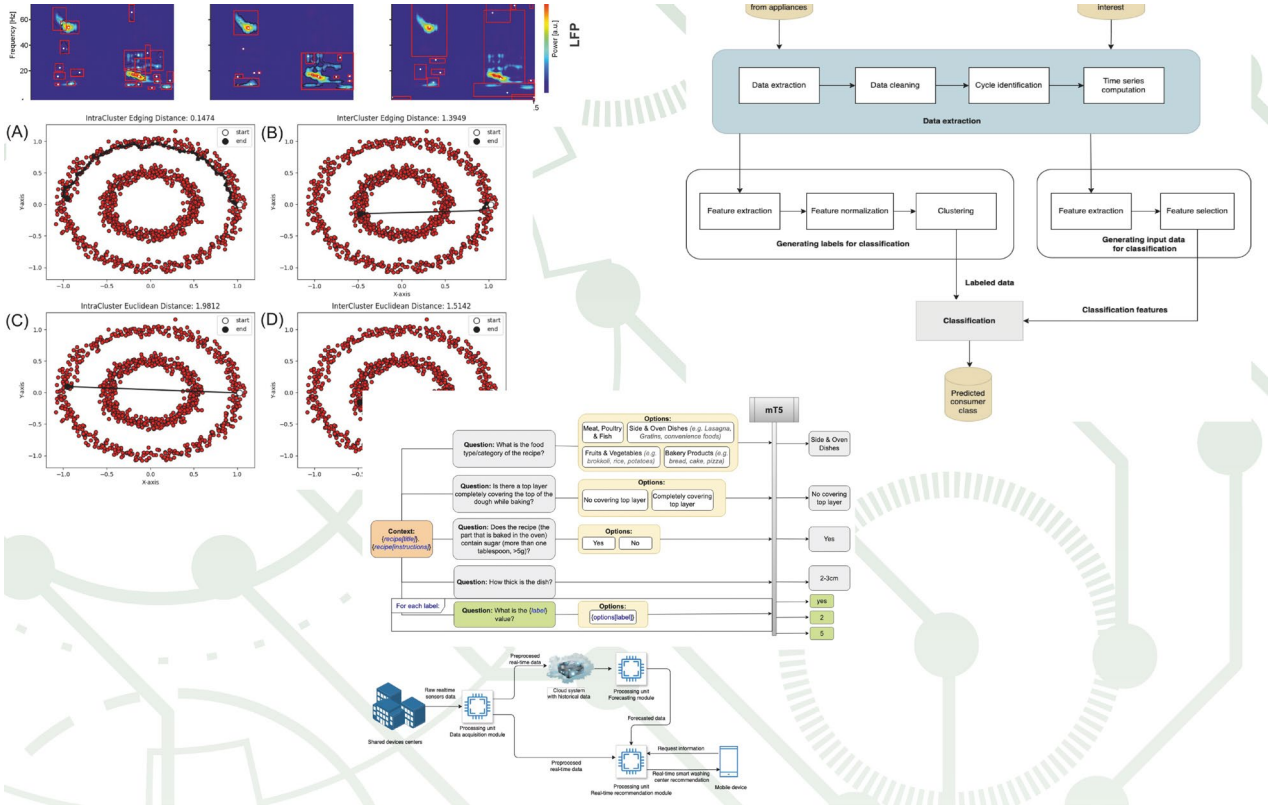
6. Vlad-Andrei Negru, Robert Vacareanu, Camelia Lemnaru, Mihai Surdeanu, Rodica Potolea. From Text to Taste: Advancing Smart Appliances with Multilingual Recipe Interpretation. In 2024 IEEE 40th International Conference on Data Engineering Workshops (ICDEW), pp 13-20

7. Ardelean, E.R., Portase, R.L., Potolea, R. and Dînşoreanu, M., 2024. A path-based distance computation for non-convexity with applications in clustering. Knowledge and Information Systems, Springer, pp.1-39.

8. Portase, R.L.; Tolas, R.; Potolea, R. SmartLaundry: A Real-Time System for Public Laundry Allocation in Smart Cities. Sensors 2024, 24, 2159

9. Andrei-Victor Chisca, Andrei-Cristian Rad, Camelia Lemnaru. Prompting Fairness: Learning Prompts for Debiasing Large Language Models. In Proceedings of the Fourth Workshop on Language Technology for Equality, Diversity, Inclusion 2024, within EACL 2024, pp. 52-62

10. Ardelean Eugen-Richard, Ichim Ana-Maria, Dînşoreanu Mihaela, Mureşan Raul Cristian, Improved space breakdown method –A robust clustering technique for spike sorting, in Frontiers in Computational Neuroscience, Vol 17, 2023,doi:10.3389/fncom.2023.1019637, ISSN=1662-5188



Contact details:

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ROBOTICS AND NONLINEAR CONTROL

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Team

Faculty: Lucian Busoniu, group lead; Zsófia Lendek, Levente Tamás; Gheorghe Lazea, honorary member Alexandru Codrean, Tassos Natsakis, Cosmin Marcu
More than 20 postdocs and research students employed from research funding.
Remote-work senior researchers: prof.dr. Constantin Morărescu, dr. Vineeth Varma
Technician: Adrian Lucaci. Executive project manager: Teodora Sanislav.

Areas of expertise

Our research interests range from robot design, perception, and control; through fundamental nonlinear control, networked systems, and estimation; to machine learning, artificial intelligence, and deep neural networks. These methods are applied to marine, ground, and aerial robotics, precision agriculture, rehabilitation robotics, and so on.

Significant Activity and Results

1. DECIDE: AI Design of Decentralized Coopetitive Control over Networks, National Resilience and Recovery Plan, component C9, investment I8, 2023-2026, PI Constantin Morarescu https://decide.utcluj.ro/

2. SeaClear2.0: Scalable Full-Cycle Marine Litter Remediation in the Mediterranean: Robotic and Participatory Solutions, Horizon Europe Innovation Action, 2023-2026, PI Lucian Busoniu, https:www.seaclear2.eu, see also the first iteration of the project at https://seaclear-project.eu

3. VinEye: Collaborative Wineyard Mapping using Autonomous Robots, PED grant, 2022-2024, PI Levente Tamas, http://rocon.utcluj.ro/~levente/?page_id=568

4. Control design for optimal estimation using heterogeneous sensors (HEROES), Young Teams grant, 2021-2022, PI Zsofia Lendek, http://lendek.net/TE185?

5. Targeted Robotic UppEr-arm REHABilitation (TRUE-REHAB). Young Teams Grant, 2020-2022, PI Tassos Natsakis, http://rocon.utcluj.ro/true-rehab

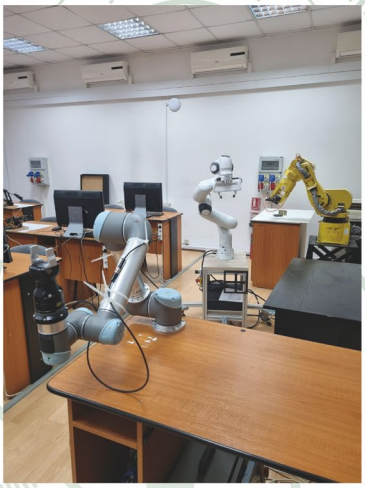
6. T. Santejudean, S. Ungur, R. Herzal, I.-C. Morărescu, V. S. Varma, L. Buşoniu, Globally convergent path-aware optimization with mobile robots, Nonlinear Analysis – Hybrid Systems, 2025.

7. B Yousuf, R Herzal, Zs Lendek, L Buşoniu, Multi-agent active multi-target search with intermittent measurements, Control Engineering Practice, 2024.

8. Sz. Molnar, L. Tamas. Variational autoencoders for 3D data processing. Artificial Intelligence Review, 2024.

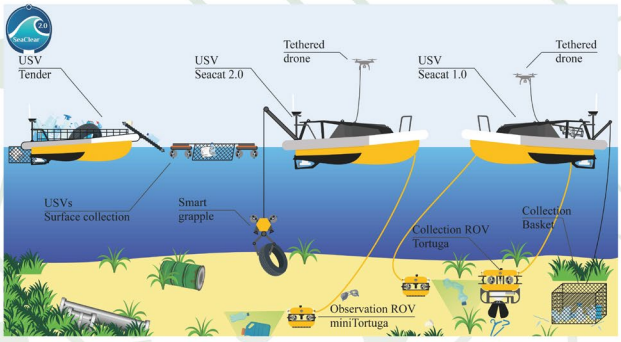
9. I.A. Ulici, A. Codrean, T. Natsakis, Human-Robot Interaction with Sliding Mode Control for Rehabilitation. IFAC PapersOnLine, 2023.

VinEye



TrueRehab

SeaClear



SeaClear

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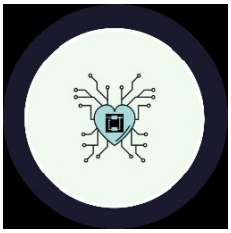
Director: Prof. Dr. Eng. Eva Dulf



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Areas of expertise

Smart Process Modelling & Simulation
- Building detailed, high-precision models for industrial, biotech, and medical processes
- Creating simulations to support personalized medicine and tailored treatments

Next-Level Control Systems
- Designing and fine-tuning from classic PID to advanced control strategies (predictive, fractional, fault-tolerant, robust)
- Developing and implementing custom control solutions
- Boosting performance with control optimization

Cutting-Edge Monitoring & Supervision for Innovative Technologies
- Designing new, efficient solutions for unconventional processes
- Modelling, monitoring, and controlling complex biochemical and biomedical systems
- Maximizing efficiency through smart optimization and ongoing process maintenance
- Engineering tools for better diagnostics and personalized medical care

Significant Activity and Results

1. Centre of Excellence in Computer Assisted Systems for Drug Dosing Control and Optimisation, PNRR-III-C9-2022-I8 (2023-2026), https://control.utcluj.ro/projects/optimdrug

2. Nanovaccinal Approaches for Colon Cancer, PN-III-P2-2.1-PED-2019-0844 (2020-2022), https://nanovacol.wixsite.com/home

3. Development of an intelligent combined imagistic–cytologic–molecular system to guide the diagnosis, risk stratification and the management of thyroid cancer, PN-III-P2-2.1-PED-2019-2536 (2020-2022), https://tircitogenwixsite.com/home

4. Berciu, A.G., Dulf, EH., Jurj, D., Czumbil, L., Micu, D. (2024). Energy Pulse: Competitive and Accessible Application for Monitoring Electricity Consumption. Perspectives in Dynamical Systems I — Applications (pp. 107-117). Cham: Springer Nature Switzerland.

5. Orzan, R. I., Santa, D., Lorenzovici, N., Zareczky, T. A., Pojoga, C., Agoston, R., Dulf E.H.*, Seicean, A. (2024). Deep Learning in Endoscopic Ultrasound: A Breakthrough in Detecting Distal Cholangiocarcinoma. Cancers, 16(22), 379.

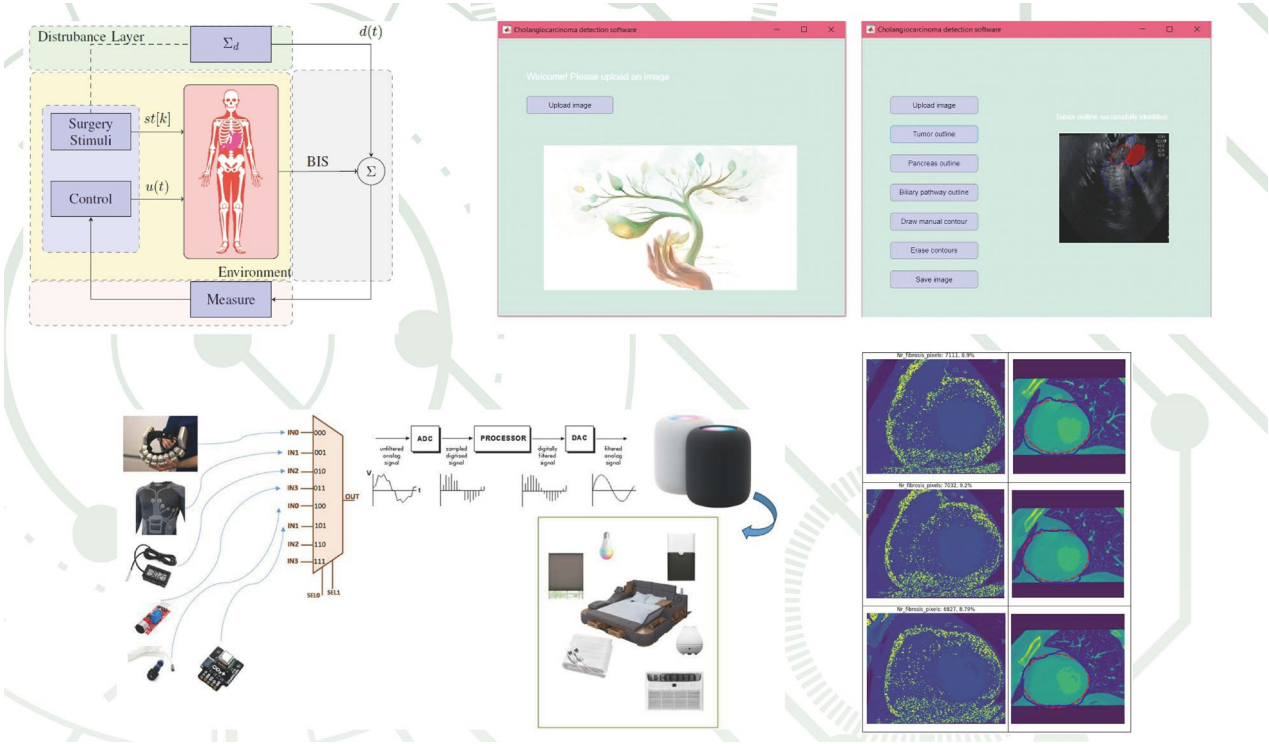
6. Timis, D. D., & Dulf, E. H. (2024). Unmanned Aerial Vehicles: State of the Art on Swarm Control. Journal of Control Engineering and Applied Informatics, 26(4), 69-80.

7. Muresan, C. I., Hegedüs, E. T., Mihai, M. D., Othman, G. B., Birs, I., Copot, D., Dulf E.H., deKeyser R., Ionescu C., Neckebroek, M.(2024). Fractional-Order Modeling of the Depth of Analgesia as Reference Model for Control Purposes. Fractal and Fractional, 8(9), 539.

8. Gonciar, D., Berciu, A. G., Dulf, E. H., Orzan, R. I., Mocan, T., Danku, A. E., Lorenzovici N., Agoston-Coldea, L. (2024). Computer-Assisted Algorithm for Quantification of Fibrosis by Native Cardiac CT: A Pilot Study. Journal of Clinical Medicine, 13(16), 4807.

9. Timis D.D., Muresan C.I., Dulf E.H.* (2022) Design and Experimental Results of an Adaptive Fractional-Order Controller for a Quadrotor, Fractal and Fractional, 6 (4), 204

10. Stoleru CA, Dulf E.H.*, Ciobanu L. (2022) Automated detection of celiac disease using Machine Learning Algorithms, Scientific Reports 12 (1), 1-19



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Eng. Andreea MUSCAN; Eng. Răzvan DOLOGA; Eng. Bogdan DRĂGHICI; Eng. George FLUTUR; Eng. Alexandru JIBOTEAN

Areas of expertise

Dependability. Security • Development of intelligent techniques for dependability (availability, reliability, safety, security, integrity and maintainability), security (confidentiality) and testing of information systems • Analysis, design, implementation and testing of information systems with dependability properties used in various fields (e.g. critical infrastructure - energy, water, environment, transport, medicine). Cyber – Physical Systems (CPSs) • Development of abstractions, models, architectures and tools to allow implementation of reliable CPSs (including areas as cloud- fog-edge architectures) made from unsafe components and resistant CPSs at cyber or physical attacks • Development of the semantic basics for heterogeneous models' composition and for modelling languages that describe various physical processes of a CPS and their associated logic. Intelligent Systems • Analysis, design, implementation and testing of intelligent real-time control and monitoring systems using artificial intelligence techniques (intelligent agents, fuzzy logic, machine learning, decision support systems, deep neural networks).

Significant Activity and Results

1. 2024 - 2026 - “Cybersecurity Seminars”, TUCN project, funded by the Google.org Cybersecurity Seminars Program

2. 2024 - 2025 – “FortifyAI: Enhancing Efficiency, Reliability, and Security through Integrated HW-SW Co-Design for AI Algorithms, Ro-Fr Bilateral Cooperation”, École Centrale de Lyon

3. 2021 - 2023 - “The Innovative European University of Technology (Inno-EUt+)”, a HEI Initiative project aiming to enhance the innovation and entrepreneurial capacity of a new European University Alliance, the European University of Technology (EUt+)

4. 2018 - 2020 - “Robots and Society: Cognitive Systems for Personal Robots and Autonomous Vehicle - ROBIN”, PCCDI2018

5. Misaroș, M.; Stan, O.P.; Enyedi, S.; Stan, A.; Donca, I.; Miclea, L.C., “A Method for Assessing the Reliability of the Pepper Robot in Handling Office Documents: A Case Study”. Biomimetics, 2024, 9, 558

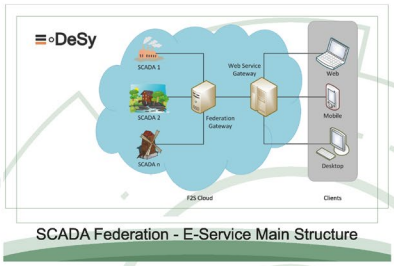
6. Donca, I.C.; Stan, O.P.; Misaroș, M; Stan, A.; Miclea, L., “Comprehensive Security for IoT Devices with Kubernetes and Raspberry Pi Cluster”, Electronics, 2024, 13, 9

7. Gundala, S.; Basha, M.M.; Madhurima, V.; Stan, O.P., “Input Voltage-Level Driven Split-Input Inverter Level Shifter for Nanoscale Applications”. Electronics, 2024, 13

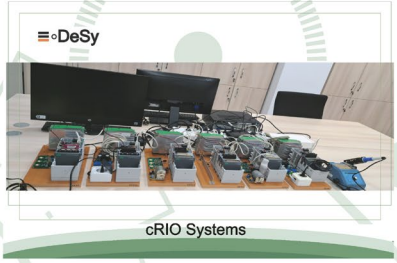
8. Roy, P.P.; Teju, V.; Kandula, S.R.; Sowmya, K.V.; Stan, A.I.; Stan, O.P., “Secure Healthcare Model Using Multi-Step Deep Q Learning Network in Internet of Things”. Electronics 2024, 13, 669

9. Urs, P.; Muresan, V.; Hulea, M.; Ștefan, I., “Securing the 18O Oxygen Isotope Separation Process: A Focus on Network Devices and Access Servers”, International Conference on Reliable Systems Engineering (ICoRSE), 2024, vol 1129. Springer, Cham

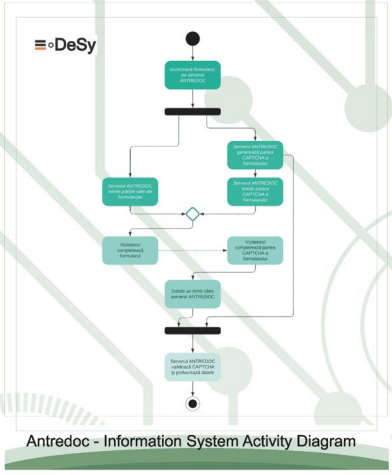
10. Sudhakar, M.V.; Stan, O.P., “Implementation of High-Speed Compact Level-Up Shifter for Nano-Scale Applications”. Electronics 2023, 12, 5015A



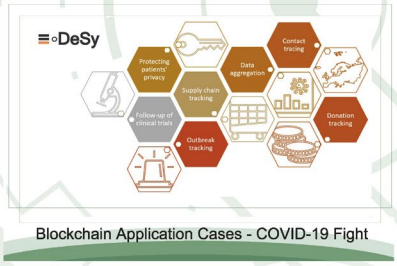
SCADA Federation - E-Service Main Structure



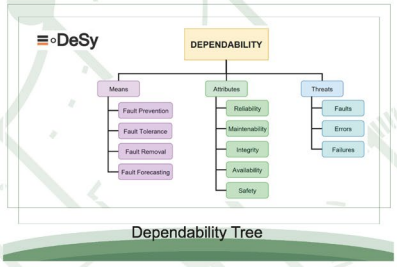
cRIO Systems



Antredoc - Information System Activity Diagram



Blockchain Application Cases - COVID-19 Fight



Dependability Tree

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Areas of expertise

Digital Control of electrical drives for CNC machines.
Electrical drives for industrial robots.
Equipment Setup for building automation;
Embedded systems for intelligent environment

Significant Activity and Results

1. Mihaly, Vlad, Mircea Şuşcă, and Petru Dobra. "Robust numeric implementation of the fractional-order element." Journal of the Franklin Institute 361, no. 14 (2024): 107087.

2. Șușcă, Mircea, Vlad Mihaly, Simona Daiana Sim, and Petru Dobra. "Design of Linear Control Laws for Minimum Uniform Quantization Tracking Error." In 2024 European Control Conference (ECC), pp. 3624-3629. IEEE, 2024.

3. Mihaly, Vlad, Mircea Şuşcă, Simona Daiana Sim, and Petru Dobra. "Robust Feedback Linearization for Full Relative Degree Input-Affine Nonlinear Systems." In 2024 European Control Conference (ECC), pp. 3835-3840. IEEE, 2024.

4. Șușcă, Mircea, Vlad Mihaly, Mihai Stănese, and Petru Dobra. "Uncertainty Modelling of Mechanical Systems with Derivative Behaviour for Robust Control Synthesis." In 2023 European Control Conference (ECC), pp. 1-7. IEEE, 2023.

5. Fratean, Adrian; Dobra, Petru, Technical and economic viability of greenfield large scale photovoltaic plants in Romania, SUSTAINABLE ENERGY TECHNOLOGIES AND ASSESSMENTS 2213-1388, 2213-1396 OCT, 2022, 53 A , 10.1016/j.seta.2022.102486, WOS:000847202800010

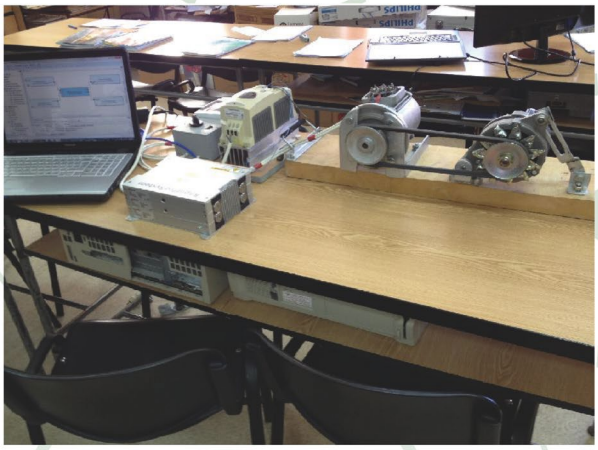
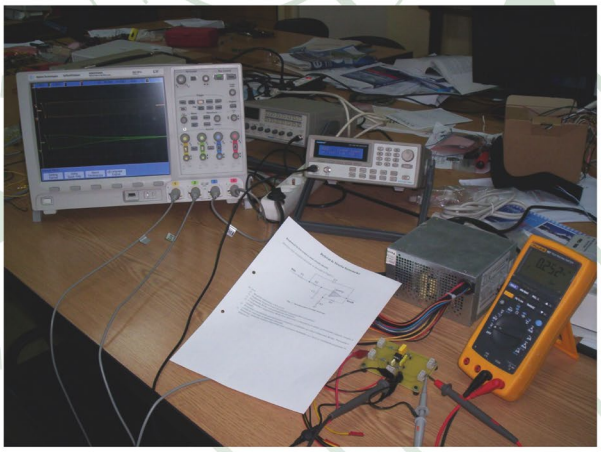
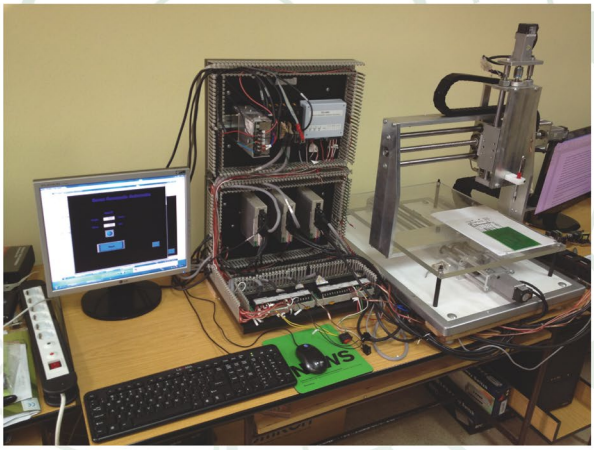
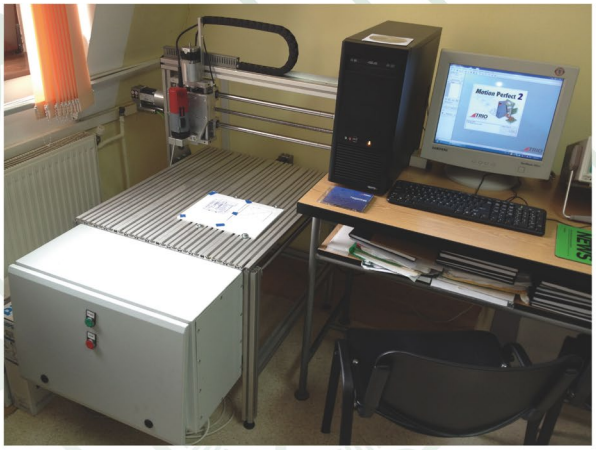
6. Mihaly, Vlad; Susca, Mircea; Morar, Dora; Dobra, Petru, Sensitivity Analysis of Krasovskii Passivity-Based Controllers, MATHEMATICS, 2227-7390 OCT, 2022, 10, 20,10.3390/math10203750, WOS:000875873300001

7. Susca, Mircea; Mihaly, Vlad; Morar, Dora; Dobra, Petru, Sampling Rate Optimization and Execution Time Analysis for Two-Degrees-of-Freedom Control Systems, MATHEMATICS , 2227-7390 OCT, 2022, 10, 19 10.3390/math10193449, WOS:000867182800001

8. Fratean, Adrian; Dobra, Petru, A Case Study for the Optimal Residential Battery Size and Dispatch Control in the Energy Market Context in Romania, PROCEEDINGS OF 2022 IEEE INTERNATIONAL CONFERENCE ON AUTOMATION, QUALITY AND TESTING, ROBOTICS (AQTR 2022), 23rd IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR), MAY 19-21, 2022, Cluj Napoca, ROMANIA, 1844-7872 978-1-6654-7933-2 2022 159, 164, 10.1109/AQTR55203.2022.9802010, WOS:000890261900027

9. Janos, Oliver; Dobra, Petru, H-infinity Controller Design and Parametric Identification for a DC Brushed Motor, PROCEEDINGS OF 2022 IEEE INTERNATIONAL CONFERENCE ON AUTOMATION, QUALITY AND TESTING, ROBOTICS (AQTR 2022), 23rd IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR), MAY 19-21, 2022, Cluj Napoca, ROMANIA, 1844-7872 978-1-6654-7933-2 2022 189, 194, 10.1109/AQTR55203.2022.9801991, WOS:000890261900032

10.Mihaly, Vlad; Susca, Mircea; Dulf, Eva H.; Dobra, Petru, Approximating the Fractional-Order Element for the Robust Control Framework, 2022 AMERICAN CONTROL CONFERENCE (ACC), American Control Conference (ACC), JUN 08-10, 2022, Atlanta, GA , 978-1-6654-5196-3 2022 1151, 1157 WOS:000865458701030

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Lighting Electrical Laboratory: Prof. Dorin BEU, Dr. Tania RUS, Dr. Octavian POP;
Advanced Process Control Methods: Prof. Eva DULF, Prof. Vlad MURESAN, Dr. Valentin SITA;
Civil Engineering Group: Dr. Iulia PRODAN, Dr. Nicoleta COBÂRZAN; Prof. Ligia MOGA;
Research Group in Renewable Energies: Prof. Dorin PETREUȘ, Prof. Ovidiu POP, Dr. Toma PĂTĂRAU, Dr. Radu ETZ;
Environmental Engineering Group: Prof. Horațiu VERMEȘAN, Dr. Timea GABOR.

Areas of expertise

The EnTReC expertise was gained through active participation, starting from 2014, in interdisciplinary research consortiums within international scientific cooperation in European projects: Energy Efficiency in Buildings & Industry; RES Integration; Smart Grid; Energy Islands & Communities; Energy Storage; Power flow Optimisation; nZEB adoption; Electric mobility; Waste to Energy; Energy Culture and Consumer Behaviour; Energy Analytics & Numerical Tools; Energy Profiling and Forecasting; IOT and Blockchain technology; Big Data Analytics; Cognitive and Artificial Intelligence; Electromagnetic Fields; Electromagnetic Compatibility.

Significant Activity and Results

1. Smart Grid-Efficient Interactive Buildings – EVELIXIA, HORIZON-CL5-2022-D4-02, 2023-2027, UTCN-360.438 EUR, Prof. Dan D. Micu

2. Renewable Energy-based Positive Homes - RENplusHOMES, HORIZON-CL5-2022-D4-01-02, 2023-2026, UTCN-463.188 EUR, Dr. Mihaela Crețu

3. Holistic Green Airports - OLGA, HORIZON2020-LC-GD-5-1-2020, 2021-2026, UTCN - 765.897 EUR, Prof. Dan D. Micu

4. Energy Transition Audits towards Decarbonization – EnTRAINER, LIFE21-CET-AUDITS, 2022-2025, UTCN – 283.179 EUR, Dr. Denisa Șteț

5. Positive Energy Districts driven by citizens – PERSIST, DUT Partnership, 2024-2026, UTCN - 195.960 EUR, Dr. Stefan Cîrstea

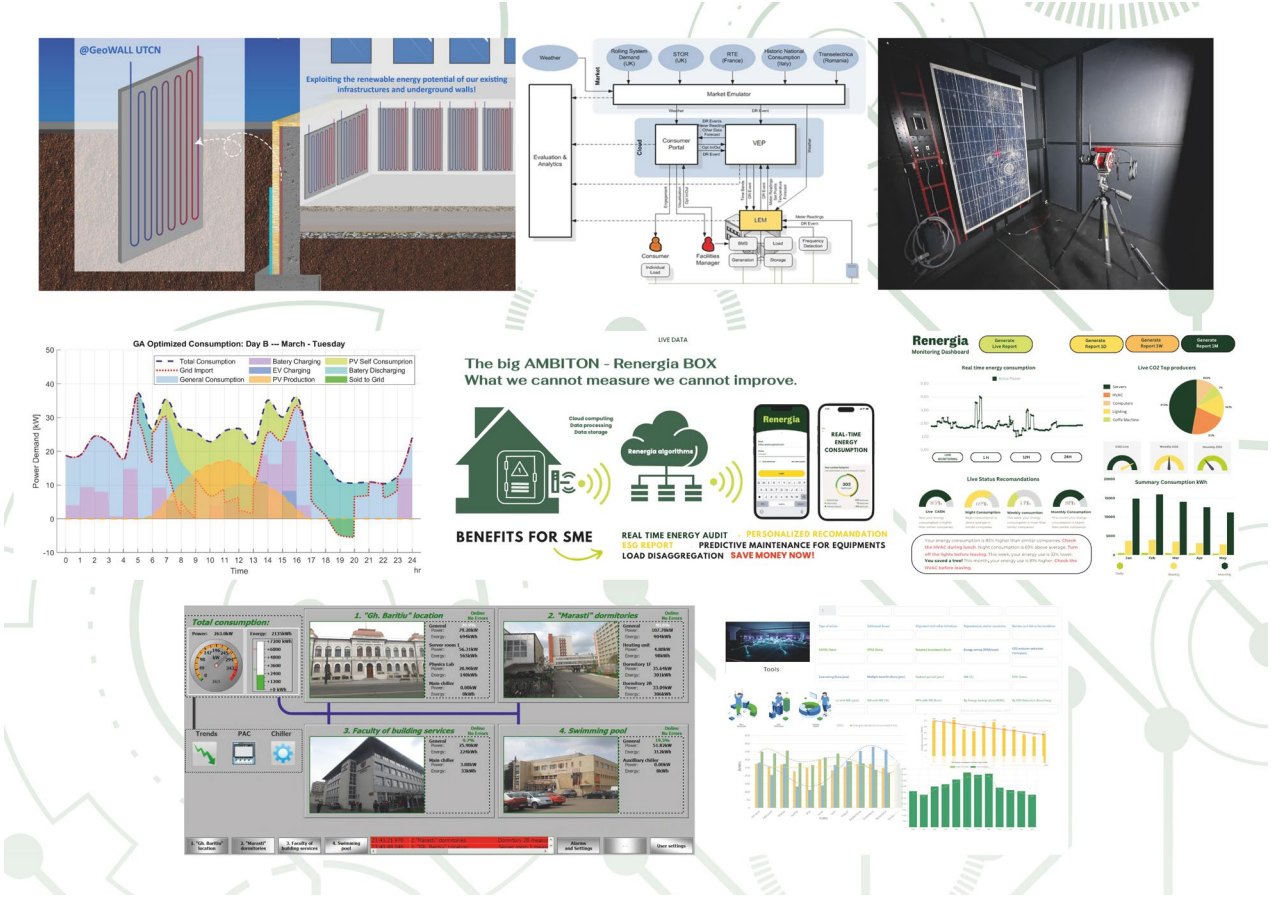
6. Fostering the implementation of Shallow Geothermal Hybrid Heating and Cooling systems in the Danube Region – GeoHeCo, Interreg Danube Region Programme, 2024-2026, UTCN – 334.734 EUR, Prof. Radu A. Munteanu

7. Design and development of an Energy Efficiency Management and Control System with cost-effective solutions for Residential and Educational Buildings - DOITSMARTER, 332783/2022-2023 EEA and Norway Funds, UTCN - 167.000 EUR, Dr. Andrei Ceclan

8. Empowering Energy Efficiency awareness through a Holistic Educational Approach - ENERGEIA, 346660/2022-2023 EEA and Norway Funds, UTCN-199 987 EUR, Dr. Denisa Șteț

9. Sun coupled innovative Heat Pumps – SUNHORIZON, H2020-LC-SC3-2018-RES, 2018 – 2023, UTCN: 145.268 EUR, Dr. Levente Czumbil

10.Renewable Cogeneration and Storage Technologies integration for Energy Autonomous Buildings - RECOGNITION, H2020-LC-SC3-2018, 2019- 2022, UTCN - 221.250 EUR, Prof. Dan D. Micu



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Areas of expertise

Numerical modelling and optimal design (CAD, CAE)

- Multiphysics modelling for advanced device and technology developments.
- Numerical modelling of the electromagnetic field distribution in complex systems.
- High-frequency electromagnetic fields analysis, waves propagation, antennas and filters design.
- Optimal design of electromagnetic devices and systems.

Electromagnetic compatibility (EMC)

- Pre-compliance and compliance according to the nowadays international standards: Radiated disturbances (emission and immunity)

Conducted emissions; Immunity for electrostatic discharges ESD; Immunity for BURST, SURGE, and Voltage Dips.

- Human exposure to electric and magnetic fields in vicinity of electro-energetic systems.
- Human exposure to electromagnetic RF fields.
- Analysis of the electromagnetic interferences generated by HV (AC and DC) lines and cables on neighbourhood metallic structures and design of the cathodic protection systems.
- PCB design and practical implementation for RF inductivities and HF filters construction.

Significant Activity and Results

1. Integrated circuit surrogate models for fast electrothermal parameter computations, Infineon Technologies, Marius Purcar, 2024-2027

2. Optimization of the extraction and modeling of parasitic elements from the structure of integrated circuits, starting from the integration masks, Infineon Technologies,, Marius Purcar 2024-2027

3. Digitalization of the design process of RFID multifrequency antennas and evaluation of human exposure to the radiation emitted by them, no.31/08.04.2024, Romanian Academy of Scientists, Claudia Constantinescu, 2024-2025

4. Methodology for analysis of electro-thermal processes in integrated circuits, Infineon Technologies, Marius Purcar, 2022-2025

5. Electromagnetic compatibility study services for the E-INFRA project Electrogrup/Transgaz/Transelectrica/Ministry of Energy - HVDC (525 - 640 kV) Black Sea – Podișoru (Bucharest) - Hungary (BRUA corridor), ELECTROGRUP INFRASTRUCTURE SA - E-INFRA, Calin Munteanu, 2023-2024

6. Development and optimization of MIMO antennas and evaluation of human exposure to the radiation emitted by them, GNaC ARUT 2023, no.31/08.04.2024, Claudia Constantinescu, 2023-2024

7. Digitalization of the process of assessing human exposure to electric and magnetic fields, AOSR-TEAMS-II Contract - Digital Transformation in Sciences no. 31/11.04.223, Adina Giurgiuman, 2023-2024

8. Carrying out electromagnetic field measurements and noise measurements within the project "Refurbishment of the 220/110 kV Baru Mare substation", ELECTROGRUP SA, Calin Munteanu, 2024

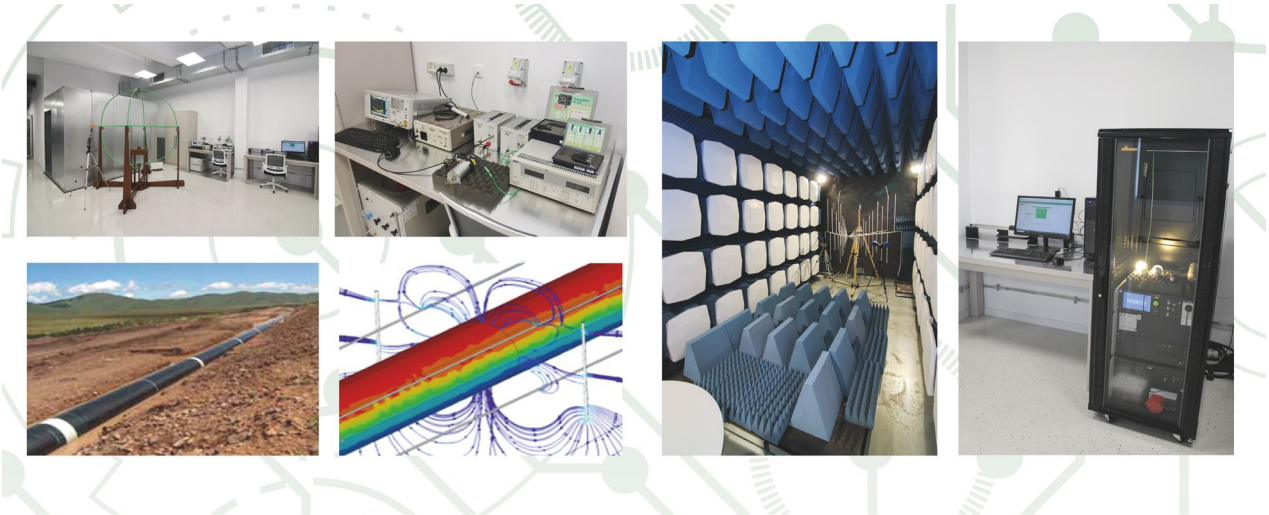
9. Study of the electric and magnetic field distribution in the 220 kV Vetis substation in the design phase, Smart Electric Design S.R.L., Calin Munteanu, 2024

10. Pacurar, C., Topa, V., Constantinescu, C., Munteanu, C.; Gliga, M., Andreica, S., Giurgiuman, A., „Adapting the Formula for Planar Spiral Inductors' Inductance Computation to the New Oval Geometric Shape, Ideal for Designing Wireless Power Transfer Systems for Smart Devices", Mathematics 2025, 13, 348, https://doi.org/10.3390/math13030348, IF:2.3, 2025

11. Constantinescu, C., Andreica, S., Laszlo, R., Giurgiuman, A., Gliga, M., Munteanu, C., Pacurar, C., "Numerical Modeling, Analysis, and Optimization of RFID Tags Functioning at Low Frequencies", Applied Sciences 14, 9544. https://doi.org/10.3390/app142095544, 2024 (Q2)

12. Constantinescu C., Pacurar C., Giurgiuman A., Munteanu C., Andreica S., Gliga M., „High Gain Improved Planar Yagi Uda Antenna for 2.4 GHz Applications and Its Influence on Human Tissues", Applied Sciences 13, no. 11, 6678, ISSN: 2076-3417, DOI10.3390/app13116678, WOS:001005579400001, IF: 2.7, 2023 (Q2)

13. Giurgiuman A., Gliga M., Bojita A., Andreica S., Munteanu C., Topa V., Constantinescu C., Pacurar C., "Software Program for the Evaluation of Human Exposure to Electric and Magnetic Fields", Technologies Journal, 11/6, 159, IF: 3.6, 2023 (Q1)



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Areas of expertise

DC and AC high efficiency converters;
PWM and PFM converters control strategies ;
High power factor and/or power conditioning converters;
Power electronics for high efficiency lighting systems;
High frequency, high power density converters for motor drive and renewable energy.

Significant Activity and Results

1. MICROINV – ”High-power density and high efficiency micro-inverters for renewable energy sources”; Action: POC-A1-A1.2.3-G-2-15 Knowledge Transfer Partnerships, (2017-2021);

2. CIA_CLIM - “Smart buildings adaptable to the effects of climate change” - PNIII-P1-1.2 PCCDI 2018, (2018-2020);

3. Chirca, M.; Dranca, M.; Oprea, C.A.; Teodosescu, P.-D.; Pacuraru, A.M.; Neamtu, C.; Breban, S. Electronically Controlled Actuators for a Micro Wind Turbine Furling Mechanism. Energies 2020, 13, 4207.

4. V. M. Suciu, S. I. Salcu, A. M. Pacuraru, L. N. Pintilie, N. C. Szekely, and P. D. Teodosescu, “Independent Double-Boost Interleaved Converter with Three-Level Output,” Applied Sciences, vol. 11, no. 13, p. 5993, Jun. 2021.

5. S. Breban, M. Dranca, M. Chirca, A.-M. Pacuraru, P.D. Teodosescu, and C.-A. Oprea, “Experimental Tests on a Spoke-Type Permanent Magnets Synchronous Machine for Light Electric Vehicle Application,” Applied Sciences, vol. 12, no. 6, p. 3019, Mar. 2022

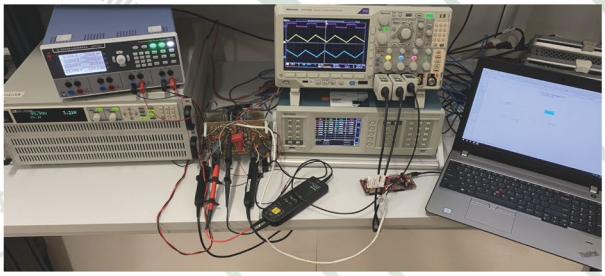
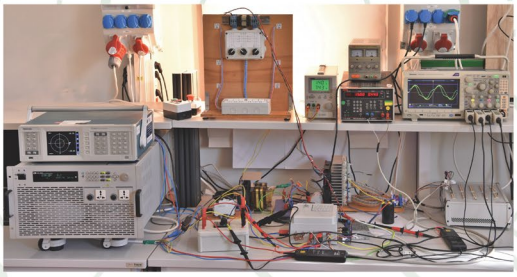
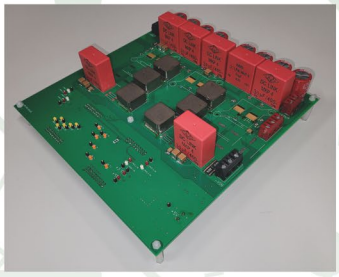
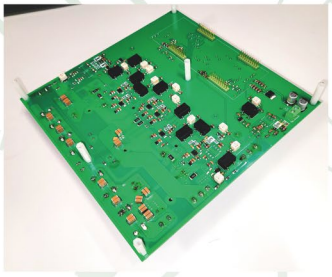
6. N. C. Szekely, S. I. Salcu, V. M. Suciu, L. N. Pintilie, G. I. Fasola, and P. D. Teodosescu, “Power Factor Correction Application Based on Independent Double-Boost Interleaved Converter (IDBIC),” Applied Sciences, vol. 12, no. 14, p. 7209, Jul. 2022

7. S. I. Salcu, V. M. Suciu, P. D. Teodosescu, and Z. Mathe, “The Condition Number Perspective in Modeling and Designing an Electronic IDBIC Converter,” Electronics, vol. 13, no. 7, p. 1302, Mar. 2024, doi: 10.3390/electronics13071302.

8. A. M. Păcuraru, V. M. Suciu, L. N. Pintilie, S. I. Salcu, A. B. Cristian and P. D. Teodosescu, "Analysis and Practical Implementation of an Independent Double Buck Interleaved Converter," 2022 International Conference and Exposition on Electrical And Power Engineering (EPE), Iasi, Romania, 2022, pp. 472-477, [IEEE].

9. A. M. Păcuraru, S. I. Salcu, M. A. Iuoraș, Ș. Breban, Z. Mathe and P. D. Teodosescu, "Practical Implementation of an Electronic Controlled Actuator for Micro Wind Turbine Overspeed Protection," 2022 International Conference and Exposition on Electrical And Power Engineering (EPE), Iasi, Romania, 2022, pp. 478-483, [IEEE].

10. L. N. Pintilie, H.C. Hedeșiu, C.G. Rusu, P.D. Teodosescu, C.I. Mărginean, S.I. Salcu, V.M. Suciu, N.C. Szekely, A.M. Păcuraru, “Energy Conversion Optimization Method in Nano-Grids Using Variable Supply Voltage Adjustment Strategy Based on a Novel Inverse Maximum Power Point Tracking Technique (iMPPT),” Electricity, vol. 4, no. 4, pp. 277–308, Oct. 2023 [Scopus].

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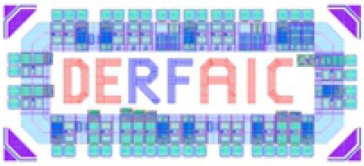

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Areas of expertise

Design of RF, Analog and Mixed–Signal Integrated Circuits
- High performance Power Management circuitry, including Energy harvesting and conversion
- Reconfigurable and programmable Analog Front-Ends for sensors and transceivers, support circuitry for MEMS
- Digitally-intensive frequency synthesizers and Low-power radio transceivers

Methodologies for optimized design, analysis and verification of integrated circuits and systems
- Systematic design of analog integrated circuits (ICs) and AI-driven optimization
- Multivariate IC pre-silicon verification based on Machine Learning; Metamodeling
- AI-based analysis and processing of post-silicon data; Yield analysis

Circuit and Signal Theory and Applications; Tools and methodologies for Education in Electronics
- System modelling and analysis; Feedback theory & stability analysis
- Electro-thermal modelling and analysis of power integrated circuits

Electronic circuits and systems for acoustics
- Optimized synthesis of acoustic equalizers; Analysis and improvement of the acoustic behaviour of enclosures

Algorithms and techniques for compensating effects of non-idealities inherent to analog circuits & systems
- Compensation of IQ mismatch in integrated radio receivers; Reduction and compensation of DC offsets
- Digital control of DC-DC Converters

Significant Activity and Results

1. HELP - Home Electronic Laboratory Platform; Erasmus+ ; Grant No. 2020-1-IE02-KA226-HE-000786, 2021-2023

2. PartEnerIC - Parteneriate pentru transfer de cunoștințe și tehnologie în vederea dezvoltării de circuite integrate specializate pentru creșterea eficienței energetice a noilor generații de vehicule, POC2014, Ctr.19 (2016-2022)

3. iDev4.0 - Integrated development 4.0 (Dezvoltare integrată 4.0), Program ECSEL Call H2020-ECSEL-2017-1-IA-TWO STAGE, contract nr. 783163-iDev40, POC 72/1/2, Componenta 1: RO-ECSEL - Crearea de sinergii cu acțiunile de CDI ale programului cadru ORIZONT 2020 al Uniunii Europene și alte programe CDI internaționale (2020-2021)

4. NAPOSIP – "New Approaches to Analyzing and Designing High Frequency Synthetisers Performance for Modern Communication Systems", PNIII 43 BG/2016 (2016-2018), https://naposip.utcluj.ro/node/1

5. "Automation of Split Lot Analysis based on AI methods", R&D Consultancy for industrial customer, 2024-2025

6. "Design of functional blocks for high-performance power management integrated circuits" and "High-performance integrated LDO regulators", R&D Contract for a Romanian IC design company, 2021-2024

7. A. -T. Grãjdeanu, C. Rãducan, M. Neag and I. -A. Ilie, "Linear Voltage Regulators with Gate-Driving Buffer for Automotive Applications," in IEEE Access, October 2024, doi: 10.1109/ACCESS.2024.3468882

8. A. Rusu, E. David, V. Grosu, M. Topa, A. Buzo, B. Carbunescu, G.Pelz, "On Multivariate Electrical Performance Machine Learning Driven Pre-Silicon IC Adaptive Verification" IEEE Access, vol. 12, pp. 136436-136450, 2024

9. R. Onet, M.Neag, A.Fazakas, P. Miresan, G. Petrasuc, I. Sularea, A.Battigelli, M. Murray, M. Hill – "A Blended On-Campus and At-Home Approach to Laboratories on Electronic Circuits", Romjist, Vol. 26, No. 2, 2023, pp.167–180

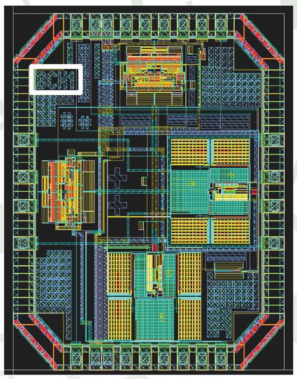
10. C. Răducan, M. Neag, "Slew-Rate Booster and Frequency Compensation Circuit for Automotive LDOs", IEEE Transactions on Circuits and Systems I: Regular Papers, vol. 69, no. 1, pp. 465-477, Jan. 2022

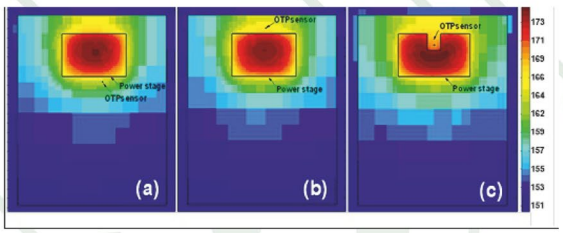
11. C. Răducan, M. Neag and A. -G. Băjenaru, "Automotive Switched-Capacitor DC-DC Converter With High BW Power Mirror and Dual Supply Driver," in IEEE Trans. Circuits and Systems I,vol. 69, no.1, pp. 452-464, Jan. 2022,

12. A.-T. Grăjdeanu, C. Răducan, C.-S. Pleșa, M. Neag, L. Vărzaru & M. Țopa, "Fast LDO Handles a Wide Range of Load Currents and Load Capacitors, up to 100 mA and over 1µF", IEEE Access, vol. 10, pp. 9124-9141, Jan.2022

13. C.-S. Pleșa, C. Răducan, A.-T. Grăjdeanu, O. Serpedin, M. Neag, "An Area-Efficient Automotive LDO with Scalable Maximum Load Current Exhibits Excellent Response to Line and Load Transients", AEU - International Journal of Electronics and Communications, Volume 149, May 2022, 154136, ISSN 1434-8411,

14. C. Răducan, M. Neag, A-T. Grăjdeanu, M. Țopa, A. Negoiță, – "A High-Precision Low-Temperature Drift LDO Regulator Tailored for Time-Domain Temperature Sensors", Sensors, vol 22, issue 4:1518, February 2022,





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Areas of expertise

Renewable Energy
- Develop new ways to improve energy harvesting and storing for microgrids.
Switched Mode Power Supplies (SMPS) and Power Electronics
- Study and develop of new topologies in the field of SMPS.
Digital Control
- Study and develop of new algorithms that can be used in the field of power supplies/grid tied inverters.
System Modelling and Simulations
- Develop models for the switched-mode power converters in order to improve simulation times.
Embedded Systems
- Develop systems with microcontrollers in C/C++ and assembly for different types of applications: low cost, time constrained, wireless, industrial and sensing.

Significant Activity and Results

1. HELIoS - “Hybrid Renewable Energy Microgrid with Low Operation Cost, Integrating Energy Management Methods Based on Solar Predictions“, PED706/2022, PN-III-P2—2.1-PED-2021-0544, https://helios-energy.utcluj.ro 2022-2024.

2. MULTIPASS - “Simultaneous elemental microanalytical method for environment and food control using passive sampling coupled with miniaturized instrumentation based on plasma microtorch optical emission spectrometry”, PED733/2022, PN-III-P2—2.1-PED-2021-0151, https://icia.ro/multipass/2022-2024.

3. MVDC-ERS - “Flexible medium voltage DC electric railway systems”, H2020-S2RJU-OC-2018, (2018-2021)

4 D. Petreus and T. Patarau, "Detailed Analysis of a Regenerative Active Clamping Snubber for a Phase-Shifted Converter," in IEEE Access, vol. 13, pp. 7223-7233, 2025, https://doi:10.1109/ACCESS.2025.3526210

5. Nicolae Alexandru Sarbu, Dorin Petreus, Eniko Szilagyi, Practical solutions for microgrid energy management: Integrating solar forecasting and correction algorithms, Energy Reports, Volume 12, 2024, Pages 4160-4174, ISSN 2352-4847, https://doi.org/10.1016.j.egyr.2024.10.005

6. J. Sora, I. Serban and D. Petreus, "Enhancing Microgrid Operation Through Electric Vehicle Integration: A Survey," in IEEE Access, vol. 12, pp. 64897-64912, 2024, https://doi.10.1109/ACCESS.2024.3397587.

7. Cirstea, M.; Benkrid, K.; Dinu, A.; Ghiriti, R.; Petreus, D. Digital Electronic System-on-Chip Design: Methodologies, Tools, Evolution, and Trends. Micromachines 2024, 15, 247. https://doi.org/10.3390/mi15020247

8. Eniko Szilagyi, Dorin Petreus, Marius Paulescu, Toma Patarau, Sergiu-Mihai Hategan, Nicolae Alexandru Sarbu, Cost-effective energy management of an islanded microgrid, Energy Reports, Volume 10, 2023, Pages 4516-4537, ISSN 2352-4847.

9. Petreus, D.; Patarau, T.; Szilagyi, E.; Cirstea, M. Electrical Vehicle Battery Charger Based on Smart Microgrid. Energies 2023, 16, 3853. https://doi.org/10.3390/en16093853

10. Ana-Maria Petri, Dorin Petreus, Adaptive Cruise Control in Electric Vehicles with Field-Oriented Control Appl. Sci. 12, 7094. https://doi.org/10.3390/app12147094, 2022.

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Areas of expertise

Radio network planning and performance evaluation for fixed, mobile and satellite systems: radio network planning (satellite, cellular, local, and sensors) and behavior analysis (QoS and QoE) using professional tools (QualNet, EXata, ICS Telecom EV/HTZ communications);
Electromagnetic waves propagation and radio channel characterization: radio channel modelling (Matlab), RF and microwave propagation, EM field modelling and simulation (AWR Microwave Office); ionospheric propagation monitoring;
Microwave antenna design and measurement: design using professional tools (AWR Microwave Office, HFSS) and measurement using professional equipment (R&S analyzers, MegiQ Radiation Measurement System)
Environmental monitoring: evaluation of electromagnetic pollution; sensor networks for pollution monitoring;
Industrial IoT: sensor networks for IIoT (redundancy, dual-standard, energy efficiency), modelling and analysis of IIoT
Software Defined Radio prototyping: RF spectrum monitoring, smart antenna arrays, direction finding and beamforming.

Significant Activity and Results

1. RoNaQCI, Infrastructura Națională de Comunicații Cuantice a României, 16EUD/2024, 2024-2025.

2. RoNaQCI, Romanian National Quantum Communication Infrastructure, DIGITAL-2021-QCI-01, 2023 – 2025.

3. SIMoRF, Intelligent System for RF spectrum monitoring, 05PSCD/2022, MApN, 2022-2025.

4. Codau, C., Buta, R.-C., Pastrav, A., Dolea, P., Palade, T., Puschita, E., “Experimental Evaluation of an SDR-Based UAV Localization System”, Sensors 2024, 24, 2789. https://doi.org/10.3390.s24092789.

5. Minteuan, G., Palade, T., Puschita, E., Dolea, P., Pastrav, A., “Monopulse Secondary Surveillance Radar Coverage—Determinant Factors”, Sensors 2021, 21, 4198. https://doi.org/10.3390/s21124198.

6. Padrah, Z.; Pastrav, A.; Palade, T.; Ratiu, O.; Puschita, E., “Development and Validation of an ISA100.11a Simulation Model for Accurate Industrial WSN Planning and Deployment”, Sensors 2021, 21, 3600. https://doi.org/10.3390/s21113600.

7. Domuta, I., Palade, T.P., Puschita, E., Pastrav, A., “Timestamp Estimation in P802.15.4z Amendment”, Sensors 2020, vol. 20(18), Article Number: 54225422. https://doi.org/10.3390/s20185422.

8. Murariu, T., Pastrav, A., Tripon, C., Morari, C., Puschita, E., and Zarbo, L., "A roadmap for building quantum key distribution devices," 2022 21st RoEduNet Conference: Networking in Education and Research (RoEduNet), Sovata, Romania, 2022, pp. 1-6, https://doi.org/10.1109/RoEduNet57163.2022.9921102.

9. Minteuan, G., Pastrav, A., Palade, T., "Monopulse Secondary Surveillance Radar – Environment Impact on Target Detection," 2022 International Workshop on Antenna Technology (iWAT), Dublin, Ireland, 2022, pp. 86-89. https://doi.org/10.1109/iWAT54881.2022.9811020

10. Dolea, P., Pastrav, A., Puschita, E., Palade, T., "Geomagnetic Storms Forecasting by VLF Radio Waves Monitoring", 2021 IEEE Conference on Antenna Measurements & Applications (CAMA), Antibes Juan-les-Pins, France, 2021, pp. 161-164, https://doi.org/10.1109/CAMA49227.2021.9703524

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Areas of expertise

Telecommunications Networks
Switching and routing; Computer networks; Internet protocols; Unified Communications in Cloud; Software-defined networking; Network security; Cyber-security; Quality of Service in Next-Generation Networks; IoT platforms; DevNet.

Significant Activity and Results

FRIEND-NOW "FutuRe telecommunication InfrastructurEs aND Next-generatiOn netWorks Education Program", Project ID 101128194, https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/projects-details/43353764/101125194/ERASMUS2027/

CLOUDUT "Cloud Cercetare UTCN", Contract No. 235/21.04.2020, POC, MySMIS ID:124493, https://cloudut.utcluj.ro/en/ (2020-2022)

1. G.R. Andreica, G.L. Tabacar, D. Zinca, I.A. Ivanciu and V. Dobrota, “Denial of Service Attack Prevention and Mitigation for Secure Access in IoT GPS-based Intelligent Transportation Systems”, Electronics 2024, 13(14), 2693; https://doi.org/10.3390/electronics13142693,WOS:001277655900001 (Q2 Journal).

2. R. Botez, A.T. Sferle, I.A. Ivanciu and V. Dobrota, “Work-in-Progress: KubeUT: A Cloud-Agnostic Kubernetes Management Platform”, Proceedings of the 11th International Black Sea Conference on Communications and Networking BlackSeaCom 2023, Istanbul, Turkiye, 2023, pp. 384-389, doi: 10.1109/BlackSeaCom58138.2023.10299745.

3. A.T. Costin, D. Zinca, and V. Dobrota, “A Real-Time Streaming System for Customized Network Traffic Capture”, Sensors 2023, 23(14), 6467; https://doi.org/10.3390/s23146467, WOS:001036373600001 (ISI Q2 Journal).

4. R. Botez, A.G. Pasca, A.T. Sferle, I.A. Ivanciu, and V. Dobrota, “Efficient Network Slicing with SDN and Heuristic Algorithm for Low Latency Services in 5G/B5G Networks”, Sensors 2023, 23(13), 6053; https://doi.org/10.3390/s23136053, WOS:001030144200001 (ISI Q2 Journal).

5. A.G. Mari, D. Zinca, and V. Dobrota, “Development of a Machine-Learning Intrusion Detection System and Testing of Its Performance Using a Generative Adversarial Networks”, Sensors 2023, 23(3), 1315; https://doi.org/10.3390/s23031315, WOS:000930773600001 (ISI Q2 Journal).

6. D. Deac, E. Teshome, R Van Glabbeek, V. Dobrota, A. Braeken, K. Steenhaut, “Traffic Aware Scheduler for Time-Slotted Channel-Hopping-Based IPv6 Wireless Sensor Networks”, Sensors 2022, 22(17), 6397; https://doi.org/10.3390/s22176397, WOS:000851975400001 (ISI Q2 Journal).

7. A.T. Costin, D. Zinca and V. Dobrota, “LAN traffic capture applications using the libtins library”, Electronics 2021, ISSN: 2079-9292, Special Issue: "Real-Time Systems, Cyber-Physical Systems and Applications", Electronics 2021, 10(24), 3084;

https://doi.org/10.3390/electronics10243084, WOS:000742426500001 (ISI Q3 Journal).

8. R. Botez, J. Costa-Requena, I.A. Ivanciu, V. Strautiu, V. Dobrota, “SDN-based Network Slicing Mechanism for a Scalable 4G/5G Core Network: A Kubernetes Approach”, Sensors 2021, 21(11), 3773; https://doi.org/10.3390/s21113773, ISSN: 1424-8220, WOS:000660676800001 (ISI Q1 Journal).

9. R. Botez, I.A. Ivanciu, C.M. Iurian, V. Dobrota, “Quantum Implementation of the Modified Dijkstra's Routing Algorithm”, Proceedings of the Romanian Academy - Series A, ISSN 1454-9069, Vol. 22, No. 41, January - March 2021, pp. 91-98, Romanian Academy Publishing House, WOS:000635594600011 (ISI Q2 Journal).

10. E. Teshome, D. Deac, S. Thielemans, M. Carlier, K. Steenhaut, A. Braeken, V. Dobrota, “Time Slotted Channel Hopping and ContikiMAC for IPv6 Multicast Enabled Wireless Sensor Networks”, Sensors 2021, 21(5), 1771; https://doi.org/10.3390/s21051771, ISSN: 1424-8220, WOS:000628863900001 (ISI Q1 Journal).

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Prof. Dr. Eng. Daniela Lucia Manea; Assoc. Prof. Dr. Eng. Claudiu Aciu; Assoc. Prof. Dr. Eng. Daniela-Roxana Tămaș-Gavrea; Assoc. Prof. Dr. Eng. Dana Adriana Iluțiu-Varvara; Assist. Prof. Dr. Eng. Elena Jumate; Assist. Prof. Dr. Eng. Florin Babota;
Assist. Prof. Dr. Eng. Luminița Monica Pleșa; Assist. Prof. Dr. Eng. Răzvan Andrei Iernuțan; Assist. Dr. Eng. Raluca Ștoan;
CSI Dr. Eng. Andreea Hegyi, CSII Dr. Eng. Adrian-Victor Lăzărescu, CSIII Dr. Eng. Tudor Toader; CSIII Dr. Eng. Brăduț Ionescu; Assist. Dr. Eng. Alexandra Olga Țiriac; Dr. Eng. Tunde-Orsolya Deneș; Dr. Eng. Adrian Siomin; Dr. Eng. Loredana Țințișan;
Dr. Eng. Marta-Ioana Moldoveanu, Dr. Eng. Roxana Rada, Dr. Ec. Maria Vălean. Phd Students: Eng. Iacob Florea; Eng. Cătălin Șaitiș; Eng. Dorin Isac; Eng. Sorin Ioan Lețiu, Eng. Paul Răzvan Costin.

Areas of expertise

Civil engineering
- materials chemistry;
- green building materials;
- sustainable development;
- quality control of building materials;
- recovery of industrial waste in construction materials;
- influence of construction materials on health and environment;
- “in situ” determination of mechanical strengths by non-destructive methods.

Significant Activity and Results

1. Aciu C., Roman C., Iluţiu – Varvara D.A., Puia C., Cadar O. (2016). Plastering Mortar with Antibacterial and Antifungal Properties. Romanian Journal of Materials, 46 (2):160 – 166.

2. Jumate E., Moldovan D., Manea D., Demco D., Fechete R. (2016). The Effects of Cellulose Ethers and Limestone Fillers in Portland Cement-Based Mortars by 1H NMR relaxometry. Applied Magnetic Resonance, 47: 1353-1373.

3. Mircea, C.; Toader, T.-P.; Hegyi, A.; Ionescu, B.-A.; Mircea, A. Early Age Sealing Capacity of Structural Mortar with Integral Crystalline Waterproofing Admixture. Materials 2021, 14, 4951.

4. C. Aciu, D. L. Manea, D. A. Iluțiu – Varvara (2021). “Study Regarding the Micro Filler Effect of Sludge Resulting from Steel Pickling”. Metals, vol. 11(2), pp. 361-372.

5. Iluțiu – Varvara D.A., Aciu C. (2022). “Metallurgical Wastes as Resources for Sustainability of the Steel Industry”. Sustainability, vol. 14(9), 5488.

6. Sava C., Iluţiu-Varvara D.A., Mare R., Roman M.D., S. Rada, Pică, L. Jäntschi, “Physico-chemical characterization and possible uses of sludge processed from an urban sewage treatment plant”. Heliyon, vol. 10(8), e29576, 2024.

7. Saitis C.; Manea D.L.; Moldovan, M.; Pleasa, L.M.; Borodi, G.; Petean, I.; Sorin, L. Recycled Aggregates Influence on the Mechanical Properties of Cement Lime-Based Mortars. Materials 2024, 17, 5122.

8. Ișstoan, R.; Tămaș-Gavrea, D.-R.; Dumitran, M.; Gavriș, O.G. Comparative, Cost and Multi-Criteria Analyses of Traditional Binders in the Composition of Hemp-Based Finishing Products. Materials 2025, 18, 452.

9. Plesa L., Manea D.L., Istoan R., (2022). Recycling plastic wastes in order to obtain new building materials, Journal, IOP Conference Series: Materials Science and Engineering, Volume 1251, Issue 1, Publisher IOP Publishing.

10. Ionescu, B.A.; Chira, M.; Vermeșan, H.; Hegyi, A.; Lăzărescu, A.-V.; Thalmaier, G.; Neamțu, B.V.; Gabor, T.; Sur, I.M. Influence of Fe2O3, MgO and Molarity of NaOH Solution on the Mechanical Properties of Fly Ash-Based Geopolymers. Materials 2022, 15, 6965


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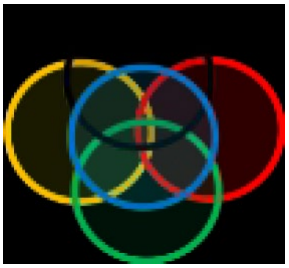
Director: Prof. Dr. Habil. Eng. Mat. Cosmin G. Chiorean



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Team

The CMASSGE research structure coordinated by **Prof. Cosmin G Chiorean**, affiliates all the full members of the Structural Mechanics Department and encloses five research groups coordinated by the representative researchers from Structural Mechanics Department (MECON): Advanced Nonlinear Analysis Models for Structures & Soils (Dr. Marius Buru); Stability and Structural Health Monitoring of Structures (Dr. Mihai Nedelcu); Advanced Multiphysics FEM Modeling & Artificial Intelligence (Dr. Marius Botos); Advanced Testing and Experimental Procedures for Structures (Dr. Ovidiu Prodan); Advanced FEM Modeling of Structures (Dr. Mircea Botez).

Areas of expertise

Domain: Civil Engineering-Structural and Geotechnical Engineering

Computational and experimental techniques for advanced nonlinear structural analysis, addressing limit states, stability, progressive collapse, seismic performance (push-over analysis), and wind-induced effects. It includes FEM-based simulations of composite materials under extreme loads such as ballistic impact and explosions, as well as the design and behavior of steel-concrete composite structures and the application of FEM to geotechnical and multiphysics problems. Additionally, advanced CFD models are employed to investigate radon accumulation mechanisms and develop mitigation strategies. The stability of thin-walled members is analyzed using the Generalized Beam Theory, complemented by Machine Learning algorithms trained on experimental and numerical FE data to enhance predictive accuracy.

Significant Activity and Results

1. Smart Systems for Public Safety through Control and Mitigation of Residential Radon linked with Energy Efficiency Optimization of Buildings in Romanian Major Urban Agglomerations" Code: SMART-RAD-EN:2017-2020-A1-A1; POC-A1-A1.1.4-E-2015

(http://www.smartradon.eo/), 2017-2021.

2. Chiorean C.G., "Computational issues in biaxial bending capacity assessment of RC and composite cross-sections exposed to fire", COMPUTERS & STRUCTURES (ELSEVIER), 302, 2024.

3. Bud M., Nedelcu, M., Moldovan, I., Figueiredo, E., Hybrid Approach for Supervised Machine Learning Algorithms to Identify Damage in Bridges, JOURNAL of BRIDGE ENGINEERING (ASCE), 29, 2024.

4. Le-Van Binh, Chiorean C.G., Kim S.E., Ngo-Huu C., Nonlinear Inelastic Analysis of Space Semi-Rigid Steel Frames Subjected to Static Load Using Plastic-Zone Method, MECHANICS OF ADVANCED MATERIALS AND STRUCTURES, (TAYLOR & FRANCIS), 31, 2024.

5. Nedelcu, M., "New unified family of GBT deformation modes for the analysis of thin-walled cylinders", THIN-WALLED STRUCTURES (ELSEVIER), 183, 2023.

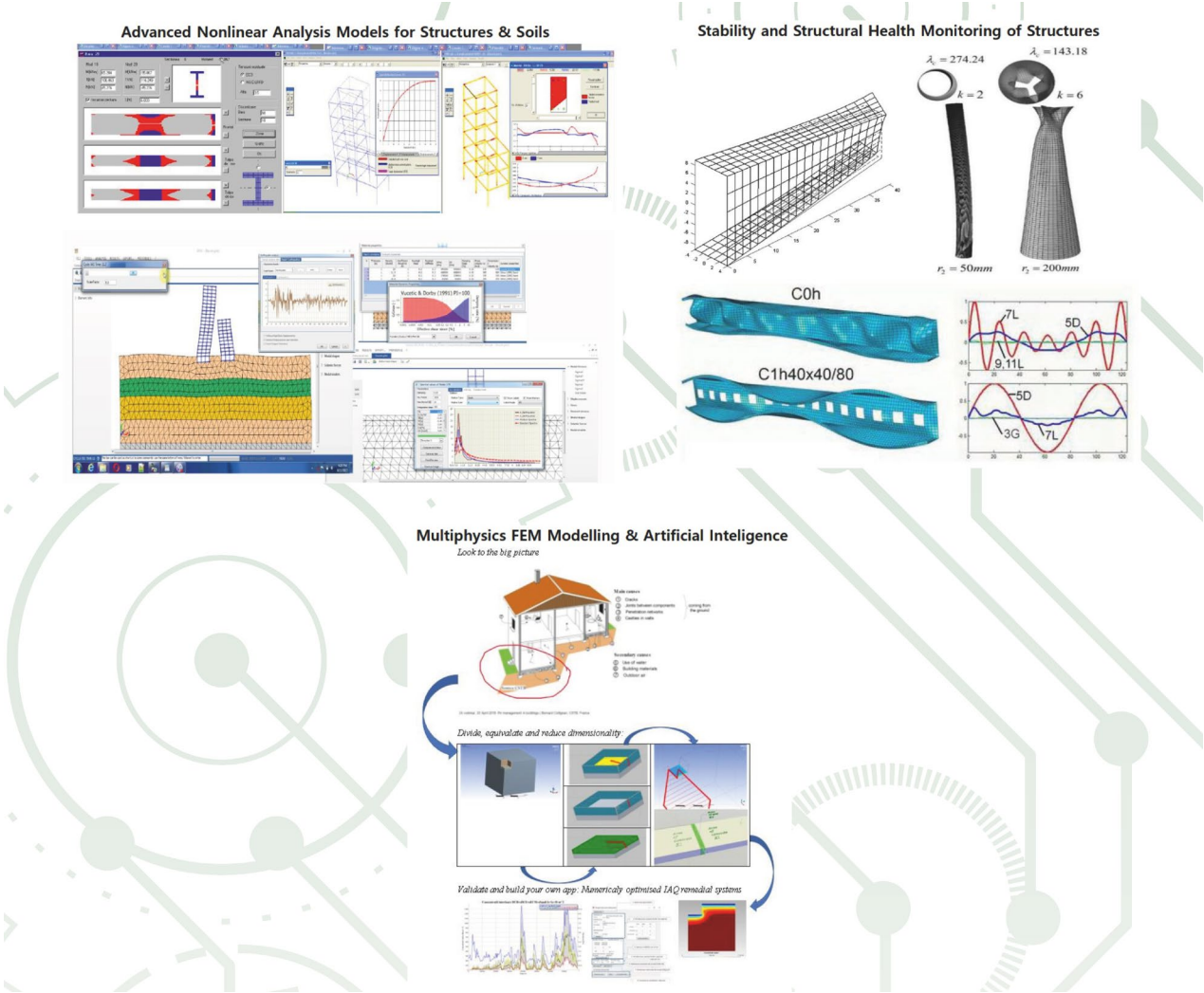
6. Nedelcu, M., First-order and linear buckling analysis of thin-walled cylinders using new GBT deformation modes, THIN-WALLED STRUCTURES (ELSEVIER), 189, 2023.

7. Dicu, T., Cucos, A., Botos, M. et al., Exploring statistical and machine learning techniques to identify factors influencing indoor radon concentration, SCIENCE OF THE TOTAL ENVIRONMENT (ELSEVIER), 905, 2023.

8. Dicu, T., Burghele, B.D., Botos, M., Cucos, A, et.al., "A new approach to random temporal correction factor based on active environmental monitoring devices", SCIENTIFIC REPORTS (NATURE), 11, 2021

9. Chiorean, C.G., D. Passera, R. Ferrari, E. Rizzi, "An implementation for 2nd-order M-N couplingand geometric stiffness adaptation in tapered beam-column elements", ENGINEERING STRUCTURES (ELSEVIER), 225, 2020.

10. GFAS & RSL2D – A Finite Element System for Geotechnical Applications; NEFCAD & ASEP – Advanced Nonlinear Inelastic Analysis System for Seismic Performance Evaluation of Structures (Software developed).



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Areas of expertise

Heating ventilation and air conditioning (HVAC): Thermal analysis on heating and cooling units; Air distribution in ventilation systems;
Systems for providing indoor air quality; HVAC systems for passive houses, near zero energy buildings (nZEB) and Positive Energy Building (PEB).
Indoor Environmental Quality: Indoor Air Quality (IAQ) air cleanness, indoor air movement; Thermal comfort, indoor environmental parameters, outdoor-indoor heat exchange; Lighting quality; Acoustics; finite element thermal analysis.
Energy efficient building systems: air to air heat recovery; ground to air and water to air heat exchangers; heat pumps.
Renewable energies: Photovoltaic (PV) panels with crystalline and amorphous layers; Vacuum tube and thermal solar collector; geothermal energy sources; wind turbines.
Thermal storage: Latent heat thermal energy storage; phase change materials; cold storage for free cooling; thermal storage in hot and cold-water tanks. Life Cycle Assessment (LCA), Carbon Footprint analysis.

Significant Activity and Results

1. Educational campuses as drivers for Positive Energy Districts - EDUPED, COFUND-DUT-EDUPED-1, contract no. 115/2025, 2025 – 2027;

2. Building skylight with integrated PCM cooling and BIPVT system, PN-IV-P7-7.1-PED-2024-2264, 2024-2026;

3. Clădiri pOzitiv eNergetic în EduCaTie - CONECT, GNaC ARUT 2023, Contract nr. 22/01.07.2024, 2024-2025;

4. Influenta anvelopei vitrate PV cu racire prin PCM asupra sistemelor de climatizare ale cladirilor, GNaC ARUT 2023, Contract Nr. 21/01-07-2024;

5. BIM enabled Digital Twins" - BIM2in, KA220-HED, ID 2024-1-RO01-KA220-HED-000249147, 2024-2027;

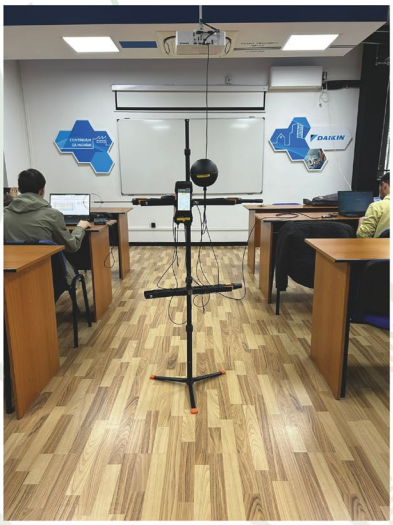
6. Rus, Tania, Moldovan, Raluca Paula, & Pardo Picazo, Miguel Ángel, LCA analysis of a roof mounted PV system: A Romanian case study. Frontiers in Environmental Science, 2024. 12, 1413629, IF 4.6;

7. Răzvan Calotă, Octavian Pop, Florin Bode, Cristiana Croitoru, Andrada Serafim, Alina Bărbulescu, Celina Damian and Lucia Tefas, A Novel Concept of Nano-Enhanced Phase Change Material, Materials 2024, 17(17), 4268, IF 3.1;

8. Sava, C., Iluţiu-Varvara, D. A., Mare, R., Roman, M. D., Rada, S., Pică, E. M., & Jäntschi, L. (2024). Physico-chemical characterization and possible uses of sludge processed from an urban sewage treatment plant. Heliyon, 10(8) IF 3.4.

9. Milon, A. G., Dragoş, C. M., Vereş, V. A., Baciu, L., & Mare, R. (2024). Sports and clean environment: Key drivers of health and longevity in the European Union. Amfiteatru Economic, 26(67), 975-990.

10.Albu Horaţiu, Beu Dorin, Rus Tania, Moldovan Raluca, Domniţa Florin, Vilcekova Silvia - Life cycle assessment of LED luminaire and impact on lighting installation - A case study; Alexandria Engineering Journal; Elsevier, vol. 80; pp. 282-293; DOI: 10.1016/j.aej.2023.08.068; ISSN: 1110-0168; WOS; IF 6,8/ 2023;



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Areas of expertise

The centre primarily focuses on Digital Production, Design, Development and Simulation, covering the following key areas:

• **CAD/CAM/CAE** – The research center is the first Dassault Systèmes academic partner in Romania, providing cutting-edge solutions in computer-aided design (CAD), product modeling, computer-aided engineering (CAE) and manufacturing system simulation. It serves as a hub for innovation, education, and industry collaboration, offering expertise in virtual prototyping, digital twin technology, and process optimization. The centre provides product lifecycle management (PLM), finite element analysis (FEA), and manufacturing process simulation.

• **Reverse engineering and digitization** – drive innovation across multiple fields, transforming physical objects into precise digital models, using 3D scanners that employ a wide range of technologies (laser, structured light and terrestrial 3D scanners) for workpieces ranging from small to medium and big. Applications include product development for prototyping and manufacturing, digital archaeology for artifact preservation and reconstruction, and medical prosthetics for custom implants. They also support automotive and aerospace part replication, biomechanics for ergonomic design, and entertainment for realistic digital assets. These technologies enhance precision, efficiency, and creativity across diverse industries.

• **3D high-precision measurements** – the research center is well equipped with multiple fixed and mobile CMM machines, that can be deployed for a wide range of services, depending on the requirements of the measured workpieces (dimensions, precision requirements and data collection speed).

• **Extended reality** – complex computer-generated 3D environments in VR, AR, and MR enable users to access and interact with an alternative reality. These environments allow for immersive interaction with 3D models at a 1:1 scale providing an in-depth overview of complex assemblies. Users can conduct virtual inspections, disassemble parts into individual components for measurement and analysis, and evaluate ergonomics, all within an interactive and spatially aware digital workspace.

Significant Activity and Results

1. RESTORY - HORIZON-CL2-2023-HERITAGE-01-04 (2024-2026) - Recovering Past Stories for the Future: A Synergistic Approach to Textual and Oral Heritage of Small Communities

2. AtOP - PN-III-P1-1.1-TE-2021 (2021-2023) - Mass digitization of cultural heritage: between myth and reality. Evaluating the accuracy of 3D models generated using the photogrammetry method in the case of cultural Heritage

3. HOPE - PN-III-P2-2.1 PED-2019-5430 (2021-2023) - “Intelligent Hospital Bed”

4. VART - PN-III-P1-1.1-PD-2019-1246 (2021-2023) - “Scientific investigation and promotion of the ornamental Dacian parade shields using virtual / augmented reality techniques”

5. RO-CULTURA CALL01-16 (2021-2023) “Horea's Church – a heritage for the future. Valorization of an 18th century architectural monument through virtual reality”

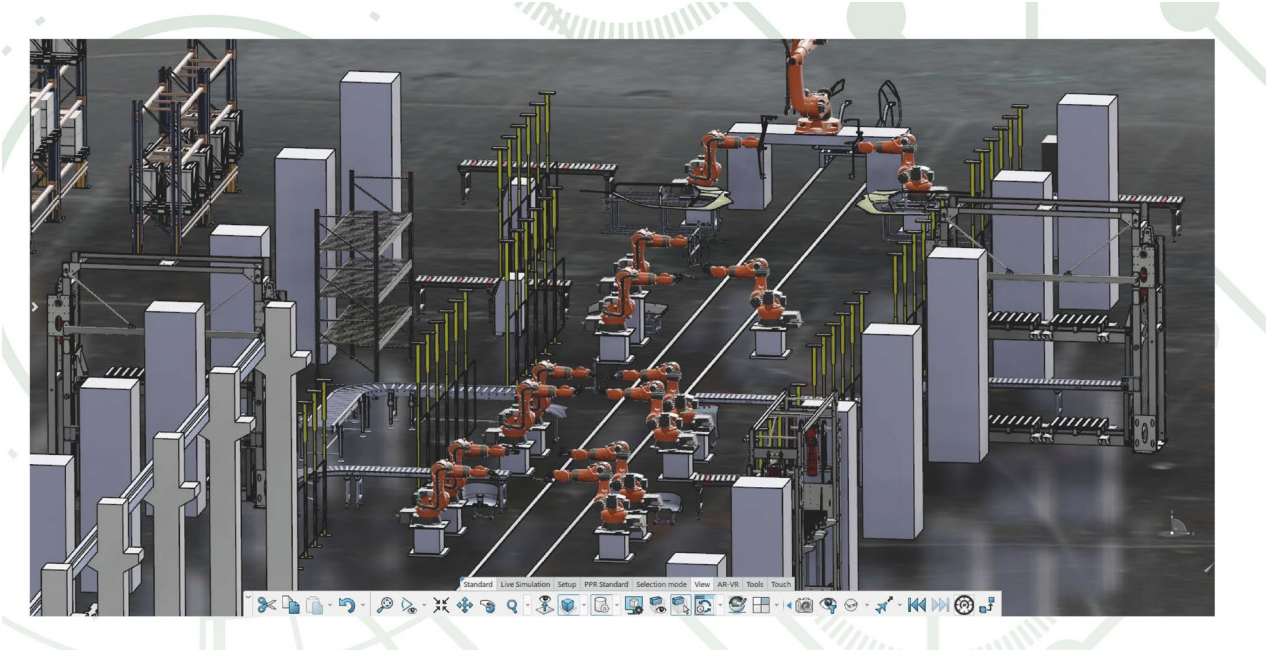
6. Neamțu, C., Comes, R., Popovici, D. M., Băutu, E., Liliana, M. S., Syrotnik, A., & Popovici, M. I. (2024). Evaluating User Experience in the Context of Cultural Heritage Dissemination Using Extended Reality: A Case Study of the Dacian Bronze Matrix with Hollow Design. ACM Journal on Computing and Cultural Heritage, 17(2), 1-21.

7. Popescu, D., Dragomir, M., Popescu, S., & Dragomir, D. (2022). Building better digital twins for production systems by incorporating environmental related functions—literature analysis and determining alternatives. Applied Sciences, 12(17), 8657.

8. Comes, R., Neamțu, C. G. D., Grec, C., Buna, Z. L., Găzdac, C., & Mateescu-Suciu, L. (2022). Digital Reconstruction of Fragmented Cultural Heritage Assets: The Case Study of the Dacian Embossed Disk from Piatra Roșie. Applied Sciences, 12(16), 8131.

9. Kęsik, J., Żyła, K., Montusiewicz, J., Miłosz, M., Neamtu, C., & Juszczyk, M. (2022). A methodical approach to 3d scanning of heritage objects being under continuous display. Applied Sciences, 13(1), 441.

10. Popovici, D. M., Iordache, D., Comes, R., Neamțu, C. G. D., & Băutu, E. (2022). Interactive exploration of virtual heritage by means of natural gestures. Applied Sciences, 12(9), 4452.



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Doctoral researchers: Andrei Caprariu; Alexandru Pusca; Gabriela Rus; Alin Horsia; Nagy Jefte; Bianca Baldean; Gabriel Todea; Ionut Zima; Dragos Sebeni; Vasile Bulbucan; Andrei Cailean.
Master students: Daniel Horvath; Vasile Popovici.

Areas of expertise

Innovative development of intelligent robotic systems with complex structures, focused on parallel architectures.
Intelligent medical robots: development of application based intelligent robotic systems and instrumentation for minimally invasive surgery, targeted diagnosis and treatment of cancer tumors, rehabilitation of patients with neuromotor deficiencies.
Advanced adaptive control solutions, including tele-robotics.
Virtual and augmented reality and development of algorithms based on Artificial Intelligence solutions.
Modeling and Simulation technologies of complex systems.

Significant Activity and Results

Relevant research project:

1. ATHENA, "New smart and adaptive robotics solutions for personalized minimally invasive surgery in cancer treatment", PNRR-2023, Code CF 116/15.11.2022, (2023-2026).

2. ASKLEPIOS, "New frontiers in adaptive modular robotics for patient - centered medical rehabilitation" , PNRR-2023, Code CF 121/15.11.2022, (2023-2026).

3. APOLLO, "Intelligent telerobotic systems for the personalised treatment of neuromotor deficit to increase the patients quality of life" , PTI-2022 (Technologic Transfer), MySMIS code 155988, (2023).

4. MAN-X, "Exoskeleton structure for human augmentation" , 1-PSCD/2022, (2022-2025).

5. CHALLENGE, "New frontiers in robotic assisted single port surgery: a novel robotic system with dexterous instruments", Code PN-III-P4-ID-PCE-2020-0572-PCE-171, (2021-2023).

Relevant publications:

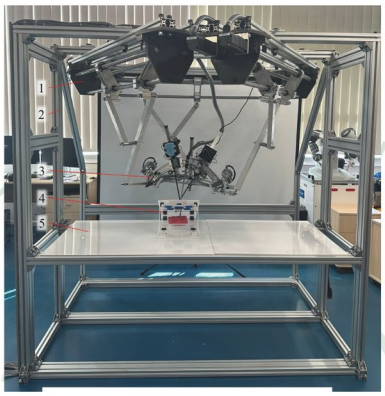
6. Pisla, D.; Popa, C.; Pusca, A.; Ciocan, A.; Gherman, B. (corresponding author) ; Mois, E.; Cailean, A.-D.; Vaida, C.; Radu, C.;Chablat,D.,On the Control and Validation of the PARA-SILSROB Surgical Parallel Robot. Appl. Sci., 14, 7925, 2024, (IF: 2.5).

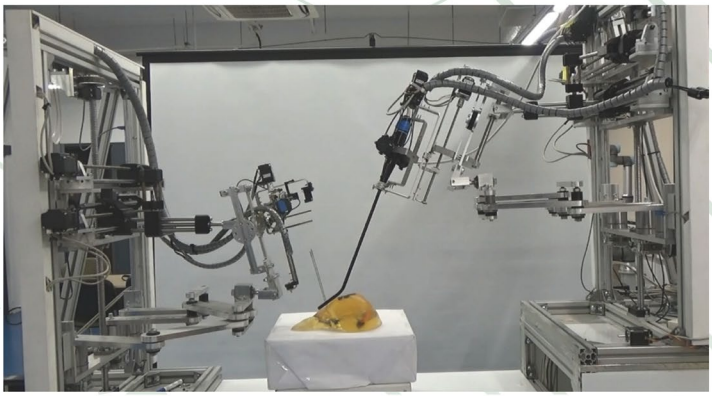
7. Pisla, D.; Bulbucan, V.; Hedesiu, M.; Vaida, C.; Zima, I.; Mocan, R.; Tucan, P.; Dinu, C.; Pisla, D. (corresponding author); TEAM Project Group. A Vision-Guided Robotic System for Safe Dental Implant Surgery.J. Clin. Med., 13, 6326, 2024, (IF: 3).

8. Vaida, C.; Rus, G.; Tucan, P.; Machado, J.; Pisla, A.; Zima, I.; Birlescu, I.; Pisla, D (corresponding author). Enhancing Robotic-Assisted Lower Limb Rehabilitation Using Augmented Reality and Serious Gaming. Appl. Sci. 2024; 14(24):12029, (IF: 2.5).

9. Birlescu, I.; Tohanean, N.; Vaida, C.; Gherman, B.; Neguran, D.; Horsia, A.; Tucan, P.; Condurache, D.; Pisla, D. (corresponding author);. Modeling and analysis of a parallel robotic system for lower limb rehabilitation with predefined operational workspace. Mechanism and Machine Theory, 198, 105674, 2024, (IF: 4.5).

10.Pisla, D.; Crisan, N.; Gherman, B. (corresponding author); Andras, I.; Tucan, P.; Radu, C.; Pusca, A.; Vaida, C.; Al Hajjar N. Safety Issues in the Development of an Innovative Medical Parallel Robot Used in Renal Single-Incision Laparoscopic Surgery. Journal of Clinical Medicine. 2023; 12(14):4617, (IF: 3).





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Team

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Areas of expertise

The main areas of our scientific interest and activity are:
Modelling of the material behavior; Formability of metallic materials; Simulation of the sheet and tube metal forming processes; Virtual fabrication in metal forming

Significant Activity and Results

Relevant research project:

1. Analysis of formability and mechanical behavior of metallic materials – research contract with FONTANA Pietro SPA Italy (2019-2024)

2. Banabic D., Barlat F., Cazacu O., Kuwabara T., Advances in Anisotropy of Plastic Behaviour and Formability of Sheet Metals, International Journal of Materials Forming, 13(2020), 749-787.

3. Banabic D., Kami A., Comsa D.S., Eyckens P., Developments of the Marciniak-Kuczynski Model for Sheet Metal Formability: a Review, Journal of Materials Processing Technology, 287(2021) 116446.

4. Da-Yong Chen, Yong Xu, Shi-Hong Zhang, Yan Ma, Ali Abd El-Aty, Dorel Banabic, Artur I. Pokrovsky, Alina A. Bakinovskaya, A novel method to evaluate high strain rate formability of sheet metals under impact hydroforming, Journal of Materials Processing Technology, 287(2021), 116553.

5. Lucasz Madej, Dorel Banabic, Professor Zdzisław Marciniak—A life dedicated to metal forming, Journal of Materials Processing Technology, 287(2021), 1168762.

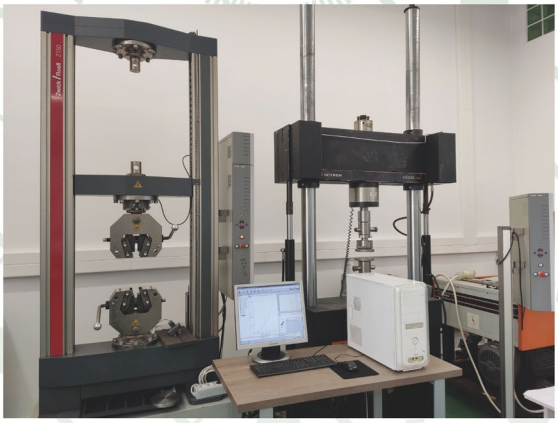
6. W Jiang, W Xie, H.W. Song, L. Lazarescu, S.H. Zhang, D. Banabic, A modified thin-wall tube push-bending process with polyurethane mandrel, International Journal of Advanced Manufacturing Technology, 106(2021), 2509–2521

7. W. Chen, H.W. Song, L. Lazarescu, Y. Xu, S.H. Zhang, D. Banabic, Formability analysis of hot-rolled dual-phase steel during the multistage stamping process of wheel disc, International Journal of Advanced Manufacturing Technology, 110(2020)1563–1573.

8.J ohan Pilthammar, Dorel Banabic, Mats Sigvant, BBC05 with Non-Integer Exponent and Ambiguities in Nakajima Yield Surface Calibration, International Journal of Materials Forming, 14(2021), 577-593.

9. H.-W Song, W. Xie, S-H. Zhang, W. Jiang, L. Lazarescu, D. Banabic, Granular media filler assisted push bending method of thin-walled tubes, International Journal of Mechanical Sciences, 198(2021) 106365.

10. W. Xie, W. Jiang, Y. Wu, H. Song, S. Deng, L. Lăzărescu, S.H. Zhang, D. Banabic, Process parameter optimization for thin-walled tube push-bending using response surface methodology, International Journal of Advanced Manufacturing Technology, 118(2022),3833 – 3847, 10.1007/s00170-021-08196-8



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Team

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Senior Lect. Cosmin Cosma, Assoc. Prof. Adrian Trif, Assoc. Prof. Vlad Bocăneţ.

Areas of expertise

3D Printing (SLM - Selective Laser Melting; SLS - Selective Laser Sintering; FDM - Fused Deposition Modelling); Production Engineering (Innovative manufacturing for product development); Rapid Tooling (Investment Casting, Silicone Rubber Molding, Metal Spray Tooling); Medical Applications of AM (Prototypes, Customized Implants, New biocompatible materials); Industrial Engineering (Laser Beam Machining, Water Jet Cutting, Electrical Discharge Machining); CAD/CAM/CAE (Applied Industrial design for products and technologies); Concurrent engineering (Methodologies and software tools in Design for Manufacture and Assembly-DFMA); Composite Materials (Manufacturing composite materials, reinforced with carbon/glass fibber).

Significant Activity and Results

Relevant research project:

1. ESA Contract Nr. 4000138822/22/NL/AR/ces (European Space Agency), „Application Assessment of Additive Manufacturing Capabilities for AlSi10Mg Preliminary Development of Process Parameter (AlAMa)", Period: 05.09.2023-05.01.2024, Director: Prof. N. Bâlc

2. H2020 – DiCoMI, „Directional Composites through Manufacturing Innovation", 2018–2023, TUCN Leader: Prof. N. Balc, http://www.dicomi.eu;

3. PP H2020, Contract 71/2022: "Fabricaţia inovativă a compozitelor prin tipărire 3D", 2022-2023, Director Prof. N. Bâlc

4. H2020 – AMaTUC, „Boosting the scientific excellence and innovation capacity in additive manufacturing of the TUC-N", 2016–2018, Coordinator: Prof. N. Balc. www.amatuc.com;

5. Erasmus+ KA2 – DigiMan, „Digital Manufacturing Master Degree to set specialists for the dawn of the Industry 4.0", 2019 – 2022, TUCN Leader: Prof.N. Balc, https://www.digimanproject.eu;

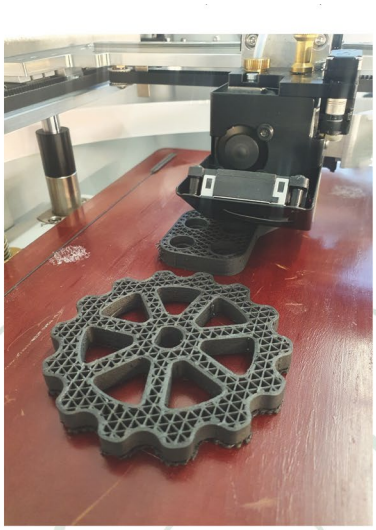
6. Eichler, F; Balc, N; Bremen, S; Nink, P; „ Investigation of Laser Powder Bed Fusion Parameters with Respect to Their Influence on the Thermal Conductivity of 316L Samples", JOURNAL OF MANUFACTURING AND MATERIALS PROCESSING, Volume 8, Issue 4, 2024, DOI10.3390/jmmp8040166 (FI: 3,3);

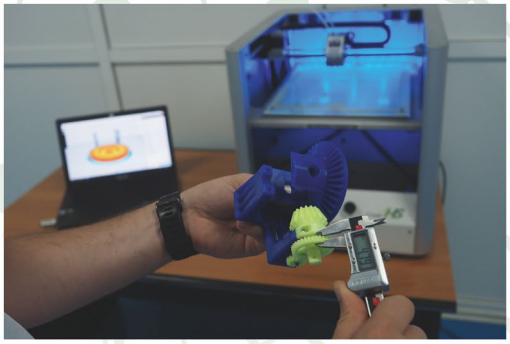
7. Popan, IA; Bocnet, V; Softic, S.; Popan, AI; Panc, N; Balc, N, „Artificial Intelligence Model Used for Optimizing Abrasive Water Jet Machining Parameters to Minimize Delamination in Carbon Fiber-Reinforced Polymer", APPLIED SCIENCES-BASEL, Volume 14, Issue 18, 2024, DOI10.3390/app14188512 (FI: 2.5);

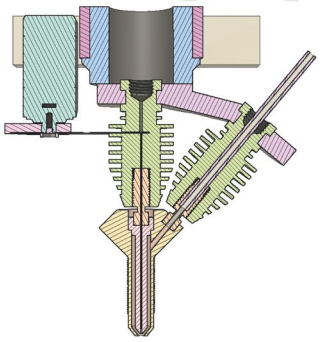
8. Rusu, M; Balc, N, Moldovan, M, Cuc, S, Petean, I, Cosma, C, Leordean, D, „Recycled PET Composites Reinforced with Stainless Steel Lattice Structures Made by AM", POLYMERS, Volume 15, Issue 23, 2023, DOI10.3390/polym15234591 (Q1, FI: 5)

9. Abbas, K, Hedwig, L, Balc, N, Bremen, S, „Advanced FFF of PEEK: Infill Strategies and Material Characteristics for Rapid Tooling", POLYMERS, Volume 15, Issue 21, 2023, DOI 10.3390/polym15214293 (Q1, FI: 5)

10.Birlescu, A, Balc, N, „Computational Model for Tree-like Fractals Used as Internal Structures for AM Parts", APPLIED SCIENCES-BASEL, Volume 13, Issue 20, 2023, DOI10.3390/app132011187 (FI: 2.7)







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Areas of expertise

Clean technologies, waste recovery, recycling materials, ecological reconstruction, sustainable development, new materials, sustainable energy, structural modelling, risk assessment, impact studies, monitoring systems, landscape reconstruction, soil treatment and decontamination.

Significant Activity and Results

Relevant research project:

1."Ecological method for recyclable wastes valorization", 2020, Transfer tehnologic la Fibrex.

2. Urian A.M., Ilies N.M., Nemes O.*, Nagy A.C., Clayey Soil Improvement with Polyethylene Terephthalate (PET) Waste, APPLIED SCIENCES-BASEL, 2023, Vol.13, Issue21

3. Moldovan A., Cuc S., Prodan D., Rusu M., Popa D., Taut A.C., Petean I., Bombos D., Dukeh R., Nemes O*., Development and Characterization of Polylactic Acid (PLA)-Based Nanocomposites Used for Food Packaging, POLYMERS, 2023, Vol. 15, Issue 13,

4. Tiuc A.-E*., Borlea S.I., Nemeș O.*, Vermeșan H.*, Vasile O., Popa F., Pinți R., New Composite Materials Made from Rigid/Flexible Polyurethane Foams with Fir Sawdust: Acoustic and Thermal Behavior, POLYMERS, 2022, Vol. 14, Issue 17

5. Borlea (Muresan) I.S., Tiuc A.E.*, Nemeş, O.*, Vermesan, H., Vasile, O., Innovative Use of Sheep Wool for Obtaining Materials with Improved Sound-Absorbing Properties, MATERIALS, 2020, 13, 3, 694

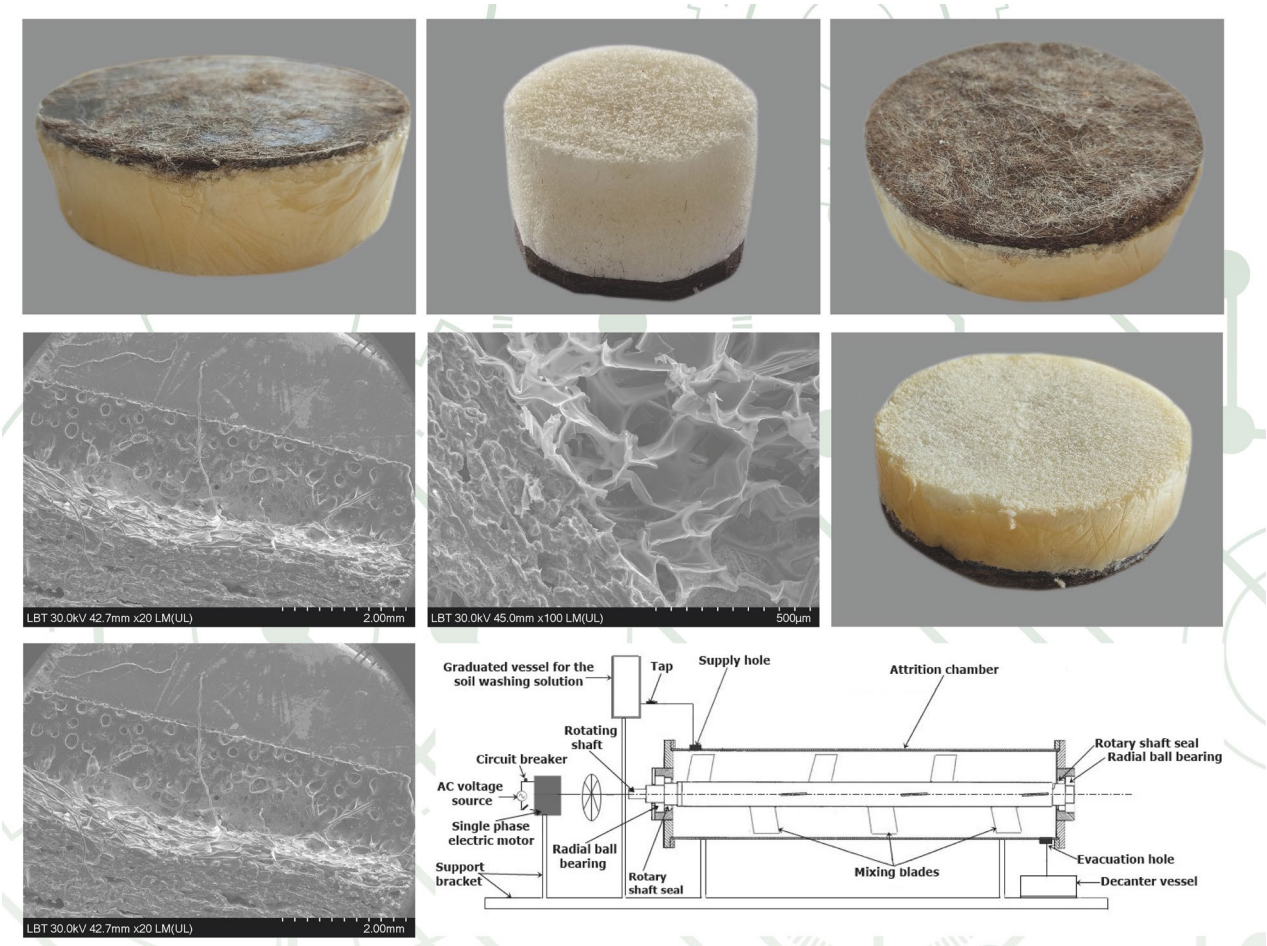
6. Sur, I.M.; Hegyi, A.; Micle, V.; Gabor, T.; Lăzărescu, A.-V, Influence of the Extraction Solution on the Removal of Heavy Metals from Polluted Soils. Materials 2023, 16, 6189.

7. Ioana Monica Sur, Ana Moldovan, Valer Micle, Evelyn Terez Polyak, Assessment of Surface Water Quality in the Baia Mare Area, Romania, Water 2022, 14, 3118.

8. Smical, I.; Muntean, A.; Micle, V.; Sur, I.M., The Influence of Spent Portable Battery Waste on the Aquatic Environment, Appl. Sci. 2023, 13, 11658.

9. Material with sound-absorbing properties using sheep wool and rigid two-component polyurethane foam as raw materials, has main portion which is meant to be used in field of civil and industrial constructions to reduce global noise level and ensure adequate acoustics in closed spaces, Patent Number(s): RO136050(A0,A3), RO136050(B1), 2024, Authors: NEMES O; TIUC A E; MURESAN I S; DEAK G

10. Biological method for extraction of hydrocarbons polluted solutions, involves sorting and homogenizing specific quantity of clay-polluted soil with hydrocarbons with initial concentration on concrete platforms, Patent Number(s): RO132554(A0), RO132554(B1), 2023, Authors: MICLE V; SUR I; MITREA M



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Team

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Areas of expertise

Nanocrystalline/nanocomposite magnetic powders produced by mechanical alloying/milling, production of bonded magnets, sintered magnetic materials (soft and hard), obtaining of nanocrystalline compacts (composite and sintered – SPS), fibers based SMC obtained by cold sintering, consulting in magnetic materials, materials characterization, structural, morphological and thermal analysis (X-ray diffraction, SEM + EDX, DTA, DSC+TG).

Significant Activity and Results

Relevant research project:

1.“Multiferroic functional materials for energy conversion obtained by nonconventional methods” 21PCE /2025

2.“Balance between magnetic properties and electrical properties in soft magnetic composites powders and sintered compacts”, PN-III-P4-ID-PCE-2020-2264/PCE128/2021, https://neamtubogdan.wixsite.com/magelectsmc

3.“Cold sintered soft magnetic composites based on amorphous ferromagnetic fibres”, PN-III-P4-ID-PCE-2020-0175/PCE 32/2021, https://neamtubogdan.wixsite.com/cs-fsmc

4.“Alloy/oxide type composite magnetic cores for energy efficient applications in electromagnetic devices”, PN-III-P2-2.1-PED-2019-3763, https://traianmarinca.wixsite.com/300ped

5.“Fibers based soft magnetic composites prepared by cold pressing and spark plasma sintering”, PN-III-P1-1.1-TE-2016-0649 (2018-2020), https://neamtubogdan.wixsite.com/fsmc

6.B.V. Neamţu, M. Năsui, G. Cupa, E. Ware, F. Popa, T.F. Marinca, I. Chicinaş, Effects of adding carbonyl Fe or Mn-Zn ferrite powders to fibre-based soft magnetic composites prepared via hybrid cold sintering/spark plasma sintering, Journal of Materials Research and Technology 28 (2024) 2969–2979. Q1 ranked

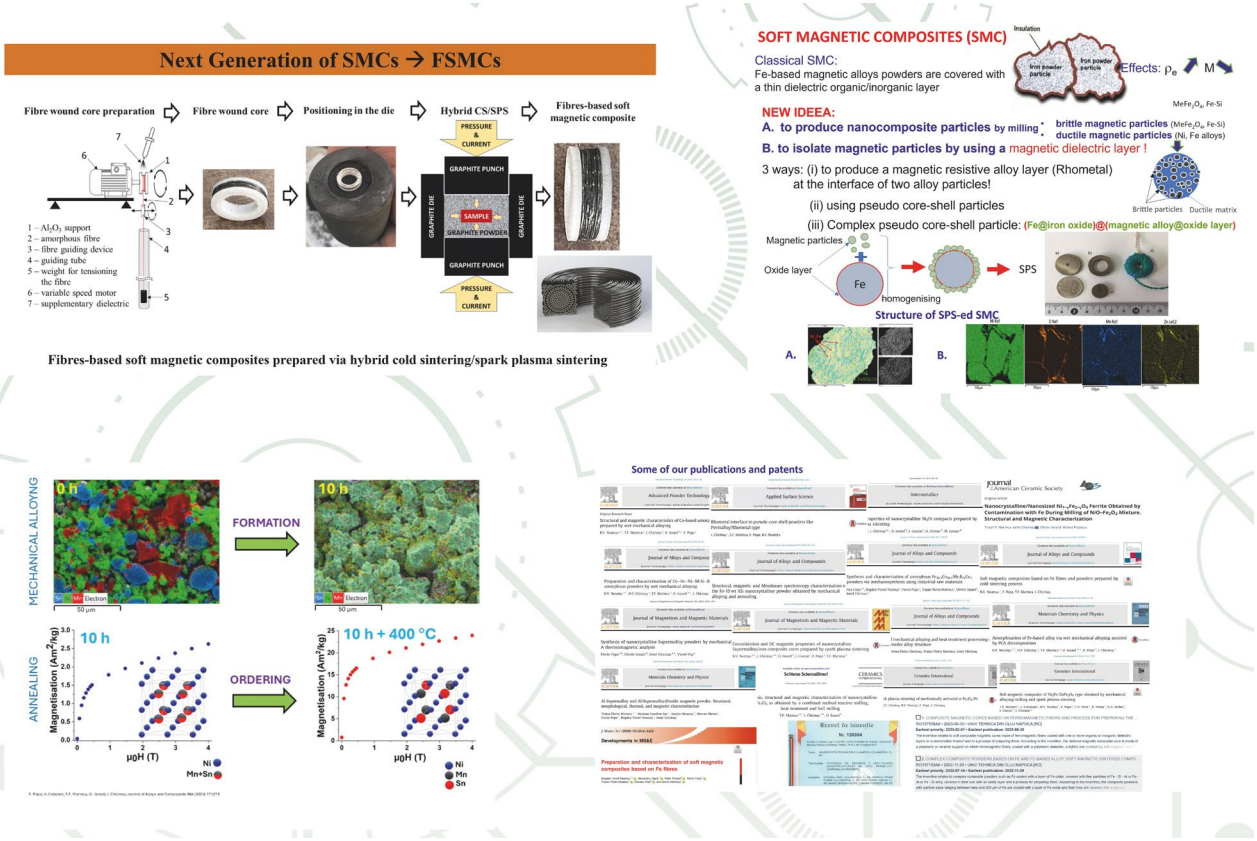
7.B.V. Neamţu, M. Năsui, G. Stoian, F. Popa, T.F. Marinca, P. Bere, N. Lupu, I. Chicinaş,Influence of coating process on the magnetic properties of cold-sintered CoFeSiB@BaTiO3 fibres based soft magnetic composites, Ceramics International 49 (2023) 40914, Q1 ranked

8.T.F. Marinca, L. Cotojman, B.V. Neamțu, F. Popa, C.V. Prică, R. Hirian, N.A. Sechel, I. Ciascai, I. Chicinaș,

Soft magnetic composite of Ni3Fe/ZnFe2O4 type obtained by mechanical alloying/milling and spark plasma sintering, Ceramics International, 50 (2024)7547- 7557

9.F. Popa, T.F. Marinca, B.V. Neamțu, I. Chicinaș, Ni3Fe/Cr nanocrystalline soft magnetic composite compacts obtained by mechanical milling and spark plasma sintering, Journal of Magnetism and Magnetic Materials, 592 (2024) 171800

10.V. Cebotari, F. Popa, T.F. Marinca, B.V. Neamţu, N.A. Sechel, M. Galatanu, A. Galatanu, I. Chicinaș, Obtaining and characterisation of thermoelectric Mg2Si compound via wet and dry mechanical alloying and spark plasma sintering, Journal of Materials Research and Technology 26 (2023) 8904-8914. Q1 ranked



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Team

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Areas of expertise

Engine testing
In the TestEcoCel Laboratory a series of functional, reliability and dynamic analysis can be performed on internal combustion engines designed for vehicles, powered by conventional fuel and also non conventional fuels.
Testing the quality of fuels on engines
An analysis of the physical and chemical properties of fuels used in internal combustion engines can be made, and also the evaluation of pollutant emissions generated in the burn process.
Optical analysis of the combustion
Using an endoscopic camera and the transparent components of the single cylinder research engine inside the Laboratory, some tests regarding the characteristic phenomenon of the combustion process can be made, based on the particularities of the burning flame generated by the different fuels used to powered the internal combustion engine.
Hardware in the loop testing
Using the engine mounted on the testbed, and a virtual environment, the team can implement different driving techniques, roads, manoeuvres, vehicles and the real system (engine) can be compared to a simulation version and validate its functionality.
Also acceleration tests can be implemented.
Fuel cell testing
The fuel cell is mounted in laboratory, supplied with hydrogen and tested on a virtual road with a virtual driver, but the transmission is real and connected to the dynamometer to provide the load.

Significant Activity and Results

1.“Research regarding fuels quality and its effects on an internal combustion engine” 2024

2.“Cooperation with Porsche Engineering”, Industry research, (2016-2024)

3.“Cooperation with LUK Oil Romania”, Industry research, (2019)

4. Burnete, N.V., Mariasiu, F., Depcik, C., Barabas, I. and Moldovanu, D., 2022. Review of thermoelectric generation for internal combustion engine waste heat recovery. Progress in Energy and Combustion Science, 91, p.101009.

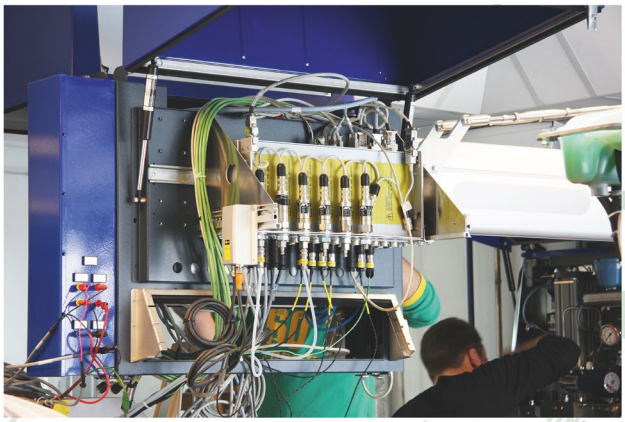
5. Burnete, N. V., Mariasiu, F., Moldovanu, D., & Depcik, C. (2021). Simulink Model of a Thermoelectric Generator for Vehicle Waste Heat Recovery. Applied Sciences, 11(3), 1340.

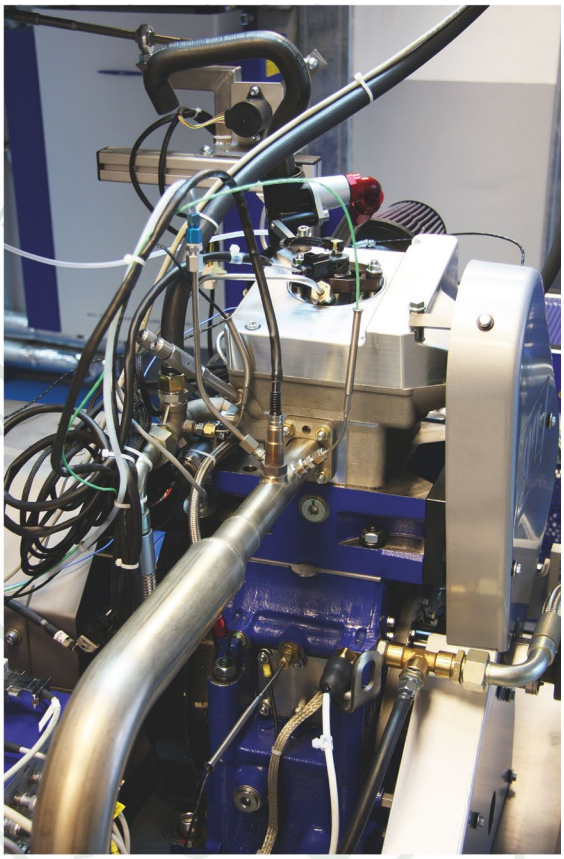
6. Burnete, N. V., Mariasiu, F., Moldovanu, D., Burnete, N., Capata, D., & Jurchis, B. (2021, August). Parametric study of air-cooled TEG heat exchanger design for waste heat recovery in heavy-duty vehicle. In IOP Conference Series: Materials Science and Engineering

(Vol. 1169, No. 1, p. 012027). IOP Publishing.

7. Mattson, J., Burnete, N. V., Depcik, C., Moldovanu, D., & Burnete, N. (2019). Second law analysis of waste cooking oil biodiesel versus ULSD during operation of a CI engine. Fuel, 255, 115753.

8. Varga, Bogdan Ovidiu; Sagoian, Arsen; Mariasiu, Florin, Prediction of Electric Vehicle Range: A Comprehensive Review of Current Issues and Challenges ENERGIES Volume: 12 Issue: 5 Article Number: 946 Published: MAR 1 2019





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PhD student Carmen Gheorghe, PhD student Georgiana Muresan.
Extern member PhD. Marius Deac. PhD. Claudiu Golgot

Areas of expertise

Intelligent Transportation System
Bus line design: Urban area regeneration using new traffic approach: Intelligent traffic lights: pedestrian safety. The traffic network macroscopic simulation.
Increase urban mobility
Integrate system for Urban Mobility Plans
Research in the field of imagine processing for traffic scan
Traffic drones: Image processing equipment
The noise produced by traffic conversion in electric energy
Selective FFT noise conversion systems and energy storage devices

Significant Activity and Results

1. JUST STREETS - Mobility justice for all: framing safer, healthier and happier streets, HORIZON-MISS-2022-CIT-01, 2024-2027, https://just-streets.eu

2. Urban Mobility Plan for Cugir city

3. Development of studies for optimizing the county public transport service, taking into account the principle of economic efficiency in service management and the efficient use of funds in Bistrița-Năsăud County, for the period 2024-2033, as well as the circulation schedules, N-C-ST 6721/05.03.2024, 2024.

4. Urban regeneration for Cluj Napoca city Nord area 2021-2022

5. ITF solution for hydrogen buses 2021

6. Filip N., Gheorghe C., Deac M., THE EFFECT OF DEDICATED BUS LANE IN A CITY CENTER, INGINERIA AUTOMOBILULUI, Issue 71, 2024.

7. Heller AV, Filip N, Deac T. STUDIES ON THE DEVELOPMENT OF A RELIABILITY DIAGNOSIS FOR AGRICULTURAL TRACTORS GEARBOXES. INMATEH-AGRICULTURAL ENGINEERING. DOI 10.35633/inmateh-71-75. https://www.webofscience.com/wos/woscc/full-record/WOS:001165595900003

8. Heller AV, Filip N., RESEARCH ON THE MEASUREMENT OF THE GEARBOX VIBRATIONS IN ORDER TO DETERMINE THE FREQUENCY RESPONSE, INGINERIA AUTOMOBILULUI, Issue 70, 2024.

9. Heller AV, Filip N. and Deac T., STUDIES ON THE DEVELOPMENT OF A RELIABILITY DIAGNOSIS FOR AGRICULTURAL TRACTORS GEARBOXES, INMATEH-AGRICULTURAL ENGINEERING, Vol. 71, Issue 3, Pp. 857-864, 2023.

10.Gheorghe C., Filip N. Image Processing Applied in Road Traffic Using a Quadcopter. 30TH SIAR INTERNATIONAL CONGRESS OF AUTOMOTIVE AND TRANSPORT ENGINEERING: SCIENCE AND MANAGEMENT OF AUTOMOTIVE AND TRANSPORTATION ENGINEERING. Page 297-303, DOI 10.1007/978-3-030-32564-0_35. Published 2020.

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PhD. Stud. Eng. Gabriel PRUNEAN, PhD. Stud. Eng. Tudor OARGĂ.

Areas of expertise

Electric vehicles; Hybrid vehicles; Vehicles with fuel cells; Optimization of high voltage batteries; Thermal management of high voltage batteries; Solutions for the decarbonization of cities; Optimizing urban and extra-urban transport; Optimizing intermodal transport;

Significant Activity and Results

1. NetZeroCities - partners along Cluj-Napoca Municipality - assists cities to overcome the current structural, institutional and cultural barriers they face in order to achieve climate neutrality by 2030, (2023-2025).

2. Elaboration of opportunity study for the purchase of articulated electric buses and buses with fuel cells (Hydrogen) in the Municipality of Cluj-Napoca;

3. Consultancy services in the elaboration of the specifications for the purchase of buses with fuel cells and a hydrogen production and distribution plant in the Municipality of Cluj-Napoca;

4. Consultancy services in the elaboration of the specifications for the purchase of 12m electric buses and minibuses for Alba Iulia and Ciugud Municipality.

5. Consultancy services in the elaboration of the specifications for the purchase of 12m electric buses for Bistrița Municipality.

6. Oargă, Ioan-Tudor, et al. "Modular Autonomous Vehicles' Application in Public Transport Networks: Conceptual Analysis on Airport Connection." Sustainability 16.4 (2024): 1512.

7. Cărăușan, Horațiu, et al. "Energy efficiency analysis of a Fuel Cell Bus model using real scenarios generated by data collection." Sustainability 16.5 (2024): 1863.

8. Oargă, Ioan-Tudor, et al. "Connected and Autonomous Vehicles in Urban Mobility: Technologies, Challenges and Opportunities." International Congress of Automotive and Transport Engineering. Cham: Springer Nature Switzerland, 2024.

9. Cărăuşan, Horaţiu, Bogdan Ovidiu Varga, Dan Moldovanu, Florin Mariasiu, Gabriel Prunean, Ioan-Tudor Oargă, and Dan Doru Micu. "Energy Efficiency Assesment of Sustainable Public Transport Solutions: a Comparative Analysis Fuel Cell vs Battery in Real Life Scenarios." In 2023 58th International Universities Power Engineering Conference (UPEC), pp. 1-6. IEEE, 2023.

10.Moldovanu, Dan, Florin Mariaşiu, Bogdan Ovidiu Varga, Adela Ioana Borzan, Horaţiu Cărăuşan, and Dan Doru Micu. "Analysis of the modes of operation of an electric vehicle on energy consumption." In 2023 10th International Conference on Modern Power Systems (MPS), pp. 1-5. IEEE, 2023.

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Areas of expertise

Mechanical Characterization of Materials: -Determination of mechanical and thermo-mechanical characteristics of materials using standard testing and equipment for metals, plastics, thermo-plastics, composites, additive manufacturing materials etc.
Experimental Stress and Deformation Analysis: - Experimental determination of stress and deformation of structures using the Strain Gauge Technique and/or optical methods like 2D and 3D DIC (Digital Image Correlation), Moire, Photoelasticity and ESPI (Electronic Speckle Pattern Interferometry)
Thermo-Mechanical Simulation using Finite Element Analysis: -Stress-strain analysis and deformation determination using ANSYS Workbench finite element analysis software for parts and assemblies under mechanical and/or thermal loads
3D Metrology: -3D scanning with the GOM Atos Core stereo camera measuring system with Blue Light Technology; GD&T report generation in reference to CAD and/or technical drawings using the GOM Inspect software

Significant Activity and Results

1. Transilvania Digital Innovation Hub, project no. 1_EDIH/23.11.2023, MySMIS: 161789, industrial partner Napochim SA, Cluj-Napoca, 2024-2025.

2. Smart buildings adaptable to the effects of climate change (CIA_CLIM), Complex Project carried out in RDI consortia (PCCDI30), coordinator UP Timișoara, 2018-2021/ P1 partner project management at UTC-N.

3. Zach, T. F., Dudescu, M. C. (2024). The Three-Dimensional Printing of Composites: A Review of the Finite Element/Finite Volume Modelling of the Process. Journal of Composites Science, 8(4), 146.

4. Muresanu, A. D., & Dudescu, M. C. (2024). Modelling of a Cylindrical Battery Mechanical Behavior under Compression Load. Batteries, 10(10), 353.

5. Cimpoies, V. I., Dudescu, M. C. (2024). Numerical and Experimental Analysis of Quilling-Inspired Metamaterials. Procedia Structural Integrity, 56, 49-57.

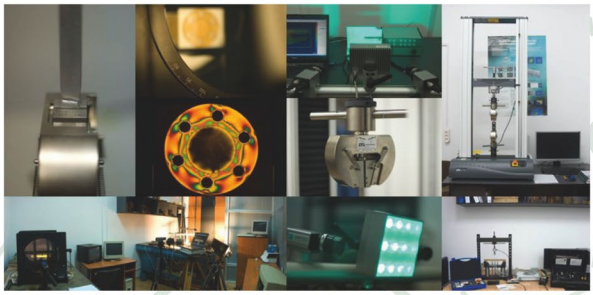
6. Racz, L., Dudescu, M. C. (2024). Numerical evaluation of the infill pattern upon mechanical proprieties of 3D printed materials. Procedia Structural Integrity, 56, 3-10.

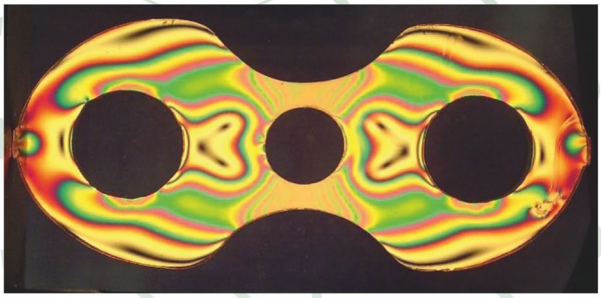
7. Rusu, M. M., Vilau, C., Dudescu, C., Pascuta, P., Popa, F., & Ardelean, I. (2023). Characterization of the Influence of an Accelerator upon the Porosity and Strength of Cement Paste by Nuclear Magnetic Resonance (NMR) Relaxometry. Analytical Letters, 56(2), 303-311.

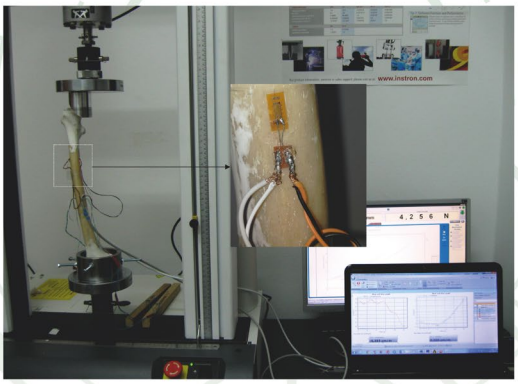
8. Dudescu, M. C., Racz, L., & Popa, F. (2023). Effect of infill pattern on fatigue characteristics of 3D printed polymers. Materials Today: Proceedings, 78, 263-269.

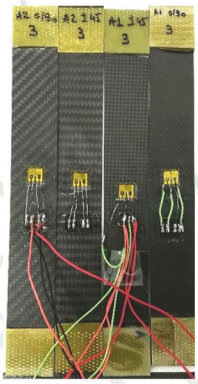
9. Rusu, M. M., Vulpoi, A., Vilau, C., Dudescu, C. M., Păşcuţă, P., & Ardelean, I. (2022). Analyzing the Effects of calcium nitrate over white Portland Cement: A multi-Scale approach. Materials, 16(1), 371.

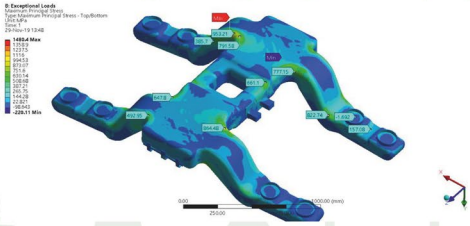
10.Cimpean, S. I., Burtea, A. L. C., Chiorean, R. S., Dudescu, M. C., Antoniac, A., Robu, A., ... & Timis, L. I. (2022). Evaluation of Bond Strength of Four Different Root Canal Sealers. Materials, 15(14), 4966.











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Areas of expertise

Ventilation / Personalized ventilation -Thermal comfort, Indoor Air Pollution Reduction, Indoor Air Quality (IAQ) – CFD studies
Smoke and Hot Gases Evacuation in Fires - CFD studies, Expertise in evaluation of smoke extraction systems
Biomedical Engineering - Flows through Bypass Grafts and Mechanical Heart Valves - numerical (CFD) and experimental investigations (PIV)
Heat and Mass Transfer -Free and Impinging Jets with application in Heating Ventilation and Air Conditioning; Heat Transfer; Combustion: reactive and non-reactive flows – numerical (CFD), experimental investigations
Fluid Flow Control Systems - Design and manufacture of controllers for fluid systems; Sensorics; Analyse and signal processing.

Significant Activity and Results

1. SAFE - Innovative seating system to reduce SARS-CoV-2 transmission on board of commercial aircrafts, PN-III-P2-2.1-PED-2021-2265, Responsible: Florin Bode, http://www.cambi.ro/safe (2022-2024)

2. XTREME Innovative system to extend the range of electric vehicles at improved thermal comfort PN-III-P2-2.1-PED-2019-4249, Responsible: Florin Bode, www.cambi.ro/xtreme (2020-2022)

3. Corina Maria GIURGEA, Carmen-Anca Safta, Ciprian Lupu, Mihaela Ordean4 and Dan Opruţa, 2023 IOP Conf. Ser.: Earth Environ. https://iopscience.iop.org/article/10.1088/1755-1315/1136/1/012010

4. Florin BODE, Nicolae Vlad BURNETE*, Lucian FECHETE TUTUNARU, and Ilinca NASTASE*. Improving Electric Vehicle Range and Thermal Comfort through an Innovative Seat Heating System, Sustainability, 15, no. 6: 5534. https://doi.org/10.3390/su15065534, 2023, IF2023: 3.3, Q2, 2023

5. Andrei – Stelian BEJAN, Florin BODE*, et al, Journal of Cleaner Production, Volume 336, 15 February 2022, 130398, https://doi.org/10.1016/j.jclepro.2022.130398, IF2021:11.072 (Q1), 2022
6. El Bachir LAHMER*, Florin BODE, et al, Thermal Science and Engineering Progress, https://doi.org/10.1016/j.tsep.2023.101804, 2451-9049, 2023 Elsevier, IF2021: 4.8 (IF: Q1, AIS: Q1).

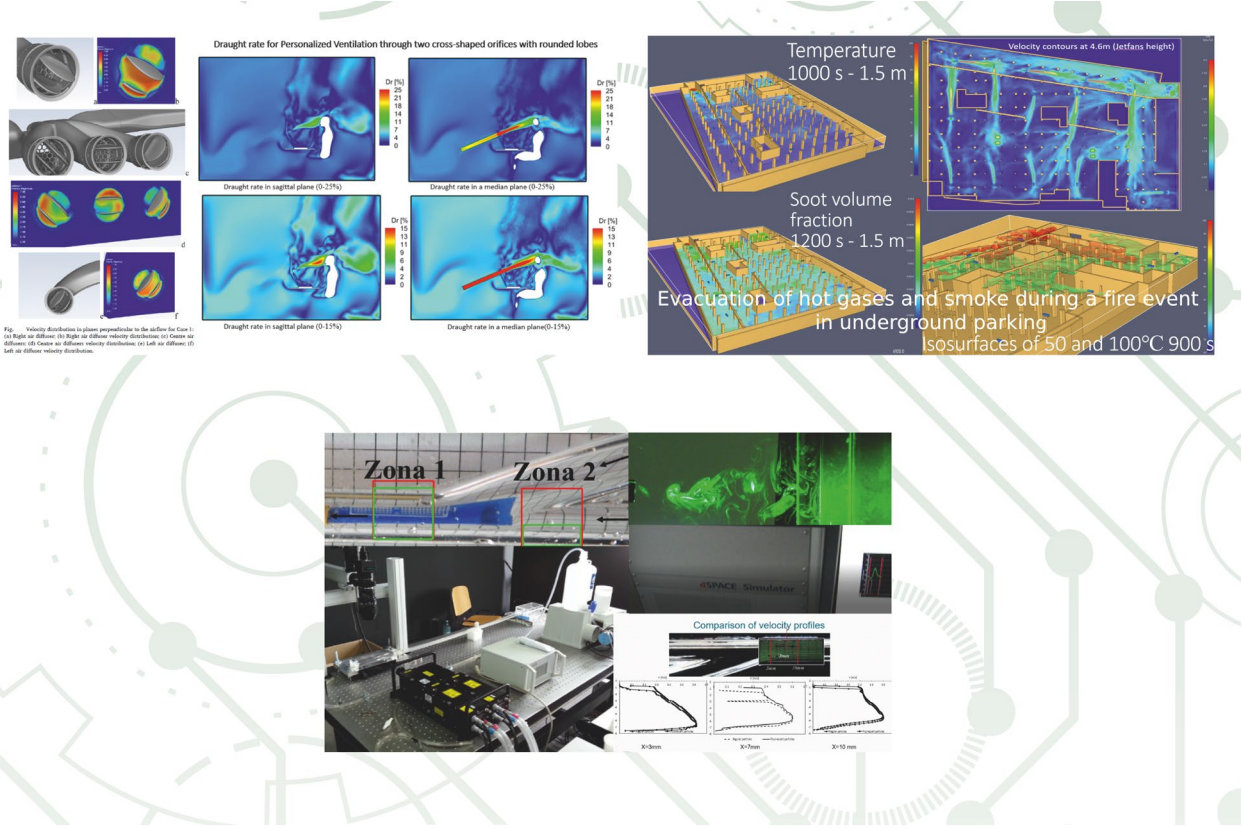
7. Matei Razvan GEORGESCU*, Florin BODE, et al, Building and Environment, Volume 204, 15 October 2021, 108150, ISSN 0360-1323, eISSN 1873-684X, https://doi.org/10.1016/j.buildenv.2021.108150, IF2021:7.093 (Q1)

8. Florin BODE*, Daniel BANYAI, et al, Enhancing Fire Safety, Fire Journal, 6(12), 451; https://doi.org/10.3390/fire6120451, 2023,(IF2022:3.2, IF:Q1, AIS:Q1), 2023

9. Florin BODE, Ilinca NASTASE*, ISSN: 1660-4601; Int. J. Environ. Res. Public Health 2023, 20(1), 740; https://doi.org/10.3390/ijerph20010740, Q1 (IF2021:4.64, IF:Q1)

10.Florin BODE, et al, Thermal Science, 2021 Volume 25, Issue 4 Part A, Pages: 2637-2652, https://doi.org/10.2298/TSCI200713227B, ISSN 0354-9836, eISSN 2334-7163, IF2021:1.971 (Q3), 2021 9. Cărăuşan, Horaţiu, Bogdan Ovidiu Varga, Dan Moldovanu, Florin Mariasiu, Gabriel Prunean, Ioan-Tudor Oargă, and Dan Doru Micu. "Energy Efficiency Assesment of Sustainable Public Transport Solutions: a Comparative Analysis Fuel Cell vs Battery in Real Life Scenarios." In 2023 58th International Universities Power Engineering Conference (UPEC), pp. 1-6. IEEE, 2023.

10.Moldovanu, Dan, Florin Mariaşiu, Bogdan Ovidiu Varga, Adela Ioana Borzan, Horaţiu Cărăuşan, and Dan Doru Micu. "Analysis of the modes of operation of an electric vehicle on energy consumption." In 2023 10th International Conference on Modern Power Systems (MPS), pp. 1-5. IEEE, 2023.



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Areas of expertise

SUPERCONDUCTIVITY: Investigation of different artificial pinning center incorporation in YBa2Cu3O7 (YBCO) thin films for efficient vortex pinning; development of environmentally friendly, i.e. fluorine-free, chemical solution deposition (CSD) processes for YBCO thin film growth;
oxide thin films elaboration for buffer-layer architecture in high-temperature superconducting coated conductor applications. Responsible/contact: traian.petrisor@phys.utcluj.ro
SPINTRONICS: Elaboration and study of novel magnetic spintronic and spin-orbitronic systems concerning the use of spin-orbit coupling In magnetic and nonmagnetic materials to generate, detect and exploit spin-polarized currents, with the aim to design and manufacture individual spin based electronic devices for applications in the field of sensors, data storage and processing.
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MATERIALS CHEMISTRY. Within this topic the following axes are developed: precursors (synthesis, characterization, single crystal growth, molecular modeling), thin films, nanoparticles and nanostructuring. Using chemical preparation methods (sol-gel) different thin oxide films with a large range of applications in electronics, optics, catalysis, wear resistance, corrosion protection and superconductivity are prepared, e.g. La0.66Sr0.33MnO3, La2Zr2O7, YBa2Cu3O7, BaZrO3, GaFe2O4. Responsible/contact: lelia.ciontea@chem.utcluj.ro

Significant Activity and Results

1. Gate voltage controlled chiral magnetic domain wall spin-orbitronic devices, PN-IV-P1-PCE-2023-1548, 15PCE/08.01.2025

2. Nanostructured hybrid architectures with tunable magneto-luminescent properties, PN-III-P4-PCE-2021-1561 No. 82/2022, https://c4s/utcluj.ro/NAno-Mag@Lu/Nano-Mag@Lu.html

3. Spin-orbit torque driven field-free artificial synapses and neurons, PN-III-P4-ID-PCE-2020-1853 No. 182/04/01/2021,

https://c4s/utcluj.ro/SPINSYNE/spinsyne.html

4. Diode and Selective Routing Functionalities Controlled by Geometry in Current-Induced Spin–Orbit Torque Driven Magnetic Domain Wall Devices, E.M. Stetco, T. Petrisor jr., O.A.Pop, M. Belmeguenai, I. M. Miron, M. S. Gabor, Nano Lett. 2024, 24, 44, 13991–13997 (2024)

5. Bulk and interface spin-orbit torques in Pt/Co/MgO thin film structures, M. S. Gabor, M. Belmeguenai, and I. M. Miron, Phys. Rev. B 109, 104407 (2024)

6. "Influence of different additives on the morphology, defect state and luminescence of ZnO nanoparticles," I. Perhatia, L. E. Muresan, A. Belcovici, A. Popa, G. Borodi, A. Mesaros, and L. B. Tudoran, Colloids and Surfaces A-Physicochemical and Engineering Aspects, vol. 684, Mar 2024.

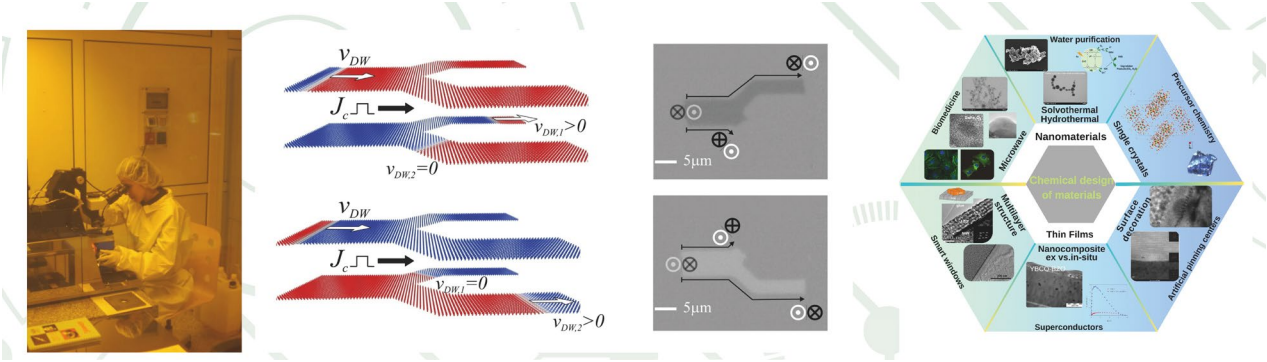
7. Correlation between interface perpendicular magnetic anisotropy and interfacial Dzyaloshinskii–Moriya interactions in Pt/Pd/Co/Au, D Ourdani, Y Roussigné, SM Chérif, MS Gabor, M Belmeguenai, Journal of Physics D: Applied Physics , 55, 485004 (2022)

8. "Insight into synthesis and characterisation of Ga0.9Fe2.1O4 superparamagnetic NPs for biomedical applications," A. Mesaros, A.Garzón, M. Nasui, R. Bortnic, B. Vasile, O. Vasile, F. Iordache, C. Leostean, L. Ciontea, J. Ros, and O. Pana, Scientific Reports, vol. 13, Oct 2023

9. Effect of Chiral Damping on the dynamics of chiral domain walls and skyrmions, CK Safeer, M-A Nsibi, J Nath, MS Gabor, H Yang, I Joumard, S Auffret, G Gaudin, I-M Miron, Nature Communications , 13, 1192(2022)

10. Investigation of diethanolamine (DEA) as a chelating agent in the fabrication of fluorine-free propionate route YBa2Cu3O7 (YBCO) thin films, A. Daniel, M. Nasui, T. Petrisor Jr., R. B. Sonher, A. Augieri, C. Pop, A. Palau, A. Vannozzi, G. Celentano, L. Ciontea and T. Petrisor, Supercond. Sci. Technol. 35, 054010 (2022)

11. Magneto-Ionics in Annealed W/CoFeB/HfO2 Thin Films, R Pachat, D Ourdani, MA Syskaki, A Lamperti, S Roy, S Chen, A Di Pietro,L Largeau, R Juge, M Massouras, C Balan, JW van der Jagt, G Agnus, Y Roussigné, MS Gabor, SM Chérif, G Durin, S Ono, J Langer,D Querlioz, D Ravelosona, M Belmeguenai, LH Diez, Advanced Materials Interfaces, 9, 2200690 (2022)



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Areas of expertise

Chemical data analysis
Electrochemistry
Materials for sensors
Modelling and simulation

Significant Activity and Results

1. Ungureanu EM, Ștefaniu A, Isopescu R, Mușina CE, Bujduveanu MR, Jäntschi L. Extended characteristic polynomial estimating the electrochemical behaviour of some 4-(azulen-1-yl)-2,6-divinylpyridine derivatives. J Electrochem Sci Eng 2025. http://doi.org/10.5599/jese.2374

2. Sava C, Varvara Ilțiu DA, Mare R, Roman MD, Rada S, Pică EM, Jäntschi L. Physico-chemical characterization and possible uses of sludge processed from an urban sewage treatment plant. Heliyon 2024, 10(8), e29576. http://doi.org/10.1016/j.heliyon.2024.e29576

3. Jäntschi L. Triple crossed 3C26 cyclic cumulene catenane. Fuller Nanotub Carbon Nanostruct 2024, 32(10), 962. http://doi.org/10.1080/1536383X.2024.2354721

4. Jäntschi L. Nanoporous carbon, its pharmaceutical applications and metal organic frameworks. J Incl Phenom Macrocycl Chem 2023, 103(7-8): 245-261. http://doi.org/10.1007/s10847-023-01194-1

5. Roman MD, Sava C, Varvara Ilțiu DA, Mare R, Pruteanu LL, Pică EM, Jäntschi L. Biological activated sludge from wastewater treatment plant before and during the COVID-19 pandemic. Int J Environ Res Public Health 2022, 19, 11323. http://doi.org/10.3390/ijerph191811323

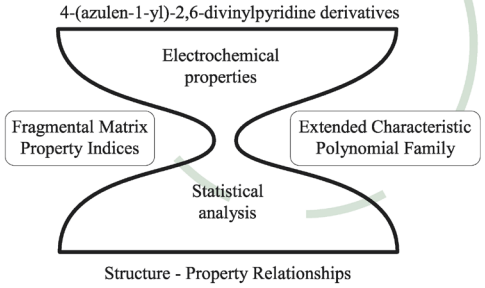
6. Stoenoiu CE, Putz MV, Jäntschi L. Is triple crossed C28 cyclic polyyne cluster a stable conformation?. Fuller Nanotub Carbon Nanostruct 2024, 32(1): 55. http://doi.org/10.1080/1536383X.2023.2261573

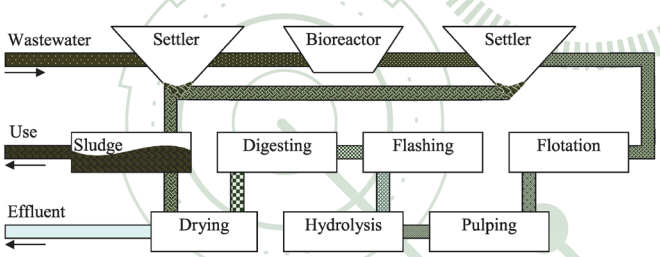
7. Rada S, Gorea AB, Culea E. Graphite–Phosphate Composites: Structure and Voltammetric Investigations. Materials 2024, 17, 5000. http://doi.org/10.3390/ma17205000

8. Bolundut L, Pop L, Bosca M, Pascuta P, Stefan R, Culea E, Popa A. Influence of Sm2O3/AgNPs Addition on the Properties of Lithium-Borate Glass-Ceramic System. Anal Lett 2024, 58(3), 364–373. http://doi.org/10.1080/00032719.2024.2326173

9. Stăncioi CM; Ștefan IA, Briciu V, Mureșan V, Clitan I, Abrudean M, Ungureșan ML, Miron R, Stativă E, Nanu M, Topan A, Toader DO, Nanu I. Solution for the Mathematical Modeling and Future Prediction of the COVID-19 Pandemic Dynamics. Appl Sci 2023, 13, 7971. http://doi.org/10.3390/app13137971

10.Stoenoiu CE, Jäntschi L. Least squares for generalized Gauss-Laplace distribution of the error in certain nonlinear regressions with perpendicular offsets. Springer Proc Math Stat 2024, 446. http://doi.org/10.1007/978-3-031-52965-8_12





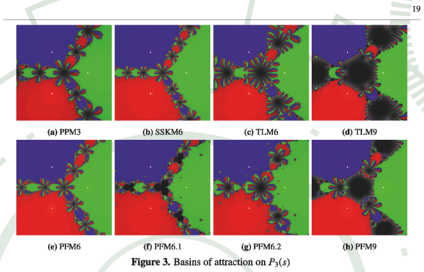


Figure 3. Basins of attraction on $P_3(s)$

of attraction. Our proposed methods exhibit strong performance with large basins, demonstrating their robustness by yielding a notably low count of divergent points. PFM6 emerges as the top performer, with SSKM6 following closely behind, offering a strong challenge to our proposed approach. On the other hand, PFM9 and TLM9 underperform, indicating that higher order does not guarantee better convergence or stability, as evidenced by their small basins and high number of divergent points. Intriguingly, while PFM6.1 excels and matches the performance of PFM6 and SSKM6 for $P_1(s)$ and $P_2(s)$, it struggles significantly with $P_3(s)$, lagging behind the other methods and delivering the poorest performance in this specic scenario. These observations are corroborated by the divergent point data in Table 4.

8. Concluding remarks

In this study, we have presented a family of three-step iterative methods with sixth order convergence for solving systems of nonlinear equations. The proposed methods are based on a novel approach to enhance the convergence order of iterative methods. We have also proposed a three-step scheme with convergence order $p + 3$ (for p 3) and extended it to a generalized m+2-step scheme, by merely incorporating one additional function evaluation, thus achieving convergence orders up to $p + 3m$, m N. We have provided thorough local convergence analysis and numerical experiments to validate the theoretical ndings. Lastly, we have showcased the performance of these methods through the analysis of their basins of attraction and their application to systems of nonlinear equations.

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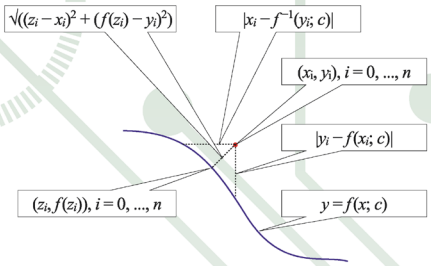

Perpendicular offset is locally the shortest path from the observation point to the curve

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Areas of expertise

NMR diffusometry and relaxometry techniques are implemented to investigate the dynamics of liquid molecules at the interface of porous media and under confinement conditions. The confining pores of the investigated systems may have sizes ranging from nanometres to micrometres and may be entirely or partially saturated with fluids. The investigations can be done at different temperatures and resonance frequencies. The porous systems currently under study are porous glasses, carbon-based materials,colloidal crystals, polymeric nanocapsules used in controlled drug delivery, cement-based materials, bone cements, porous ceramics with magnetic impurities, biomaterials with applications in medicine, magnetic nanoparticles used as contrast agents in magnetic resonance imaging. Other materials which can be studied in our laboratory are: woods, fuel cell membranes, lubricants, fuels, catalysts, zeolites, ionic liquids, liquid crystals, rubber. Using NMR relaxometry and diffusometry techniques in the investigation of fluids confined inside porous media it is possible to extract information about pore dimensions and their connectivity. Other information that can be extracted refers to the ageing and alteration processes of different materials such as rubber, polymers, lubricants or food. In our laboratory we are also interested in developing of new NMR techniques suitable for the investigation of systems with a high content of magnetic impurities (concrete, rocks, soils, different building materials).

Significant Activity and Results

1. PN-III-P4-ID-PCE-2020-0533 (4.01.2021-31.12.2023): New cement-based nanocomposite materials for 3D printing applications;https://pce23.weebly.com/.

2. A. Crețu (Bede), C. Mattea, S. Stapf, I. Ardelean, The effect of silica fume and organosilane addition on the porosity of cement paste, Molecules 25 (8), 1762 (2020), https://doi.org/10.3390/molecules25081762

3. F Gallego-Gómez, C Cadar, C López, I Ardelean, Imbibition and dewetting of silica colloidal crystals: An NMR relaxometry study, Journal of colloid and interface science 561, 741-748(2020), https://doi.org/10.1016/j.jcis.2019.11.050

4. A. Nan, M. Suciu, I. Ardelean, M. Senila, R. Turcu, Characterization of the Nuclear Magnetic Resonance Relaxivity of Gadolinium Functionalized Magnetic Nanoparticles, Analytical Letters 54, 124-139 (2021), https://doi.org/10.1080/00032719.2020.1731522

5. J Stepišnik, I Ardelean, A Mohorič, Molecular self-diffusion in internal magnetic fields of porous medium investigated by NMR MGSE method, Journal of Magnetic Resonance 328, 106981 (2021), https://doi.org/10.1016/j.jmr.2021.106981

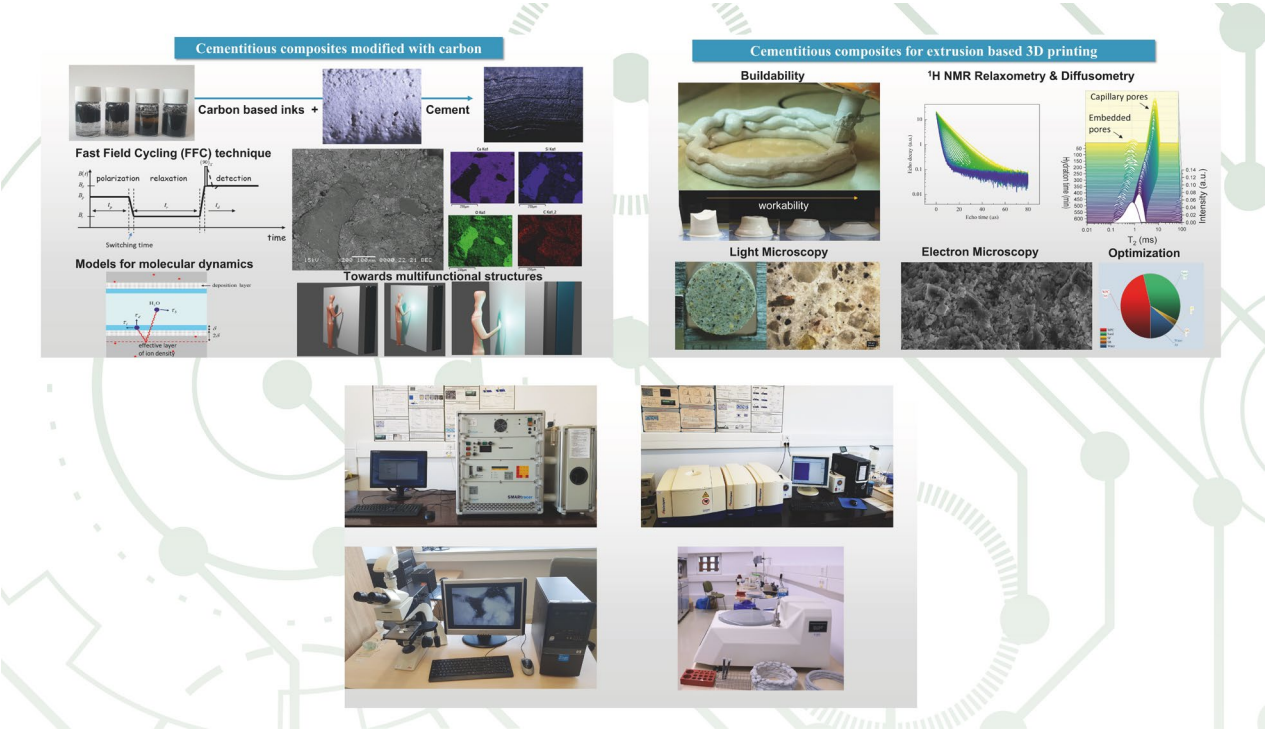
6. I. Ardelean, The Effect of an Accelerator on Cement Paste Capillary Pores: NMR Relaxometry Investigations, Molecules 26, (17), 5328 (2021), https://mdpi.com/1420-3049/26/17/5328

7. L.M. Nicula, O. Corbu, I. Ardelean, A.V. Sandu, M Iliescu, D. Simedru, Freeze–Thaw Effect on Road Concrete Containing Blast Furnace Slag: NMR Relaxometry Investigations, Materials 14 (12), 3288 (2021), https://doi.org/10.3390/ma14123288

8. M. Oztop Berkay Berk, C. Cavdaroglu, L. Grunin, I. Ardelean, D. Kruk, G. Mazi, Use of Magic Sandwich Echo and Fast Field Cycling NMR Relaxometry on Honey Adulteration with Corn Syrup, J. Science of Food and Agriculture, 2021, https://doi.org/10.1002/jsfa.11606

9. I. Lacan, M. Moldovan, C. Sarosi, I. Ardelean, Chitosan Effect on Hardening Dynamics of Calcium Phosphate Cement: Low-Field NMR Relaxometry Investigations. Polymers. 2022; 14(15):3042, https://doi.org/10.3390/polym14153042

10.M.M Rusu, D. Faux, I. Ardelean, Monitoring the Effect of Calcium Nitrate on the Induction Period of Cement Hydration via Low-Field NMR Relaxometry, Molecules, 2023, 28, 476. https://doi.org/10.3390/molecules28020476



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Assoc. Prof. Alina Ramona Baias; Assoc. Prof. Diana Otrocol; Assist. Prof. Vicuta Neagos; Assoc. Prof. Constantin-Cosmin Todea.

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Numerical Analysis
-New methods and tools in Approximation Theory; Application of MATHEMATICA's approximation subroutines; High degree quadrature formulas; New algorithms for energy-minimizing curves and surfaces
Functional, Differential, and Integral Equations and Calculus of Variations
-Existence and representation of single-valued and multivalued solutions. Hyers-Ulam stability of equations in algebraic and topological structures; Applications to the stability and perturbations of Dynamical Systems.
-Generalized equations of Euler-Lagrange and Euler-Gauss type used in the theory of 2D and 3D deformable models
Geometry
-Geometry of image formation in stereo vision, different camera models, calibration, systems of multiple lenses and mirrors of a specific type; Manifold learning and pattern recognition
Operator theory and Special functions
-Multivalued operator theory, which is about the investigation of the fixed point properties of special multivalued operators; Investigating the properties of special functions, Riemann zeta, Hurwitz zeta, and Polylogarithm functions
Modelling
-Ultrasound echocardiography; Computer-aided surgery (Prosthetic medicine); Dynamic image-based modelling Nonlinear and Convex Analysis and Mathematical Programming/Optimization
-Equilibrium problems; Optimization; Variational inequalities; Numerical Optimization; Numerical Optimization

Significant Activity and Results

1. Cohmetblfg – "Cohomological Methods in the Study of Blocks and Characters of Finite Groups", PN-III-P1-1.1-TE-2019-0745, (2020-2022)

2. Kajántó S, Kristály A, Peter I, Zhao W. A generic functional inequality and Riccati pairs: an alternative approach to Hardy-type inequalities. Mathematische Annalen. Math. Ann. (2024). https://doi.org/10.1007/s00208-024-02827-7

3. Baias, A.R., Popa, D., Rassias, M. Th.: Set-valued solutions of an equation of Jensen type, Quaest. Math. 8(1),doi: 10.2989/16073606.2022.2072249, (2022).

4. Ivan, M., Neagos, V., A representation of the interpolation polynomial, Numerical Algorithms 88 (2021), 1215—1231, https://doi.org/10.1007/s11075-021-01072-2

5. Ignat, R., Rus, M.D., Vortex sheet solutions for the Ginzburg-Landau system in cylinders: symmetry and global minimality, Calculus of Variations and Partial Differential Equations 63 (2024), Art. no. 34, https://dx.doi.org/10.1007/s00526-023-02628-x

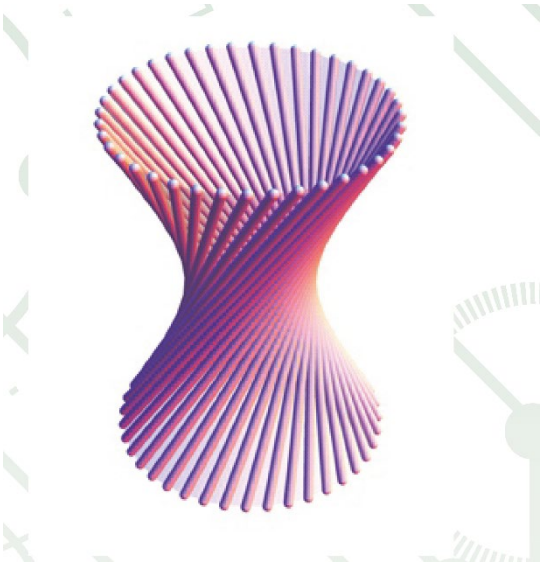
6. Holhoș A., A Voronovskaya-type theorem in simultaneous approximation, Period. Math. Hungar. 85 (2022), 280-291, https://doi.org/10.1007/s10998-021-00434-6

7. Holhoş, A. Voronovskaya-type Results for Positive Linear Operators of Exponential Type and their Derivatives. Bull. Malays. Math. Sci. Soc. 45 (2022), 1839–1861, https://doi.org/10.1007/s40840-021-01227-3

8. Holhoş, A. Approximation of Real Functions by a Generalization of Ismail–May Operator. Mathematics (2022), 10, 1650, https://doi.org/10.3390/math10101650

9. A. Holhoș, D. Roșca, Orthonormal Wavelet Bases on The 3D Ball Via Volume Preserving Map from The Regular Octahedron. Mathematics (2020) 8 (6), 994, 15 pp. doi: 10.3390/math8060994

10.Inoan, D., Kolumbán, J., Calmness of the Solution Mapping of Navier-Stokes Problems Modeled by Hemivariational Inequalities. Set-Valued Variational Analysis (2022) 30, 1089–1104. doi.org/10.1007/s11228-022-00636-1



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Areas of expertise

Combinatorial Optimization: Complexity aspects; Mathematical modelling; Exact approximation, heuristic and hybrid algorithms;
Relaxation techniques
Metaheuristic Algorithms: Genetic algorithms; Ant colony optimization; Variable neighborhood search; Memetic algorithms; Hybrid algorithms
Machine learning: with applications in medicine and agriculture.

Significant Activity and Results

1. Collaborative Framework for Smart Agriculture – COSA, Romania's National Recovery and Resilience Plan PNRR-III-C9-2022-I8, under grant agreement 760070, 2023-2026.

2.“Building Trust in Ecosystems and Ecosystem Components”, EUROPEAN COMMISSION Horizon 2020 - Research and Innovation Framework Programme, https://www/bieco.org/ 2020-2023

3. P.C. Pop, O. Cosma, C. Sabo, C. Pop Sitar, A comprehensive survey on the generalized traveling salesman problem, European Journal of Operational Research, Vol. 314(3), pp. 819-835, 2024.

4. A. Petrovan, P.C. Pop, C. Sabo, I. Zelina, Novel two-level hybrid genetic algorithms based on different Cayley-type encodings for solving the clustered shortest-path tree problem, Expert Systems with Applications, Vol. 215, 119372, 2023.

5. P.C. Pop, The generalized minimum spanning tree problem: an overview of formulations, solution procedures and latest advances, European Journal of Operational Research, Vol. 283(1), pp. 1-15, 2020.

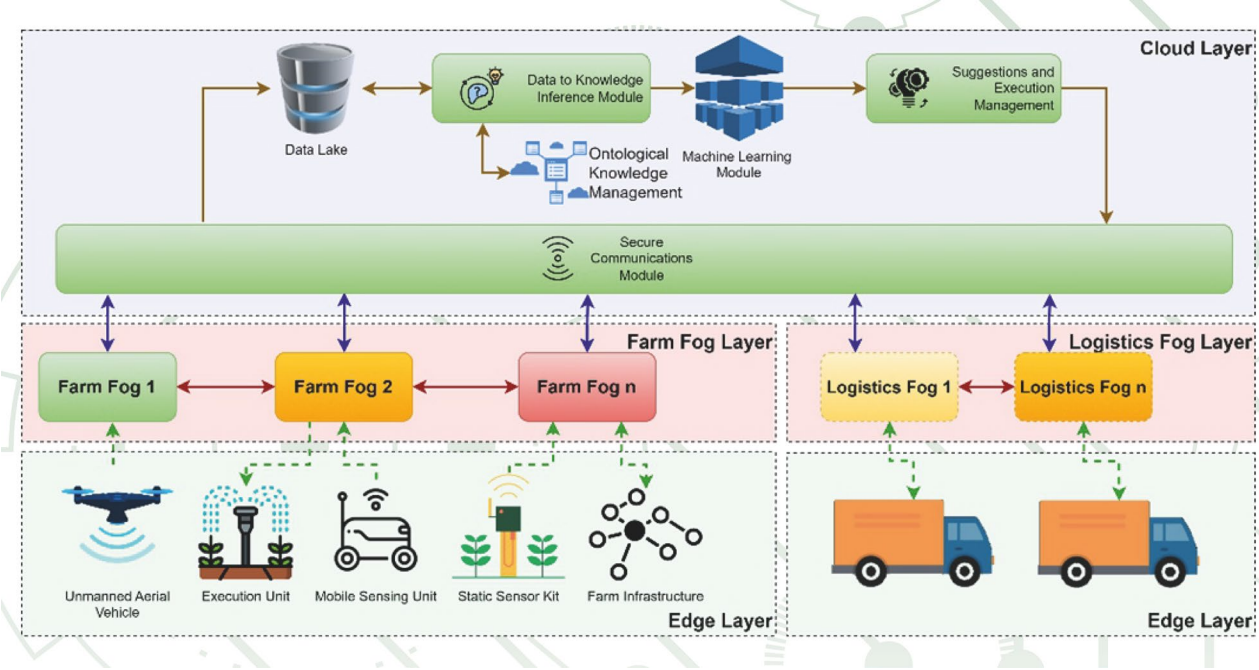
6. O. Cosma, P.C. Pop and D. Danciulescu, A novel matheuristic approach for a two-stage transportation problem with fixed costs associated to the routes, Computers and Operations Research, Vol. 118, art. no. 104906, 2020.

7. O. Cosma, P.C. Pop and D. Danciulescu, A parallel algorithm for solving a two-stage fixed-charge transportation problem, Informatica, Vol. 31(4), pp. 681-706, 2020.

8. O. Cosma, D. Danciulescu and P.C. Pop, On the two-stage transportation problem with fixed charge for opening the distribution centers, IEEE Access, Vol. 7(1), pp. 113684-113698, 2019.

9. Pintea, C.-M., Calinescu, A., Pop Sitar, C., Pop, P.C., Towards secure & green two-stage supply chain networks, Logic Journal of the IGPL, Vol. 27(2), pp. 137-148, 2019.

10.O. Cosma, P.C. Pop and C. Pop Sitar, An efficient iterated local search heuristic algorithm for the two-stage fixed-charge transportation problem, Carpathian Journal of Mathematics, Vol. 35(2), pp. 153-164, 2019.



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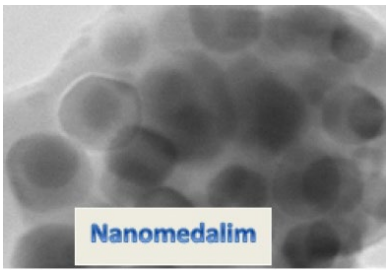

Team

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Areas of expertise

Synthesis and characterisation of nanoparticles embedded in silica, polyvinilalcool and PVA-SiO2 matrix
- Synthesis of MFe2O4, M1xM21-xFe2O4 and M1xM21-x-yM3yFe2O4 (M, M1, M2, M3 = Ag+, Na+, Co2+, Mn2+, Zn2+, Cu2+, Ni2+, Cd2+, Ca2+, La3+, Bi3+, Cr3+) oxidic system nanoparticles nonembedded and embedded in silica, PVA and PVA-SiO2
- Structural (TG-DTG-DTA-MS, XRD, FT-IR, Mossbauer, BET, porosity), morphological (TEM; SEM, AFM) and magnetic (VSM, Ms, Mr, Hc, K)
characterization of ferrite-based nanocomposites.
- Photocatalytic and coloristic applications of ferritic nanomaterials embedded in silica matrices.
Environmental chemistry. Mathematical modelling of environmental data;
- Analysis of physico-chemical parameters of water; assessment of the water quality in water reservoirs, lakes, groundwater, glacial lakes and drinking water supply network, assessment of the impact of anthropogenic activities on water quality parameters, chemical
modelling of groundwater quality in the aquifer; heavy metal pollution index, human health risk assessment; water quality index; mathematical modelling of environmental data; drawing the pollution map.
- Transfer of pollution from water to fish, and evaluation of metal content in fish tissues
Physico-chemical and sensory characterization of food
- Assesment of hydrolysis and oxidation processes in animal fats; monitoring of chemical parameters during storage
- Increasing the oxidative stability of alimentary fat by the addition of antioxidants;
- Analysis of Volatile Compounds, Fatty Acid Composition, Metals and Thermal Behaviour of solids foods (spices, milk powder, tea, coffee, cocoa powder);
- Chromatographic analysis of food components and environmental pollutants by HPLC and gas chromatography.

Significant Activity and Results

1. POIM project 118881- Participatory management of the Natura 2000 sites Pricop-Huta-Certeze, Tisa Superior and of the protected natural area Ronișoara Forest. 2020-2022, https://www.heidenroslein.ro/arhive/1446

2. T. Dippong, M.A.Resz, C. Tănăselia, O. Cadar. Assessing microbiological and heavy metal pollution in surface waters associated with potential human health risk assessment at fish ingestion exposure. Journal of Hazardous Materials. 476 (2024) 135187, FI – 12.2 (Q1).

3. T. Dippong, C. Mihali, M. Marian, O.M. Rosca, M.A. Resz, Correlations between chemical, hydrological and biotic factors in rivers from the protected area of Tisa Superioara, Romania. Process Safety and Environmental Protection 176 (2023) 40-55. FI – 7.8 (Q1).

4. T. Dippong, M. Senila, O. Cadar, M.A. Resz, Assessment of the heavy metal pollution degree and potential health risk implications in lakes and fish from northern Romania. Journal of Environmental Chemical Engineering, 12:2, 112217 (2024) 112217. FI – 7.7 (Q1).

5. T Dippong, I. Török, C Tănășelia, M.A. Resz, Impact of water and sediment pollution in Valea Viseului river, Romania. Process Safety and Environmental Protection (2025) 106796. FI – 6.9 (Q1).

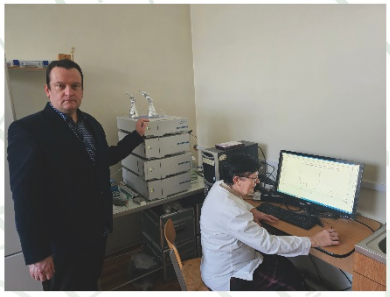
6. T. Dippong, E.A.Levei, D.Toloman, L. Barbu Tudoran, O. Cadar, Investigation on the formation, structural and photocatalytic properties of mixed Mn-Zn ferrites nanoparticles embedded in SiO2 matrix. Journal of Analytical and Applied Pyrolysis. 158 (2021) 105281, FI – 6.437 (Q1)

7. T. Dippong, D.M. Lazar, P. Palade, I. Petean, G. Borodi, O. Cadar, The effect of cation distribution and heat treatment temperature on the structural, surface, morphological and magnetic properties of MnxCo1−xFe2O4@SiO2 nanocomposites. Journal of Alloys and Compounds, 895 (2022) 162715, FI – 6.371 (Q1).

8. T. Dippong, D. Toloman, M. Dan, E.A. Levei, O Cadar, Structural, morphological and photocatalytic properties of Ni-Mn ferrites: Influence of the Ni:Mn ratio, Journal of Alloys and Compounds 913 (2022), 165129, FI – 6.371 (Q1).

9. T. Dippong, I.G. Deac, M.D,Lazar, I. Petean, E.A. Levei, G. Borodi, O. Cadar, Effect of heat-treatment temperature and zinc addition on magnetostructural and surface properties of manganese nanoferrite prepared by an ecofriendly sol–gel synthesis, Journal of Materials Research and Technology. 15 (2021) 6528-6540, FI – 6.267 (Q1).

10.T. Dippong, M.A. Hoaghia, M. Senila Appraisal of heavy metal pollution in alluvial aquifers. Study case on the protected area of Ronișoara Forest, Romania. Ecological Indicators, 143 (2022) 109347, FI – 6.263 (Q1).



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Areas of expertise

Food safety and quality: · Food control; · Functional food; · Food packaging
Environment: · Environment monitoring: wastes, organic and inorganic pollutants from different matrices · Recovery of valuable metals from different wastes (including the mining waste water)
Science of material: · Nanomaterials based on titania, silica and noble metals: preparation, characterization and applications in depollution, recovery of metals, self-cleaning, food preservation, food packaging, etc...
Chemometry: · Statistically processing of the experimental data; · Mathematical modelling of experimental data

Significant Activity and Results

1.Title: Demonstration of innovative functional food production systems based on a sustainable value chain of marine and freshwater raw materials for conscientious European consumers – NOVAFOODIES, Project code: 101084180
Time range: 2023 - 2026
Programme: Type of action: HORIZON-IA; Type of model grant agreement: HORIZON Action Grant Budget-Based (HORIZON-AG), HORIZON-CL6-2022-FARM2FORK-02-two-stage; Topic: HORIZON-CL6-2022-FARM2FORK-02-05-two-stage; Type of action: HORIZON Innovation Actions
Responsible from TUCN: Prof.Anca Mihaly Cozmuta

2. Anca Peter, Lucica Pop, Leonard Mihaly Cozmuta, Camelia Nicula, Anca Mihaly Cozmuta, Goran Drazic, Klara Magyari, Marieta Muresan-Pop, Milica Todea, Lucian Baia. Beeswax-poly(vinyl alcohol) composite films for bread packaging. Food Chemistry: X 24 (2024) 102053. https://doi.org/10.1016/j.fochx.2024.102053.

3. A. Mihaly Cozmuta, A. Peter, C. Nicula, A. Jastrzębska, M. Jakubczak, M.A.K. Purbayanto, A. Bunea, F. Bora, A. Uivarasan,Z. Szakacs, L. Mihaly Cozmuta. The impact of visible light component bands on polyphenols from red grape seed extract powder encapsulated in alginate–whey protein matrix. Food Chemistry: X 23 (2024) 101758. https://doi.org/10.1016/j.fochx.2024.101758.

4. Pop, L.M.; Mihaly Cozmuta, A.; Nicula, C.; Mihaly Cozmuta, L.; Peter, A. Attempts to Obtain Material Based on Polyvinyl Alcohol with Barrier Properties against Water Vapor. Appl. Sci. 2024, 14, 4310. https://doi.org/10.3390/app14104310

5. A. Uivarasan, J. Lukinac, M. Jukic, G. Šelo, A. Peter, C. Nicula, A. Mihaly Cozmuta, L. Mihaly Cozmuta. (2004). Characterization of polyphenol composition and starch and protein structure in brown rice flour, black rice flour and their mixtures. Foods 2024, 13(11), 1592; https://doi.org/10.3390/foods13111592

6. AM Uivarasn, L. Mihaly Cozmuta, J. Lukinac, M. . Jukic, G. Selo, A. Peter, C. Nicula, A. Mihaly Cozmuta. (2024). Whole black rice flour improves the physicochemical, glycemic, and sensory properties of cracker snacks. Foods, 13(10), 1503. https://doi.org/10.3390/foods13101503.

7. Mihaly Cozmuta A., Purbayanto M.A.K., Jastrebska A., Peter A., Nicula C., Uivarasan, L. Mihaly Cozmuta (2023). Thermal stability and in vitro digestion of alginate–starch–iron beads for oral delivery of iron, Food Hydrocolloids, 108808, https://doi.org/10.1016/j.foodhyd.2023.108808

8. Anca Peter, Leonard Mihaly Cozmuta, Camelia Nicula, Anca Mihaly Cozmuta, Goran Drazic, Antonio Peñas, Stefania Silvi. (2023). Recovery and characterization of nano-Ag -graphene-TiO2: Active compound from polylactic acid (PLA)-based film. Journal of Polymers and the Environment. https://doi.org/10.1007/s10924-023-02995-8.

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Areas of expertise

Domain: philology, humanities (onomastics, socio-/psycho-/ethnolinguistics, anthropological linguistics, pragmatics).
Philology can be defined as the scientific knowledge of the entire activity and life of a certain people, in a given period of its existence.
As a sub-field of philology, linguistics studies human language, exploring its mechanisms by means of comparative, synchronic and diachronic studies of languages.

Significant Activity and Results

1. O. Felecan, La mémoire polonaise en onomastique roumaine, in "Linguistique Balkanique", LXIII, 2/2024, p. 97-110.

2. Oliviu Felecan, Alina Bugheșiu (eds.), Proceedings of the Sixth International Conference on Onomastics "Name and Naming".(In)correctness in Onomastics, Cluj-Napoca: Editura Mega, 2024, 984 p.

3. O. Felecan, D. Felecan and A. Bugheșiu, Anthroponymic Implications of Covid-19 and the Underlying Coronavirus, in "B.A.S. British and American Studies", XXX/2024, p. 205-216, DOI: 10.35923/BAS.30.19

4. O. Felecan, Romanian First Names in America: A Synchronic Perspective, în „Onomástica desde América Latina", 4 (2)/2023, p. 1-17.

5. O. Felecan, A. Mihali, Romanian-Ukrainian Anthroponymic Contact on the Interstate Border along the Tisza River, în „Names", vol. 71, nr. 4/2023, p. 5-18, DOI 10.5195/names.2023.2597.

6. O. Felecan, Aurea mediocritas: Heroes and Fake Heroes/Antiheroes in Romanian Hodonymy, în „Studia UBB, Philologia", LXVIII, 3/2023, p. 203-224, DOI:10.24193/subbphilo.2023.3.12

7. O. Felecan, A. Bugheșiu (eds.), Proceedings of the Fifth International Conference on Onomastics "Name and Naming". Multiculturalism in Onomastics, Cluj-Napoca: Editura Mega, 2022, 1074 p.

8. O. Felecan, A Semiotic Perspective on the Presence of Clergy in Romanian Hodonymy, în Monika Kopytowska, Artur Gałkowski, Massimo Leone (Eds.), Thought-Sign-Symbol: Cross-Cultural Representations of Religion. Berlin, Bruxelles, Lausanne, New York, Oxford: Peter Lang, 2022, p. 313-333.

9. O. Felecan, Normare academică în hodonimia românească, în „Studii și cercetări lingvistice" (SCL), LXXIII, nr. 2/2022, p. 226-243.

10.O. Felecan, N. Felecan, Feminine names in current Romanian hodonymy, în „Onomastica" LXV (1)/2021, p.271-287.

11.O. Felecan, A. Bugheșiu (eds.), Names and Naming: Multicultural Aspects, Palgrave Macmillan, 2021, 455 p., DOI: 10.1007/978-3-030-73186-1


Names and Naming
Multicultural Aspects
ONOMASTICS BETWEEN SACRED AND PROFANE
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Areas of expertise

Documentation, evaluation, conservation, rehabilitation, and communication of architectural, urban and landscape-architectural heritage.

Significant Activity and Results

1. 2024-2025: Partners with the owners of churches and historic buildings to promote interventions and disseminate information on projects funded by the Historic Monuments Stamp. The Greek-Catholic church in Săndulești, the tower of the tinkers in the fortress of Sighisoara, the Orthodox church in Năsăud. Preparing funding applications for TMI/IV and V applications. 6 Projects won which will be implemented in 2025. Participants: Imola Kirizsan – responsible, Virgil Pop, Silviu Borș, Alexandru Sabău.

2. 2024: Restoration project for the Tioltiur wooden church. In collaboration with the TUCN - FAU research group ACDS. Virgil Pop, Alina Voinea.

3. 2022 - on-going: Restoration and recording activities of Debreczeni László. Coordinator: Imola Kirizsan.

4. 2022 - on-going: Documentation and critical analysis of rural architectural and environmental heritage. Coordinators: Virgil Pop, Andreea Milea. Researcher: Verona Musteață.

5. 2022 - on-going: Urban renewal through landscape- and heritage-sensitive regeneration of former industrial and infrastructural sites, 2022-2024. Itinerant exhibit around the projects of prof. urbanist Marcel Smets (Belgium), first organised at Cluj, Sept.15 - Oct. 5 2023, in partnership with the contemporary art organisation Centrul de Interes

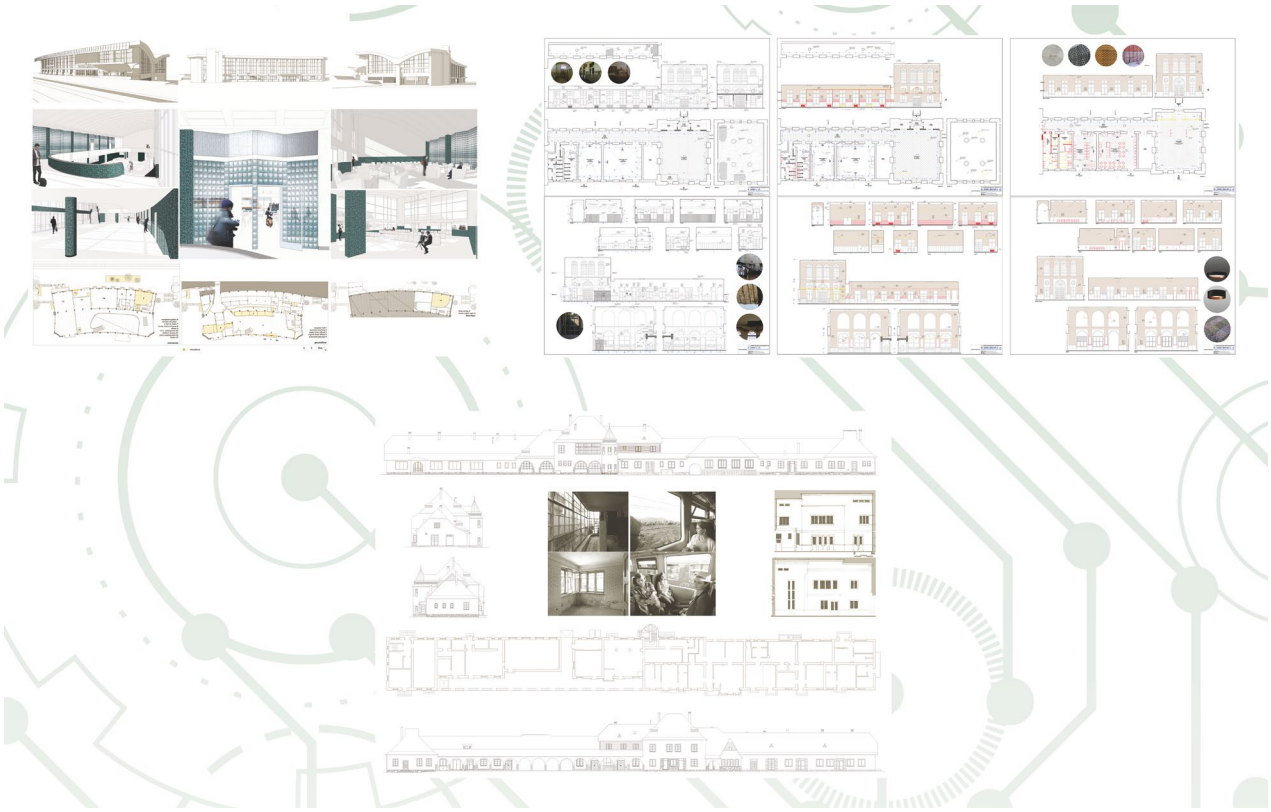
6. 2024. KIRIZSAN, Imola. Guided tours of historic roof structures. FAST Festival for Architecture Schools of Tomorrow, Cluj, Oct. - Nov. 2024.

7. 2024. PURCAR, Cristina, ed. The Art of Urban Design. A critical catalogue of post-industrial regeneration in the work of Marcel Smets / Arta proiectului urban. Catalog critic de regenerare postindustrială în practica lui Marcel Smets. Cluj: Universitatea Tehnica din Cluj Napoca & Centrul de Interes, 2024.

8. 2023. GERGELY, Csenge. "The History and Future of Medieval Szekler Churches." In QUEST10NS: volum dedicat ediției aniversare al Conferinței Internaționale de Arhitectură Quest10ns, 346-61. Cluj-Napoca: U.T.Press, 2023.

9. 2023. PURCAR, Cristina, and Andreea MILEA. “Ruin Figures and Ruin Fields of the Contemporary: The Post-Industrial Parc à fabriques.” studies in History and Theory of Architecture, no. 11 (2023): 225-246.

10. 2022. POP, Virgil. „Biserica de lemn din Calna.” In Calna 700 (coord. Iustin Marchiș), 182-202. București, 2022.



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Dr.Arch. Eugen-Cristian Rus, Dr. Arch. Vlad Nicolae Cocheci; Dr. Dana Maria Mărcuş (licensed in history), Petru Dimoff, photographer.

Areas of expertise

History and theory of architecture
Interdisciplinary studies bordering on theory of architecture, culture theory, psychology, philosophy, and sociology
Miscellaneous studies related to space, spatiality, and interpretations of space Building restoration
Cultural heritage enhancement
Cultural environment and lifestyle
Cultural tourism.

Significant Activity and Results

1. PARTNERSHIP for organising a series of architectural guided tours within FAST - Festival for Architecture Schools of Tomorrow, an international event initiated by The Romanian Order of Architects (Ordinul Arhitecților din România), and hosted by The Faculty of Architecture and Urban Planning of Cluj-Napoca [The Technical University of Cluj-Napoca] period: 31 octombrie 2024;1-2 noiembrie 2024

2. PARTNERSHIP for organising a series of cultural activities within the event „S.O.S. HERITAGE", Sibiu, period: October 2022 – March 2023 partners: Uniunea Arhitecților din România (București) and the Technical University of Cluj-Napoca

3. PARTNERSHIP for colaboration for "the Hand in hand Summer School" ,period: July 2023, partners: Asociația Montessori Hand in Hand and the Technical University of Cluj-Napoca

4. PARTNERSHIPS for research activities within the project "Recomposing fragments: a (micro)history of the Korda de Borosjenő family in context ". period: March 2021 – March 2022, partners: Parohia Reformată Centrală Cluj I and the Technical University of Cluj-Napoca, Muzeul Haáz Rezső in Odorheiu Secuiesc and the Technical University of Cluj-Napoca

5. Julean, Dan-Ionuț; Julean, Dana, "2 X Anna Korda - An Introspective Radiography of Two Historical Paintings. The Portraits of the Last Two Women of Their Kin", Philobiblon, vol. XXIX, Nr. 1 (2024): pp. 19-39. DOI: https://doi.org/10.26424/PHILOBIB.2024.29.1

6. Nicula, Vasilica Cristina (Monahia Epiharia), “Considerații despre biserica de lemn din Dâncu”, în Bioetica de Frontieră; libertatea firescului și firescul mărturisirii (Medicii și Biserica), Vol. XXII, coord. Mircea Gelu Buta, Cluj-Napoca: Editura Renașterea, 2024, pp. 651-666.

7. Nicula, Vasilica Cristina (Monahia Epiharia), “Biserica de lemn din Vechea. Studiu de caz privind stadiul actual de conservare”, Caietele Restaurării, nr. XIII (2024): pp. 358-381.

8. Sas, Maria Alexandra, “Giulio Magni, an architect for the project of the State archives in Bucharest at the end of the 19th century”, Atlanti+, No. 34/1 (2023): pp. 7-22. https://doi.org/10.33700/2670-4579.34.1(2023)

9. Sas, Maria Alexandra, “Sediul central al Arhivelor Naționale fragment de istorie”, Magazin istoric, No. 12 (2023): pp. 16-19.

10.Abos, Ileana Ana, “Patrimoniul între salvare și dispariţie. peisaj și castel: Două castele neoclasice pe Valea Mureșului”, Philohistoriss, Year IX, No. 13 (April, 2023): pp. 189-205;

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PAPERS IN ISI JOURNALS

ISI PUBLICATIONS IN 2024

[1] K. Abbas, N. Balc, S. Bremen, and L. Hedwig, "POLYETHERETHERKETONE (PEEK) IN RAPID TOOLING: ADVANCEMENTS AND APPLICATIONS FOR FUSED FILAMENT FABRICATION OF RUBBER MOLDS," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 1, pp. 13-22, 2024-02-01 2024.

[2] U. Abel, A. Acu, M. Heilmann, and I. Rasa, "Asymptotic expansions for variants of the gamma and Post-Widder operators preserving 1 and xj," *MATHEMATICAL METHODS IN THE APPLIED SCIENCES,* vol. 47, no. 18, pp. 13718-13733, 2024-06-11 2024, doi: 10.1002/mma.10217.

[3] U. Abel, A. Acu, M. Heilmann, and I. Rasa, "Genuine Bernstein-Durrmeyer type operators preserving 1 and xj," *ANNALS OF FUNCTIONAL ANALYSIS,* vol. 15, no. 1, 2024-01-01 2024, Art no. 4, doi: 10.1007/s43034-023-00305-w.

[4] U. Abel, A. Acu, M. Heilmann, and I. Rasa, "Voronovskaja formula for Aldaz-Kounchev-Render operators: uniform convergence," *ANALYSIS AND MATHEMATICAL PHYSICS,* vol. 14, no. 1, 2024-02-01 2024, Art no. 2, doi: 10.1007/s13324-023-00861-3.

[5] A. Acu, J. Adell, and I. Rasa, "EXPLICIT UPPER BOUNDS FOR TOUCHARDPOLYNOMIALS AND BELL NUMBERS," *ACTA MATHEMATICA HUNGARICA,* vol. 172, no. 1, pp. 255-263, 2024-01-31 2024, doi: 10.1007/s10474-024-01401-6.

[6] A. Acu, S. De Marchi, and I. Rasa, "Aldaz-Kounchev-Render operators on simplices," *JOURNAL OF MATHEMATICAL ANALYSIS AND APPLICATIONS,* vol. 533, no. 2, 2024-01-16 2024, Art no. 128072, doi: 10.1016/j.jmaa.2023.128072.

[7] A. Acu, M. Heilmann, I. Rasa, and A. Steopoaie, "VORONOVSKAJA TYPE RESULTS FOR THE ALDAZ-KOUNCHEV-RENDER VERSIONS OF GENERALIZED BASKAKOV OPERATORS," *APPLICABLE ANALYSIS AND DISCRETE MATHEMATICS,* vol. 18, no. 2, pp. 408-417, 2024-10-01 2024, doi: 10.2298/AADM230725016A.

[8] A. Acu, I. Rasa, and F. Sofonea, "Composition of some positive linear integral operators," *DEMONSTRATIO MATHEMATICA,* vol. 57, no. 1, 2024-10-01 2024, Art no. 20240018, doi: 10.1515/dema-2024-0018.

[9] A. Acu, I. Rasa, and A. Steopoaie, "Bernstein-Kantorovich operators, approximation and shape preserving properties," *REVISTA DE LA REAL ACADEMIA DE CIENCIAS EXACTAS FISICAS Y NATURALES SERIE A-MATEMATICAS,* vol. 118, no. 3, 2024-07-01 2024, Art no. 107, doi: 10.1007/s13398-024-01605-z.

[10] C. Adascalitei, R. Martis, P. Karaisas, and C. Martis, "In-Depth Exploration of Design and Analysis for PM-Assisted Synchronous Reluctance Machines: Implications for Light Electric Vehicles," *MACHINES,* vol. 12, no. 6, 2024-06-01 2024, Art no. 361, doi: 10.3390/machines12060361.

[11] B. Adhikari, J. Veetaseveera, V. Varma, I. Morarescu, and E. Panteley, "Computationally efficient guaranteed cost control design for homogeneous clustered networks," *AUTOMATICA,* vol. 163, 2024-02-22 2024, Art no. 111588, doi: 10.1016/j.automatica.2024.111588.

[12] W. Afzal, M. Abbas, D. Breaz, and L. Cotîrla, "Fractional Hermite-Hadamard, Newton-Milne, and Convexity Involving Arithmetic-Geometric Mean-Type Inequalities in Hilbert and Mixed-Norm Morrey Spaces ℓq()(Mp(),v()) with Variable Exponents," *FRACTAL AND FRACTIONAL,* vol. 8, no. 9, 2024-09-01 2024, Art no. 518, doi: 10.3390/fractalfract8090518.

[13] W. Afzal, D. Breaz, M. Abbas, L. Cotirla, Z. Khan, and E. Rapeanu, "Hyers-Ulam Stability of 2D-Convex Mappings and Some Related New Hermite-Hadamard, Pachpatte, and Fejér Type Integral Inequalities Using Novel Fractional Integral Operators via Totally Interval-Order Relations with Open Problem," *MATHEMATICS,* vol. 12, no. 8, 2024-04-01 2024, Art no. 1238, doi: 10.3390/math12081238.

[14] S. Ahmed and A. Magurean, "Renewable Energy Communities: Towards a new sustainable model of energy production and sharing," *ENERGY STRATEGY REVIEWS,* vol. 55, 2024-09-06 2024, Art no. 101522, doi: 10.1016/j.esr.2024.101522.

[15] R. Akinola, A. Shokri, J. Sunday, D. Marian, and O. Akinlabi, "Comparing the Performance of Two Butcher-Based Block Hybrid Algorithms for the Solution of Initial Value Problems," *AXIOMS,* vol. 13, no. 3, 2024-03-01 2024, Art no. 165, doi: 10.3390/axioms13030165.

[16] M. Akram, U. Ishtiaq, K. Ahmad, T. Lazar, V. Lazar, and L. Guran, "Some Generalized Neutrosophic Metric Spaces and Fixed Point Results with Applications," *SYMMETRY-BASEL,* vol. 16, no. 8, 2024-08-01 2024, Art no. 965, doi: 10.3390/sym16080965.

[17] I. Aktas and L. Cotîrlâ, "Certain Geometrical Properties and Hardy Space of Generalized k-Bessel Functions," *SYMMETRY-BASEL,* vol. 16, no. 12, 2024-12-01 2024, Art no. 1597, doi: 10.3390/sym16121597.

[18] A. Alexan, A. Alexan, and S. Oniga, "Real-Time Machine Learning for Human Activities Recognition Based on Wrist-Worn Wearable Devices," *APPLIED SCIENCES-BASEL,* vol. 14, no. 1, 2024-01-01 2024, Art no. 329, doi: 10.3390/app14010329.

[19] I. Alexandrescu, R. Cotetiu, and S. Haragâs, "EXPERIMENTAL RESEARCH ON SHOCK ABSORPTION IN THE LUBRICATING FILM AT THE NARROW HD RADIAL BEARING," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 4, pp. 609-614, 2024-11-01 2024.

[20] M. Alharbi *et al.*, "PHOTOCATALYTIC PERFORMANCES OF DIP-COATED Ag DOPED TIO2 THIN FILMS," *ARCHIVES OF METALLURGY AND MATERIALS,* vol. 69, no. 3, pp. 987-996, 2024-01-01 2024, doi: 10.24425/amm.2024.150919.

[21] N. Alhouiti, F. Mofarreh, F. Alghamdi, A. Ali, and L. Piscoran, "Geometric topology of CR-warped products in six-dimensional sphere," *AIMS MATHEMATICS,* vol. 9, no. 9, pp. 25114-25126, 2024-01-01 2024, doi: 10.3934/math.20241224.

[22] D. Alkhorshid, E. Tognetti, and I. Morarescu, "Saturated control of consensus value under energy and state constraints in multi-agent systems☆," *AUTOMATICA,* vol. 169, 2024-08-07 2024, Art no. 111822, doi: 10.1016/j.automatica.2024.111822.

[23] H. Alohali, V. Breaz, O. Alsalami, L. Cotirla, and A. Alamer, "Generalization of the Fuzzy Fejer-Hadamard Inequalities for Non-Convex Functions over a Rectangle Plane," *AXIOMS,* vol. 13, no. 10, 2024-10-01 2024, Art no. 684, doi: 10.3390/axioms13100684.

[24] G. Andreica, G. Tabacar, D. Zinca, I. Ivanciu, and V. Dobrota, "Denial of Service Attack Prevention and Mitigation for Secure Access in IoT GPS-based Intelligent Transportation Systems," *ELECTRONICS,* vol. 13, no. 14, 2024-07-01 2024, Art no. 2693, doi: 10.3390/electronics13142693.

[25] T. Antal, "GENERALIZATION BY PARAMETERIZATION WITH ASSOCIATED ARRAYS, IN PHP, IN A MANIPULATOR COMPUTATION," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 1, pp. 13-18, 2024-03-01 2024.

[26] G. Antonesi, A. Rancea, T. Cioara, and I. Anghel, "Graph Learning and Deep Neural Network Ensemble for Supporting Cognitive Decline Assessment," *TECHNOLOGIES,* vol. 12, no. 1, 2024-01-01 2024, Art no. 3, doi: 10.3390/technologies12010003.

[27] G. Arcas, T. Cioara, and I. Anghel, "Whale Optimization for Cloud-Edge-Offloading Decision-Making for Smart Grid Services," *BIOMIMETICS,* vol. 9, no. 5, 2024-05-01 2024, Art no. 302, doi: 10.3390/biomimetics9050302.

[28] E. Ardelean, R. Portase, R. Potolea, and M. Dinsoreanu, "A path-based distance computation for non-convexity with applications in clustering," *KNOWLEDGE AND INFORMATION SYSTEMS,* vol. 67, no. 2, pp. 1415-1453, 2024-11-01 2025, doi: 10.1007/s10115-024-02275-4.

[29] H. Attouch and S. László, "Convex optimization via inertial algorithms with vanishing Tikhonov regularization: fast convergence to the minimum norm solution," *MATHEMATICAL METHODS OF OPERATIONS RESEARCH,* vol. 99, no. 3, pp. 307-347, 2024-06-27 2024, doi: 10.1007/s00186-024-00867-y.

[30] S. Avram, B. Birle, L. Tudoran, G. Borodi, and I. Petean, "Investigation of Used Water Sediments from Ceramic Tile Fabrication," *WATER,* vol. 16, no. 7, 2024-04-01 2024, Art no. 1027, doi: 10.3390/w16071027.

[31] S. Avram, D. Platon, L. Tudoran, G. Borodi, and I. Petean, "Mineral Powder Extraction by the Natural Drying of Water from the Public Springs in Borsec," *APPLIED SCIENCES-BASEL,* vol. 14, no. 23, 2024-12-01 2024, Art no. 10806, doi: 10.3390/app142310806.

[32] S. Avram, L. Tudoran, S. Cuc, G. Borodi, B. Birle, and I. Petean, "Conditioning Influence of Kaolinite Matrices on Flexural Strength of Raw Pressed Slurry Collected from Ceramic Tile Production Wastewater," *JOURNAL OF COMPOSITES SCIENCE,* vol. 8, no. 6, 2024-06-01 2024, Art no. 219, doi: 10.3390/jcs8060219.

[33] S. Avram, L. Tudoran, S. Cuc, G. Borodi, B. Birle, and I. Petean, "Microstructural Investigations Regarding Sustainable Recycling of Ceramic Slurry Collected from Industrial Waste Waters," *SUSTAINABILITY,* vol. 16, no. 3, 2024-02-01 2024, Art no. 1123, doi: 10.3390/su16031123.

[34] S. Avram, L. Tudoran, S. Cuc, G. Borodi, B. Birle, and I. Petean, "Natural Fiber Reinforcement of Ceramic Slurry Compacts," *JOURNAL OF COMPOSITES SCIENCE,* vol. 8, no. 12, 2024-12-01 2024, Art no. 542, doi: 10.3390/jcs8120542.

[35] A. Babau, V. Micle, G. Damian, and I. Sur, "Lead and copper removal from sterile dumps by phytoremediation with Robinia pseudoacacia," *SCIENTIFIC REPORTS,* vol. 14, no. 1, 2024-04-29 2024, Art no. 9842, doi: 10.1038/s41598-024-60412-z.

[36] I. Baidoc and L. Bacali, "SYNERGISTIC IMPACT OF LEAN PRACTICES AND INDUSTRY 4.0 TECHNOLOGIES ON ORGANIZATIONAL PERFORMANCE IN THE ROMANIAN AUTOMOTIVE SECTOR," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 2, pp. 239-248, 2024-06-01 2024.

[37] D. Baila *et al.*, "3D printing of personalised stents using new advanced photopolymerizable resins and Ti-6Al-4V alloy," *RAPID PROTOTYPING JOURNAL,* vol. 30, no. 4, pp. 696-710, 2024-03-19 2024, doi: 10.1108/RPJ-10-2023-0360.

[38] Y. Bammou *et al.*, "Machine learning models for gully erosion susceptibility assessment in the Tensift catchment, Haouz Plain, Morocco for sustainable development," *JOURNAL OF AFRICAN EARTH SCIENCES,* vol. 213, 2024-03-20 2024, Art no. 105229, doi: 10.1016/j.jafrearsci.2024.105229.

[39] Y. Bammou *et al.*, "Spatial Mapping for Multi-Hazard Land Management in Sparsely Vegetated Watersheds Using Machine Learning Algorithms," *ENVIRONMENTAL EARTH SCIENCES,* vol. 83, no. 15, 2024-07-01 2024, Art no. 447, doi: 10.1007/s12665-024-11741-9.

[40] Y. Bammou *et al.*, "Optimizing flood susceptibility assessment in semi-arid regions using ensemble algorithms: a case study of Moroccan High Atlas," *NATURAL HAZARDS,* vol. 120, no. 8, pp. 7787-7816, 2024-03-21 2024, doi: 10.1007/s11069-024-06550-z.

[41] D. Baranyai, S. Oniga, B. Gyongyosi, B. Ujvari, and A. Mohamed, "Module Tester for Positron Emission Tomography and Particle Physics," *ELECTRONICS,* vol. 13, no. 15, 2024-08-01 2024, Art no. 3066, doi: 10.3390/electronics13153066.

[42] R. Barboza *et al.*, "EFFECT OF ULTRASOUND ON THE THERMAL, STRUCTURAL, PASTING AND MORPHOLOGICAL PROPERTIES OF MARANTA ARUNDINACEA STARCH," *CARPATHIAN JOURNAL OF FOOD SCIENCE AND TECHNOLOGY,* vol. 16, no. 1, 2024-01-01 2024, doi: 10.34302/crpjfst/2024.16.1.11.

[43] D. Barta, I. Simion, A. Tiuc, and O. Vasile, "Mycelium-Based Composites as a Sustainable Solution for Waste Management and Circular Economy," *MATERIALS,* vol. 17, no. 2, 2024-01-01 2024, Art no. 404, doi: 10.3390/ma17020404.

[44] O. Bashir *et al.*, "Mathematical vs. machine learning models for particle size distribution in fragile soils of North-Western Himalayas," *JOURNAL OF SOILS AND SEDIMENTS,* vol. 24, no. 6, pp. 2294-2308, 2024-06-06 2024, doi: 10.1007/s11368-024-03820-y.

[45] M. Bekheet, M. Sallah, N. Alghamdi, R. Rusu-Both, A. Elgarayhi, and M. Elmogy, "Cardiac Fibrosis Automated Diagnosis Based on FibrosisNet Network Using CMR Ischemic Cardiomyopathy," *DIAGNOSTICS,* vol. 14, no. 3, 2024-02-01 2024, Art no. 255, doi: 10.3390/diagnostics14030255.

[46] G. Ben Othman *et al.*, "Sustainability and predictive accuracy evaluation of gel and embroidered electrodes for ECG monitoring," *BIOMEDICAL SIGNAL PROCESSING AND CONTROL,* vol. 96, 2024-07-18 2024, Art no. 106632, doi: 10.1016/j.bspc.2024.106632.

[47] G. Ben Othman *et al.*, "Artificial Intelligence-Driven Prognosis of Respiratory Mechanics: Forecasting Tissue Hysteresivity Using Long Short-Term Memory and Continuous Sensor Data," *SENSORS,* vol. 24, no. 17, 2024-09-01 2024, Art no. 5544, doi: 10.3390/s24175544.

[48] R. Benadli, A. Houari, N. Ait-Ahmed, S. Motahhir, A. Pop, and S. El Hani, "Robust integral super-twisting controller for enhanced photovoltaic integration with hybrid battery and supercapacitor storage in DC microgrid," *RESULTS IN ENGINEERING,* vol. 24, 2024-10-04 2024, Art no. 103009, doi: 10.1016/j.rineng.2024.103009.

[49] Y. Benali *et al.*, "A new porous composite hydroxyapatite/chitosan/microcrystalline-cellulose: synthesis, characterization and application to the adsorption of Eriochrome Black T," *POLYMER BULLETIN,* vol. 81, no. 18, pp. 16875-16902, 2024-09-12 2024, doi: 10.1007/s00289-024-05496-3.

[50] A. Berar, M. Dudescu, M. Carbonel, V. Bocanet, and S. Buduru, "IN-VITRO COMPARATIVE STUDY OF COMPRESSIVE STRENGTH IN CAD/CAM DENTAL MATERIALS," *ROMANIAN JOURNAL OF ORAL REHABILITATION,* vol. 16, no. 2, pp. 119-134, 2024-04-01 2024, doi: 10.6261/RJOR.2024.2.16.13.

[51] M. Berca and I. Tulbure, "ANALYZING AND ASSESSING THE ENVIRONMENTAL IMPACTS OF ENERGY PRODUCTION," *ENVIRONMENT PROTECTION ENGINEERING,* vol. 50, no. 3, pp. 27-39, 2024-01-01 2024, doi: 10.37190/epe240302.

[52] P. Bere, C. Dudescu, M. Parparit, and C. Vilau, "DESIGN AND MANUFACTURE OF BENT AND VARIABLE SECTION TUBES MADE OF FRP COMPOSITE," *MM SCIENCE JOURNAL,* vol. 2024, pp. 7511-7517, 2024-10-01 2024, doi: 10.17973/MMSJ.2024_10_2024071.

[53] V. Berinde, "A Projection-Type Implicit Algorithm for Finding a Common Solution for Fixed Point Problems and Variational Inequality Problems," *MATHEMATICS,* vol. 12, no. 20, 2024-10-01 2024, Art no. 3187, doi: 10.3390/math12203187.

[54] V. Berinde, "An inertial self-adaptive algorithm for solving split feasibility problems and fixed point problems in the class of demicontractive mappings," *JOURNAL OF INEQUALITIES AND APPLICATIONS,* vol. 2024, no. 1, 2024-06-11 2024, Art no. 82, doi: 10.1186/s13660-024-03155-9.

[55] V. Berinde, "Existence and approximation of fixed points of enriched contractions in quasi-Banach spaces," *CARPATHIAN JOURNAL OF MATHEMATICS,* vol. 40, no. 2, pp. 263-274, 2024-01-01 2024, doi: 10.37193/CJM.2024.02.03.

[56] V. Berinde and K. Saleh, "An Averaged Halpern-Type Algorithm for Solving Fixed-Point Problems and Variational Inequality Problems," *AXIOMS,* vol. 13, no. 11, 2024-11-01 2024, Art no. 756, doi: 10.3390/axioms13110756.

[57] V. Berinde and K. Saleh, "New averaged type algorithms for solving split common fixed point problems for demicontractive mappings," *ARABIAN JOURNAL OF MATHEMATICS,* vol. 13, no. 3, pp. 679-688, 2024-10-05 2024, doi: 10.1007/s40065-024-00476-x.

[58] Z. Berinde and C. Butean, "Robust mathematical models of structure and quantitative structure-property relationship studies of alkyl halides," *CARPATHIAN JOURNAL OF MATHEMATICS,* vol. 40, no. 3, pp. 607-622, 2024-01-01 2024, doi: 10.37193/CJM.2024.03.04.

[59] S. Bilasco *et al.*, "Spatial Analysis of Creative Industries for Urban Functional Zones: A GIS-Based Comparative Study in Eastern European Regional Centres: Cluj-Napoca (Romania) and Pécs (Hungary)," *APPLIED SCIENCES-BASEL,* vol. 14, no. 3, 2024-02-01 2024, Art no. 1088, doi: 10.3390/app14031088.

[60] C. Birleanu, M. Cioaza, F. Serdean, M. Pustan, P. Bere, and G. Contiu, "Tribological Investigation of Glass Fiber Reinforced Polymer Composites against 52100 Chrome Alloy Steel Based on ELECTRE Decision-Making Method," *POLYMERS,* vol. 16, no. 1, 2024-01-01 2024, Art no. 62, doi: 10.3390/polym16010062.

[61] I. Birlescu *et al.*, "Modeling and analysis of a parallel robotic system for lower limb rehabilitation with predefined operational workspace," *MECHANISM AND MACHINE THEORY,* vol. 198, 2024-05-10 2024, Art no. 105674, doi: 10.1016/j.mechmachtheory.2024.105674.

[62] K. Biruk-Urban, P. Bere, R. Udroiu, J. Józwik, and K. Beer-Lech, "Understanding the Effect of Drilling Parameters on Hole Quality of Fiber-Reinforced Polymer Structures," *POLYMERS,* vol. 16, no. 16, 2024-08-01 2024, Art no. 2370, doi: 10.3390/polym16162370.

[63] A. Bitang, V. Bitang, V. Grosu, A. Ciorsac, and A. Isvoran, "ADMET profiles of selected anabolic steroid derivatives," *JOURNAL OF THE SERBIAN CHEMICAL SOCIETY,* vol. 89, no. 3, pp. 367-382, 2024-01-01 2024, doi: 10.2298/JSC230803086B.

[64] B. Blaga and S. Nedevschi, "Semantic Segmentation of Remote Sensing Images With Transformer-Based U-Net and Guided Focal-Axial Attention," *IEEE JOURNAL OF SELECTED TOPICS IN APPLIED EARTH OBSERVATIONS AND REMOTE SENSING,* vol. 17, pp. 18303-18318, 2024-01-01 2024, doi: 10.1109/JSTARS.2024.3470316.

[65] M. Bocos *et al.*, "Mentoring and metacognition-Interferences and interdependencies," *JOURNAL OF INFRASTRUCTURE POLICY AND DEVELOPMENT,* vol. 8, no. 2, 2024-01-01 2024, Art no. 2859, doi: 10.24294/jipd.v8i2.2859.

[66] G. Boczor, D. Fratila, and A. Popescu, "APPROACH ON THE PREVENTION AND METHODS OF ELIMINATING DEFECTS OCCURRING IN THE SELECTIVE COATING PROCESS USING A 1K MATERIAL," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 1, pp. 173-178, 2024-02-01 2024.

[67] F. Bode, T. Joldos, G. Sirbu, P. Danca, C. Cosoiu, and I. Nastase, "Innovative High-Induction Air Diffuser for Enhanced Air Mixing in Vehicles and Personalized Ventilation Applications," *ENERGIES,* vol. 17, no. 12, 2024-06-01 2024, Art no. 2930, doi: 10.3390/en17122930.

[68] F. Bode, T. Joldos, G. Sirbu, P. Danca, I. Nastase, and C. Cosoiu, "Impact of realistic boundary conditions on CFD simulations: A case study of vehicle ventilation," *BUILDING AND ENVIRONMENT,* vol. 267, 2024-11-07 2025, Art no. 112264, doi: 10.1016/j.buildenv.2024.112264.

[69] L. Bolundut *et al.*, "Influence of Sm2O3/AgNPs Addition on the Properties of Lithium-Borate Glass-Ceramic System," *ANALYTICAL LETTERS,* vol. 58, no. 3, pp. 364-373, 2024-03-02 2025, doi: 10.1080/00032719.2024.2326173.

[70] A. Botean, "ANALYSIS OF THE THERMAL EXPANSION COEFFICIENT OF ANISOTROPIC SOLIDS: APPLICATION TO CALCIUM SILICATE - PART I - INTRODUCTION TO MEASUREMENT METHODOLOGY," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 4, pp. 615-628, 2024-11-01 2024.

[71] A. Botean, "ANALYSIS OF THE THERMAL EXPANSION COEFFICIENT OF ANISOTROPIC SOLIDS: APPLICATION TO CALCIUM SILICATE - PART II - EVALUATION OF THE EXPERIMENTAL DATA," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 4, pp. 629-638, 2024-11-01 2024.

[72] A. Botean, "APPROXIMATION OF THE ELASTIC CURVE DIFFERENTIAL EQUATION BY TRIGONOMETRIC SERIES FOR AN ISOTROPIC BEAM WITH A CONSTANT MOMENT OF INERTIA, COMPLEXLY LOADED, ACCORDING TO THE EULER-BERNOULLI THEORY," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 1, pp. 55-68, 2024-03-01 2024.

[73] R. Bouaru, A. Peculea, B. Iancu, S. Buzura, E. Cebuc, and V. Dadarlat, "Analysis of a Bluetooth Traffic Dataset Obtained during University Examination Sessions," *DATA,* vol. 9, no. 4, 2024-04-01 2024, Art no. 49, doi: 10.3390/data9040049.

[74] M. Bouleryah, A. Ali, and P. Laurian-Ioan, "Infinite Dimensional Maximal Torus Revisited," *MATHEMATICS,* vol. 12, no. 23, 2024-12-01 2024, Art no. 3829, doi: 10.3390/math12233829.

[75] S. Braun *et al.*, "Investigation of morphology and volume phase transition of supramacromolecular microgels by NMR spectroscopy and quartz crystal microbalance," *JOURNAL OF POLYMER SCIENCE,* vol. 62, no. 11, pp. 2301-2319, 2024-03-07 2024, doi: 10.1002/pol.20230852.

[76] M. Bud, M. Nedelcu, I. Moldovan, and E. Figueiredo, "Hybrid Approach for Supervised Machine Learning Algorithms to Identify Damage in Bridges," *JOURNAL OF BRIDGE ENGINEERING,* vol. 29, no. 8, 2024-08-01 2024, Art no. 04024056, doi: 10.1061/JBENF2.BEENG-6537.

[77] T. Buidin and F. Mariasiu, "Effects of using fireproof thermal management systems on the lifespan of battery cells," *CASE STUDIES IN THERMAL ENGINEERING,* vol. 57, 2024-04-06 2024, Art no. 104347, doi: 10.1016/j.csite.2024.104347.

[78] R. Buta, A. Pastrav, P. Dolea, C. Codau, T. Palade, and E. Puschita, "SDR-Based Ku-Band Multifeed Receiver for SST," *IEEE ACCESS,* vol. 12, pp. 110626-110641, 2024-01-01 2024, doi: 10.1109/ACCESS.2024.3430046.

[79] C. Butin, Y. Aoustin, D. Gouaillier, and D. Chablat, "Design of an Efficient Non-Backdrivable Mechanism With Wrap Spring for Hand Prosthesis," *JOURNAL OF MECHANISMS AND ROBOTICS-TRANSACTIONS OF THE ASME,* vol. 16, no. 10, 2024-10-01 2024, Art no. 101015, doi: 10.1115/1.4064739.

[80] V. Calofir, R. Munteanu, M. Simoiu, and K. Lemnaru, "Innovative approach to estimate structural damage using linear regression and K-nearest neighbors machine learning algorithms," *RESULTS IN ENGINEERING,* vol. 22, 2024-05-17 2024, Art no. 102250, doi: 10.1016/j.rineng.2024.102250.

[81] R. Calota, F. Bode, M. Souliotis, C. Croitoru, and P. Fokaides, "Bridging the gap: Discrepancies in energy efficiency and smart readiness of buildings," *ENERGY REPORTS,* vol. 12, pp. 5886-5898, 2024-11-28 2024, doi: 10.1016/j.egyr.2024.11.060.

[82] R. Calota *et al.*, "A Novel Concept of Nano-Enhanced Phase Change Material," *MATERIALS,* vol. 17, no. 17, 2024-09-01 2024, Art no. 4268, doi: 10.3390/ma17174268.

[83] A. Câmpean *et al.*, "Examining Teachers' Perception on the Impact of Positive Feedback on School Students," *EDUCATION SCIENCES,* vol. 14, no. 3, 2024-03-01 2024, Art no. 257, doi: 10.3390/educsci14030257.

[84] A. Capata, "Generalized Vector Quasi-Equilibrium Problems," *MATHEMATICS,* vol. 12, no. 6, 2024-03-01 2024, Art no. 809, doi: 10.3390/math12060809.

[85] H. Carausan, B. Varga, D. Moldovanu, G. Prunean, and I. Oarga, "Energy Efficiency Analysis of a Fuel Cell Bus Model Using Real Scenarios Generated by Data Collection," *SUSTAINABILITY,* vol. 16, no. 5, 2024-03-01 2024, Art no. 1863, doi: 10.3390/su16051863.

[86] A. Carolino *et al.*, "Virus adsorbent systems based on Amazon holocellulose and nanomaterials," *MICROSCOPY RESEARCH AND TECHNIQUE,* vol. 87, no. 8, pp. 1933-1954, 2024-04-02 2024, doi: 10.1002/jemt.24566.

[87] S. Catalin *et al.*, "Recycled Aggregates Influence on the Mechanical Properties of Cement Lime-Based Mortars," *MATERIALS,* vol. 17, no. 20, 2024-10-01 2024, Art no. 5122, doi: 10.3390/ma17205122.

[88] V. Cheimaras *et al.*, "Low-Cost, Open-Source, Experimental Setup Communication Platform for Emergencies, Based on SD-WAN Technology," *TELECOM,* vol. 5, no. 2, pp. 347-368, 2024-06-01 2024, doi: 10.3390/telecom5020018.

[89] R. Chelcea, D. Moldovan, S. Nicoara, C. Katler, and R. Fechete, "Characterization of a Simulated Martian Regolith Ecosystem by Proton Nuclear Magnetic Resonance (NMR) Relaxometry and Fourier Transform Infrared (FT-IR) and Visible (VIS)-Near-Infrared (NIR) Spectroscopies," *ANALYTICAL LETTERS,* 2024-05-17 2024, doi: 10.1080/00032719.2024.2357688.

[90] I. Chereches, F. Gaspar, and I. Danci, "DESIGNING AND CALIBRATION OF A LOW-COST MULTI-POINT SOIL MOISTURE MONITORING SYSTEM FOR PRECISION AGRICULTURE," *INMATEH-AGRICULTURAL ENGINEERING,* vol. 72, no. 1, pp. 245-254, 2024-01-01 2024, doi: 10.35633/inmateh-72-23.

[91] L. Cheregi, M. Iliyas, and M. Mursaleen, "Approximation by Stancu-type operators on a triangular domain with curved sides," *FILOMAT,* vol. 38, no. 10, pp. 3453-3465, 2024-01-01 2024, doi: 10.2298/FIL2410453C.

[92] L. Cheregi and M. Mursaleen, "Approximation of complex q-Beta-Baskakov-Szasz-Stancu operators in compact disk," *DEMONSTRATIO MATHEMATICA,* vol. 57, no. 1, 2024-05-30 2024, Art no. 20230158, doi: 10.1515/dema-2023-0158.

[93] F. Chetan, E. Dulf, T. Rusu, C. Chetan, and A. Simon, "TEMPERATURE AND PRECIPITATION FORECAST FOR WESTERN TRANSYLVANIAN PLAINS USING ARTIFICIAL INTELLIGENCE," *AGROLIFE SCIENTIFIC JOURNAL,* vol. 13, no. 1, pp. 41-53, 2024-06-01 2024.

[94] L. Chifor *et al.*, "Modeling and Simulation of the Operation of an 18O Isotope Separation Cascade using Artificial Intelligence," *CONTROL ENGINEERING AND APPLIED INFORMATICS,* vol. 26, no. 4, pp. 81-89, 2024-01-01 2024.

[95] V. Chifu, T. Cioara, C. Pop, H. Rusu, and I. Anghel, "Deep Q-Learning-Based Smart Scheduling of EVs for Demand Response in Smart Grids," *APPLIED SCIENCES-BASEL,* vol. 14, no. 4, 2024-02-01 2024, Art no. 1421, doi: 10.3390/app14041421.

[96] D. Chilom *et al.*, "Influence of dancesport on segmental coordination development in 6-8-year-old children," *PEDAGOGY OF PHYSICAL CULTURE AND SPORTS,* vol. 28, no. 2, pp. 147-155, 2024-01-01 2024, doi: 10.15561/26649837.2024.0209.

[97] I. Chindris and T. Hoda, "Effect of Bolts Overloading in Flange-Type Joints," *JOURNAL OF APPLIED ENGINEERING SCIENCES,* vol. 14, no. 1, pp. 65-70, 2024-05-01 2024, doi: 10.2478/jaes-2024-0008.

[98] C. Chiorean, "Computational issues in biaxial bending capacity assessment of RC and composite cross-sections exposed to fire," *COMPUTERS & STRUCTURES,* vol. 302, 2024-07-22 2024, Art no. 107477, doi: 10.1016/j.compstruc.2024.107477.

[99] S. Chiribau-vitlinger, V. Vizitiu, A. Mihail, D. Dragomir, and M. Dragomir, "FAILURE RISK ANALYSIS IN THE CASE OF AN AEROSPACE MANUFACTURING COMPANY USING COMPOSITE MATERIALS," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 3, pp. 479-484, 2024-09-01 2024.

[100] O. Chiver, I. Sugar, and L. Neamt, "Study on the Selection of Electric Motor/Engine on the Performance of Hybrid Vehicles," *ENERGIES,* vol. 17, no. 14, 2024-07-01 2024, Art no. 3529, doi: 10.3390/en17143529.

[101] H. Chuyen, T. Minh, Q. Phu, L. Giurgiulescu, and D. Nguyen, "MATHEMATICAL MODEL STUDY TO OPTIMIZE THE FREEZE DRYING PROCESS FOR PRODUCTION OF DRIED YOGURT," *CARPATHIAN JOURNAL OF FOOD SCIENCE AND TECHNOLOGY,* vol. 16, no. 4, 2024-01-01 2024, doi: 10.34302/crpjfst/2024.16.4.12.

[102] Z. Çiftci, M. Coskun, Ç. Yildiz, L. Cotîrla, and D. Breaz, "On New Generalized Hermite-Hadamard-Mercer-Type Inequalities for Raina Functions," *FRACTAL AND FRACTIONAL,* vol. 8, no. 8, 2024-08-01 2024, Art no. 472, doi: 10.3390/fractalfract8080472.

[103] V. Cimpoies and M. Dudescu, "NUMERICAL AND EXPERIMENTAL STIFFNESS EVALUATION OF QUILLING INSPIRED STRUCTURES," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 1, pp. 81-88, 2024-03-01 2024.

[104] M. Ciotlaus, G. Kollo, C. Fenesan, A. Danciu, M. Dragomir, and V. Marusceac, "Rail Wear Evolution on Small-Radius Curves under Mixed Traffic Conditions, In-Field Investigations," *APPLIED SCIENCES-BASEL,* vol. 14, no. 1, 2024-01-01 2024, Art no. 209, doi: 10.3390/app14010209.

[105] C. Ciupan and M. Ciupan, "DESIGNING A LINE FOR THE CONTINUOUS THERMOFORMING OF BOARDS MADE OF COMPOSITE MATERIALS," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 1, pp. 413-420, 2024-02-01 2024.

[106] E. Ciupan and M. Ciupan, "SOFTWARE SYSTEM FOR SELECTING THE COMPOSITE MATERIAL USED TO MANUFACTURE UPHOLSTERED FURNITURE," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 1, pp. 421-428, 2024-02-01 2024.

[107] C. Codau, R. Buta, A. Pastrav, P. Dolea, T. Palade, and E. Puschita, "Experimental Evaluation of an SDR-Based UAV Localization System," *SENSORS,* vol. 24, no. 9, 2024-05-01 2024, Art no. 2789, doi: 10.3390/s24092789.

[108] O. Cojocariu-Oltean, M. Tripa, I. Baraian, D. Rotaru, and M. Suciu, "About Calculus Through the Transfer Matrix Method of a Beam with Intermediate Support with Applications in Dental Restorations," *MATHEMATICS,* vol. 12, no. 23, 2024-12-01 2024, Art no. 3861, doi: 10.3390/math12233861.

[109] O. Cojocariu-oltean, M. Tripa, I. Baraian, D. Rotaru, and M. Suciu, "CALCULUS OF A MONOBLOC DENTAL BRIDGE WITH TWO POLES AND TWO MISSING TEETH AS A BEAM, BY TRANSFER-MATRIX METHOD," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 2, pp. 275-282, 2024-06-01 2024.

[110] C. Constantinescu *et al.*, "Numerical Modeling, Analysis, and Optimization of RFID Tags Functioning at Low Frequencies," *APPLIED SCIENCES-BASEL,* vol. 14, no. 20, 2024-10-01 2024, Art no. 9544, doi: 10.3390/app14209544.

[111] H. Constantinescu and T. Toader, "Structural Design and Technology of Pocket Foundations for Long Precast Concrete Columns in Seismic Areas," *BUILDINGS,* vol. 14, no. 11, 2024-11-01 2024, Art no. 3466, doi: 10.3390/buildings14113466.

[112] M. Coskun, Ç. Yildiz, and L. Cotîrla, "Novel Estimations of Hadamard-Type Integral Inequalities for Raina's Fractional Operators," *FRACTAL AND FRACTIONAL,* vol. 8, no. 5, 2024-05-01 2024, Art no. 302, doi: 10.3390/fractalfract8050302.

[113] O. Cosma, P. Pop, and L. Cosma, "A comparative study of neural network architectures for software vulnerability forecasting," *LOGIC JOURNAL OF THE IGPL,* 2024-05-14 2024, doi: 10.1093/jigpal/jzae075.

[114] O. Cosma, P. Pop, and L. Cosma, "A novel memetic algorithm for solving the generalized traveling salesman problem," *LOGIC JOURNAL OF THE IGPL,* vol. 32, no. 4, pp. 576-588, 2024-03-24 2024, doi: 10.1093/jigpal/jzae019.

[115] M. Costandin and B. Gavrea, "A polynomial algorithm for some instances of NP-complete problems," *STUDIA UNIVERSITATIS BABES-BOLYAI MATHEMATICA,* vol. 69, no. 1, pp. 233-244, 2024-01-01 2024, doi: 10.24193/subbmath.2024.1.15.

[116] L. Cotîrla and R. Szász, "ON THE GENERAL CASE OF BRANNAN CONJECTURE," *JOURNAL OF MATHEMATICAL INEQUALITIES,* vol. 18, no. 3, pp. 953-969, 2024-09-01 2024, doi: 10.7153/jmi-2024-18-52.

[117] L. Cotîrla and E. Totoi, "Similar Classes of Convex and Close-to-Convex Meromorphic Functions Obtained Through Integral Operators," *SYMMETRY-BASEL,* vol. 16, no. 12, 2024-12-01 2024, Art no. 1604, doi: 10.3390/sym16121604.

[118] A. Couthures, V. Varma, S. Lasaulce, and I. Morarescu, "Analysis of an opinion dynamics model coupled with an external environmental dynamics," *CHAOS SOLITONS & FRACTALS,* vol. 189, 2024-11-16 2024, Art no. 115719, doi: 10.1016/j.chaos.2024.115719.

[119] M. Covaci, R. Galatus, and L. Szolga, "Stability improvement of high-power semiconductor laser diode regulators used in infrared solid-state laser applications," *OPTICAL AND QUANTUM ELECTRONICS,* vol. 56, no. 5, 2024-03-25 2024, Art no. 776, doi: 10.1007/s11082-024-06457-w.

[120] F. Covaciu, C. Vaida, B. Gherman, A. Pisla, P. Tucan, and D. Pisla, "Development of a Virtual Reality-Based Environment for Telerehabilitation," *APPLIED SCIENCES-BASEL,* vol. 14, no. 24, 2024-12-01 2024, Art no. 12022, doi: 10.3390/app142412022.

[121] T. Covrig *et al.*, "System for the Acquisition and Monitoring of Energy Consumption in the Context of Industry 4.0," *SENSORS,* vol. 24, no. 19, 2024-10-01 2024, Art no. 6302, doi: 10.3390/s24196302.

[122] A. Cozmuta *et al.*, "The impact of visible light component bands on polyphenols from red grape seed extract powder encapsulated in alginate-whey - whey protein matrix," *FOOD CHEMISTRY-X,* vol. 23, 2024-08-30 2024, Art no. 101758, doi: 10.1016/j.fochx.2024.101758.

[123] L. Cozmuta *et al.*, "Exploring the impact of microwaves, ultrasounds, UVA light, and X-rays on polyphenols in alginate-whey protein matrix-encapsulated red grape seed extract powder," *APPLIED FOOD RESEARCH,* vol. 5, no. 1, 2024-12-27 2025, Art no. 100658, doi: 10.1016/j.afres.2024.100658.

[124] R. Craciun *et al.*, "Portal vein velocity and its dynamics: a potentially useful tool for detecting clinically silent transjugular intrahepatic porto-systemic shunt dysfunction using Doppler ultrasonography," *ULTRASOUND INTERNATIONAL OPEN,* vol. 10, 2024-12-17 2024, Art no. a24228339, doi: 10.1055/a-2422-8339.

[125] R. Crainic, A. Farcasanu, P. Pascuta, L. Saitis, F. Popa, and R. Fechete, "Complex Characterization of Nanofiber Biomaterials Based on Chitosan, Collagen and Fish Gelatine Produced by Electrospinning," *ANALYTICAL LETTERS,* 2024-06-24 2024, doi: 10.1080/00032719.2024.2372348.

[126] R. Crainic and R. Fechete, "Slaughterhouse Wastewater Properties Assessment by Modern and Classic Methods," *WATER,* vol. 16, no. 17, 2024-09-01 2024, Art no. 2382, doi: 10.3390/w16172382.

[127] R. Crainic *et al.*, "Advanced Nuclear Magnetic Resonance, Fourier Transform-Infrared, Visible-NearInfrared and X-ray Diffraction Methods Used for Characterization of Organo-Mineral Fertilizers Based on Biosolids," *AGRICULTURE-BASEL,* vol. 14, no. 10, 2024-10-01 2024, Art no. 1826, doi: 10.3390/agriculture14101826.

[128] I. Craiu and M. Nedelcu, "Combining iFEM and GBT for accurate shape sensing and damage detection in truncated conical shells with circular cross-section," *OCEAN ENGINEERING,* vol. 311, 2024-08-03 2024, Art no. 118811, doi: 10.1016/j.oceaneng.2024.118811.

[129] M. Crenganis, C. Girjob, D. Rusu, and A. Bârsan, "SIMULINK BASED DYNAMIC MODEL FOR MECANUM DRIVE AUTONOMOUS MOBILE PLATFORMS CONSIDERING FRICTION FORCES," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 2, pp. 297-308, 2024-06-01 2024.

[130] C. Crisan and H. Vermesan, "USING EXPIRED DRUGS AS ENVIRONMENTALLY FRIENDLY CORROSION INHIBITORS," *SCIENTIFIC PAPERS-SERIES E-LAND RECLAMATION EARTH OBSERVATION & SURVEYING ENVIRONMENTAL ENGINEERING,* vol. 13, pp. 67-72, 2024-01-01 2024.

[131] C. Danci, I. Duma, T. Buidin, N. Cordos, and A. Todorut, "VERTICAL VIBRATION ANALYSIS OF A FORMULA STUDENT VEHICLE USING DIFFERENT SUSPENSION SYSTEM CONFIGURATIONS," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 1, pp. 121-130, 2024-03-01 2024.

[132] R. Danescu, R. Itu, A. Fuzes, and V. Turcu, "Increasing the accuracy of real time wide field of view space surveillance by grid-based combination of multiple calibration results," *ADVANCES IN SPACE RESEARCH,* vol. 73, no. 3, pp. 2098-2118, 2024-01-11 2024, doi: 10.1016/j.asr.2023.11.036.

[133] D. Daraba, F. Pop, and C. Daraba, "Digital Twin Used in Real-Time Monitoring of Operations Performed on CNC Technological Equipment," *APPLIED SCIENCES-BASEL,* vol. 14, no. 22, 2024-11-01 2024, Art no. 10088, doi: 10.3390/app142210088.

[134] G. David *et al.*, "Key Factors Influencing Consumer Choices in Wood-Based Recycled Products for Circular Construction Sector," *SUSTAINABILITY,* vol. 16, no. 20, 2024-10-01 2024, Art no. 8767, doi: 10.3390/su16208767.

[135] B. Deé and D. Leordean, "RESEARCH ON IMPROVING THE FUNCTIONAL CHARACTETISTICS OF THE DOUBLE BAS BOW," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 1, pp. 281-288, 2024-02-01 2024.

[136] L. Dénes-Fazakas *et al.*, "Physical Activity Detection for Diabetes Mellitus Patients Using Recurrent Neural Networks," *SENSORS,* vol. 24, no. 8, 2024-04-01 2024, Art no. 2412, doi: 10.3390/s24082412.

[137] E. Deniz, A. Kiziltepe, and L. Cotirla, "RADII OF LEMNISCATE STARLIKENESS AND CONVEXITY OF THE FUNCTIONS INCLUDING DERIVATIVES OF BESSEL FUNCTIONS," *JOURNAL OF MATHEMATICAL INEQUALITIES,* vol. 18, no. 3, pp. 971-982, 2024-09-01 2024, doi: 10.7153/jmi-2024-18-53.

[138] O. Detesan, "SEEDING THE FUTURE: A JOURNEY THROUGH THE EVOLUTION AND PROSPECTS OF AGRICULTURAL ROBOTICS," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 2, pp. 167-178, 2024-06-01 2024.

[139] T. Dicu, M. Botos, A. Cucos, S. Grecu, S. Florica, and A. Tunyagi, "Evaluating radon concentration and temporal correction factors in residential and workplace buildings: A comparison of passive and active methods," *HELIYON,* vol. 10, no. 17, 2024-09-04 2024, Art no. e37144, doi: 10.1016/j.heliyon.2024.e37144.

[140] M. Din, U. Ishtiaq, K. Alnowibet, T. Lazar, V. Lazar, and L. Guran, "Certain Novel Fixed-Point Theorems Applied to Fractional Differential Equations," *FRACTAL AND FRACTIONAL,* vol. 8, no. 12, 2024-12-01 2024, Art no. 701, doi: 10.3390/fractalfract8120701.

[141] F. Dinu, C. Neagu, D. Dubina, M. Senila, R. Laszlo, and E. Ghicioi, "Experimental and numerical studies on steel liner tray walls under static transverse loads," *ENGINEERING STRUCTURES,* vol. 305, 2024-02-24 2024, Art no. 117666, doi: 10.1016/j.engstruct.2024.117666.

[142] F. Dinu, C. Neagu, R. Laszlo, E. Ghicioi, M. Senila, and D. Dubina, "Behavior of steel liner tray walls under external blast: Experimental testing and numerical simulations," *ENGINEERING STRUCTURES,* vol. 310, 2024-05-07 2024, Art no. 118106, doi: 10.1016/j.engstruct.2024.118106.

[143] F. Dinu, C. Neagu, and M. Senila, "Wall sandwich panels with steel facings and PUR foam core under transverse loading: Experimental testing and numerical model calibration," *ENGINEERING STRUCTURES,* vol. 321, 2024-09-20 2024, Art no. 119014, doi: 10.1016/j.engstruct.2024.119014.

[144] V. Dinu, C. Dragos, C. Mare, S. Dragos, and R. Mare, "Economic and institutional determinants of environmental health and sustainability: Spatial and nonlinear effects for a panel of worldwide countries," *OECONOMIA COPERNICANA,* vol. 15, no. 1, pp. 195-227, 2024-03-01 2024, doi: 10.24136/oc.2915.

[145] T. Dippong, "Innovative Nanomaterial Properties and Applications in Chemistry, Physics, Medicine, or Environment," *NANOMATERIALS,* vol. 14, no. 2, 2024-01-01 2024, Art no. 145, doi: 10.3390/nano14020145.

[146] T. Dippong and R. Mereu, "Effect of La3+ on thermal, structural and morphological properties of Zn-Co ferrite spinel-based pigments," *CERAMICS INTERNATIONAL,* vol. 50, no. 7, pp. 10314-10324, 2024-02-23 2024, doi: 10.1016/j.ceramint.2023.12.343.

[147] T. Dippong, C. Mihali, and A. Avram, "Evaluating Groundwater Metal and Arsenic Content in Piatra, North-West of Romania," *WATER,* vol. 16, no. 4, 2024-02-01 2024, Art no. 539, doi: 10.3390/w16040539.

[148] T. Dippong and M. Resz, "Chemical Assessment of Drinking Water Quality and Associated Human Health Risk of Heavy Metals in Gutai Mountains, Romania," *TOXICS,* vol. 12, no. 3, 2024-03-01 2024, Art no. 168, doi: 10.3390/toxics12030168.

[149] T. Dippong and M. Resz, "Heavy metal contamination assessment and potential human health risk of water quality of lakes situated in the protected area of Tisa, Romania," *HELIYON,* vol. 10, no. 7, 2024-04-08 2024, Art no. e28860, doi: 10.1016/j.heliyon.2024.e28860.

[150] T. Dippong, M. Resz, C. Tanaselia, and O. Cadar, "Assessing microbiological and heavy metal pollution in surface waters associated with potential human health risk assessment at fish ingestion exposure," *JOURNAL OF HAZARDOUS MATERIALS,* vol. 476, 2024-07-13 2024, Art no. 135187, doi: 10.1016/j.jhazmat.2024.135187.

[151] T. Dippong, M. Senila, O. Cadar, and M. Resz, "Assessment of the heavy metal pollution degree and potential health risk implications in lakes and fish from northern Romania," *JOURNAL OF ENVIRONMENTAL CHEMICAL ENGINEERING,* vol. 12, no. 2, 2024-02-20 2024, Art no. 112217, doi: 10.1016/j.jece.2024.112217.

[152] I. Donca, O. Stan, M. Misaros, A. Stan, and L. Miclea, "Comprehensive Security for IoT Devices with Kubernetes and Raspberry Pi Cluster," *ELECTRONICS,* vol. 13, no. 9, 2024-05-01 2024, Art no. 1613, doi: 10.3390/electronics13091613.

[153] M. Dragomir, D. Szabo, D. Dragomir, and D. Blagu, "Remaining Socially Responsible in the Age of Smart Sustainable Production," *TEHNICKI GLASNIK-TECHNICAL JOURNAL,* vol. 18, no. 1, pp. 129-133, 2024-03-01 2024, doi: 10.31803/tg-20230513110613.

[154] M. Dragomir, A. Titu, S. Bodi, T. Osanu, and A. Radu, "Product Development Anxiety: A Contingency Planning Model for Innovative Production Companies," *SUSTAINABILITY,* vol. 16, no. 14, 2024-07-01 2024, Art no. 6251, doi: 10.3390/su16146251.

[155] I. Duma *et al.*, "EVALUATION OF THE INFLUENCE OF TRANSVERSE TRACK INCLINATION ON VEHICLE STABILITY PARAMETERS AT THE LIMIT OF SIDE ROLLOVER," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 1, pp. 101-110, 2024-03-01 2024.

[156] B. Dutka, S. Rada, K. Godyn, D. Moldovan, R. Chelcea, and M. Tram, "Structural and Textural Characteristics of Municipal Solid Waste Incineration Bottom Ash Subjected to Periodic Seasoning," *SUSTAINABILITY,* vol. 16, no. 21, 2024-11-01 2024, Art no. 9597, doi: 10.3390/su16219597.

[157] F. Eichler, N. Balc, S. Bremen, and P. Nink, "Investigation of Laser Powder Bed Fusion Parameters with Respect to Their Influence on the Thermal Conductivity of 316L Samples," *JOURNAL OF MANUFACTURING AND MATERIALS PROCESSING,* vol. 8, no. 4, 2024-08-01 2024, Art no. 166, doi: 10.3390/jmmp8040166.

[158] F. Eichler, N. Balc, S. Bremen, M. Schleser, and A. Schwarz, "RESEARCH ON REDUCING RESIDUAL STRESSES OF SLM PARTS MADE FOR DOWNSTREAM WELDING PROCESS," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 1, pp. 69-78, 2024-02-01 2024.

[159] N. Ejaz *et al.*, "Automatic Gait Classification Model Empowered by Machine Learning for People with and without Osteoporosis Using Smart Walker," *APPLIED SCIENCES-BASEL,* vol. 14, no. 9, 2024-05-01 2024, Art no. 3874, doi: 10.3390/app14093874.

[160] S. El-Deeb and L. Cotîrla, "Sufficiency Conditions for a Class of Convex Functions Connected with Tangent Functions Associated with the Combination of Babalola Operators and Binomial Series," *MATHEMATICS,* vol. 12, no. 11, 2024-06-01 2024, Art no. 1691, doi: 10.3390/math12111691.

[161] E. El-hady, S. Ögrekçi, T. Lazar, and V. Lazar, "Stability in the Sense of Hyers-Ulam-Rassias for the Impulsive Volterra Equation," *FRACTAL AND FRACTIONAL,* vol. 8, no. 1, 2024-01-01 2024, Art no. 47, doi: 10.3390/fractalfract8010047.

[162] R. Elisei *et al.*, "Liver Phantoms Cast in 3D-Printed Mold for Image-Guided Procedures," *DIAGNOSTICS,* vol. 14, no. 14, 2024-07-01 2024, Art no. 1521, doi: 10.3390/diagnostics14141521.

[163] R. Elisei *et al.*, "A 3D-Printed, High-Fidelity Pelvis Training Model: Cookbook Instructions and First Experience," *JOURNAL OF CLINICAL MEDICINE,* vol. 13, no. 21, 2024-11-01 2024, Art no. 6416, doi: 10.3390/jcm13216416.

[164] R. Elisei *et al.*, "Gelatin-Based Liver Phantoms for Training Purposes: A Cookbook Approach," *JOURNAL OF CLINICAL MEDICINE,* vol. 13, no. 12, 2024-06-01 2024, Art no. 3440, doi: 10.3390/jcm13123440.

[165] R. Erdei, D. Delinschi, O. Matei, and L. Andreica, "Good practices in designing a communication channel architecture for secure async flexible distributed collaboration," *LOGIC JOURNAL OF THE IGPL,* vol. 32, no. 2, pp. 334-351, 2024-03-13 2024, doi: 10.1093/jigpal/jzae012.

[166] I. Fagarasan *et al.*, "Metabolic Disturbances Associated with In-Hospital Complication and Mortality in Different Types of Pneumonia," *JOURNAL OF CLINICAL MEDICINE,* vol. 13, no. 24, 2024-12-01 2024, Art no. 7832, doi: 10.3390/jcm13247832.

[167] T. Farias *et al.*, "Electrospun poly(ε-caprolactone) membranes modified with heparin and essential fatty acids for biomedical applications," *JOURNAL OF APPLIED POLYMER SCIENCE,* vol. 141, no. 34, 2024-06-09 2024, doi: 10.1002/app.55853.

[168] D. Felecan, "Functional Styles and Language Functions," *PHILOLOGICA JASSYENSIA,* vol. 20, no. 2, pp. 203-224, 2024-01-01 2024, doi: 10.60133/PJ.2024.2.16.

[169] N. Felecan, "THE IMPLICATION OF TRANSYLVANIAN SCHOOL AND OF GREEK- CATHOLIC CHURCH IN DEVELOPING THE ROMANIAN LANGUAGE. A DIACHRONIC PERSPECTIVE," *DACOROMANIA,* vol. 29, no. 1, pp. 58-71, 2024-01-01 2024, doi: 10.33993/dr.2024.1.58.71.

[170] O. Felecan, D. Felecan, and A. Bughesiu, "ANTHROPONYMIC IMPLICATIONS OF COVID-19 AND THE UNDERLYING CORONAVIRUS," *BRITISH AND AMERICAN STUDIES,* vol. 30, 2024-01-01 2024, doi: 10.35923/BAS.30.19.

[171] R. Felseghi, A. Plesa, and A. Popa, "Electrification of the Thermal Load in an Industrial Hall by Replacing Conventional Energy with Solar Energy," *INTERNATIONAL JOURNAL OF ENERGY RESEARCH,* vol. 2024, 2024-08-30 2024, Art no. 6459432, doi: 10.1155/2024/6459432.

[172] S. Ferahtia, A. Houari, T. Cioara, M. Bouznit, H. Rezk, and A. Djerioui, "Recent advances on energy management and control of direct current microgrid for smart cities and industry: A Survey," *APPLIED ENERGY,* vol. 368, 2024-05-25 2024, Art no. 123501, doi: 10.1016/j.apenergy.2024.123501.

[173] C. Filip and M. Coman, "REGARDING THE LEVEL OF SOIL POLLUTION WITH HEAVY METALS (I)," *SCIENTIFIC PAPERS-SERIES A-AGRONOMY,* vol. 68, no. 1, pp. 92-96, 2024-01-01 2024.

[174] N. Filip, C. Gheorghe, and M. Deac, "THE EFFECT OF DEDICATED BUS LANE IN A CITY CENTER," *INGINERIA AUTOMOBILULUI,* no. 71, 2024-06-01 2024.

[175] C. Florean *et al.*, "The Influence of Using Recycled Waste Aggregates and Adding TiO2 Nanoparticles on the Corrosion Resistance of Steel Reinforcement Embedded in Cementitious Composite," *MATERIALS,* vol. 17, no. 16, 2024-08-01 2024, Art no. 3895, doi: 10.3390/ma17163895.

[176] C. Florean *et al.*, "Influence of the Addition of TiO2 Nanoparticles on the Self-Cleaning Capacity of Cementitious Composites," *MATERIALS,* vol. 17, no. 13, 2024-07-01 2024, Art no. 3098, doi: 10.3390/ma17133098.

[177] C. Florean *et al.*, "Influence of TiO2 Nanoparticles on the Physical, Mechanical, and Structural Characteristics of Cementitious Composites with Recycled Aggregates," *MATERIALS,* vol. 17, no. 9, 2024-05-01 2024, Art no. 2014, doi: 10.3390/ma17092014.

[178] C. Florean *et al.*, "The Influence of TiO2 Nanoparticles on the Physico-Mechanical and Structural Characteristics of Cementitious Materials," *COATINGS,* vol. 14, no. 2, 2024-02-01 2024, Art no. 218, doi: 10.3390/coatings14020218.

[179] C. Florean *et al.*, "POSSIBILITIES FOR CONSERVING NATURAL RESOURCES AND THE ENVIRONMENT THROUGH THE USE OF RECYCLED WASTE AGGREGATES AS A SUBSTITUTE FOR NATURAL AGGREGATES IN CEMENTITIOUS COMPOSITES," *INTERNATIONAL JOURNAL OF CONSERVATION SCIENCE,* vol. 15, no. 1, 2024-01-01 2024, doi: 10.36868/IJCS.2024.01.10.

[180] H. Florian, C. Avram, D. Radu, and A. Astilean, "Decision System Based on Markov Chains for Sizing the Rebalancing Fleet of Bike Sharing Stations," *APPLIED SCIENCES-BASEL,* vol. 14, no. 15, 2024-08-01 2024, Art no. 6743, doi: 10.3390/app14156743.

[181] B. Frasin and L. Cotîrla, "Salagean Differential Operator in Connection with Stirling Numbers," *AXIOMS,* vol. 13, no. 9, 2024-09-01 2024, Art no. 620, doi: 10.3390/axioms13090620.

[182] A. Friganovic *et al.*, "Critical Care Nurses' Perceptions of Abuse and Its Impact on Healthy Work Environments in Five European Countries: A Cross-Sectional Study," *INTERNATIONAL JOURNAL OF PUBLIC HEALTH,* vol. 69, 2024-05-10 2024, Art no. 1607026, doi: 10.3389/ijph.2024.1607026.

[183] A. Gál, A. Szakács, C. Ionescu, and M. Kovacs, "Mineral- and Rock Type Localities in Romania and Their Potential Geoheritage Value," *GEOHERITAGE,* vol. 16, no. 3, 2024-09-01 2024, Art no. 80, doi: 10.1007/s12371-024-00977-3.

[184] C. Gal *et al.*, "Randomness impacts the building of specific priors, visual exploration, and perception in object recognition," *SCIENTIFIC REPORTS,* vol. 14, no. 1, 2024-04-12 2024, Art no. 8527, doi: 10.1038/s41598-024-59089-1.

[185] M. Geler and D. Leordean, "RESEARCH ON THE DESIGN FOR PROTECTING THE ARDUINO-MEGA MICROCONTROLLER USED AT AQUATIC EXPLORATION," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 1, pp. 217-222, 2024-02-01 2024.

[186] A. Ghaderi *et al.*, "Nanoscale morphology, optical dynamics and gas sensor of porous silicon," *SCIENTIFIC REPORTS,* vol. 14, no. 1, 2024-02-14 2024, Art no. 3677, doi: 10.1038/s41598-024-54336-x.

[187] D. Gonciar *et al.*, "The Quantification of Myocardial Fibrosis on Human Histopathology Images by a Semi-Automatic Algorithm," *APPLIED SCIENCES-BASEL,* vol. 14, no. 17, 2024-09-01 2024, Art no. 7696, doi: 10.3390/app14177696.

[188] D. Gonciar *et al.*, "Computer-Assisted Algorithm for Quantification of Fibrosis by Native Cardiac CT: A Pilot Study," *JOURNAL OF CLINICAL MEDICINE,* vol. 13, no. 16, 2024-08-01 2024, Art no. 4807, doi: 10.3390/jcm13164807.

[189] R. Gonsalves and M. Nedelcu, "First-order GBT for truncated conical shells with circular cross-section," *THIN-WALLED STRUCTURES,* vol. 203, 2024-07-18 2024, Art no. 112210, doi: 10.1016/j.tws.2024.112210.

[190] F. Gorski *et al.*, "Development and Studies of VR-Assisted Hand Therapy Using a Customized Biomechatronic 3D Printed Orthosis," *ELECTRONICS,* vol. 13, no. 1, 2024-01-01 2024, Art no. 79, doi: 10.3390/electronics13010079.

[191] M. Gosta, M. Fofiu, and I. Kirizsan, "Comparison Regarding the Carbon Footprint of Various Sustainable Seismic Consolidation Solutions for Romanian Orthodox Churches," *SUSTAINABILITY,* vol. 16, no. 10, 2024-05-01 2024, Art no. 3979, doi: 10.3390/su16103979.

[192] A. Grajdeanu, C. Raducan, M. Neag, and I. Ilie, "Linear Voltage Regulators With Gate-Driving Buffer for Automotive Applications," *IEEE ACCESS,* vol. 12, pp. 144905-144918, 2024-01-01 2024, doi: 10.1109/ACCESS.2024.3468882.

[193] S. Gundala, M. Basha, V. Madhurima, and O. Stan, "Input Voltage-Level Driven Split-Input Inverter Level Shifter for Nanoscale Applications," *ELECTRONICS,* vol. 13, no. 6, 2024-03-01 2024, Art no. 1115, doi: 10.3390/electronics13061115.

[194] C. Günther, A. Orzan, and N. Popovici, "A new concept of semistrict quasiconvexity for vector functions," *OPTIMIZATION,* 2024-07-30 2024, doi: 10.1080/02331934.2024.2384919.

[195] P. Gurusamy, M. Caglar, L. Cotirla, and S. Sivasubramanian, "Initial Coefficient Bounds for Bi-Close-to-Convex Classes of n-Fold-Symmetric Bi-Univalent Functions," *AXIOMS,* vol. 13, no. 11, 2024-11-01 2024, Art no. 735, doi: 10.3390/axioms13110735.

[196] P. Gurusamy, M. Çaglar, S. Sivasubramanian, and L. Cotirla, "The Fekete-Szego Functional Associated with the mth Root Transformation Using Conical Domains," *UKRAINIAN MATHEMATICAL JOURNAL,* vol. 76, no. 7, pp. 1075-1090, 2024-11-30 2024, doi: 10.1007/s11253-024-02373-0.

[197] S. Haragâs *et al.*, "An Attempt to Establish a Mathematical Model for an Unconventional Worm Gear with Bearings," *APPLIED SCIENCES-BASEL,* vol. 14, no. 23, 2024-12-01 2024, Art no. 10833, doi: 10.3390/app142310833.

[198] E. Hegedüs, I. Birs, C. Ionescu, and C. Muresan, "A Novel Decentralized-Decoupled Fractional-Order Control Strategy for Complete Anesthesia-Hemodynamic Stabilization in Patients Undergoing Surgical Procedures," *FRACTAL AND FRACTIONAL,* vol. 8, no. 11, 2024-11-01 2024, Art no. 623, doi: 10.3390/fractalfract8110623.

[199] A. Heller and N. Filip, "RESEARCH ON THE MEASUREMENT OF THE GEARBOX VIBRATIONS IN ORDER TO DETERMINE THE FREQUENCY RESPONSE," *INGINERIA AUTOMOBILULUI,* no. 70, 2024-03-01 2024.

[200] M. Herbei *et al.*, "Rainfall-runoff modeling based on HEC-HMS model: a case study in an area with increased groundwater discharge potential," *FRONTIERS IN WATER,* vol. 6, 2024-10-11 2024, Art no. 1474990, doi: 10.3389/frwa.2024.1474990.

[201] M. Hulea, R. Miron, and V. Muresan, "Digital Product Passport Implementation Based on Multi-Blockchain Approach with Decentralized Identifier Provider," *APPLIED SCIENCES-BASEL,* vol. 14, no. 11, 2024-06-01 2024, Art no. 4874, doi: 10.3390/app14114874.

[202] R. Ignat and M. Rus, "Vortex sheet solutions for the Ginzburg-Landau system in cylinders: symmetry and global minimality," *CALCULUS OF VARIATIONS AND PARTIAL DIFFERENTIAL EQUATIONS,* vol. 63, no. 2, 2024-03-01 2024, Art no. 34, doi: 10.1007/s00526-023-02628-x.

[203] V. Ilea and D. Otrocol, "INTEGRAL EQUATION WITH MAXIMA VIA FIBRE CONTRACTION PRINCIPLE," *FIXED POINT THEORY,* vol. 25, no. 2, pp. 601-610, 2024-01-01 2024, doi: 10.24193/fpt-ro.2024.2.10.

[204] R. Ilesan *et al.*, "In Silico Decoding of Parkinson's: Speech & Writing Analysis," *JOURNAL OF CLINICAL MEDICINE,* vol. 13, no. 18, 2024-09-01 2024, Art no. 5573, doi: 10.3390/jcm13185573.

[205] I. Ilyes *et al.*, "A Single Dose of Piperacillin Plus Tazobactam Gel as an Adjunct to Professional Mechanical Plaque Removal (PMPR) in Patients with Peri-Implant Mucositis: A 6-Month Double-Blind

Randomized Clinical Trial," *ANTIBIOTICS-BASEL,* vol. 13, no. 3, 2024-03-01 2024, Art no. 269, doi: 10.3390/antibiotics13030269.

[206] I. Ilyes *et al.*, "Comparative Study of Systemic vs. Local Antibiotics with Subgingival Instrumentation in Stage III-IV Periodontitis: A Retrospective Analysis," *ANTIBIOTICS-BASEL,* vol. 13, no. 5, 2024-05-01 2024, Art no. 430, doi: 10.3390/antibiotics13050430.

[207] C. Ionescu *et al.*, "Development, Validation, and Comparison of a Novel Nociception/Anti-Nociception Monitor against Two Commercial Monitors in General Anesthesia," *SENSORS,* vol. 24, no. 7, 2024-04-01 2024, Art no. 2031, doi: 10.3390/s24072031.

[208] A. Iordan, "An Optimized LSTM Neural Network for Accurate Estimation of Software Development Effort," *MATHEMATICS,* vol. 12, no. 2, 2024-01-01 2024, Art no. 200, doi: 10.3390/math12020200.

[209] D. Isopescu *et al.*, "Balancing the Energy Efficiency Benefits of Glazed Surfaces: A Case Study," *BUILDINGS,* vol. 14, no. 7, 2024-07-01 2024, Art no. 2157, doi: 10.3390/buildings14072157.

[210] R. Itu and R. Danescu, "Fully Convolutional Neural Network for Vehicle Speed and Emergency-Brake Prediction," *SENSORS,* vol. 24, no. 1, 2024-01-01 2024, Art no. 212, doi: 10.3390/s24010212.

[211] L. Jaentschi and M. Louzazni, "Accelerating Convergence for the Parameters of PV Cell Models," *MATHEMATICAL AND COMPUTATIONAL APPLICATIONS,* vol. 29, no. 1, 2024-02-01 2024, Art no. 4, doi: 10.3390/mca29010004.

[212] S. Jangir, G. Shanker, J. Kaur, and L. Piscoran, "ON THE EXISTENCE AND EXAMPLES OF HOMOGENEOUS GEODESICS IN GENERALIZED m-KROPINA SPACE," *FACTA UNIVERSITATIS-SERIES MATHEMATICS AND INFORMATICS,* vol. 39, no. 2, pp. 289-302, 2024-01-01 2024, doi: 10.22190/FUMI230524020J.

[213] L. Jäntschi, "Oxidation Potential of 2,6-Dimethyl-1,4-dihydropyridine Derivatives Estimated by Structure Descriptors," *SYMMETRY-BASEL,* vol. 16, no. 10, 2024-10-01 2024, Art no. 1320, doi: 10.3390/sym16101320.

[214] L. Jäntschi, "Triple crossed 3 C26 cyclic cumulene catenane," *FULLERENES NANOTUBES AND CARBON NANOSTRUCTURES,* vol. 32, no. 10, pp. 962-976, 2024-05-15 2024, doi: 10.1080/1536383X.2024.2354721.

[215] T. Joldos, L. Tutunaru, and M. Georgescu, "ADVANCEMENTS IN 3D PRINTING TECHNIQUES FOR LOW-SPEED AERODYNAMICS IN VEHICLE VENTILATION - PART 1," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 1, pp. 251-260, 2024-02-01 2024.

[216] T. Joldos, L. Tutunaru, and M. Georgescu, "ADVANCEMNETS IN 3D PRINTING TEHNICQUES FOR LOW-SPEED AERODYNAMICS IN VEHICLE VENTILATION - PART 2," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 1, pp. 371-380, 2024-02-01 2024.

[217] B. Jorgic *et al.*, "The Influence of Body Composition on Sagittal Plane Posture among Elementary School-Aged Children," *CHILDREN-BASEL,* vol. 11, no. 1, 2024-01-01 2024, Art no. 36, doi: 10.3390/children11010036.

[218] J. Juhasz, V. Brezoczki, G. Filip, and C. Munteanu, "CONSIDERATION REGARDING GASEOUS EMISSIONS INCINERATION OF HOUSEHOLDS WASTE FROM MARAMURES COUNTY, ROMANIA," *ENVIRONMENTAL ENGINEERING AND MANAGEMENT JOURNAL,* vol. 23, no. 6, 2024-06-01 2024, doi: 10.30638/eemj.2024.106.

[219] D. Julean and D. Julean, "Aspects regarding the issue of heritage assets and works of art in Romania at the beginning of the 21st century," *PHILOBIBLON-TRANSYLVANIAN JOURNAL OF MULTIDISCIPLINARY RESEARCH IN HUMANITIES,* vol. 29, no. 1, 2024-01-01 2024, doi: 10.26424/philobib.2024.29.1.02.

[220] A. Juma, N. Shehab, D. Breaz, L. Cotîrla, M. Darus, and A. Danciu, "New Results on Differential Subordination and Superordination for Multivalent Functions Involving New Symmetric Operator," *SYMMETRY-BASEL,* vol. 16, no. 10, 2024-10-01 2024, Art no. 1326, doi: 10.3390/sym16101326.

[221] S. Kajánto, A. Kristály, I. Peter, and W. Zhao, "A generic functional inequality and Riccati pairs: an alternative approach to Hardy-type inequalities," *MATHEMATISCHE ANNALEN,* vol. 390, no. 3, pp. 3621-3663, 2024-03-27 2024, doi: 10.1007/s00208-024-02827-7.

[222] T. Kalmar *et al.*, "Geospatial technologies for landslide monitoring: a case study of Sighetu Marmatiei, Romania," *ENVIRONMENTAL EARTH SCIENCES,* vol. 83, no. 10, 2024-05-01 2024, Art no. 341, doi: 10.1007/s12665-024-11473-w.

[223] M. Kansal, V. Sharma, L. Rani, and L. Jäntschi, "A novel class of fourth-order derivative-free iterative methods to obtain multiple zeros and their basins of attraction," *AIMS MATHEMATICS,* vol. 9, no. 12, pp. 35823-35859, 2024-01-01 2024, doi: 10.3934/math.20241699.

[224] M. Kansal, V. Sharma, P. Sharma, and L. Jäntschi, "A Globally Convergent Iterative Method for Matrix Sign Function and Its Application for Determining the Eigenvalues of a Matrix Pencil," *SYMMETRY-BASEL,* vol. 16, no. 4, 2024-04-01 2024, Art no. 481, doi: 10.3390/sym16040481.

[225] M. Karapetyants and S. László, "A Nesterov Type Algorithm with Double Tikhonov Regularization: Fast Convergence of the Function Values and Strong Convergence to the Minimal Norm Solution," *APPLIED MATHEMATICS AND OPTIMIZATION,* vol. 90, no. 1, 2024-08-01 2024, Art no. 17, doi: 10.1007/s00245-024-10163-0.

[226] B. Katanic *et al.*, "How Does a 12-Week Physical Exercise Program Affect the Motor Proficiency and Cognitive Abilities of Overweight and Normal-Weight Preschool Children?," *CHILDREN-BASEL,* vol. 11, no. 4, 2024-04-01 2024, Art no. 479, doi: 10.3390/children11040479.

[227] M. Kaviyarasu, L. Cotîrla, D. Breaz, M. Rajeshwari, and E. Rapeanu, "A Study on Complex t-Neutrosophic Graph with Intention to Preserve Biodiversity," *SYMMETRY-BASEL,* vol. 16, no. 8, 2024-08-01 2024, Art no. 1033, doi: 10.3390/sym16081033.

[228] N. Kilyen, R. Lemnariu, I. Muntean, and G. Mois, "An Indoor Localization System for Automotive Driving Competitions," *INTERNATIONAL JOURNAL OF COMPUTERS COMMUNICATIONS & CONTROL,* vol. 19, no. 1, 2024-02-01 2024, Art no. 6030, doi: 10.15837/ijccc.2024.1.6030.

[229] I. Kirizsán and A. Tudoreanu-Crisan, "A Sustainable Approach to Reconstruction: Historical Roof Structure Interventions," *SUSTAINABILITY,* vol. 16, no. 11, 2024-06-01 2024, Art no. 4325, doi: 10.3390/su16114325.

[230] I. Kiss, "Sculptural Hybridization: Combining Digital Parametric Modeling and Manufacturing with Traditional Handcrafting Techniques," *LEONARDO,* vol. 57, no. 5, 2024-10-01 2024, doi: 10.1162/leon_a_02540.

[231] R. Kovacs, S. Buzura, B. Iancu, V. Dadarlat, A. Peculea, and E. Cebuc, "Practical Implementation of a Blockchain-Enabled SDN for Large-Scale Infrastructure Networks," *APPLIED SCIENCES-BASEL,* vol. 14, no. 5, 2024-03-01 2024, Art no. 1914, doi: 10.3390/app14051914.

[232] S. Kumar, D. Breaz, L. Cotîrla, and A. Çetinkaya, "Hankel Determinants of Normalized Analytic Functions Associated with Hyperbolic Secant Function," *SYMMETRY-BASEL,* vol. 16, no. 10, 2024-10-01 2024, Art no. 1303, doi: 10.3390/sym16101303.

[233] S. Kumar, J. Sharma, and L. Jaentschi, "Optimal Fourth-Order Methods for Multiple Zeros: Design, Convergence Analysis and Applications," *AXIOMS,* vol. 13, no. 3, 2024-03-01 2024, Art no. 143, doi: 10.3390/axioms13030143.

[234] S. Kumar, J. Sharma, and L. Jäntschi, "An Optimal Family of Eighth-Order Methods for Multiple-Roots and Their Complex Dynamics," *SYMMETRY-BASEL,* vol. 16, no. 8, 2024-08-01 2024, Art no. 1045, doi: 10.3390/sym16081045.

[235] C. Larosa and S. Talu, "Fluorescence behavior of cyanine fluorophore Cy3 confined in anodic porous alumina: Advanced surface analysis," *COLLOIDS AND SURFACES A-PHYSICOCHEMICAL AND ENGINEERING ASPECTS,* vol. 707, 2024-12-06 2025, Art no. 135885, doi: 10.1016/j.colsurfa.2024.135885.

[236] S. László, "Solving convex optimization problems via a second order dynamical system with implicit Hessian damping and Tikhonov regularization," *COMPUTATIONAL OPTIMIZATION AND APPLICATIONS,* vol. 90, no. 1, pp. 113-149, 2024-10-19 2025, doi: 10.1007/s10589-024-00620-5.

[237] A. Lazarescu, A. Hegyi, A. Csapai, and F. Popa, "The Influence of Different Aggregates on the Physico-Mechanical Performance of Alkali-Activated Geopolymer Composites Produced Using Romanian Fly Ash," *MATERIALS,* vol. 17, no. 2, 2024-01-01 2024, Art no. 485, doi: 10.3390/ma17020485.

[238] F. Lekoui *et al.*, "Ag-doped ZnO nanostructured thin films for transparent antibacterial surfaces: Effect of Ag content," *INORGANIC CHEMISTRY COMMUNICATIONS,* vol. 173, 2024-12-31 2025, Art no. 113831, doi: 10.1016/j.inoche.2024.113831.

[239] S. Leone *et al.*, "Design of a Wheelchair-Mounted Robotic Arm for Feeding Assistance of Upper-Limb Impaired Patients," *ROBOTICS,* vol. 13, no. 3, 2024-03-01 2024, Art no. 38, doi: 10.3390/robotics13030038.

[240] S. Leonte, A. Pastrav, C. Zamfirescu, and E. Puschita, "Voice Quality Evaluation in a Mobile Cellular Network: In Situ Mean Opinion Score Measurements," *SENSORS,* vol. 24, no. 20, 2024-10-01 2024, Art no. 6630, doi: 10.3390/s24206630.

[241] Y. Li *et al.*, "Multi-Agent Graph Reinforcement Learning Method for Electric Vehicle on-Route Charging Guidance in Coupled Transportation Electrification," *IEEE TRANSACTIONS ON SUSTAINABLE ENERGY,* vol. 15, no. 2, pp. 1180-1193, 2024-04-01 2024, doi: 10.1109/TSTE.2023.3330842.

[242] P. Lopes *et al.*, "The Influence of Lyophilization Pretreatment and Whey Content on Whey and Gelatin-Based Hydrogels," *GELS,* vol. 10, no. 4, 2024-04-01 2024, Art no. 229, doi: 10.3390/gels10040229.

[243] A. Luft, N. Balc, and S. Bremen, "EXPERTS' PERSPECTIVES ON THE ADOPTION OF ADDITIVE MANUFACTURING IN THE INDUSTRY AND ITS INTERRELATED IMPLICATIONS IN PRODUCTION STRUCTURES," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 1, pp. 159-166, 2024-02-01 2024.

[244] I. Lupea, M. Lupea, and A. Coroian, "Helical Gearbox Defect Detection with Machine Learning Using Regular Mesh Components and Sidebands," *SENSORS,* vol. 24, no. 11, 2024-06-01 2024, Art no. 3337, doi: 10.3390/s24113337.

[245] Mamata, C. Kumar, V. Tiwari, S. Talu, K. Awasthi, and A. Dutta, "Biofabrication of GO-Ag nanocomposite using Cucumis callosus (kachri) fruits: Enhanced antibacterial properties and green synthesis approach," *MICROSCOPY RESEARCH AND TECHNIQUE,* vol. 88, no. 1, pp. 286-297, 2024-09-25 2025, doi: 10.1002/jemt.24689.

[246] I. Mare and I. Negrean, "ADVANCED KINEMATICS MODELING OF A 2RTR SERIAL ROBOT," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 2, pp. 343-352, 2024-06-01 2024.

[247] I. Mare, I. Negrean, and A. Crisan, "Polynomial Functions in Robot Dynamics," *ROMANIAN JOURNAL OF ACOUSTICS AND VIBRATION,* vol. 21, no. 1, pp. 91-102, 2024-01-01 2024.

[248] I. Mare, I. Negrean, S. Vlase, and A. Modrea, "Gibbs-Appell Equations used in Finite Element Analysis of Elastic Materials with Voids having a Plane Motion," *ROMANIAN JOURNAL OF ACOUSTICS AND VIBRATION,* vol. 21, no. 1, pp. 83-90, 2024-01-01 2024.

[249] D. Marian, S. Ciplea, and N. Lungu, "Hyers-Ulam stability of a nonlinear partial integro-differential equation of order three," *OPEN MATHEMATICS,* vol. 22, no. 1, 2024-06-13 2024, Art no. 20240017, doi: 10.1515/math-2024-0017.

[250] M. Marian *et al.*, "USING MACHINE LEARNING ALGORITHMS FOR NATURAL HABITATS ASSESSMENT," *CARPATHIAN JOURNAL OF EARTH AND ENVIRONMENTAL SCIENCES,* vol. 19, no. 1, pp. 103-113, 2024-02-01 2024, doi: 10.26471/cjees/2024/019/282.

[251] F. Mariasiu, I. Szabo, and T. Buidin, "Numerical Simulation of a Thermal Management System Using Composite Flame-Retardant Resin and Its Effect on Battery Life Span," *SUSTAINABILITY,* vol. 16, no. 9, 2024-05-01 2024, Art no. 3702, doi: 10.3390/su16093702.

[252] T. Marinca *et al.*, "Soft magnetic composite of Ni3Fe/ZnFe2O4 type obtained by mechanical alloying/milling and spark plasma sintering," *CERAMICS INTERNATIONAL,* vol. 50, no. 5, pp. 7547-7557, 2024-01-31 2024, doi: 10.1016/j.ceramint.2023.12.061.

[253] T. Marinca, L. Cotojman, F. Popa, B. Neamtu, C. Prica, and I. Chicinas, "Pseudo-Core-Shell Permalloy (Supermalloy)@ZnFe2O4 Powders and Spark Plasma Sintered Compacts Based on Mechanically Alloyed Powders," *MATERIALS,* vol. 17, no. 16, 2024-08-01 2024, Art no. 4139, doi: 10.3390/ma17164139.

[254] C. Marincu, D. Dan, and L. Moga, "Investigating the influence of building shape and insulation thickness on energy efficiency of buildings," *ENERGY FOR SUSTAINABLE DEVELOPMENT,* vol. 79, 2024-02-09 2024, Art no. 101384, doi: 10.1016/j.esd.2024.101384.

[255] I. Martin, G. Arcas, and T. Cioara, "Reinforcement-Learning-Based Edge Offloading Orchestration in Computing Continuum," *COMPUTERS,* vol. 13, no. 11, 2024-11-01 2024, Art no. 295, doi: 10.3390/computers13110295.

[256] D. Maticu and D. Leordean, "THEORETICAL OPTIMIZATION OF AN INDUSTRIAL VACUUM CLEANER TANK FOR THE SEPARATION OF LIGHT AND HEAVY PARTICLES," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 1, pp. 189-198, 2024-02-01 2024.

[257] A. Maties *et al.*, "Characterization of Nutritional Potential of Amaranthus sp. Grain Production," *AGRONOMY-BASEL,* vol. 14, no. 3, 2024-03-01 2024, Art no. 630, doi: 10.3390/agronomy14030630.

[258] A. Matis and N. Balc, "INDUSTRIAL IMPLEMENTATION OF HYBRID MANUFACTURING FOR REPAIR," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 1, pp. 29-36, 2024-02-01 2024.

[259] A. Matyas, Z. Nagy, and Z. Lendek, "Stabilization of time-delay nonlinear systems using Takagi-Sugeno models," *FUZZY SETS AND SYSTEMS,* vol. 480, 2024-01-24 2024, Art no. 108861, doi: 10.1016/j.fss.2024.108861.

[260] S. Maxineasa, D. Isopescu, I. Vizitiu-Baciu, A. Cojocaru, and L. Moga, "Variability in Heating Demand Predictions: A Comparative Study of PHPP and Mc001-2022 in Existing Residential Buildings," *BUILDINGS,* vol. 14, no. 9, 2024-09-01 2024, Art no. 2923, doi: 10.3390/buildings14092923.

[261] M. Merfea *et al.*, "Comparative Assessment of Push-Out Bond Strength and Dentinal Tubule Penetration of Different Calcium-Silicate-Based Endodontic Sealers," *DENTISTRY JOURNAL,* vol. 12, no. 12, 2024-12-01 2024, Art no. 397, doi: 10.3390/dj12120397.

[262] A. Mesaros *et al.*, "Preparation of Fe@Fe3O4/ZnFe2O4 Powders and Their Consolidation via Hybrid Cold-Sintering/Spark Plasma-Sintering," *NANOMATERIALS,* vol. 14, no. 2, 2024-01-01 2024, Art no. 149, doi: 10.3390/nano14020149.

[263] V. Miclea and S. Nedevschi, "Dynamic Semantically Guided Monocular Depth Estimation for UAV Environment Perception," *IEEE TRANSACTIONS ON GEOSCIENCE AND REMOTE SENSING,* vol. 62, 2024-01-01 2024, Art no. 5605111, doi: 10.1109/TGRS.2023.3345475.

[264] A. Mihail and A. Pop, "A PROCESS CAPABILITY STUDY ON THE DRILLING OPERATION OF A SEAT TRACK USED IN AEROSPACE INDUSTRY," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 1, pp. 179-188, 2024-02-01 2024.

[265] A. Mihaila, F. Runcan, V. Vizitiu, D. Dragomir, and M. Dragomir, "PERSONNEL DEVELOPMENT THROUGH IMPROVEMENT PROJECTS IN THE FIELD OF MODERN TECHNOLOGIES," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 3, pp. 519-524, 2024-09-01 2024.

[266] V. Mihaly, M. Susca, and P. Dobra, "Robust numeric implementation of the fractional-order element," *JOURNAL OF THE FRANKLIN INSTITUTE-ENGINEERING AND APPLIED MATHEMATICS,* vol. 361, no. 14, 2024-07-23 2024, Art no. 107087, doi: 10.1016/j.jfranklin.2024.107087.

[267] D. Mihnea, I. Tulbure-Moldovan, O. Tiganea, and E. Tugui, "Approaching the Rural Abandonment in Twentieth Century Romania: Political Decisions, Strategies, and Intervention Projects," *ARCHISTOR-ARCHITECTURE HISTORY RESTORATION,* no. 21, 2024-01-01 2024.

[268] A. Milon, C. Dragos, V. Veres, L. Baciu, and R. Mare, "SPORTS AND CLEAN ENVIRONMENT: KEY DRIVERS OF HEALTH AND LONGEVITY IN THE EUROPEAN UNION," *AMFITEATRU ECONOMIC,* vol. 26, no. 67, pp. 975-990, 2024-08-01 2024, doi: 10.24818/EA/2024/67/975.

[269] M. Misaros, O. Stan, S. Enyedi, A. Stan, I. Donca, and L. Miclea, "A Method for Assessing the Reliability of the Pepper Robot in Handling Office Documents: A Case Study," *BIOMIMETICS,* vol. 9, no. 9, 2024-09-01 2024, Art no. 558, doi: 10.3390/biomimetics9090558.

[270] J. Mitic *et al.*, "Utilizing Artificial Neural Networks for Geometric Bone Model Reconstruction in Mandibular Prognathism Patients," *MATHEMATICS,* vol. 12, no. 10, 2024-05-01 2024, Art no. 1577, doi: 10.3390/math12101577.

[271] D. Mitrea, V. Chifu, T. Cioara, I. Anghel, and C. Pop, "Social Factors in P2P Energy Trading Using Hedonic Games," *IEEE ACCESS,* vol. 12, pp. 71256-71270, 2024-01-01 2024, doi: 10.1109/ACCESS.2024.3402226.

[272] D. Mitrea, T. Cioara, I. Anghel, and L. Toderean, "Evolutionary game for incentivizing social cooperation of prosumers in transactive energy communities," *ENERGY AND BUILDINGS,* vol. 327, 2024-11-24 2025, Art no. 115057, doi: 10.1016/j.enbuild.2024.115057.

[273] S. Mittal, S. Panday, and L. Jäntschi, "Enhanced Ninth-Order Memory-Based Iterative Technique for Efficiently Solving Nonlinear Equations," *MATHEMATICS,* vol. 12, no. 22, 2024-11-01 2024, Art no. 3490, doi: 10.3390/math12223490.

[274] C. Moga, S. Gutiu, and A. Danciu, "Structural Design of the Multifunctional Sports Hall in the City of Blaj, Romania," *JOURNAL OF APPLIED ENGINEERING SCIENCES,* vol. 14, no. 2, pp. 300-307, 2024-12-01 2024, doi: 10.2478/jaes-2024-0037.

[275] S. Mohammadi, S. Rezaee, B. Nia, A. Boochani, and S. Talu, "Investigation of microstructural, micromorphology, and surface plasmon resonance characteristics in Ni/Al, Ni/Cu, and Ni/SS thin films," *MICROSCOPY RESEARCH AND TECHNIQUE,* vol. 87, no. 8, pp. 1974-1983, 2024-04-09 2024, doi: 10.1002/jemt.24568.

[276] A. Moldovan *et al.*, "Development and characterization of PLA food packaging composite," *JOURNAL OF THERMAL ANALYSIS AND CALORIMETRY,* 2024-11-27 2024, doi: 10.1007/s10973-024-13841-x.

[277] A. Moldovan and D. Sîmbotin, "Resilience and Emotional Comfort in a Pandemic Through Philosophical Counselling. Experimental," *BRAIN-BROAD RESEARCH IN ARTIFICIAL INTELLIGENCE AND NEUROSCIENCE,* vol. 15, no. 1, pp. 229-239, 2024-01-01 2024, doi: 10.18662/brain/15.1/548.

[278] S. Molnar and L. Tamás, "Variational autoencoders for 3D data processing," *ARTIFICIAL INTELLIGENCE REVIEW,* vol. 57, no. 2, 2024-02-08 2024, Art no. 42, doi: 10.1007/s10462-023-10687-x.

[279] I. Morar *et al.*, "FT-IR and HPLC analysis of silver fir (Abies alba Mill.) bark compounds from different geographical provenances," *HELIYON,* vol. 10, no. 5, 2024-03-02 2024, Art no. e26820, doi: 10.1016/j.heliyon.2024.e26820.

[280] L. Moraru *et al.*, "Combining Molecular and Traditional Prognostic Factors: A Holistic Approach to Breast Cancer Prognostication," *DIAGNOSTICS,* vol. 14, no. 13, 2024-07-01 2024, Art no. 1449, doi: 10.3390/diagnostics14131449.

[281] G. Motronea, D. Popa, and I. Rasa, "Steklov Type Operators and Functional Equations," *ANNALES MATHEMATICAE SILESIANAE,* vol. 38, no. 1, pp. 57-63, 2024-02-15 2024, doi: 10.2478/amsil-2024-0006.

[282] G. Muntean *et al.*, "A Qualitative Evaluation of ChatGPT4 and PaLM2's Response to Patient's Questions Regarding Age-Related Macular Degeneration," *DIAGNOSTICS,* vol. 14, no. 14, 2024-07-01 2024, Art no. 1468, doi: 10.3390/diagnostics14141468.

[283] M. Murar, R. Curta, C. Neamtu, and C. Mocan, "AUTOMATION SYSTEM OF A SMART HOSPITAL BED," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 2, pp. 199-204, 2024-06-01 2024.

[284] C. Muresan and I. Birs, "Fractional order control for unstable first order processes with time delays," *FRACTIONAL CALCULUS AND APPLIED ANALYSIS,* vol. 27, no. 4, pp. 1709-1733, 2024-06-10 2024, doi: 10.1007/s13540-024-00301-4.

[285] C. Muresan *et al.*, "Fractional-Order Modeling of the Depth of Analgesia as Reference Model for Control Purposes," *FRACTAL AND FRACTIONAL,* vol. 8, no. 9, 2024-09-01 2024, Art no. 539, doi: 10.3390/fractalfract8090539.

[286] A. Muresanu and M. Dudescu, "Modelling of a Cylindrical Battery Mechanical Behavior under Compression Load," *BATTERIES-BASEL,* vol. 10, no. 10, 2024-10-01 2024, Art no. 353, doi: 10.3390/batteries10100353.

[287] A. Muresanu, M. Dudescu, and D. Tica, "Study on the Crashworthiness of a Battery Frame Design for an Electric Vehicle Using FEM," *WORLD ELECTRIC VEHICLE JOURNAL,* vol. 15, no. 11, 2024-11-01 2024, Art no. 534, doi: 10.3390/wevj15110534.

[288] S. Muresanu *et al.*, "Automating Dental Condition Detection on Panoramic Radiographs: Challenges, Pitfalls, and Opportunities," *DIAGNOSTICS,* vol. 14, no. 20, 2024-10-01 2024, Art no. 2336, doi: 10.3390/diagnostics14202336.

[289] M. Nawaz, D. Breaz, M. Raza, and L. Cotîrla, "Starlikeness and Convexity of Generalized Bessel-Maitland Function," *AXIOMS,* vol. 13, no. 10, 2024-10-01 2024, Art no. 691, doi: 10.3390/axioms13100691.

[290] R. Nawaz, R. Fayyaz, D. Breaz, and L. Cotîrla, "Sharp Coefficient Estimates for Analytic Functions Associated with Lemniscate of Bernoulli," *MATHEMATICS,* vol. 12, no. 15, 2024-08-01 2024, Art no. 2309, doi: 10.3390/math12152309.

[291] O. Neagu and M. Neagu, "Economic Complexity as a Determinant of Green Development in the Central and Eastern European (CEE) Countries," *STUDIA UNIVERSITATIS VASILE GOLDIS ARAD SERIA STIINTE ECONOMICE,* vol. 34, no. 3, pp. 108-132, 2024-09-01 2024, doi: 10.2478/sues-2024-0015.

[292] C. Neamtu *et al.*, "Evaluating User Experience in the Context of Cultural Heritage Dissemination Using Extended Reality: A Case Study of the Dacian Bronze Matrix with Hollow Design," *ACM JOURNAL ON COMPUTING AND CULTURAL HERITAGE,* vol. 17, no. 2, 2024-06-01 2024, Art no. 19, doi: 10.1145/3639933.

[293] E. Negomireanu, M. Manciu-simijdean, O. Iusan, and M. Dragomir, "CIRCULAR WASTE MANAGEMENT TO SUPPORT THE SUSTAINABILITY OF NONCONVENTIONAL MANUFACTURING COMPANIES," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 3, pp. 525-532, 2024-09-01 2024.

[294] I. Negrean, A. Crisan, S. Vlase, and R. Pascu, "D'Alembert-Lagrange Principle in Symmetry of Advanced Dynamics of Systems," *SYMMETRY-BASEL,* vol. 16, no. 9, 2024-09-01 2024, Art no. 1105, doi: 10.3390/sym16091105.

[295] V. Negru, V. Suciu, A. Lapusan, C. Lemnaru, M. Dînsoreanu, and R. Potolea, "Assessing language models' task and language transfer capabilities for sentiment analysis in dialog data," *COMPUTER SPEECH AND LANGUAGE,* vol. 89, 2024-08-09 2025, Art no. 101704, doi: 10.1016/j.csl.2024.101704.

[296] S. Nemes *et al.*, "Integration of ultrasound and microwave pretreatments with solid-state fermentation enhances the release of sugars, organic acids, and phenolic compounds in wheat bran," *FOOD CHEMISTRY,* vol. 463, 2024-09-20 2025, Art no. 141237, doi: 10.1016/j.foodchem.2024.141237.

[297] R. Ninacs and S. Haragas, "DESIGN AND OPTIMAL MODELING OF UNCONVENTIONAL WORM GEAR WITH BEARINGS," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 2, pp. 569-576, 2024-04-01 2024.

[298] C. Nosner, C. Cosma, G. Contiu, P. Berce, and N. Balc, "DESIGN OF CUSTOMIZED IMPLANT SLM MANUFACTURED," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 1, pp. 451-460, 2024-02-01 2024.

[299] T. O'Mahony, M. Hill, R. Onet, M. Neag, L. Cubillo, and D. Zhou, "The impact of take-home laboratories on student perceptions of conceptual and professional learning in electronic engineering across four European universities," *EUROPEAN JOURNAL OF ENGINEERING EDUCATION,* vol. 49, no. 6, pp. 1376-1396, 2024-09-27 2024, doi: 10.1080/03043797.2024.2407480.

[300] I. Oarga, G. Prunean, B. Varga, D. Moldovanu, and D. Micu, "Comparative Analysis of Energy Efficiency between Battery Electric Buses and Modular Autonomous Vehicles," *APPLIED SCIENCES-BASEL,* vol. 14, no. 11, 2024-06-01 2024, Art no. 4389, doi: 10.3390/app14114389.

[301] I. Oarga, B. Varga, D. Moldovanu, H. Carausan, and G. Prunean, "Modular Autonomous Vehicles' Application in Public Transport Networks: Conceptual Analysis on Airport Connection," *SUSTAINABILITY,* vol. 16, no. 4, 2024-02-01 2024, Art no. 1512, doi: 10.3390/su16041512.

[302] V. Oniga, A. Loghin, M. Macovei, A. Lazar, B. Boroianu, and P. Sestras, "Enhancing LiDAR-UAS Derived Digital Terrain Models with Hierarchic Robust and Volume-Based Filtering Approaches for Precision Topographic Mapping," *REMOTE SENSING,* vol. 16, no. 1, 2024-01-01 2024, Art no. 78, doi: 10.3390/rs16010078.

[303] O. Onysko *et al.*, "Analytical Model of Tapered Thread Made by Turning from Different Machinability Workpieces," *MACHINES,* vol. 12, no. 5, 2024-05-01 2024, Art no. 313, doi: 10.3390/machines12050313.

[304] E. Orban, Z. Pap, R. Fechete, and R. Sipos, "Evaluation of the Influence of Hypolipidemic Medication on Albino Wistar Rats' Bone Tissue by NMR Diffusiometry," *MEDICINA-LITHUANIA,* vol. 60, no. 6, 2024-06-01 2024, Art no. 918, doi: 10.3390/medicina60060918.

[305] E. Orban, Z. Pap, R. Sipos, and R. Fechete, "Assessment of bone tissue cytoarchitectonics by 2D 1H NMR relaxometry maps," *JOURNAL OF BIOLOGICAL PHYSICS,* vol. 50, no. 3-4, pp. 255-269, 2024-06-27 2024, doi: 10.1007/s10867-024-09658-2.

[306] R. Orzan *et al.*, "Deep Learning in Endoscopic Ultrasound: A Breakthrough in Detecting Distal Cholangiocarcinoma," *CANCERS,* vol. 16, no. 22, 2024-11-01 2024, Art no. 3792, doi: 10.3390/cancers16223792.

[307] A. Ouallali *et al.*, "Exploring soil pedogenesis through frequency-dependent magnetic susceptibility in varied lithological environments," *EURO-MEDITERRANEAN JOURNAL FOR ENVIRONMENTAL INTEGRATION,* vol. 10, no. 2, pp. 887-900, 2024-10-18 2025, doi: 10.1007/s41207-024-00663-4.

[308] D. Ourdani, N. Challab, Y. Roussigne, S. Cherif, M. Gabor, and M. Belmeguenai, "Temperature dependence and capping and underlayer layers effect on the interfacial magnetic properties of Ir/Fe- or Pt/Fe-based systems," *PHYSICAL REVIEW B,* vol. 109, no. 21, 2024-06-20 2024, Art no. 214426, doi: 10.1103/PhysRevB.109.214426.

[309] S. Özcan and L. Cotîrla, "Generalized n-Polynomial p-Convexity and Related Inequalities," *MATHEMATICS,* vol. 12, no. 7, 2024-04-01 2024, Art no. 1042, doi: 10.3390/math12071042.

[310] R. Pacurar *et al.*, "Use of high-performance polymeric materials in customized low-cost robotic grippers for biomechatronic applications: experimental and analytical research," *FRONTIERS IN MATERIALS,* vol. 11, 2024-01-22 2024, Art no. 1304339, doi: 10.3389/fmats.2024.1304339.

[311] C. Panazan and E. Dulf, "Intelligent Cane for Assisting the Visually Impaired," *TECHNOLOGIES,* vol. 12, no. 6, 2024-06-01 2024, Art no. 75, doi: 10.3390/technologies12060075.

[312] S. Panday, S. Mittal, C. Stoenoiu, and L. Jäntschi, "A New Adaptive Eleventh-Order Memory Algorithm for Solving Nonlinear Equations," *MATHEMATICS,* vol. 12, no. 12, 2024-06-01 2024, Art no. 1809, doi: 10.3390/math12121809.

[313] I. Pap and S. Oniga, "eHealth Assistant AI Chatbot Using a Large Language Model to Provide Personalized Answers through Secure Decentralized Communication," *SENSORS,* vol. 24, no. 18, 2024-09-01 2024, Art no. 6140, doi: 10.3390/s24186140.

[314] D. Papageorgiou, F. Popa, and C. Medrea, "Failure analysis of a forming assembly used in aluminum packaging tubes production," *ENGINEERING FAILURE ANALYSIS,* vol. 163, 2024-05-25 2024, Art no. 108452, doi: 10.1016/j.engfailanal.2024.108452.

[315] R. Papara, L. Grec, I. Potarniche, and R. Voichita, "Testing of Indoor Obstacle-Detection Prototypes Designed for Visually Impaired Persons," *APPLIED SCIENCES-BASEL,* vol. 14, no. 5, 2024-03-01 2024, Art no. 1767, doi: 10.3390/app14051767.

[316] M. Parparita, P. Bere, and K. Biruk-urban, "COMPOSITE SANDWICH STRUCTURES - AN OVERVIEW," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 1, pp. 275-280, 2024-02-01 2024.

[317] N. Pasca, M. Banica, L. Butnar, and V. Nasui, "EXPERIMENTAL RESEARCH ON MACHINING WITH DLC DIAMOND COATED MILLING TOOLS OF ALUMINUM ALLOY PARTS USED IN THE AERONAUTICAL INDUSTRY," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 4, pp. 657-664, 2024-11-01 2024.

[318] I. Perhatia *et al.*, "Influence of different additives on the morphology, defect state and luminescence of ZnO nanoparticles," *COLLOIDS AND SURFACES A-PHYSICOCHEMICAL AND ENGINEERING ASPECTS,* vol. 684, 2024-01-03 2024, Art no. 133102, doi: 10.1016/j.colsurfa.2023.133102.

[319] A. Peter *et al.*, "Beeswax-poly(vinyl alcohol) composite films for bread packaging," *FOOD CHEMISTRY-X,* vol. 24, 2024-12-03 2024, Art no. 102053, doi: 10.1016/j.fochx.2024.102053.

[320] D. Petrean and R. Potolea, "Homomorphic encrypted Yara rules evaluation," *JOURNAL OF INFORMATION SECURITY AND APPLICATIONS,* vol. 82, 2024-03-04 2024, Art no. 103738, doi: 10.1016/j.jisa.2024.103738.

[321] D. Petrean and R. Potolea, "Random forest evaluation using multi-key homomorphic encryption and lookup tables," *INTERNATIONAL JOURNAL OF INFORMATION SECURITY,* vol. 23, no. 3, pp. 2023-2041, 2024-03-14 2024, doi: 10.1007/s10207-024-00823-1.

[322] D. Piscoiu *et al.*, "The Effect of Calcium and Iron (III) Oxides on Lead Spent Plates: Spectroscopic, Voltametric, and EIS Investigations," *MATERIALS,* vol. 17, no. 17, 2024-09-01 2024, Art no. 4229, doi: 10.3390/ma17174229.

[323] D. Pisla *et al.*, "A Vision-Guided Robotic System for Safe Dental Implant Surgery," *JOURNAL OF CLINICAL MEDICINE,* vol. 13, no. 21, 2024-11-01 2024, Art no. 6326, doi: 10.3390/jcm13216326.

[324] D. Pisla *et al.*, "On the Control and Validation of the PARA-SILSROB Surgical Parallel Robot," *APPLIED SCIENCES-BASEL,* vol. 14, no. 17, 2024-09-01 2024, Art no. 7925, doi: 10.3390/app14177925.

[325] M. Platon and O. Nemes, "FIBREGLASS REINFORCEMENT INFLUENCE ON THE MECHANICAL BEHAVIOUR OF AN ABS- PMMA- FIBREGLASS COMPOSITE MATERIAL," *ARCHIVES OF METALLURGY AND MATERIALS,* vol. 69, no. 4, pp. 1637-1642, 2024-01-01 2024, doi: 10.24425/amm.2024.151435.

[326] M. Pollák, M. Kocisko, S. Grozav, V. Ceclan, and A. Bogdan, "Suitability of UR5 Robot for Robotic 3D Printing," *APPLIED SCIENCES-BASEL,* vol. 14, no. 21, 2024-11-01 2024, Art no. 9845, doi: 10.3390/app14219845.

[327] A. Pop, A. Titu, S. Ravai-Nagy, and C. Daraba, "Influence of Machining Parameters on the Dimensional Accuracy of Drilled Holes in Engineering Plastics," *POLYMERS,* vol. 16, no. 11, 2024-06-01 2024, Art no. 1490, doi: 10.3390/polym16111490.

[328] C. Pop, T. Cioara, V. Chifu, I. Anghel, and F. Bellesini, "Electric vehicles coordination for grid balancing using multi-objective Harris Hawks Optimization," *ENERGY REPORTS,* vol. 12, pp. 2483-2497, 2024-08-27 2024, doi: 10.1016/j.egyr.2024.08.049.

[329] F. Pop and T. Dippong, "The Antioxidant Effect of Burdock Extract on the Oxidative Stability of Lard and Goose Fat during Heat Treatment," *FOODS,* vol. 13, no. 2, 2024-01-01 2024, Art no. 304, doi: 10.3390/foods13020304.

[330] F. Pop, C. Semeniuc, M. Dan, and T. Dippong, "Impact of different processing methods and thermal behaviour on quality characteristics of soybean and sesame oils," *JOURNAL OF THERMAL ANALYSIS AND CALORIMETRY,* vol. 149, no. 4, pp. 1403-1417, 2024-01-22 2024, doi: 10.1007/s10973-023-12852-4.

[331] I. Pop, D. Ighian, R. Toader, and R. Hahn, "Predictors of Adopting a Sustainability Policy in Museums," *SUSTAINABILITY,* vol. 16, no. 10, 2024-05-01 2024, Art no. 4062, doi: 10.3390/su16104062.

[332] I. Pop and S. Mandru, "THE INFLUENCE OF GEOMETRIC PARAMETERS ON THE PERFORMANCES OF PNEUMATIC SOFT ACTUATORS," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 4, pp. 665-674, 2024-11-01 2024.

[333] L. Pop, A. Cozmuta, C. Nicula, L. Cozmuta, and A. Peter, "Attempts to Obtain Material Based on Polyvinyl Alcohol with Barrier Properties against Water Vapor," *APPLIED SCIENCES-BASEL,* vol. 14, no. 10, 2024-05-01 2024, Art no. 4310, doi: 10.3390/app14104310.

[334] M. Pop, I. Sas-Boca, D. Frunza, F. Popa, and A. Neag, "The Influence of Hot Deformation on the Mechanical and Structural Properties of 42CrMo4 Steel," *METALS,* vol. 14, no. 6, 2024-06-01 2024, Art no. 647, doi: 10.3390/met14060647.

[335] S. Pop *et al.*, "EVALUATION OF THE BIOMECHANICAL PROPERTIES OF IN VIVO USED ORTHODONTIC MINI-IMPLANTS," *ROMANIAN JOURNAL OF ORAL REHABILITATION,* vol. 16, no. 1, pp. 238-245, 2024-01-01 2024, doi: 10.6261/RJOR.2024.1.16.20.

[336] V. Pop and A. Negrescu, "Three New Proofs of the Theorem rank f(M) plus rank g(M) = rank (f, g) (M) plus rank [f, g] (M)," *MATHEMATICS,* vol. 12, no. 3, 2024-02-01 2024, Art no. 360, doi: 10.3390/math12030360.

[337] V. Pop and C. Todea, "ON SOME PROPERTIES OF SYLVESTER MATRIX RANK FUNCTIONS," *UNIVERSITY POLITEHNICA OF BUCHAREST SCIENTIFIC BULLETIN-SERIES A-APPLIED MATHEMATICS AND PHYSICS,* vol. 86, no. 4, pp. 45-48, 2024-01-01 2024.

[338] D. Popa and L. Szabó, "Overcoming Catch-22 for rare earth metals in green transition: Solutions in electrical machine manufacturing," *RENEWABLE & SUSTAINABLE ENERGY REVIEWS,* vol. 207, 2024-09-10 2025, Art no. 114917, doi: 10.1016/j.rser.2024.114917.

[339] F. Popa, T. Marinca, B. Neamtu, and I. Chicinas, "Ni3Fe/Cr nanocrystalline soft magnetic composite compacts obtained by mechanical milling and spark plasma sintering," *JOURNAL OF MAGNETISM AND MAGNETIC MATERIALS,* vol. 592, 2024-02-02 2024, Art no. 171800, doi: 10.1016/j.jmmm.2024.171800.

[340] F. Popa, T. Marinca, N. Sechel, D. Frunza, and I. Chicinas, "High Milling Time Influence on the Phase Stability and Electrical Properties of Fe50Mn35Sn15 Heusler Alloy Obtained by Mechanical Alloying," *MATERIALS,* vol. 17, no. 17, 2024-09-01 2024, Art no. 4355, doi: 10.3390/ma17174355.

[341] F. Popa, T. Marinca, N. Sechel, D. Frunzä, and I. Chicinas, "Influence of Long Milling Time on the Electrical Resistivity of Nanocrystalline Ni2MnSn Heusler Alloy Obtained by Mechanosynthesis," *NANOMATERIALS,* vol. 14, no. 13, 2024-07-01 2024, Art no. 1156, doi: 10.3390/nano14131156.

[342] S. Popa *et al.*, "Gemini-Assisted Deep Learning Classification Model for Automated Diagnosis of High-Resolution Esophageal Manometry Images," *MEDICINA-LITHUANIA,* vol. 60, no. 9, 2024-09-01 2024, Art no. 1493, doi: 10.3390/medicina60091493.

[343] T. Popa *et al.*, "The Effects of Surface Patterning and Photobiomodulation on the Osseointegration of Titanium Implants in Osteoporotic Long Bones: An In Vivo Study in Rats," *JOURNAL OF FUNCTIONAL BIOMATERIALS,* vol. 15, no. 11, 2024-11-01 2024, Art no. 346, doi: 10.3390/jfb15110346.

[344] I. Popan, V. Bocanet, S. Softic, A. Popan, N. Panc, and N. Balc, "Artificial Intelligence Model Used for Optimizing Abrasive Water Jet Machining Parameters to Minimize Delamination in Carbon Fiber-Reinforced Polymer," *APPLIED SCIENCES-BASEL,* vol. 14, no. 18, 2024-09-01 2024, Art no. 8512, doi: 10.3390/app14188512.

[345] I. Popan, C. Cosma, A. Popan, V. Bocanet, and N. Bâlc, "Monitoring Equipment Malfunctions in Composite Material Machining: Acoustic Emission-Based Approach for Abrasive Waterjet Cutting," *APPLIED SCIENCES-BASEL,* vol. 14, no. 11, 2024-06-01 2024, Art no. 4901, doi: 10.3390/app14114901.

[346] F. Popister, M. Dragomir, P. Ciudin, and H. Goia, "Empowering Rehabilitation: Design and Structural Analysis of a Low-Cost 3D-Printed Smart Orthosis," *POLYMERS,* vol. 16, no. 10, 2024-05-01 2024, Art no. 1303, doi: 10.3390/polym16101303.

[347] F. Popister, H. Goia, P. Ciudin, and D. Dragomir, "Experimental Study of a 3D Printing Strategy for Polymer-Based Parts for Drone Equipment Using Bladeless Technology," *POLYMERS,* vol. 16, no. 4, 2024-02-01 2024, Art no. 533, doi: 10.3390/polym16040533.

[348] R. Portase, R. Tolas, and R. Potolea, "From Sensors to Insights: An Original Method for Consumer Behavior Identification in Appliance Usage," *ELECTRONICS,* vol. 13, no. 7, 2024-04-01 2024, Art no. 1364, doi: 10.3390/electronics13071364.

[349] R. Portase, R. Tolas, and R. Potolea, "SmartLaundry: A Real-Time System for Public Laundry Allocation in Smart Cities," *SENSORS,* vol. 24, no. 7, 2024-04-01 2024, Art no. 2159, doi: 10.3390/s24072159.

[350] R. Portase, A. Colesa, and G. Sebestyen, "SpecRep: Adversary Emulation Based on Attack Objective Specification in Heterogeneous Infrastructures," *SENSORS,* vol. 24, no. 17, 2024-09-01 2024, Art no. 5601, doi: 10.3390/s24175601.

[351] R. Portase, A. Muntea, A. Mermeze, A. Colesa, and G. Sebestyen, "Detection Strategies for COM, WMI, and ALPC-Based Multi-Process Malware," *SENSORS,* vol. 24, no. 16, 2024-08-01 2024, Art no. 5118, doi: 10.3390/s24165118.

[352] R. Portase, R. Portase, A. Colesa, and G. Sebestyen, "LEDA-Layered Event-Based Malware Detection Architecture," *SENSORS,* vol. 24, no. 19, 2024-10-01 2024, Art no. 6393, doi: 10.3390/s24196393.

[353] B. Postolka *et al.*, "Hindfoot kinematics and kinetics- A combined in vivo and in silico analysis approach," *GAIT & POSTURE,* vol. 112, pp. 8-15, 2024-05-08 2024, doi: 10.1016/j.gaitpost.2024.04.023.

[354] D. Predoi *et al.*, "New Physico-Chemical Analysis of Magnesium-Doped Hydroxyapatite in Dextran Matrix Nanocomposites," *POLYMERS,* vol. 16, no. 1, 2024-01-01 2024, Art no. 125, doi: 10.3390/polym16010125.

[355] D. Predoi *et al.*, "Synthesis, characterization, and antifungal properties of chrome-doped hydroxyapatite thin films," *MATERIALS CHEMISTRY AND PHYSICS,* vol. 324, 2024-07-11 2024, Art no. 129690, doi: 10.1016/j.matchemphys.2024.129690.

[356] D. Predoi, S. Talu, S. Ciobanu, S. Iconaru, R. Matos, and H. da Fonseca, "Exploring the physicochemical traits, antifungal capabilities, and 3D spatial complexity of hydroxyapatite with Ag+-Mg2+substitution in the biocomposite thin films," *MICRON,* vol. 184, 2024-06-03 2024, Art no. 103661, doi: 10.1016/j.micron.2024.103661.

[357] C. Prica *et al.*, "Cu-Al-Ni Nanocrystalline Compacts Obtained by Spark Plasma Sintering of Mechanically Alloyed Powders," *MATERIALS,* vol. 17, no. 19, 2024-10-01 2024, Art no. 4847, doi: 10.3390/ma17194847.

[358] A. Priya, D. Geetha, D. Pabba, R. Aepuru, S. Talu, and R. Varalakshmi, "Prominent ferroelectric properties in multilayered TiO2 Mn-doped BiFeO3 spin-coated thin films," *FERROELECTRICS,* vol. 618, no. 4, pp. 957-969, 2024-03-11 2024, doi: 10.1080/00150193.2023.2300607.

[359] R. Procházka *et al.*, "Collection of Plastic Packaging of Various Types: Sorting of Fractions of Plastic Waste Using Both Automated and Manual Modes," *IEEE ACCESS,* vol. 12, pp. 44244-44261, 2024-01-01 2024, doi: 10.1109/ACCESS.2024.3376230.

[360] Y. Pu, Q. Li, S. Huo, E. Breaz, W. Chen, and F. Gao, "Optimal configuration for shared electric-hydrogen energy storage for multiple integrated energy systems with mobile hydrogen transportation," *RENEWABLE ENERGY,* vol. 237, 2024-11-11 2024, Art no. 121828, doi: 10.1016/j.renene.2024.121828.

[361] Y. Pu, Q. Li, S. Luo, W. Chen, E. Breaz, and F. Gao, "Peer-to-Peer Electricity-Hydrogen Trading Among Integrated Energy Systems Considering Hydrogen Delivery and Transportation," *IEEE TRANSACTIONS ON POWER SYSTEMS,* vol. 39, no. 2, pp. 3895-3911, 2024-03-01 2024, doi: 10.1109/TPWRS.2023.3312144.

[362] A. Purcar *et al.*, "The Effect of Visual Reasoning on Arithmetic Word Problem Solving," *EDUCATION SCIENCES,* vol. 14, no. 3, 2024-03-01 2024, Art no. 278, doi: 10.3390/educsci14030278.

[363] T. Quoc, D. Trong, V. Long, K. Huu, and S. Talu, "Effects of liquefied gas temperature and negative pressure on the microstructural characteristics of oxide Mg 2 SiO 4 using molecular dynamics simulation method," *COMPUTATIONAL MATERIALS SCIENCE,* vol. 242, 2024-05-07 2024, Art no. 113075, doi: 10.1016/j.commatsci.2024.113075.

[364] R. Rada, D. Manea, A. Nowakowski, and S. Rada, "Nanocomposites Derived from Construction and Demolition Waste for Cement: X-ray Diffraction, Spectroscopic and Mechanical Investigations," *NANOMATERIALS,* vol. 14, no. 10, 2024-05-01 2024, Art no. 890, doi: 10.3390/nano14100890.

[365] R. Rada, D. Manea, S. Rada, and R. Fechete, "Circular Economy of Construction and Demolition Waste for Nanocomposite Cement: XRD, NMR, Vickers, Voltammetric and EIS Characterization," *NANOMATERIALS,* vol. 14, no. 15, 2024-08-01 2024, Art no. 1239, doi: 10.3390/nano14151239.

[366] S. Rada, A. Gorea, and E. Culea, "Graphite-Phosphate Composites: Structure and Voltammetric Investigations," *MATERIALS,* vol. 17, no. 20, 2024-10-01 2024, Art no. 5000, doi: 10.3390/ma17205000.

[367] V. Radulescu, G. Radulescu, S. Nas, A. Radulescu, and C. Radulescu, "Structural Health Monitoring of Bridges under the Influence of Natural Environmental Factors and Geomatic Technologies: A Literature Review and Bibliometric Analysis," *BUILDINGS,* vol. 14, no. 9, 2024-09-01 2024, Art no. 2811, doi: 10.3390/buildings14092811.

[368] M. Ragazzi *et al.*, "MSW Management in Two Italian Mountainous Areas," *ENVIRONMENTAL AND CLIMATE TECHNOLOGIES,* vol. 28, no. 1, pp. 84-93, 2024-01-01 2024, doi: 10.2478/rtuect-2024-0008.

[369] S. Raval-Nagy, I. Pasca, and V. Diciuc, "EXPERIMENTAL RESEARCH ON MILLING OF THE POLYETHERETHERKETONES (TECAPEEK NATURAL)-WHIT BALL- NOSE END MILL," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 1, pp. 429-434, 2024-02-01 2024.

[370] S. Ravai-Nagy, A. Pop, and I. Pasca, "THE INFLUENCE OF CHIP TRANSPORT DIRECTION ON THREAD TAPPING OF PEHD1000 AND M980 PLASTIC MATERIALS," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 1, pp. 435-444, 2024-02-01 2024.

[371] M. Raza, D. Breaz, S. Mushtaq, L. Cotirla, F. Tawfiq, and E. Rapeanu, "Geometric Properties and Hardy Spaces of Rabotnov Fractional Exponential Functions," *FRACTAL AND FRACTIONAL,* vol. 8, no. 1, 2024-01-01 2024, Art no. 5, doi: 10.3390/fractalfract8010005.

[372] H. Rehman, P. Kumam, V. Berinde, and W. Kumam, "Non-monotonic and self-adaptive strongly convergent iterative methods for efficiently solving variational inequalities with pseudomonotone operators," *COMPUTATIONAL & APPLIED MATHEMATICS,* vol. 43, no. 2, 2024-03-01 2024, Art no. 80, doi: 10.1007/s40314-024-02606-9.

[373] S. Rezaee *et al.*, "Influence of film thickness on structural, optical, and electrical properties of sputtered nickel oxide thin films," *MICROSCOPY RESEARCH AND TECHNIQUE,* vol. 87, no. 7, pp. 1402-1412, 2024-02-21 2024, doi: 10.1002/jemt.24530.

[374] I. Ross-Sokolovsky, S. Munteanu, E. Hajdasz, and S. Gupta, "BOOSTING L2 CONFIDENCE AND COMMUNICATION THROUGH THE VIRTUAL CAFÉ PROJECT," *JOURNAL OF TEACHING ENGLISH FOR SPECIFIC*

AND ACADEMIC PURPOSES, vol. 12, no. 2, pp. 391-404, 2024-01-01 2024, doi: 10.22190/JTESAP240227032R.

[375] P. Roy, V. Teju, S. Kandula, K. Sowmya, A. Stan, and O. Stan, "Secure Healthcare Model Using Multi-Step Deep Q Learning Network in Internet of Things," *ELECTRONICS,* vol. 13, no. 3, 2024-02-01 2024, Art no. 669, doi: 10.3390/electronics13030669.

[376] J. Ruiz-Sarrio, J. Antonino-Daviu, and C. Martis, "Comprehensive Diagnosis of Localized Rolling Bearing Faults during Rotating Machine Start-Up via Vibration Envelope Analysis," *ELECTRONICS,* vol. 13, no. 2, 2024-01-01 2024, Art no. 375, doi: 10.3390/electronics13020375.

[377] J. Ruiz-Sarrio, J. Antonino-Daviu, and C. Martis, "Localized Bearing Fault Analysis for Different Induction Machine Start-Up Modes via Vibration Time-Frequency Envelope Spectrum," *SENSORS,* vol. 24, no. 21, 2024-11-01 2024, Art no. 6935, doi: 10.3390/s24216935.

[378] J. Ruiz-Sarrio, J. Antonino-Daviu, C. Martis, P. Llovera-Segovia, and V. Fuster-Roig, "Influence of Rotor Position in the Broadband Impedance Response for SFRA Rotating Machine Diagnosis," *IEEE TRANSACTIONS ON INDUSTRY APPLICATIONS,* vol. 60, no. 4, pp. 6133-6143, 2024-07-01 2024, doi: 10.1109/TIA.2024.3397770.

[379] T. Rus, R. Moldovan, and M. Picazo, "LCA analysis of a roof mounted PV system: a Romanian case study," *FRONTIERS IN ENVIRONMENTAL SCIENCE,* vol. 12, 2024-06-03 2024, Art no. 1413629, doi: 10.3389/fenvs.2024.1413629.

[380] C. Rusan, I. Scurtu, and M. Ciupan, "METHODOLOGY FOR DESIGN AND FOR OBTAIN STIFFNESS OF MACHINE TOOL MAIN SPINDLE UNITS WITH ANGULAR BEARING SYSTEMS," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 3, pp. 533-542, 2024-09-01 2024.

[381] A. Rusu *et al.*, "On Multivariate Electrical Performance Machine Learning Driven Pre-Silicon IC Adaptive Verification," *IEEE ACCESS,* vol. 12, pp. 136436-136450, 2024-01-01 2024, doi: 10.1109/ACCESS.2024.3463393.

[382] D. Rusu and S. Mândru, "EXPERIMENTAL RESEARCH OF A MULTI-SEGMENT SOFT ACTUATOR," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 2, pp. 353-358, 2024-06-01 2024.

[383] J. Rybarczyk *et al.*, "Mechanical Properties of Carbon Fiber Reinforced Materials for 3D Printing of Ankle Foot Orthoses," *ADVANCES IN SCIENCE AND TECHNOLOGY-RESEARCH JOURNAL,* vol. 18, no. 4, pp. 191-215, 2024-01-01 2024, doi: 10.12913/22998624/188819.

[384] E. Sabau, A. Timbus, C. Borzan, and A. Popescu, "ROTATING FRAME DESIGN FOR PHOTOVOLTAIC PANELS," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 1, pp. 319-324, 2024-02-01 2024.

[385] D. Sadkaoui *et al.*, "Evaluation of tectonic activity using morphometric indices: Study of the case of Taïliloute ridge (middle-Atlas region, Morocco)," *JOURNAL OF AFRICAN EARTH SCIENCES,* vol. 213, 2024-03-16 2024, Art no. 105219, doi: 10.1016/j.jafrearsci.2024.105219.

[386] M. Safár *et al.*, "Design of a method to optimise the dimensions of steel bearing rings for automotive applications," *INTERNATIONAL JOURNAL OF ADVANCED MANUFACTURING TECHNOLOGY,* vol. 135, no. 11-12, pp. 5961-5986, 2024-12-04 2024, doi: 10.1007/s00170-024-14866-0.

[387] S. Salar, B. Jorgic, M. Olanescu, and I. Popa, "Barriers to Physical Activity Participation in Children and Adolescents with Autism Spectrum Disorder," *HEALTHCARE,* vol. 12, no. 23, 2024-12-01 2024, Art no. 2420, doi: 10.3390/healthcare12232420.

[388] S. Salcu, V. Suciu, P. Teodosescu, and Z. Mathe, "The Condition Number Perspective in Modeling and Designing an Electronic IDBIC Converter," *ELECTRONICS,* vol. 13, no. 7, 2024-04-01 2024, Art no. 1302, doi: 10.3390/electronics13071302.

[389] T. Salem, M. Dragomir, and E. Chatelet, "Strategic Integration of Drone Technology and Digital Twins for Optimal Construction Project Management," *APPLIED SCIENCES-BASEL,* vol. 14, no. 11, 2024-06-01 2024, Art no. 4787, doi: 10.3390/app14114787.

[390] T. Salem, M. Dragomir, A. Zinveli, and D. Blagu, "EMPLOYING DIGITAL TWINS IN ENGINEERING PROJECT MANAGEMENT WITH APPLICATIONS IN CONSTRUCTIONS," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 3, pp. 543-548, 2024-09-01 2024.

[391] S. Salisu, V. Berinde, S. Sriwongsa, and P. Kumam, "On approximating fixed points of strictly pseudocontractive mappings in metric spaces," *CARPATHIAN JOURNAL OF MATHEMATICS,* vol. 40, no. 2, pp. 419-430, 2024-01-01 2024, doi: 10.37193/CJM.2024.02.12.

[392] S. Salisu, V. Berinde, S. Sriwongsa, and P. Kumam, "Fixed point properties of saturated and unsaturated contractive mappings in CAT(0) spaces," *JOURNAL OF ANALYSIS,* vol. 33, no. 2, pp. 903-925, 2024-12-20 2025, doi: 10.1007/s41478-024-00868-4.

[393] S. Salisu, S. Sriwongsat, P. Kumam, and V. Berinde, "VARIATIONAL INEQUALITY AND PROXIMAL SCHEME FOR ENRICHED NONEXPANSIVE MAPPINGS IN CAT(0) SPACES," *JOURNAL OF NONLINEAR AND CONVEX ANALYSIS,* vol. 25, no. 7, pp. 1759-1776, 2024-01-01 2024.

[394] T. Sanislav, G. Mois, S. Zeadally, S. Folea, and H. Hedesiu, "A Smart Platform for Monitoring and Managing Energy Harvesting in Household Systems," *ENERGIES,* vol. 17, no. 23, 2024-12-01 2024, Art no. 5977, doi: 10.3390/en17235977.

[395] T. Sântejudean, S. Ungur, R. Herzal, I. Morarescu, V. Varma, and L. Busoniu, "Globally convergent path-aware optimization with mobile robots," *NONLINEAR ANALYSIS-HYBRID SYSTEMS,* vol. 55, 2024-09-13 2025, Art no. 101546, doi: 10.1016/j.nahs.2024.101546.

[396] P. Santos, D. Abrantes, P. Lopes, and L. Moga, "The Relevance of Surface Resistances on the Conductive Thermal Resistance of Lightweight Steel-Framed Walls: A Numerical Simulation Study," *APPLIED SCIENCES-BASEL,* vol. 14, no. 9, 2024-05-01 2024, Art no. 3748, doi: 10.3390/app14093748.

[397] A. Sarbu, R. Papa, A. Digulescu, and C. Ioana, "A Software-Defined Radio Platform for Teaching Beamforming Principles," *APPLIED SCIENCES-BASEL,* vol. 14, no. 22, 2024-11-01 2024, Art no. 10386, doi: 10.3390/app142210386.

[398] N. Sarbu, D. Petreus, and E. Szilagyi, "Practical solutions for microgrid energy management: Integrating solar forecasting and correction algorithms," *ENERGY REPORTS,* vol. 12, pp. 4160-4174, 2024-10-09 2024, doi: 10.1016/j.egyr.2024.10.005.

[399] C. Sava *et al.*, "Physico-chemical characterization and possible uses of sludge processed from an urban sewage treatment plant," *HELIYON,* vol. 10, no. 8, 2024-04-22 2024, Art no. e29576, doi: 10.1016/j.heliyon.2024.e29576.

[400] A. Sbihi *et al.*, "Assessing landslide susceptibility in northern Morocco: A geostatistical mapping approach in Al Hoceima-Ajdir," *JOURNAL OF AFRICAN EARTH SCIENCES,* vol. 218, 2024-07-29 2024, Art no. 105361, doi: 10.1016/j.jafrearsci.2024.105361.

[401] T. Shaba, F. Tawfiq, D. Breaz, and L. Cotirla, "New Uses of q-Generalized Janowski Function in q-Bounded Turning Functions," *MATHEMATICS,* vol. 12, no. 10, 2024-05-01 2024, Art no. 1552, doi: 10.3390/math12101552.

[402] Q. Shakir, A. Tayyah, D. Breaz, L. Cotirla, E. Rapeanu, and F. Sakar, "Upper Bounds of the Third Hankel Determinant for Bi-Univalent Functions in Crescent-Shaped Domains," *SYMMETRY-BASEL,* vol. 16, no. 10, 2024-10-01 2024, Art no. 1281, doi: 10.3390/sym16101281.

[403] M. Shams, N. Kausar, and I. Somîtca, "Efficient Multiplicative Calculus-Based Iterative Scheme for Nonlinear Engineering Applications," *MATHEMATICS,* vol. 12, no. 22, 2024-11-01 2024, Art no. 3517, doi: 10.3390/math12223517.

[404] N. Shehab, A. Juma, L. Cotirla, and D. Breaz, "New Results of Differential Subordination for a Specific Subclass of p-Valent Meromorphic Functions Involving a New Operator," *AXIOMS,* vol. 13, no. 12, 2024-12-01 2024, Art no. 878, doi: 10.3390/axioms13120878.

[405] M. Sheikhi, E. Gutiu, C. Moldovan, and L. Tunc, "EFFECTS OF PROCESS PARAMETERS ON THE QUALITY OFF NON- PLANAR 5-AXIS PRINTING OF FREE FORM SURFACES," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 1, pp. 387-392, 2024-02-01 2024.

[406] H. Silaghi *et al.*, "MicroRNA Expression Profiling-Potential Molecular Discrimination of Papillary Thyroid Carcinoma Subtypes," *BIOMEDICINES,* vol. 12, no. 1, 2024-01-01 2024, Art no. 136, doi: 10.3390/biomedicines12010136.

[407] D. Simbotin and P. Cardenas, "Classical Logic, Some of its Limits, and the Psychological Normality," *BRAIN-BROAD RESEARCH IN ARTIFICIAL INTELLIGENCE AND NEUROSCIENCE,* vol. 15, no. 3, pp. 249-257, 2024-01-01 2024, doi: 10.70594/brain/15.3/19.

[408] A. Simedru, O. Cadar, A. Becze, and D. Simedru, "Restructuring the Basic Design of Several Accelerator-Based Concrete Mixes by Integrating Superplasticizers," *MATERIALS,* vol. 17, no. 22, 2024-11-01 2024, Art no. 5582, doi: 10.3390/ma17225582.

[409] A. Simerean and M. Tatar, "Contributions to the Development of Tetrahedral Mobile Robots with Omnidirectional Locomotion Units," *MACHINES,* vol. 12, no. 12, 2024-12-01 2024, Art no. 852, doi: 10.3390/machines12120852.

[410] M. Simonovic *et al.*, "Toward the Enhancement of Rail Sustainability: Demonstration of a Holistic Approach to Obstacle Detection in Operational Railway Environments," *SUSTAINABILITY,* vol. 16, no. 7, 2024-04-01 2024, Art no. 2613, doi: 10.3390/su16072613.

[411] P. Sinha, I. Morarescu, and S. Srikant, "Set input-to-state stability for nonlinear time-delay systems with disturbances," *INTERNATIONAL JOURNAL OF ROBUST AND NONLINEAR CONTROL,* vol. 34, no. 17, pp. 11623-11640, 2024-08-14 2024, doi: 10.1002/rnc.7582.

[412] J. Sora, I. Serban, and D. Petreus, "Enhancing Microgrid Operation Through Electric Vehicle Integration: A Survey," *IEEE ACCESS,* vol. 12, pp. 64897-64912, 2024-01-01 2024, doi: 10.1109/ACCESS.2024.3397587.

[413] E. Sorecau, M. Sorecau, and P. Bechet, "Advanced SDR-Based Custom OFDM Protocol for Improved Data Rates in HF-NVIS Links," *APPLIED SCIENCES-BASEL,* vol. 14, no. 23, 2024-12-01 2024, Art no. 10841, doi: 10.3390/app142310841.

[414] M. Soren and L. Cotîrla, "Fuzzy differential subordination and superordination results for the Mittag-Leffler type Pascal distribution," *AIMS MATHEMATICS,* vol. 9, no. 8, pp. 21053-21078, 2024-01-01 2024, doi: 10.3934/math.20241023.

[415] M. Soren, A. Wanas, and L. Cotîrla, "Results of Third-Order Strong Differential Subordinations," *AXIOMS,* vol. 13, no. 1, 2024-01-01 2024, Art no. 42, doi: 10.3390/axioms13010042.

[416] H. Srivastava, S. El-Deeb, D. Breaz, L. Cotîrla, and G. Salagean, "Bi-Concave Functions Connected with the Combination of the Binomial Series and the Confluent Hypergeometric Function," *SYMMETRY-BASEL,* vol. 16, no. 2, 2024-02-01 2024, Art no. 226, doi: 10.3390/sym16020226.

[417] I. Stanciu and N. Nistor, "Doctoral capstone theories as indicators of university rankings: Insights from a machine learning approach," *COMPUTERS IN HUMAN BEHAVIOR,* vol. 164, 2024-11-22 2025, Art no. 108504, doi: 10.1016/j.chb.2024.108504.

[418] A. Stanciu-birlescu, C. Vilau, I. Voina, C. Noesner, and N. Balc, "MECHANICAL PROPERTIES EVALUATION OF THE SAMPLES MADE BY SLM, WITH TREE-LIKE FRACTALS INTERNAL STRUCTURE," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 1, 2024-02-01 2024.

[419] Z. Stankovic *et al.*, "The Volatility Dynamics of Prices in the European Power Markets during the COVID-19 Pandemic Period," *SUSTAINABILITY,* vol. 16, no. 6, 2024-03-01 2024, Art no. 2426, doi: 10.3390/su16062426.

[420] M. Stef and Z. Polgar, "Software Platform for the Comprehensive Testing of Transmission Protocols Developed in GNU Radio," *INFORMATION,* vol. 15, no. 1, 2024-01-01 2024, Art no. 62, doi: 10.3390/info15010062.

[421] O. Stefan and A. Codrean, "Networked Control of a Small Drone Resilient to Cyber Attacks," *DRONES,* vol. 8, no. 10, 2024-10-01 2024, Art no. 552, doi: 10.3390/drones8100552.

[422] E. Stetco, T. J. Petrisor, O. Pop, M. Belmeguenai, I. Miron, and M. Gabor, "Diode and Selective Routing Functionalities Controlled by Geometry in Current-Induced Spin-Orbit Torque Driven Magnetic Domain Wall Devices," *NANO LETTERS,* vol. 24, no. 44, pp. 13991-13997, 2024-10-27 2024, doi: 10.1021/acs.nanolett.4c03339.

[423] C. Stoenoiu and L. Jäntschi, "Circular Economy Similarities in a Group of Eastern European Countries: Orienting towards Sustainable Development," *SUSTAINABILITY,* vol. 16, no. 4, 2024-02-01 2024, Art no. 1593, doi: 10.3390/su16041593.

[424] C. Stoenoiu and L. Jäntschi, "Connecting the Computer Skills with General Performance of Companies-An Eastern European Study," *SUSTAINABILITY,* vol. 16, no. 22, 2024-11-01 2024, Art no. 10024, doi: 10.3390/su162210024.

[425] C. Stoenoiu and L. Jäntschi, "Sustainable Development of the Economy-A Case Study of the Impacts of the Size of Enterprises and Factors Affecting Performance," *SUSTAINABILITY,* vol. 16, no. 13, 2024-07-01 2024, Art no. 5376, doi: 10.3390/su16135376.

[426] N. Stojiljkovic *et al.*, "Validity and reliability of the My Jump 2 app for detecting interlimb asymmetry in young female basketball players," *FRONTIERS IN SPORTS AND ACTIVE LIVING,* vol. 6, 2024-04-04 2024, Art no. 1362646, doi: 10.3389/fspor.2024.1362646.

[427] N. Stojiljkovic, N. Trajkovic, D. Rancic, M. Olanescu, A. Suciu, and D. Popa, "Relationship between Gross Motor Coordination and Health-Related Fitness in Serbian Preschool Children," *CHILDREN-BASEL,* vol. 11, no. 8, 2024-08-01 2024, Art no. 933, doi: 10.3390/children11080933.

[428] C. Suciu, A. Marginean, V. Suciu, G. Muntean, and S. Nicoara, "Diabetic Macular Edema Optical Coherence Tomography Biomarkers Detected with EfficientNetV2B1 and ConvNeXt," *DIAGNOSTICS,* vol. 14, no. 1, 2024-01-01 2024, Art no. 76, doi: 10.3390/diagnostics14010076.

[429] D. Suciu, E. Dulf, and L. Kovács, "Low-Cost Autonomous Trains and Safety Systems Implementation, using Computer Vision," *ACTA POLYTECHNICA HUNGARICA,* vol. 21, no. 9, pp. 29-43, 2024-01-01 2024.

[430] I. Sugar, F. Gaspar, and O. Chiver, "STUDY ON THE AERODYNAMIC AND DIMENSIONAL PROPERTIES OF CORN USED TO OBTAIN BIOFUEL," *CARPATHIAN JOURNAL OF FOOD SCIENCE AND TECHNOLOGY,* vol. 16, no. 3, 2024-01-01 2024, doi: 10.34302/crpjfst/2024.16.3.5.

[431] M. Susca, V. Mihaly, Z. Lendek, and I. Morarescu, "Passivity of Linear Singularly Perturbed Systems," *IEEE CONTROL SYSTEMS LETTERS,* vol. 8, pp. 2105-2110, 2024-01-01 2024, doi: 10.1109/LCSYS.2024.3404337.

[432] S. Swamy, D. Breaz, K. Venugopal, M. Kempegowda, L. Cotirla, and E. Rapeanu, "Initial Coefficient Bounds Analysis for Novel Subclasses of Bi-Univalent Functions Linked with Lucas-Balancing Polynomials," *MATHEMATICS,* vol. 12, no. 9, 2024-05-01 2024, Art no. 1325, doi: 10.3390/math12091325.

[433] S. Swamy, B. Frasin, D. Breaz, and L. Cotîrla, "Two Families of Bi-Univalent Functions Associating the (p, q)-Derivative with Generalized Bivariate Fibonacci Polynomials," *MATHEMATICS,* vol. 12, no. 24, 2024-12-01 2024, Art no. 3933, doi: 10.3390/math12243933.

[434] D. Székely *et al.*, "Bacterial-fungicidal vine disease detection with proximal aerial images," *HELIYON,* vol. 10, no. 14, 2024-07-11 2024, Art no. e34017, doi: 10.1016/j.heliyon.2024.e34017.

[435] S. Talu and N. Patra, "Nanoscale stereometric analysis of polycrystalline PDI8-CN2 thin films on hydrogen-terminated silicon (H-Si) for enhanced surface functionality," *APPLIED SURFACE SCIENCE,* vol. 684, 2024-12-03 2025, Art no. 161974, doi: 10.1016/j.apsusc.2024.161974.

[436] D. Tamas-Gavrea *et al.*, "Sustainable Approach to Achieve New Green Solutions for the Construction Industry," *SUSTAINABILITY,* vol. 16, no. 23, 2024-12-01 2024, Art no. 10556, doi: 10.3390/su162310556.

[437] M. Taut *et al.*, "Synthesis and Characterization of Microcapsules as Fillers for Self-Healing Dental Composites," *NANOMATERIALS,* vol. 14, no. 22, 2024-11-01 2024, Art no. 1853, doi: 10.3390/nano14221853.

[438] M. Teodorescu, F. Lungu, and R. Vlad, "IMPROVING EFFICIENCY IN MASS PRODUCTION: APPLYING GENETIC ALGORITHMS IN CONJUNCTION WITH OBJECTIVE FUNCTIONS," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 3, pp. 557-566, 2024-09-01 2024.

[439] P. Thammasiri, V. Berinde, N. Petrot, and K. Ungchittrakool, "Double Tseng's Algorithm with Inertial Terms for Inclusion Problems and Applications in Image Deblurring," *MATHEMATICS,* vol. 12, no. 19, 2024-10-01 2024, Art no. 3138, doi: 10.3390/math12193138.

[440] G. Thangkhenpau, S. Panday, B. Panday, C. Stoenoiu, and L. Jantschi, "Generalized high-order iterative methods for solutions of nonlinear systems and their applications," *AIMS MATHEMATICS,* vol. 9, no. 3, pp. 6161-6182, 2024-01-01 2024, doi: 10.3934/math.2024301.

[441] T. Thi *et al.*, "Study on the nanocomposites of polyaniline and Zn doped Fe3O4 using for arsenic absorption in water," *ADVANCES IN NATURAL SCIENCES-NANOSCIENCE AND NANOTECHNOLOGY,* vol. 15, no. 3, 2024-09-01 2024, Art no. 035011, doi: 10.1088/2043-6262/ad6e5b.

[442] M. Thoubaan, D. Al-Khafajy, A. Wanas, D. Breaz, and L. Cotîrla, "Analysis of a Bifurcation and Stability of Equilibrium Points for Jeffrey Fluid Flow through a Non-Uniform Channel," *SYMMETRY-BASEL,* vol. 16, no. 9, 2024-09-01 2024, Art no. 1144, doi: 10.3390/sym16091144.

[443] D. Timi and E. Dulf, "Unmanned Aerial Vehicles: State-of-the-Art on Swarm Control," *CONTROL ENGINEERING AND APPLIED INFORMATICS,* vol. 26, no. 4, pp. 69-80, 2024-01-01 2024.

[444] A. Tîtu, V. Gusan, M. Dragomir, A. Pop, and S. Tîtu, "Cost Calculation and Deployment Strategies for Collaborative Robots in Production Lines: An Innovative and Sustainable Perspective in Knowledge-Based Organizations," *SUSTAINABILITY,* vol. 16, no. 13, 2024-07-01 2024, Art no. 5292, doi: 10.3390/su16135292.

[445] A. Titu and A. Pop, "Enhancing EDM Productivity for Plastic Injection Mold Manufacturing: An Experimental Optimization Study," *POLYMERS,* vol. 16, no. 21, 2024-11-01 2024, Art no. 3019, doi: 10.3390/polym16213019.

[446] A. Titu, G. Pop, and A. Pop, "Mathematical Modeling of the Global Engineering Process for Optimizing Product Quality in the Aerospace Industry," *AEROSPACE,* vol. 11, no. 10, 2024-10-01 2024, Art no. 804, doi: 10.3390/aerospace11100804.

[447] D. Toader, C. Radulescu, and C. Toader, "Investigating the Adoption of Blockchain Technology in Agri-Food Supply Chains: Analysis of an Extended UTAUT Model," *AGRICULTURE-BASEL,* vol. 14, no. 4, 2024-04-01 2024, Art no. 614, doi: 10.3390/agriculture14040614.

[448] T. Toader, C. Mircea, A. Truta, and H. Constantinescu, "Coniferous Trees as Bioinspiration for Designing Long Reinforced Prestressed Concrete Columns," *BIOMIMETICS,* vol. 9, no. 3, 2024-03-01 2024, Art no. 165, doi: 10.3390/biomimetics9030165.

[449] L. Toderean, T. Cioara, I. Anghel, E. Sarmas, V. Michalakopoulos, and V. Marinakis, "Demand response optimization for smart grid integrated buildings: Review of technology enablers landscape and innovation challenges," *ENERGY AND BUILDINGS,* vol. 326, 2024-11-19 2025, Art no. 115067, doi: 10.1016/j.enbuild.2024.115067.

[450] D. Todorovic, P. Mitic, N. Stojiljkovic, M. Olanescu, A. Suciu, and D. Popa, "Organizational commitment in the private and public sectors: a regression analysis based on personality traits, subjective wellbeing, organizational orientations, and perceived employment uncertainty in Serbia," *FRONTIERS IN PSYCHOLOGY,* vol. 15, 2024-11-01 2024, Art no. 1442990, doi: 10.3389/fpsyg.2024.1442990.

[451] R. Tolas, R. Portase, and R. Potolea, "From Individual Device Usage to Household Energy Consumption Profiling," *ELECTRONICS,* vol. 13, no. 12, 2024-06-01 2024, Art no. 2325, doi: 10.3390/electronics13122325.

[452] R. Tolas, R. Portase, and R. Potolea, "GeMSyD: Generic Framework for Synthetic Data Generation," *DATA,* vol. 9, no. 1, 2024-01-01 2024, Art no. 14, doi: 10.3390/data9010014.

[453] D. Toloman *et al.*, "Enhancing the Photocatalytic Activity and Luminescent Properties of Rare-Earth-Doped CeO2 Nanoparticles," *APPLIED SCIENCES-BASEL,* vol. 14, no. 2, 2024-01-01 2024, Art no. 522, doi: 10.3390/app14020522.

[454] V. Tosa *et al.*, "Electrospun Polymeric Fiber Systems Inoculated with Cyanoacrylate Tissue Adhesive: A Novel Hemostatic Alternative during Open Surgery," *MATERIALS,* vol. 17, no. 17, 2024-09-01 2024, Art no. 4318, doi: 10.3390/ma17174318.

[455] D. Trong, U. Saraç, V. Long, and S. Talu, "MOLECULAR DYNAMICS STUDY OF STRUCTURE, CRYSTALLIZATION AND PHASE TRANSITION IN BULK CO-MATERIALS: EFFECT OF TEMPERATURE, NUMBER OF ATOMS AND ANNEALING TIME," *SURANAREE JOURNAL OF SCIENCE AND TECHNOLOGY,* vol. 31, no. 1, 2024-01-01 2024, Art no. 030165, doi: 10.55766/sujst-2024-01-e02746.

[456] L. Tunc, M. Sheikhi, C. Moldovan, E. Gutiu, and N. Balc, "Non-planar 5-axis directional additive manufacturing of plastics: machine, process, and tool path," *MANUFACTURING LETTERS,* vol. 41, pp. 951-956, 2024-10-15 2024, doi: 10.1016/j.mfglet.2024.09.119.

[457] O. Tunç, C. Tunç, G. Petrusel, and J. Yao, "On the Ulam stabilities of nonlinear integral equations and integro-differential equations," *MATHEMATICAL METHODS IN THE APPLIED SCIENCES,* vol. 47, no. 6, pp. 4014-4028, 2024-01-11 2024, doi: 10.1002/mma.9800.

[458] A. Turza, P. Pascuta, M. Muresan-Pop, L. Mare, G. Borodi, and V. Popescu, "Five Novel Polymorphs of Cardarine/GW501516 and Their Characterization by X-ray Diffraction, Computational Methods, Thermal Analysis and a Pharmaceutical Perspective," *PHARMACEUTICS,* vol. 16, no. 5, 2024-05-01 2024, Art no. 623, doi: 10.3390/pharmaceutics16050623.

[459] A. Uivarasan *et al.*, "Whole Black Rice Flour Improves the Physicochemical, Glycemic, and Sensory Properties of Cracker Snacks," *FOODS,* vol. 13, no. 10, 2024-05-01 2024, Art no. 1503, doi: 10.3390/foods13101503.

[460] A. Uivarasan *et al.*, "Characterization of Polyphenol Composition and Starch and Protein Structure in Brown Rice Flour, Black Rice Flour and Their Mixtures," *FOODS,* vol. 13, no. 11, 2024-06-01 2024, Art no. 1592, doi: 10.3390/foods13111592.

[461] W. Ul Hassan, K. Shabbir, M. Khan, and L. Guran, "Computational Evaluation of Heat and Mass Transfer in Cylindrical Flow of Unsteady Fractional Maxwell Fluid Using Backpropagation Neural Networks and LMS," *MATHEMATICS,* vol. 12, no. 23, 2024-12-01 2024, Art no. 3654, doi: 10.3390/math12233654.

[462] E. Ungureanu, A. Stefaniu, R. Isopescu, C. Musina, M. Bujduveanu, and L. Jäntschi, "Extended characteristic polynomial estimating the electro-chemical behaviour of some 4-(azulen-1-yl)-2,6-divinylpyridine derivatives," *JOURNAL OF ELECTROCHEMICAL SCIENCE AND ENGINEERING,* vol. 15, no. 1, 2024-07-26 2025, doi: 10.5599/jese.2374.

[463] A. Vadan and L. Miclea, "Advanced sensors network in a centralized IoT system using low-cost microcontrollers and automatic configuration," *ROMANIAN JOURNAL OF INFORMATION TECHNOLOGY AND AUTOMATIC CONTROL-REVISTA ROMANA DE INFORMATICA SI AUTOMATICA,* vol. 34, no. 4, 2024-01-01 2024, doi: 10.33436/v34i4y202402.

[464] C. Vaida *et al.*, "Enhancing Robotic-Assisted Lower Limb Rehabilitation Using Augmented Reality and Serious Gaming," *APPLIED SCIENCES-BASEL,* vol. 14, no. 24, 2024-12-01 2024, Art no. 12029, doi: 10.3390/app142412029.

[465] M. Valean *et al.*, "Performance Assessments of Plastering Mortars with Partial Replacement of Aggregates with Glass Waste," *BUILDINGS,* vol. 14, no. 2, 2024-02-01 2024, Art no. 507, doi: 10.3390/buildings14020507.

[466] T. Vandervelden, R. De Smet, D. Deac, K. Steenhaut, and A. Braeken, "Overview of Embedded Rust Operating Systems and Frameworks," *SENSORS,* vol. 24, no. 17, 2024-09-01 2024, Art no. 5818, doi: 10.3390/s24175818.

[467] T. Vandervelden, D. Deac, R. Van Glabbeek, R. De Smet, A. Braeken, and K. Steenhaut, "Evaluation of 6LoWPAN Generic Header Compression in the Context of a RPL Network," *SENSORS,* vol. 24, no. 1, 2024-01-01 2024, Art no. 73, doi: 10.3390/s24010073.

[468] M. J. Veloso *et al.*, "Thermal Decomposition and Kinetic Analysis of Amazonian Woods: A Comparative Study of Goupia glabra and Manilkara huberi," *FIRE-SWITZERLAND,* vol. 7, no. 11, 2024-11-01 2024, Art no. 390, doi: 10.3390/fire7110390.

[469] I. Vér, A. Vér, and S. Mândru, "WEARABLE ROBOTIC SYSTEM FOR UPPER LIMB REHABILITATION," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 3, pp. 567-576, 2024-09-01 2024.

[470] N. Vitkovic *et al.*, "Decision Support System for Managing Marshalling Yard Deviations," *ACTA POLYTECHNICA HUNGARICA,* vol. 21, no. 1, pp. 121-134, 2024-01-01 2024.

[471] R. Vlad, "SOLVING THE LOT STREAMING AND SCHEDULING PROBLEMS: A CASE STUDY FROM THE AUTOMOTIVE INDUSTRY," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 1, pp. 167-172, 2024-02-01 2024.

[472] Z. Vosgan *et al.*, "The influence of different forms of black cumin (Nigella sativa L.) on the characteristics of sheep's curd cheese," *FRONTIERS IN SUSTAINABLE FOOD SYSTEMS,* vol. 8, 2024-06-11 2024, Art no. 1413008, doi: 10.3389/fsufs.2024.1413008.

[473] J. Wang, V. Breaz, Y. Hamed, L. Cotirla, and X. Zuo, "Fuzzy Milne, Ostrowski, and Hermite-Hadamard-Type Inequalities for ħ-Godunova-Levin Convexity and Their Applications," *AXIOMS,* vol. 13, no. 7, 2024-07-01 2024, Art no. 465, doi: 10.3390/axioms13070465.

[474] T. Wang *et al.*, "Energy Management Strategy Based on Optimal System Operation Loss for a Fuel Cell Hybrid Electric Vehicle," *IEEE TRANSACTIONS ON INDUSTRIAL ELECTRONICS,* vol. 71, no. 3, pp. 2650-2661, 2024-03-01 2024, doi: 10.1109/TIE.2023.3269477.

[475] Y. Xia, Z. Lendek, Z. Geng, J. Li, and J. Wang, "Adaptive Fuzzy Control for Stochastic Nonlinear Systems With Nonmonotonic Prescribed Performance and Unknown Control Directions," *IEEE TRANSACTIONS ON SYSTEMS MAN CYBERNETICS-SYSTEMS,* vol. 55, no. 2, pp. 1102-1115, 2024-11-21 2025, doi: 10.1109/TSMC.2024.3494269.

[476] Y. Xia, K. Xiao, Y. Yao, Z. Geng, and Z. Lendek, "Fixed-Time Fuzzy Vibration Reduction for Stochastic MEMS Gyroscopes With Low Communication Resources," *IEEE TRANSACTIONS ON FUZZY SYSTEMS,* vol. 32, no. 8, pp. 4220-4233, 2024-08-01 2024, doi: 10.1109/TFUZZ.2024.3392296.

[477] Y. Xie and S. Oniga, "Enhancing Motor Imagery Classification in Brain-Computer Interfaces Using Deep Learning and Continuous Wavelet Transform," *APPLIED SCIENCES-BASEL,* vol. 14, no. 19, 2024-10-01 2024, Art no. 8828, doi: 10.3390/app14198828.

[478] L. Yan, Y. Li, F. Mofarreh, A. Ali, and L. Piscoran, "On Sequential Warped Products Whose Manifold Admits Gradient Schouten Harmonic Solitons," *MATHEMATICS,* vol. 12, no. 16, 2024-08-01 2024, Art no. 2451, doi: 10.3390/math12162451.

[479] B. Yousuf, R. Herzal, Z. Lendek, and L. Busoniu, "Multi-agent active multi-target search with intermittent measurements," *CONTROL ENGINEERING PRACTICE,* vol. 153, 2024-09-18 2024, Art no. 106094, doi: 10.1016/j.conengprac.2024.106094.

[480] B. Yousuf, Z. Lendek, and L. Busoniu, "Exploration-Based Planning for Multiple-Target Search with Real-Drone Results," *SENSORS,* vol. 24, no. 9, 2024-05-01 2024, Art no. 2868, doi: 10.3390/s24092868.

[481] E. Yumuk, C. Copot, C. Muresan, and C. Ionescu, "A Novel Approach to Robust PID Autotuner for Overdamped Systems: Case Study on Liquid Level System," *PROCESSES,* vol. 12, no. 12, 2024-12-01 2024, Art no. 2825, doi: 10.3390/pr12122825.

[482] A. Zibani, M. Marian, O. Sicora, and H. Benslimane, "New records of Bipolaris from Algeria causing leaf spots of corn including two new pathogens on the host, a challenge to corn silage production," *CEREAL RESEARCH COMMUNICATIONS,* vol. 53, no. 1, pp. 365-381, 2024-06-25 2025, doi: 10.1007/s42976-024-00546-y.

[483] A. Zibani, O. Sicora, M. Marian, and H. Benslimane, "Multi-locus phylogeny and morphology of Curvularia isolates associated with leaf spots of corn in northern Algeria unveiled two new species, C. algeriensis sp. nov. and C. boudouaouensis sp. nov., with a new record for C. spicifera," *PHYTOTAXA,* vol. 650, no. 1, pp. 23-46, 2024-05-23 2024, doi: 10.11646/phytotaxa.650.1.3.

[484] A. Zinveli and M. Dragomir, "A CASE STUDY IN IMPROVING THE SAFETY OF COLLABORATIVE TASKS IN THE AUTOMOTIVE INDUSTRY," *ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING,* vol. 67, no. 3, 2024-09-01 2024.

RESEARCH PATENTS

LIST OF PATENTS

1. **PATENT OSIM NR. RO132908 - B1/ 28.02.2024**

TITLE RO/EN: Procedeu de fabricatie a implanturilor medicale personalizate multi-structura prin tehnologii de adugare de material / PROCESS OF MANUFACTURING CUSTOMIZED MULTI-STRUCTURE MEDICAL IMPLANTS BY ADDITIVE MANUFACTURING TECHNOLOGIES, INVOLVES FORMING SILICONE RUBBER MOULD BY VACUUM CASTING VC, TO GIVE FINAL SHAPE OF IMPLANT

INVENTOR(S): LEORDEAN VASILE DANUT, RADU SEVER-ADRIAN, COSMA SORIN-COSMIN, CUC STANCA, VILAU CRISTIAN, RUSU MIRCEA-AURELIAN-ANTONIU

ABSTRACT: NOVELTY - The process involves imaging scanning of the zone in which the implant is to be placed, such as CT or MRI, image processing and modelling of the zone of interest, and designing the three dimensional (3D) model of the implant with a supporting structure made of a material with high mechanical resistance and a biocomposite material completing the anatomical shape of the implant. The bearing structure of biometallic materials is formed using a selective laser melting process SLM. A silicone rubber mould is formed by vacuum casting VC, to give the final shape of the implant using the master model manufactured by selective laser sintering technology SLS, followed by putting the bearing structure into the mould and casting the biocomposite material. The supporting structure supports needed for positioning it within the rubber mould, which are integral with the reinforcement, are made of the same biomaterial
l, by the selective laser melting process SLM.
USE - Process of manufacturing customized multi-structure medical implants by additive manufacturing technologies.

2. **PATENT OSIM NR. RO133392 -B1 / 29.03.2024**

TITLE RO/EN: Laterala de canapea realizata prin termoformare si procedeu pentru realizarea acesteia / COUCH HAS BOX CONSISTS OF INNER HOUSING SHAPED AS TRAY, WHICH IS JOINED WITH OUTER HOUSING WHOSE EDGES COVER EDGES OF HOUSING, AND OUTER HOUSING INCLUDING EDGES WHICH ARE LARGER THAN THICKNESS OF BOX

INVENTOR(S): CIUPAN CORNEL, FILIP IOAN, HERES VASILE, CIONCA IOAN, CIUPAN EMILIA, GHERGHEL CATALIN RAUL, RAT FLORIN

ABSTRACT: NOVELTY - The couch has a base that is provided with holes intended for fastening the legs and the seat side. A side face is arranged towards a couch seat. A trapezium-shaped side face is oriented towards the outside of the couch. A front face and a back face are provided with holes for fastening to the couch back-rest. The box consists of an inner housing shaped as a tray, which is joined with an outer housing whose edges cover the edges of the housing. The outer housing has

the edges larger than the thickness of the box so that they exceed the inner housing by an amount to form a bulge portion. USE - Couch

3. PATENT OSIM NR. RO136050- B1 / 30.05.2024

TITLE RO/EN: Material cu proprietati fonoabsorbante din lana de oaie cu spuma poliuretanica si procedeu de obtinere a acestuia / MATERIAL WITH SOUND-ABSORBING PROPERTIES USING SHEEP WOOL AND RIGID TWO-COMPONENT POLYURETHANE FOAM AS RAW MATERIALS, HAS MAIN PORTION WHICH IS MEANT TO BE USED IN FIELD OF CIVIL AND INDUSTRIAL CONSTRUCTIONS TO REDUCE GLOBAL NOISE LEVEL AND ENSURE ADEQUATE ACOUSTICS IN CLOSED SPACES

INVENTOR(S): NEMES OVIDIU, TIUC ANCUTA ELENA, MURESAN IOANA SIMONA, DEAK GYORGY

ABSTRACT: NOVELTY - The material has a main portion which is meant to be used in the field of civil and industrial constructions to reduce the global noise level and ensure adequate acoustics in closed spaces. The claimed material consists of three layers, layer of sheep's wool with a thickness ranging between 2-12 mm, layer of rigid two-component polyurethane foam with a thickness ranging between 8-37 mm and a transition layer with a thickness ranging between 1-20 mm, resulting from the migration of the polyurethane foam into the wool layer or the migration of the wool into the polyurethane foam layer. USE - Material with sound-absorbing properties using sheep's wool and rigid two-component polyurethane foam as raw materials. DETAILED DESCRIPTION - An INDEPENDENT CLAIM is included for a process for producing sound-absorbing properties using sheep's wool and rigid two-component polyurethane foam as raw materials

4. PATENT OSIM NR. RO135991- B1 / 30.05.2024

TITLE RO/EN: Panou modular pe baza de lana de oaie si procedeu de obtinere a acestuia / MODULAR PANEL, HAS INDIVIDUAL LAMINATED PANELS INCLUDING CORE FORMED BY MECHANICAL SPRAYING OF WOOL FIBERS WITH SOLUTION BASED ON HYDRATED LIME, WHEAT FLOUR AND WATER, AND OUTER LAYER FORMED BY MIXING FIBERS WITH HYDRATED LIME IN VESSEL

INVENTOR(S): DENES TUNDE-ORSOLYA, TAMAS-GAVREA DANIELA-ROXANA, ISTOAN RALUCA, TIUC ANCUTA ELENA, MANEA DANIELA LUCIA, VASILE OVIDIU

ABSTRACT: NOVELTY - The panel has individual laminated panels including a core formed by mechanical spraying of wool fibers with solution based on hydrated lime, wheat flour and water. A first outer layer is formed by mixing the wool fibers with the hydrated lime, the wheat flour and water in a vessel when homogeneous composition is obtained, where the resulting composition is uniformly distributed in a mold. The core is placed over the outer layer and covered with a second layer. A laminated structure is formed in laboratory conditions for 72 hours at temperature of 24 degree Celsius. USE - Modular panel. ADVANTAGE - The panel has increased stability.

5. PATENT OSIM NR. RO137345- B1 / 30.07.2024

TITLE RO/EN: Beton rutier ecologic pe baza de ciment, pulbere de sticla si agregate provenite din deseuri reciclate din beton pentru aplicatii in domeniul constructiilor / ROAD CONCRETE BASED ON CEMENT, GLASS POWDER AND AGGREGATES FROM RECYCLED UNCONTAMINATED CONCRETE WASTE USEFUL FOR IN GREEN CONSTRUCTIONS, COMPRISES E.G. CRUSHED ALTERNATIVE AGGREGATES, RIVER AGGREGATE, AND QUARRY AGGREGATE

INVENTOR(S): CORBU OFELIA CORNELIA, PUSKAS ATTILA

ABSTRACT: NOVELTY - Road concrete based on cement, glass powder and aggregates from recycled uncontaminated concrete waste, comprises 12.76-15.6 wt.% crushed alternative aggregates, sort 4/8 mm, 23.9-25 wt.% river aggregate, sort 0/4 mm, 14-19.17 wt.% quarry aggregate, sort 8/16 mm, together with 24 wt.% quarry aggregate, sort of 16/25 mm, 1.39-2.8 wt.% recycled glass as powder with a particle size of less than 0.1 mm, 11.8-12.51 wt.% Portland cement, water and super plasticizer additive of the latest generation, with strong water reducing capacity, air entrainer additive, at a water:cement ratio of 0.45:0.55, and the concrete produced this way being green in mass. USE - The road concrete is useful for in the field of green constructions, e.g. environmentally friendly roads, platforms or sidewalks. ADVANTAGE - The road concrete is environmentally-friendly.

6. PATENT OSIM NR. RO134202- B1 / 30.10.2024

TITLE RO/EN: Sistem dual de grile pentru ghidajul brahiterapiei asistata laparoscopic pentru tumorile hepatice / SYSTEM USED FOR GUIDING BRACHYTHERAPY PROBES IN TREATMENT OF UNRESECTABLE LIVER TUMOURS, HAS FOLLOWING BRACHYTHERAPY CATHETERS THAT ARE INSERTED AT EQUAL DISTANCES, PARALLEL TO FIRST INSERTED CATHETER, MAINTAINED BY GRID SYSTEM FOR GUIDANCE

INVENTOR(S): GRAUR FLORIN, NADIM AL HAJJAR, VAIDA CALIN, MOIS EMIL, PISLA DOINA LIANA, FURCEA LUMINITA, POPA CALIN, ELISEI RADU

ABSTRACT: NOVELTY - The system has a external grid that is made of sterilizable plastic material, fixed on the patients tegument. The grid is round with a central hole and the remaining holes are arranged at equal distances in concentric circles or linearly arranged in relation with the central hole. The intra-abdominal grid consists of strips which form a second set of holes, so that the first brachytherapy catheter is inserted through the central hole of the external grid that penetrates the abdominal wall, enters the peritoneal cavity, passes through the holes of the internal grid and penetrates the liver to the opposite end of the tumour. The following brachytherapy catheters are inserted at equal distances, parallel to the first inserted catheter, maintained by grid system for guidance with two guide points. USE - System used for guiding brachytherapy probes in treatment of unresectable liver tumours.

7. PATENT OSIM NR. RO134189- B1 / 30.10.2024

TITLE RO/EN: Robot paralel pentru tratamentul laparoscopic al cancerului de ficat / PARALLEL ROBOT FOR LAPAROSCOPIC TREATMENT OF UNRESECTABLE LIVER TUMORS, HAS SECOND ROBOTIC MODULE WHOSE SECOND MECHANISM REPRESENTS MECHANISM FOR ORIENTING TREATMENT DELIVERY NEEDLE, AND PERFORMS ACTUATION BY GEARMOTORS

INVENTOR(S): PLITEA NICOLAE, PISLA DOINA LIANA, VAIDA LIVIU CALIN, GHERMAN BOGDAN GEORGE, TUCAN PAUL GEORGE MIHAI

ABSTRACT: NOVELTY - The parallel robot has two robotic modules for guiding a hepatic ultrasound probe and for guiding a treatment needle. The probe is vertically positioned by actuating a gearmotor. A second mechanism is a mechanism for orienting the hepatic ultrasound probe. The actuation is performed by gearmotors. The second robotic module consists of two parallel mechanisms. The first mechanism has three mobility degrees and is used for positioning a treatment needle which is vertically positioned by actuating a gearmotor. The second mechanism represents a mechanism for orienting the treatment delivery needle, and the actuation is performed by the gearmotors. USE - Parallel robot for laparoscopic treatment of unresectable liver tumors.

8. PATENT OSIM NR. RO134941- B1 / 30.10.2024

TITLE RO/EN: Instrument medical automatizat pentru insertia mai multor ace pe traiectorii liniare si paralele in tratamentul cancerului prin brahiterapie interstitiala / AUTOMATED MEDICAL INSTRUMENT FOR INSERTION OF NEEDLES ON LINEAR PARALLEL TRAJECTORIES IN TREATMENT OF CANCER BY INTERSTITIAL BRACHYTHERAPY, HAS NEEDLES WHICH ARE TAKEN OVER BY ELEMENT AT BOTTOM, AND BY ACTUATION OF MOTOR FIXED TO ELEMENT

INVENTOR(S): GHERMAN BOGDAN GEORGE, BIRLESCU IOSIF, BURZ ALIN, PISLA DOINA LIANA

ABSTRACT: NOVELTY - The instrument has two modules which are arranged for inserting and charging the needles and for guiding the needles, respectively. The first module is set with two rotary motors. The first motor is fixed to an element to transmit a rotational movement to a screw which is integrated with the shaft of the first motor and which moves a nut to which a slide is attached to slide on a rail fixed on an element. The needles are taken over by element at the bottom, and by the actuation of the second motor fixed to element after charging the brachytherapy needles. A screw is fixed between some bearings and some elements actuated by a coupling. The second module supports the first insertion module which is attached by elements and moves by element attached to a nut moving along screw driven by a motor fixed by element. The elements are supported and slide by elements on rails. USE - Automated medical instrument for insertion of needles on linear parallel trajectories in treatment of cancer by interstitial brachytherapy.

9. PATENT OSIM NR. RO133631- B1 / 29.11.2024

TITLE RO/EN: Mecanism de franare cu cama "S" / MECHANISM FOR BRAKING WHEELS OF MEDIUM AND HEAVY TRUCKS, HAS AXIALLY MOBILE ASSEMBLY WITH PUSHING AXLE SUCH THAT BALLS SLIDE IN CHANNELS AND GENERATE ROTATION OF CAM FOR KEEPING SHOES IN CLOSE VICINITY OF DRUM

INVENTOR(S): LAZE DANIEL

ABSTRACT: NOVELTY - The mechanism has an actuation system which rotates a cam with an S-shaped profile. The cam is in permanent contact with two collecting rollers that move shoes close to or away from a drum for braking. An actuation system consists of a structure which supports a shaft. An axially mobile assembly consists of a pushing axle and another axle provided with some pockets. The balls slide in some channels and generate the rotation of the cam for keeping the shoes in the close vicinity of the drum. A mechanical reaction loop is made by a saw-tooth-type coupling consists of two frontal toothings. A threaded assembly comprises two threads. USE - Mechanism for braking wheels of medium and heavy trucks.

10. **PATENT OSIM NR. RO133971 – B1 / 30.12.2024**

TITLE RO/EN: Caroserie monobloc pentru vehicule cu masa redusa, si material compozit utilizat pentru realizarea acesteia / MONO-BLOCK BODY USEFUL FOR MOTOR VEHICLES, IS MADE OF SANDWICH-TYPE COMPOSITE STRUCTURE CONSISTING OF HONEYCOMB-LIKE ALUMINUM CORE PLACED BETWEEN EXTERIOR LAYER AND INTERIOR LAYER MADE OF COMPOSITE MATERIAL REINFORCED WITH GLASS FIBERS

INVENTOR(S): BERE PETRU PAVEL, NEAMŢU CĂLIN GHEORGHE DAN, DUDESCU CRISTIAN, KROLCZYK GRZEGORZ

ABSTRACT: NOVELTY - Mono-block body is made of a sandwich-type composite structure consisting of a honeycomb-like aluminum core placed between an exterior layer and an interior layer made of composite material reinforced with glass, carbon or Kevlar (RTM: Aramid fiber) fibers, where the body comprises two front cones and rear impact, which is continued with a floor provided on the edges with two thresholds made of composite material, to which four pillars are connected, supporting the ceiling having on the edges a structure of resistance, and with an element of stiffening arranged in the door. USE - The mono-block body is useful for motor vehicles and a sandwich-type fiber-reinforced composite material. ADVANTAGE - The body exhibits high mechanical strength and low mass.

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