TECHNICAL UNIVERSITY
OF CLUJ-NAPOCA
ROMANIA

Research Reports

2022

MINISTRY OF EDUCATION

TECHNICAL UNIVERSITY
OF CLUJ-NAPOCA, ROMANIA

RESEARCH REPORTS

2022

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Cluj-Napoca, February 2023

The Research Strategy of the Technical University of Cluj-Napoca for 2020-2024,
(Extract from the Strategic Plan of the Technical University of Cluj-Napoca for 2020-2024)

Mission
"Our mission is to develop value in people, processes and products. In this sense, we will pursue the achievement at a high level of quality of advanced scientific education and research, in specific fields, in national and international context, responding to the needs of intellectual, professional and social development of the individual and the progress of Romanian society." (Carta Universitatii Tehnice din Cluj-Napoca)

The mission assumed by the entire academic body of UTCN, is focused on:

- Reshaping and adapting education, scientific research, innovation and artistic creation to the needs and expectations of society;
- Cultivating the values, skills and abilities necessary for full integration into the European area of excellence in education, artistic creation, research and innovation;
- the digitization of educational and administrative processes to improve quality and institutional performance;
- the expansion of the international dimension in order to guarantee access to the category of world-class universities according to the criteria of the QS STARS RATING SYSTEM or other relevant rankings.

Vision
The vision of the Technical University of Cluj-Napoca is an ambitious one, and that is to become a university strongly anchored in the European area of education, research, innovation and digitization by promoting and supporting performance and excellence in all areas of activity in order to ensure substantial progress regarding quality, performance, attractiveness and international competitiveness.
Strengthening the position of a top-class research university by supporting, promoting and securing investments in the fields of research, technology transfer and artistic creation with performance potential and great effects on the prestige, reputation and international visibility of the UTCN is a major desideratum for the next Period.

Values
The proposed vision can become a reality only and only through the full involvement and contribution of each of us in a joint and focused effort to achieve the University's strategic goals, such as play an essential role in increasing academic, scientific and management performance, in supporting our own ideas and projects.

Directions of action in the field of research

- Achievement of the university status "HR Excellence in Research", which is granted by the EC to the institutions that implements and applies the principles of the Code & Book(Carta), as defined in the program "The Human Resource Strategy for Researchers - HRS4R ", as an institutional commitment to ensure the framework for the development and promotion of highly qualified human resources in research;
- The establishment of a multidisciplinary research institute for the purpose of multiplication, expansion and Leveraging best practices, expertise and academic achievements acquired in strategic areas and ensuring the international reputation and visibility of the university;
- Support for teams participating in and / or applying for major projects in priority areas under the EU Framework Program for Research and Innovation, Horizon 2020 and / or Horizon Europe 2021-2027 or other major projects with national and / or international funding;

- Developing, supporting and promoting the directions of research, technology transfer and innovation that can generate a competitive advantage for the university at local, national or international level;

- Improving the institutional framework to improve quality and performance indicators scientific, relevant in the CNFIS reports to obtain additional funding and / or in respected international rankings;

- Development of incentive, support and promotion mechanisms for co-opting and participation Students in high performing research teams with national and / or international visibility to develop research and project management skills and competencies;

- Establish the internal regulatory framework for the development of the entrepreneurial ecosystem to facilitate the creation and support of business start-ups among undergraduate and graduate students.

Professor Vasile Topa PhD
Rector

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 in charge of Scientific Research

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RESEARCH REPORTS

COMPUTATIONAL MODELING AND ADVANCED SIMULATION IN STRUCTURAL AND GEOTECHNICAL ENGINEERING

Contact details

Name	**Computational Modeling and Advanced Simulation in Structural and Geotechnical Engineering**
Acronym	**CMASSGE**
Logo	
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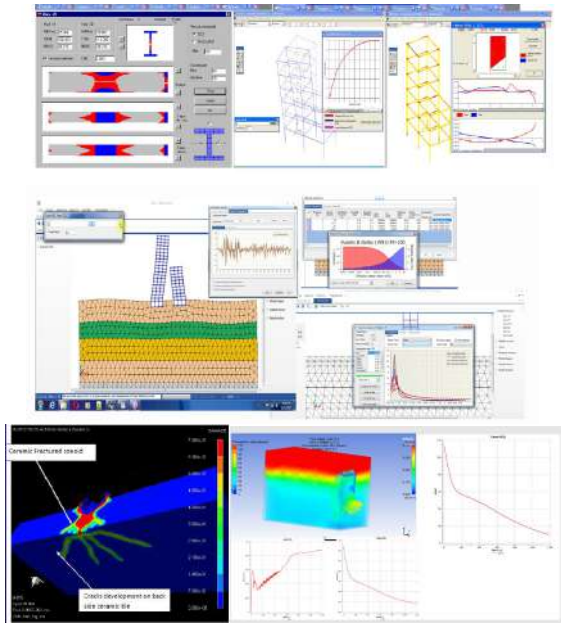

Areas of expertise

Domain: Civil Engineering-*Structural and Geotechnical Engineering*
Computational and experimental techniques with emphasis on the development and application of *advanced nonlinear analysis of structural limit states, structural stability*, *progressive collapse analysis of structures*, *push-over analysis for seismic performance evaluation of structures*, *analysis of structures subjected to wind actions*, *finite element simulation of composite materials subjected to extreme loads such as ballistic impact and explosions, design and behavior of composite steel-concrete structures, and application of FEM for geotechnical problems and multiphysics problems*. Advanced Computational Fluid Dynamics (CFD) models to identify the mechanisms of radon accumulation and developing techniques for reducing radon accumulation in homes. The stability of thin-walled members by using the *Generalised Beam Theory*. The stiffness evaluation of the vertical and horizontal joints between precast RC walls. The structural health monitoring of bridges by *Machine Learning algorithms trained on experimental and FE numerical data*.

Team (Key researchers)

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 Modelling & Artificial Inteligence (**Dr. Marius Botos**)
- Advanced Testing and Experimental Procedures for Structures (**Dr. Ovidiu Prodan**)
- Advanced FEM Modeling of Structures (**Dr. Mircea Botez**)

Representative projects

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.ro/)
Integrated design, earthquake check and shelf structures offer, Code: PN-III-P2-2.1-CI-2017-0113, http://users.utcluj.ro/~mnedelcu/Proiect%20de%20cercetare_15CI.htm
Technology for measuring forces in tensile cables, Code: PN-III-P2-2.1-CI-2017-0116, http://users.utcluj.ro/~mnedelcu/Proiect%20de%20cercetare_29CI.htm
Design and seismic performance evaluation of 3D frame structures using advanced nonlinear static analysis method (granted by CNCSIS, PNII-IDEI 193/2008)- http://www.cosminchiorean.com/projects.html

Significant results

The most representative (10) publications of the past 5 years:
1. M. Nedelcu, "New unified family of GBT deformation modes for the analysis of thin-walled cylinders", THIN-WALLED

STRUCTURES (ELSEVIER), Vol. 183, 2023.
2. Moga, R.A., Buru, S.M., Chiorean C.G., "Overall stress in periodontal ligament under orthodontic movement during a periodontal breakdown", AMERICAN JOURNAL of ORTHODONTICS and DENTOFACIAL ORTOPEDICS (ELSEVIER), Vol. 161(2), 2022.
3. Chiorean C.G., "A global convergent method for strength capacity evaluation of composite sections subjected to fire", CE/PAPERS (WILEY), 5(4), 2022.
4. 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), Vol. 11, 2021.
5. Burghele, B.D, Botos M. et al "Comprehensive survey on radon mitigation and indoor air quality in energy efficient buildings from, *SCIENCE OF THE TOTAL ENVIRONMENT* (ELSEVIER), 751, 141858, 2021.
6. C.G. Chiorean, D. Passera, R. Ferrari, E. Rizzi, "An implementation for 2nd-order M-N coupling and geometric stiffness adaptation in tapered beam-column elements", *ENGINEERING STRUCTURES* (ELSEVIER), 225, 111241, 2020.
7. L.A. Bredean, M.D. Botez, "The influence of beams and the slabs effect on the progressive collapse resisting mechanisms developed for RC framed structures", *ENGINEERING FAILURE ANALYSIS* (*ELSEVIER*), 91, 527-542, 2018.
8. C. G. Chiorean and S. M. Buru, "Practical nonlinear inelastic analysis method of composite steel-concrete beams with partial composite action" *ENGINEERING STRUCTURES* (ELSEVIER), 134, 74-106, 2017.
9. C. G. Chiorean and I. V. Marchis, "A second-order flexibility-based model for steel frames of tapered members," *JOURNAL OF CONSTRUCTIONAL STEEL RESEARCH* (ELSEVIER), 132, 43-71, 2017.
10. Almeida J, Prodan O., Tarquini D., Bayer K. "Influence of Lap Splices on the Deformation Capacity of RC Walls. I: Database Assembly, Recent Experimental Data, and Findings for Model Development", *JOURNAL OF STRUCTURAL ENGINEERING (ASCE)*, 143 (2), 2017.

Software developed
GFAS & RSL2D – (*A Finite Element System for Geotechnical Applications*) a product developed for Geostru Corporation (www.geostru.com) is a finite element package that has been developed specifically for the analysis of deformation and stability analysis in geotechnical engineering problems and local seismic response. http://www.geostru.com/EN/Geotechnical-and-F.E.M.-analysis-system.aspx
NEFCAD & ASEP – Advanced Nonlinear Inelastic Analysis System for Seismic Performance Evaluation of 3D Steel and Composite Steel-Concrete Frameworks (http://www.cosminchiorean.com/software.html)

The offer addressed to the economic environment

Research & development	**Development of advanced nonlinear analysis methods** able to describe the complex behaviour of 3D steel, RC and composite steel-concrete frame structures, *under normal and abnormal loads*. Ultimate strength analysis and design of composite-steel concrete cross-sections with arbitrary shapes subjected to biaxial bending and axial force at elevated temperatures; Computer automated optimal structural design in seismic zones based on structural performance criteria; Analysis of structures subjected to extreme actions. **Development of specialized software concerning application of nonlinear analysis to describe complex behaviour of frame structures. The stability of thin-walled members by using the Generalised Beam Theory**. The elastic buckling behaviour of rectangular plates with initial geometric imperfections by using energy methods and trigonometric series approximation of the displacements field. The elasto-plastic behaviour of the joints between the precast RC members. The optimisation of scaling for testing the RC walls under cyclic lateral loading. The stiffness evaluation of the vertical and horizontal joints between precast RC walls. **The structural health monitoring of bridges by Machine Learning algorithms trained on experimental and FE numerical data**. The effect of FRP strengthening on hollow-core slabs. **Application of FEM in geotechnical and multiphysics problems:** Development of general purpose and dedicated purpose finite element package (GFAS) specifically for the analysis of deformation and stability analysis in geotechnical engineering problems. **Advanced Computational Fluid Dynamics (CFD) models** to identify the mechanisms of radon accumulation and developing techniques for reducing radon accumulation in homes**. Numerical simulation of ballistic impact on composite laminated plates:** The ballistic performance of the lightweight armour systems can be examined to obtain an estimate for the V50 and the global damage of the composite plates.
Consulting	Application of nonlinear analysis methods for seismic performance evaluation of spatial structures; Application of FEM in structural and geotechnical engineering; Composite materials, Thin-walled structures, Experimental techniques.
Applied engineering services	Advanced analysis and Design of Structural Systems in Civil and Geotechnical Engineering. Software development for structural and geotechnical engineering.
Training	Advanced software applications such as: Abaqus, Ansys, GFAS, TrueGrid, MatLab; Extreme Loadings, Open Sees, etc. Application of nonlinear analysis for seismic performance evaluation of spatial structures; Application of FEM in Structural and Geotechnical Engineering and Multiphysics (CFD).

BUILDING MATERIALS RESEARCH GROUP

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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.

Team

Prof. Dr. Eng. Daniela Lucia Manea; Assoc. Prof. Dr. Eng. Claudiu Aciu; Assoc. Prof. Dr. Eng. Dana Adriana Ilutiu-Varvara; Assist. Prof. Dr. Eng. Elena JUMATE; Assist. Prof. Dr. Eng. Florin Babota; Assist. Dr. Eng. Luminița Monica Pleșa; Assist. Dr. Eng. Răzvan Andrei Iernuțan; Dr. Eng. Raluca Istoan; Dr. Eng. Cornelia Baeră; Dr. Eng. Gabriela Adelar Călătan; Dr. Eng. Adrian-Victor Lăzărescu, Dr. Eng. Alexandra Olga Pintea; Dr. Eng. Denes Tunde-Orsolya; Dr. Eng. Siomin Adrian; Dr. Eng. Tintisan Loredana; Phd Students: Eng. Iacob Florea; Eng. Buhus Anamaria; Eng. Roxana Rada; Eng. Cadar Daniel, Eng. Șaitiș Cătălin; Eng. Isac Dorin; Ec. Vălean Maria; Eng. Barnabas Lorintz Attila.

Representative projects

"Studies and researches regarding the reduction of **the negative environmental impact** of the pollutants **and solid wastes from the steelmaking",** "Development and support of multidisciplinary postdoctoral programmes in major technical areas of national strategy of Research - Development - Innovation" **4D-POSTDOC**, contract no. POSDRU/89/1.5/S/52603, project co-funded by the European Social Fund through Sectoral Operational Programme Human Resources Development 2007-2013, http://193.226.17.4:8080/sites/fordoc/default.aspx (2010-2013).
"Innovative Ecological Materials in Construction: A Multicriteria Analysis for Optimizing the Choice of Sustainable Building Materials in the Context of Sustainable Development" (2014 – 2015) – Post-Doctoral Programme POSDRU/159/1.5/S/137516, project co-funded from European Social Fund through the Human Resources Sectorial Operational Program 2007-2013.
"Studies of methods to optimize the use of sludge in the building materials industry", Internal competition for Research/ Development/ Innovation. Project C.I. type 1.1-T5 / 2016, Technical University of Cluj-Napoca (2016-2017).
"Research concerning the **characterization of the oily mill scale in order** to identify a optimum method **for reduction of the quantities of hazardous wastes landfilled**", Internal competition for Research/ Development/ Innovation –Project 16362/07.07.2016, C.I. type 1.1 - T4, Technical University of Cluj-Napoca (2016-2017).

Significant results

1. Claudiu Aciu, Daniela Lucia Manea, Carmen Puia, Oana Cadar (2015). "Mortars for the Enhancement of the Indoor Environmental Quality", STUDIA UBB CHEMIA, LX, 4/2015:45 – 54.
2. C. Aciu, C. Roman, D.A. Iluţiu - Varvara, C. Puia, O. Cadar (2016). Plastering Mortar with Antibacterial and Antifungal Properties. Romanian Journal of Materials, 46 (2):160 – 166.
3. E. Jumate, D. Moldovan, D. Manea, D. Demco, R. Fechete (2016). The Effects of Cellulose Ethers and Limestone Fillers in Portland Cement-Based Mortars by 1H NMR relaxometry. Applied Magnetic Resonance, 47: 1353-1373.
4. Soimosan Melania; Moga Ligia; Danku Gelu; Cazila Aurica; Manea Daniela (2019). "Assessing the Energy Performance of Solar Thermal Energy for Heat Production in Urban Areas: A Case Study", ENERGIES, 12(6).
5. Raluca Ștoan, Daniela R. Tămaș-Gavrea, Daniela L. Manea (2020). "Experimental Investigations on the Performances of Composite Building Materials Based on Industrial Crops and Volcanic Rocks", Crystals, 10, 102.
6. Maier A., Molnar Luminita Monica, Stanca Simona (2021). Challenges regarding sustainable development from building materials perspective, 38th IBIMA Conference, Seville, Spania.
7. 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.*
8. D. A. Iluțiu – Varvara, C. Aciu (2022). "Metallurgical Wastes as Resources for Sustainability of the Steel Industry". Sustainability, vol. 14(9), 5488.
9. D. A. Iluţiu – Varvara, M. Tintelecan, C. Aciu, C. M. Mârza, I. M. Sas-Boca (**2022).** "An Assessment of the Metallic Iron Content from Steel Mill Scale - Essential Factor for Sustainability and Circular Economy". **Springer's Lecture Notes in Networks and Systems book series, vol. 386, pp. 64-70.**
10. D. A. Iluţiu – Varvara, M. Tintelecan, C. Aciu, I. M. Sas-Boca (**2022).** "The Assessment of the Leaching Behavior of Metallurgical Wastes for a Sustainable Circular Economy". **Springer's Lecture Notes in Networks and Systems book series, vol. 605, pp. 282-290.**
11. Zaharie, A., Țințișan, M.L., Siomin, AC., Manea, D.L., Pleșa Luminita Monica (2022). The Use of Ceramic Waste in the Construction Materials Industry Based on the Concept of Sustainable Development. The 15th International Conference Interdisciplinarity in Engineering. Inter-Eng 2021. Vol 386. Springer.
12. Furtos, G., Molnar Luminita, Silaghi-Dumitrescu L., Pascuta P., Korniejenko K. (2022). Mechanical and thermal properties of wood fiber reinforced geopolymer composites, Journal of Natural Fibers, Volume19, Issue13.
13. Raluca ISTOAN, Lucia Daniela MANEA, PLESA Luminita, ML TINTISAN, (2022). Increasing the sustainability of construction sector by developing new products based on biomass and renewable polymers-bibliometric analysis, IOP Conference Series: Materials Science and Engineering, Volume 1251, Issue 1, Publisher: IOP Publishing.
14. Plesa Luminita, LD Manea, R Istoan, (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.
15. Zaharie, A., Tintisan, M.L., Siomin, A.C., Manea, D.L., & Pleşa, M.L. (2022). Cement materials obtained by partial replacement of cement powder with brick powder. IOP Conference Series. Materials Science and Engineering, 1242(1), 012043.
16. Iernutan Razvan Andrei, Plesa Luminita Monica (2023). Assessment of the Safety Level for a Structural Wall Belonging to a Building with an ACC Masonry Structure Confined by Dispersed The 16th International Conference Interdisciplinarity in Engineering. Inter-Eng 2022. Lecture Notes in Networks and Systems, vol 605. Springer.

The offer addressed to the economic environment

Research & development	**Research & development in core areas** Fundamental domain Civil Engineering – modern techniques and methods used in building materials quality control. **Research & development in applied fields** Green building materials. Recovery of industrial waste in construction materials. Influence of construction materials on health and environment. **Development strategy** The research and development activities of the research group are focused on: - contracts with third parties, research in the fields of building materials; - publishing articles in national and international journals indexed BDI and ISI; - participating in conferences, products presentations or technology development in the field of Civil Engineering.
Consulting	Quality control of building materials. Consultancy and applied research for the industrial or academic environment, according to the skills of the group members.
Applied engineering services	The Building Materials laboratory is part of the Central Laboratory of the Faculty of Civil Engineering and can issue quality certificates (test reports) for the authorized profiles. Tests on building materials (natural stone, aggregates, plaster, lime, cement, mortar, ceramic products, bitumen and bitumen impregnated materials etc.). Determination of the specific surface using Blaine permeameter. Determination of mechanical strengths of building materials (tensile, flexural and compressive strength) Observation of the behaviour of structures in real-time using non-destructive methods.
Training	Specialized courses in quality control of building materials. Training courses in the field of special rehabilitation materials.

TRANSPORT SYSTEMS RESEARCH GROUP

Contact details

Name	**Transport Systems Research Group**
Acronym	**TSRG**
Logo	GCDST
Site	https://iit.utcluj.ro https://erris.gov.ro/Transport-Systems-Research-Group
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Faculty Department	**Faculty of Civil Engineering** **Railways, Roads and Bridges Department (CFDP)**
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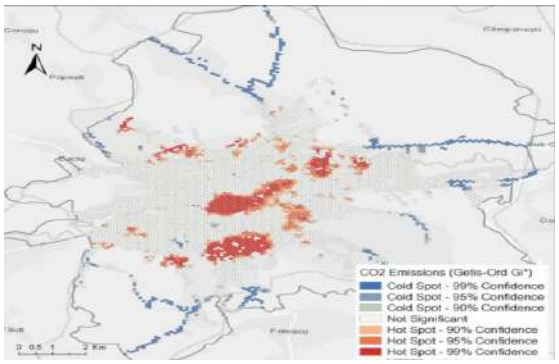
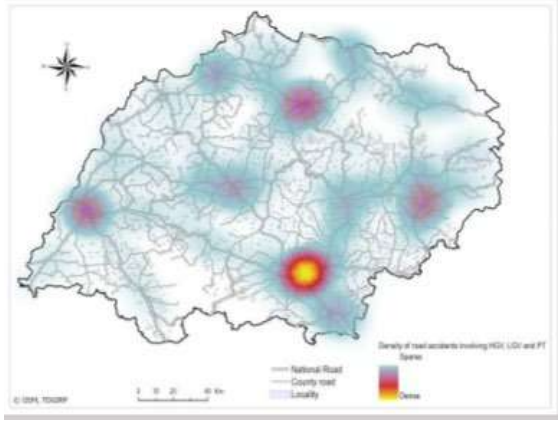
Director	Ș.I. dr. ing. Rodica Dorina **CADAR** UEFISCDI ID (UEF-ID): U-1900-063Y-8092 Scopus Author ID: 56007699800 ORCID identifier: 0000-0003-4393-5220 Web of Science ResearcherID: P-1572-2017
e-mail	Rodica.CADAR@cfdp.utcluj.ro





Areas of expertise

Intelligent Transport Systems – monitoring activity with GPS and weight-in-motion systems.
Transport impact on urban mobility – survey deployment and analysis, transport macroscopic modeling.
Economic, health and environmental impacts of transport systems; – congestion analysis, population safety and exposure, environmental impact assessment. Intermodal regional transport; Integrated transport and land-use planning – modal distribution analysis, modal shift policies;
Laboratory testing and field studies for road structures and materials
Raw materials innovation for the circular economy - sustainable processing, reuse, recycling and recovery schemes

Team

Assist. Prof. Dr. Eng. Cadar Rodica, Assist. Prof. Dr. Eng. Mihai Liviu Dragomir; Prof. Dr. Eng. Gavril Hoda ; Assist. Prof. Dr. Eng. Andrei Florin Clitan; Assist. Prof.Dr.Eng. Ciocan Remus; Assist. Prof.Dr.Eng. Toşa Cristian, Assist. Prof.Dr.Eng. Boitor Melania; Assist. Prof.Dr.Eng. Beca Ilinca Mirela; Assist. Prof.Dr.Eng. Marusceac Vladimir, Assist. Prof.Dr.Eng. Danciu Alexandra, Technician/analys: eng. Jecan Daciana

Representative projects

"Study on establishing the number of public transport taxi licenses in the city of Cluj-Napoca for the period 2020-2025", contract with Cluj-Napoca Municipality 2019
"Traffic impact study for the urbanization area following the construction of County Emergency Clinical Hospital Sibiu" - Contract no. 40/ 2018, 2018-2019
"Design services of the new general urban plan and the local urban planning regulation of Apahida commune-traffic study", contract with industry, 2018
"Experimental and numerical study on the performance of asphaltic concrete from the perspective of the thermal susceptibility and the value of the modulus of elasticity" - CICDI2017, ID 18, internal project financed by TUCN, 2017-2018
"Study on light stains at runway surface with asphalt road" – CICDI2017, ID5, internal project financed by TUCN, 2017-2018
"Mobility study to support the introduction of local public transport system in Floresti commune, Cluj County" - CONTRACT Nr. 20788/14.11.2012. Project study period: 3rd December 2012 - 28th February 2013
"Traffic study on rehabilitated county road" DJ 151 Km 45+810 – Km 126+712 between Mureş and Bistriţa Counties. Project study period: July 2013 - September 2013.
"Study of road asphaltic mixtures improved with bitumen additives", Contract 8/18.10.2013,for C.N.A.D.N.R. S.A

Significant results

The most representative publications of the past 5 years:

1. Boitor, R. M., Cadar, R. D., Măran, P. D., Mannini, L., & Petrelli, M. (2019). A NEW TOOL FOR THE EVALUATION OF CO2 EMISSIONS FROM ROAD TRAFFIC: A CASE STUDY IN CLUJ-NAPOCA, ROMANIA. Environmental Engineering & Management Journal (EEMJ), 18(9). Online at http://www.eemj.icpm.tuiasi.ro/issues/vol18/vol18no9.htm, Indexed in Web of Science
2. The Speed - Flow Relationship on Urban Roads in A Romanian Town, Dorina, Cadar Rodica ; Melania, Boitor Rozalia ; Mihai, Dragomir …More, 3RD WORLD MULTIDISCIPLINARY CIVIL ENGINEERING, ARCHITECTURE, URBAN PLANNING SYMPOSIUM (WMCAUS 2018), Volume 471 Published 2019
3. A ROAD TRAFFIC PREDICTION STUDY BASED ON WEIGH-IN-MOTION DATA, By: Ciont, Nicolae; Cadar, Rodica Dorina; Cimpean, Dalia Sabina, PROCEEDINGS OF THE ROMANIAN ACADEMY SERIES A-MATHEMATICS PHYSICS TECHNICAL SCIENCES INFORMATION SCIENCE Volume: 19 Issue: 4 Pages: 567-574 Published: OCT-DEC 2018
4. Effects of Traffic Volumes on Accidents: The Case of Romania's National RoADSm By: Cadar, Rodica Dorina; Boitor, Melania Rozalia; Dumitrescu, Mara, GEOGRAPHIA TECHNICA Volume: 12 Issue: 2 Pages: 20-29 Published: OCT 2017
5. Improving Traffic Conditions on a Set of Three Intersections Using Microscopic Simulation Models, Clitan, Andrei - Florin; Dragomir, Mihai-Liviu; Madalina, Ciotlaus; et al., Conference: 10th International Conference on Interdisciplinarity in Engineering (INTER-ENG) Location: Tirgu Mures, ROMANIA Date: OCT 06-07, 2016 INTER-ENG 2016 Book Series: Procedia Engineering Volume: 181 Pages: 139-145 Published: 2017
6. Urban Mobility and Road User Behavior Assessment, By: Cadar, Rodica Dorina; Boitor, Rozalia Melania; Petrelli, Marco, Conference: 10th International Conference on Interdisciplinarity in Engineering (INTER-ENG) Location: Tirgu Mures, ROMANIA Date: OCT 06-07, 2016, 10TH INTERNATIONAL CONFERENCE INTERDISCIPLINARITY IN ENGINEERING, INTER-ENG 2016 Book Series: Procedia Engineering Volume: 181 Pages: 116-122 Published: 2017
7. Employing a Traffic Data Processing Software to Efficiently Design Road Pavements, By: Ciont, Nicolae; Iliescu, Mihai; Cadar, Rodica Dorina, Conference: 10th International Conference on Interdisciplinarity in Engineering (INTER-ENG) Location: Tirgu Mures, ROMANIA Date: OCT 06-07, 2016, 10TH INTERNATIONAL CONFERENCE INTERDISCIPLINARITY IN ENGINEERING, INTER-ENG 2016 Book Series: Procedia Engineering Volume: 181 Pages: 868-875 Published: 2017
8. TRAVEL BEHAVIOR ASSESSMENT FOR IMPROVED URBAN MOBILITY, By: Cadar, R. D.; Boitor, R. M.; Petrelli, M., Conference: 16th International Multidisciplinary Scientific Geoconference (SGEM 2016) Location: Albena, BULGARIA Date: JUN 30-JUL 06, 2016, NANO, BIO AND GREEN - TECHNOLOGIES FOR A SUSTAINABLE FUTURE CONFERENCE PROCEEDINGS, SGEM 2016, VOL II Book Series: International Multidisciplinary Scientific GeoConference-SGEM Pages: 771-778 Published: 2016

Products and technologies:

1. **Road Traffic and Transport** measurements:

Weight in motion system hi-trac 90, hi-trac 100, Laser TruCAM (All-in-one Digital Video Camera/Laser Speed and Ranging Device), MCLocator system for fleet management and location (6GPS vehicle test), Portable Skid Resistance Tester Device, GPS Leica GS09 NetRover RTK, GPS Data Logger Performance Meter, Weather Center Tehnoline WS 550, Sound Level Meter DeltaOHM HD2010UC, Infrared and Contact Thermometer FLUKE 561, Video camera Sony XR160E, Digital Camera Canon EOS1100D, QuickMap 3D (QM3D) 5.0 from Laser Technology; Transportation planning and traffic modelling software (Transyt, Arcady, Picady, VISUM, VISSIM), Programming language MATLAB, Graphing and data analysis software OriginPro.

2. **Road materials/structures**-laboratory and field studies:

Marshall test, Unitronic Frame, Proctor, Asphalt and Cement concrete: recipes, preparation and laboratory tests; Lucas plate test, Zorn plate test, Benkelman test; Bitumen tests (ductility, ball and ring, penetration, RTFOT).

The offer addressed to the economic environment

Research & development	*Research on traffic* safety and solution development; Development of traffic models (road network and junctions); Development of original solutions regarding survey structure for transport mobility studies in urban and rural areas; Development of statistical analyses for collected traffic data; *Research on ecological road materials* using recycled material or different waste materials (bricks, old pavements, old concrete form demolition etc.);
Consulting	Technical assistance in projects; Consulting, design, research and assistance for infrastructural projects (roads, parking lots, bridges and railroads); Award of contracts in urban roads field. Valuation: investments, acquisitions, economic costs, financial reporting, sales. Public transport planning.
Applied engineering services	*Mobility studies*; Road network capacity assessment; Air quality assessment; Spot speed studies for enforcement measures in the urban environment; Traffic studies regarding speed profiles and fleet composition; *Laboratory tests and reports on road materials*; Field measurements: load capacity, deflections, flatness, core extractions; Analyze asphalt/cement concrete recipes – for different utilities: (road, playgrounds, bridge decks, parks alleys etc). Studies on stabilized materials (with different types of binder); Studies on mineral skeleton (the main part of all construction materials)
Training	Actual standards and legal framework in road construction; Rehabilitation projects and road rehabilitation methods; Traffic safety - Audit and Inspection Training.

Research, Technological Development and Innovation Centre in Civil and Building Services Engineering

Contact details

Name	**Centru de Cercetare, Dezvoltare Tehnologică și Inovare în Inginerie Civila și Instalații**
Acronym	**RTDI – Civ&BsE**
Logo	
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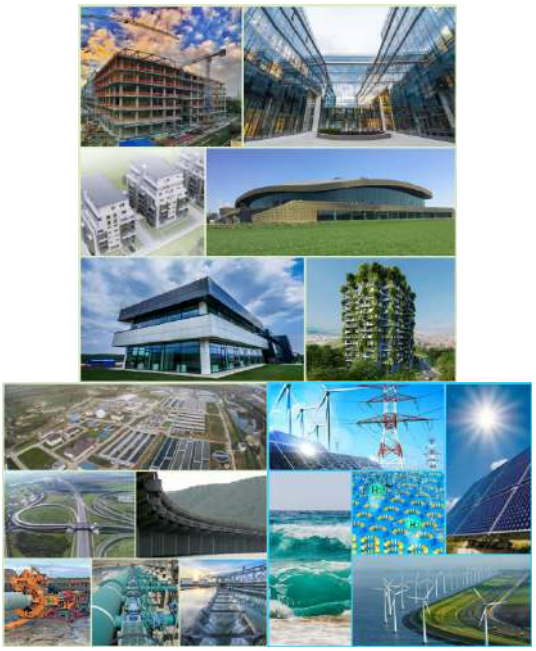
Director	Prof.Univ.Dr.Eng. Ioan AȘCHILEAN
e-mail	ioan.aschilean@ccm.utcluj.ro



Areas of expertise

1. Energy management of buildings and associated technologies: energy demands and consumption in existing and future buildings; energy balances in building complexes (residential, commercial, industrial, public and other buildings); energy conservation in built environment; energy sustainability, resilience and climate adaptability of buildings; external and internal design conditions for energy efficient buildings; life cycle energy efficiency of buildings and embodied energy; residential energy refurbishment; and renovation; building envelope materials; new building materials; engineered structures for buildings; sustainable building management strategies; clean technologies associated with energy efficient buildings; specific sustainable technologies for the building construction industry.

2. Sustainable development of localities infrastructure: adaptive built environments for sustainable cities; public health interventions in the built world; water infrastructure; power and energy infrastructure; transport infrastructure; engineered structures: bridges, railways, roads and other transport infrastructures; emerging technologies in urban sustainability and construction; information technology infrastructure; resilient infrastructure; rural infrastructure; urban infrastructure; remanufacturing, reuse and recycling; waste management infrastructure; intelligent systems and technologies.

3. Renewable energy management and associated technologies: biomass conversion; energy bioresources; geothermal technology; HydroPower; hydrogen production technology and fuel cells; nuclear energy; nutrient-energy-water nexus; photovoltaic technology applications; solar and low energy architecture; solar radiation management; solar thermal applications; thorium energy; wave, tide and ocean energies; wind energy technology; circular economy of urban development under the current climate changes; socio-economic and policy issues; clean technologies associated with renewable energy - optimization techniques, Life Cycle Assessment (LCA), Life Cycle Inventory (LCI), Life Cycle Impact Assessment (LCIA), Life Cycle Costing (LCC).

Team

Director: prof.univ.dr.eng. Ioan AȘCHILEAN Consultant: prof.univ.em.dr.eng. Gheorghe BADEA

1. Energy management of buildings and associated technologies	2. Sustainable development of localities infrastructure	3. Renewable energy management and associated technologies
Responsible:	**Responsible:**	**Responsible:**
assist.prof.dr.eng. Horea DAN	assoc.prof.dr.eng. Ovidiu GAVRIȘ	dr.eng. Raluca A. FELSEGHI
Members:	**Members:**	**Members:**
- assoc.prof.dr.ec. Sorina A. CIPLEA	- assist.prof.dr.eng. Mihaela DUMITRAN	- drd.eng. Veronica GAGEA
- assist.prof.dr.eng. Dorina SUCALĂ	- assist.prof.dr.eng. Adrian BOJAN	- drd.eng. Alexandru GAGEA
- assist.dr.eng. Raluca IȘTOAN	- assist.prof.dr.eng. Andrei BOLBOACĂ	- drd.eng. Paul MATEI
- drd.eng. Ionuț IANCU	- drd.eng. Vlad Răzvan AȘCHILEAN	- drd.eng. Lucian POPESCU
- drd.arh. Radu Ioan BOIERU	- drd.eng. Cristian COSTIN	- drd.eng. Mircea AMBRO
- drd.eng. Alex O. MUNTEAN	- drd.eng. Teodora RAD	- drd.eng. Monica MATEESCU
- drd.eng. Paul Adrian BUDUȘAN	- drd.eng. Georgiana GIURGIU	- drd.eng. Ovidiu MATEESCU
- drd.eng. Marian BUTEAN	- drd.eng. Cristian CIULBEA	

Representative projects

"Optimized system for producing thermal energy from renewable sources using heat pump", Main Partner: National Research-Development Institute for Cryogenic and Isotopic Technologies - INC DTCI ICSI Rm.Valcea Project partner: Technical University of Cluj-Napoca. Partnerships in priority areas Domain: 2-Energy Project acronym: OPTHP Contract no: 22-128 / 2008 Contract period: 2008-2011.

"Design and realization of the combustion pile assembly. Experimental determinations in order to establish functional performance. Elaboration of technical documentation to achieve a combination of hydrogen and airpowered combustion cells with a useful electrical power of up to 1kW", collaboration with - INC DTCI ICSI Rm.Valcea, 2008-2010.

"Unfavorable impact of street traffic on water, sewerage and gas pipelines solutions and ways to solve", Technical University of Cluj-Napoca & AIB CONSULTING SRL.

"Research and development of a membrane Reactor for the production of pure hydrogen usable in supplying fuel cells", collaboration with - INC DTCI ICSI Rm.Valcea, 2010.

Significant results

The most representative publications of the past 5 years:

1. Felseghi, R.A., Bolboacă, A., Răboaca, M.S., Aşchilean, I. (2022). Hybrid Energy Systems for Power of Sustainable Buildings. Case Study: A Renewable Energy Based on-Site Green Electricity Production. *Comprehensive Renewable Energy*, 420-436.
2. Senila, M., Neag, E., Cadar, O., Kovacs, E.D., Aschilean, I., Kovacs, M. H. (2022). Simultaneous removal of heavy metals (Cu, Cd, Cr, Ni, Zn and Pb) from aqueous solutions using thermally treated Romanian zeolitic volcanic tuff. *Molecules*, 27(12), 3938.
3. Aşchilean, I., Cobîrzan, N., Bolboaca, A., Boieru, R., & Felseghi, R. A. (2021). Pairing solar power to sustainable energy storage solutions within a residential building: A case study. *International Journal of Energy Research*, *45*(10), 15495-15511.
4. Felseghi, R. A., Aşchilean, I., Cobîrzan, N., Bolboacă, A. M., & Raboaca, M. S. (2021). Optimal Synergy between Photovoltaic Panels and Hydrogen Fuel Cells for Green Power Supply of a Green Building—A Case Study. *Sustainability*, *13*(11), 6304.
5. Ancaş, A. D., Aşchilean, I., Profire, M., Ţurcanu, F. E., & Felseghi, R. A. (2021). Experimental Study on the Behaviour of Seismic Actions on a Flexible Glass-Reinforced Plastic Structure Used in Water Transport Pipes. *Materials*, *14*(11), 2878.
6. Filote, C., Felseghi, R. A., Raboaca, M. S., & Aşchilean, I. (2020). Environmental impact assessment of green energy systems for power supply of electric vehicle charging station. *International Journal of Energy Research*, *44*(13), 10471-10494.
7. Maier, D., Maier, A., Aşchilean, I., Anastasiu, L., & Gavriş, O. (2020). The relationship between innovation and sustainability: A bibliometric review of the literature. *Sustainability*, *12*(10), 4083.
8. Ancaş, A. D., Aşchilean, I., Profire, M., & Toma, I. (2019). System for Increasing the Seismic Safety of Pipelines in the Water Supply and Distribution Networks. *Water*, *11*(5), 1049.
9. Badea, G., Felseghi, R. A., Varlam, M., Filote, C., Culcer, M., Iliescu, M., & Răboacă, M. S. (2019). Design and simulation of romanian solar energy charging station for electric vehicles. *Energies*, *12*(1), 74.
10. Aşchilean, I., & Giurca, I. (2018). Choosing a water distribution pipe rehabilitation solution using the analytical network process method. *Water*, *10*(4), 484.
11. Aşchilean, I., Iliescu, M., Ciont, N., & Giurca, I. (2018). The unfavourable impact of street traffic on water distribution pipelines. *Water*, *10*(8), 1086.
12. Aşchilean, I., et al. (2018). Design and concept of an energy system based on renewable sources for greenhouse sustainable agriculture. *Energies*, 11.5: 1201.

Significant solutions:

Calculation relations for the flows and pressure drops related to the rehabilitated and modernized pipes; technical and economic strategies for choosing the optimal method for rehabilitating or modernizing water supply systems; method for determining when to rehabilitate or upgrade of a water network (Aschilean method).

Simultaneous and interdisciplinary approach of the two concepts with a special role in streamlining and decarbonizing energy generation systems for residential consumers: hydrogen technology and passive house. Evaluation of the local potential for RES harnessing through on-site electrolytic production of hydrogen in order to power a residential building.

Patents:

Badea G., Moldovan E.M. Three-stage natural gas filtration assembly, no. RO 126840/28.03.2014.
Badea G., Aşchilean I. Active system for functional isolation of fluid storage tanks, no. 126490 / 30.08.2013.
Badea G., Aşchilean I. Active system for protection of pipes related to fluid storage tanks, no. 12666 / 30.12.2013.

The offer addressed to the economic environment

Research & development	Pragmatic anchoring of research, technological development and innovation activities within the research center to the process of generating knowledge through the contribution of applied research to the innovative solution of practical problems. Supporting local enterprises in the Civil Engineering and Installations sector to be more competitive on the market by using applied research. Achieving the transfer of knowledge and technologies developed in the field of Civil Engineering and Installations for their implementation in Romanian enterprises. **Development strategy.** The research and development activities of the research centre are focused on: - identification and valorization of the research infrastructure by expanding the collaborations between the research teams at UTCN level, expanding the collaborations between the research team and other institutions, national research centers (INCDTIM Cluj-Napoca; ICSI Rm. Vâlcea; ICIA Cluj-Napoca, etc.); - assuming an active role of the research center in relation to the economic sector by extending and applying the RDI results within projects developed by economic organizations; - concentration of teaching and research skills in order to increase synergy and achieve the critical mass of researchers in order to improve the success rate of research project proposals in national/international competitions; - assisting and providing institutional support for participation in research projects, with addressability for young teachers (assistants), PhD students and / or master students; - assisting, supporting and providing institutional support for participation in projects financed by structural funds; - increasing the national and international visibility of the Faculty of Civil Engineering; - increasing the number of scientific publications in prestigious international journals -ISI Web of Science with IF; - increasing the number of publications (articles / books) in collaboration with foreign authors; - increasing participation in scientific events, conferences in the country and / or abroad; - involvement in organizing events and scientific initiatives with international participation.
Consulting	- design activities; technical expertise activities; specific project verification activities; management activities of investments; technical assistance of investments.
Training	- continuous training activities for specialists (project verifiers and technical experts); continuous professional training courses; short courses for profile engineers with topics of current interest.

LIGHTING – ELECTRICAL - LABORATORY

Contact details

Name	**Lighting - Electrical - Laboratory**
Acronym	**LEL**
Logo	L ighting E lectrical L aboratory
Site	http://users.utcluj.ro/~lec
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Director	Dr.eng. Dorin BEU, Assoc. Professor
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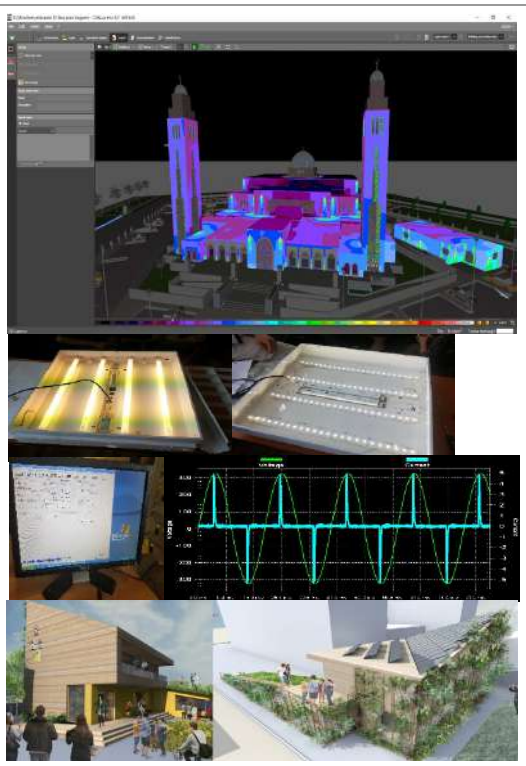

Areas of expertise

Electric Lighting: 3D building simulations for the illumination levels using DIALux EVO 8.2; lighting measurements; energy efficiency lighting solutions;
Daylight: software building simulations for the daylight levels; lighting measurements; passive tubular daylight guidance systems;
Lighting Surveys: on the use of T8, T5, CFLs, LEDs; Carbon footprint LCA
Power quality: Power quality measurements for different end use devices, including LED luminaires;
Circular economy and regenerative Building: Studying the specific aspects related with green / active building services; carbon footprint reduction;
Renewable energies: hybrid lighting systems using photovoltaics; electrical design and testing of photovoltaic systems;

Team

Dr. Eng. Dorin BEU, Reader at the Technical University of Cluj-Napoca. FormerPresident of Romanian Green Building Council RoGBC (www.rogbc.org) and of Romanian National Lighting Committee (www.cnri.ro).Chief Editor together with prof. Kim from Seoul Kyun Hee University of International Journal of Sustainable Lighting (www.lightingjournal.org); Prof. Dr. Eng. Mircea BUZDUGAN, Lecturer. Dr. Eng. Calin CIUGUDEANU, PhD student Eng. Angel CAMPIANU; dr.eng. Horatiu ALB

Representative projects

"CoME EAsy" 2018-2021 H2020 project for synchronizing EEA and Covenant of Mayor https://www.european-energy-award.org/eu-project-come-easy, finding the best KPIs for city energy and climate management and conversion tables for one system tyo another;
EXCITE! Implementarea sistemului de management European Energy Award in Bulgaria, Macedonia de Nord si Slovenia. Proiect International H2020 Contract nr. 892034 2020-2023. http://www.excite-project.eu/
COST RESTORE 2017-2021 CA 16114 www.eurestore.eu, in charge with Training School finding solutions for regenerative buildings – concept, design, tender, maintenance;
"Ensuring LEC maintenance by detecting defects with the method of real-time reflectometry", Contract 171CI/2018, Cod PN-III-P2-2.1-CI-2018-1004, 2018;
"**Procedures for testing the protection systems equipped with digital relays, when commissioning substations in the national energetic system"** cod PN-III-P2-2.1- CI-2017-0799, NR. 147CI/2017;
"LoNNE" 2012-2016-member COST action ES 1204 – LoNNE Loss of Night Network (Manager of National Committee) http://www.cost-lonne.eu/ study of the impact of Artificial Light At Night on humans and on environment;
"Energy - Efficient Technologies for a Green University" in the program „Strategic research themes for young teams, Technical University of Cluj-Napoca,UTC-N", 2014-2015;
„Modernization and the Extension of Public Lighting System and the Modernization of the Lighting Sistem in two buildings of the City Hall" DALI and FPP, Contract nr. 380333/14.11.2013, UTC-N – City of Cluj-Napoca, cooperation program Switzerland-Romania;

"CREFEN" Project Ceex 2005 - 2008 - PC-D05-PT00-303: "Informatic Integrated System for Energy Efficiency and Saving in Residential Sector - CREFEN";
"ENERLIN - Lighting Energy Efficiency Initiative" contract EISAV/EIE/05/176/2005, : http://www.enerlin.enea.it, 2006-2008;

Significant results

1. H. Albu, D. Beu, C. Ciugudeanu, Study on the Power Quality of LED Street Luminaires, August 2022 Sustainability 14(15):9671 DOI: 10.3390/su14159671
2. Tavella, C; Spoerndli, C., Beu, D, Ceclan, A. CoME EASY—**Synchronizing European Energy Award with Other Initiatives. Case Study: Romanian Local Communities**, Energies 2021, 14(19), 6248; https://doi.org/10.3390/en14196248, Published 2021
3. Ciugudeanu, C., Buzdugan, M., Beu, D., Campianu, A., Galatanu, CD, **Sustainable Lighting-Retrofit Versus Dedicated Luminaires-Light Versus Power Quality,** Sustainability, 11(24), 7125, DOI 10.3390/su11247125, Published: 2019
4. Ivan, L, Beu, D., van Hoof, J, **Smart and Age-Friendly Cities in Romania: An Overview of Public Policy and Practice**, 17(14), 5202, DOI10.3390/ijerph17145202, INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH Published: 2020
5. Ciugudeanu C, Buzdugan M, Beu D. Campianu A, Galatanu C, ***Sustainable Lighting-Retrofit Versus Dedicated Luminaires-Light Versus Power Quality,*** Sustainabiliy, 2019, 11(24), 125; https://doi.org/10.3390/su11247125
6. Galatanu, CD ; Ashraf, M ; Lucache, DD; Beu, D, Ciugudeanu, C. ***Optical Utilization Factor For Architectural Lighting,*** LIGHT & ENGINEERING. Volume: 27 Issue: 6, Pages: 49-57 DOI: 10.33383/2017-101Published: 2019
7. Beu, D; Ciugudeanu, C; Buzdugan, M. ***Circular Economy Aspects Regarding LED Lighting Retrofit-from Case Studies to Vision***, SUSTAINABILITY Volume: 10 Issue: 10 Article Number: 3674 DOI: 10.3390/su10103674, Published: OCT 2018;
8. Galatanu, C.D; Gherasim, I; Beu, D; Lucache, D.D; ***Luminance field of the facades: from aggressive to attractive lighting***, 2018 IEEE INTERNATIONAL CONFERENCE ON ENVIRONMENT AND ELECTRICAL ENGINEERING AND 2018 IEEE INDUSTRIAL AND COMMERCIAL POWER SYSTEMS EUROPE (EEEIC / I&CPS EUROPE Book Group Author(s):IEEE Published: 2018;
9. Ciugudeanu, C; Beu, D; Rastei, E; ***Living Building Laboratory - Educational Building Project in Cluj-Napoca,*** EENVIRO-YRC 2015 – BUCHAREST, Edited by: Damian, RM Book Series: Energy Procedia Volume: 85 Pages: 125-131 DOI: 10.1016/j.egypro.2015.12.282 Published: 2016;
10. Ciugudeanu, C; Beu, D; ***Passive Tubular Daylight Guidance System Survey***, 9TH INTERNATIONAL CONFERENCE INTERDISCIPLINARITY IN ENGINEERING, INTER-ENG 2015, Edited by: Moldovan, L Book Series: Procedia Technology Volume: 22 Pages: 690-696 DOI: 10.1016/j.protcy.2016.01.144 Published: 2016
11. Beu, D; Ciugudeanu, C; Maierean, M; Galatanu, C.D; ***Introducing a New Profession: Lighting Specialist***, ECOLOGY, ECONOMICS, EDUCATION AND LEGISLATION CONFERENCE PROCEEDINGS, SGEM 2016, VOL III, Book Group Author(s):SGEM Book Series: International Multidisciplinary Scientific GeoConference-SGEM Pages: 863-869 Published: 2016;
12. Beu, D; Ciugudeanu, C; Gyulai, R; ***Light Guiding Optical Lamellae System Simulations***, The 16th International Multidisciplinary Scientific Geoconference (SGEM 2016) Location: Albena, BULGARIA Date: JUN 30-JUL 06, 2016;
13. Balan, H; Tirnovan, R; Buzdugan, M; ***Commutation technique in the supply of electromagnetic actuators***, IET POWER ELECTRONICS Volume: 7 Issue: 1 Pages: 132-140 Published: JAN 2014;

Significant solutions:
Hybrid Passive Tubular Daylight Guidance System;
Living Building Laboratory - build design for the first Romanian active building (a building that produce more energy than its own consumption), using traditional materials combined with the latest technologies;
Switzerland financial support approval (1.8 million euro) for the Final Project Proposal - Modernization and the Extension of Public Lighting System of the Cluj-Napoca City Hall;

The offer addressed to the economic environment

Research & development	Supporting local lighting businesses to be more competitively on the market by using applied research; Providing and evaluating the best available techniques on the market; Evaluating and testing different new luminaires and their power quality behaviour;
Consultancy	Consulting, design, research and prototyping towards the development of different energy efficiency lighting techniques.
Design	Preparing lighting/electrical documentations for all the design phases: feasibility studies, final project proposals, technical projects, specifications and As-built;
Measurements	Lighting measurements with spectrophotometer; power quality measurements; electro-magnetic field measurements; thermo-visual surveys; earthing installation and earth resistivity; photovoltaics efficiency under different climatic conditions.
Training	Courses for Lighting Specialist. Energy efficiency lighting techniques, electrical design; lighting and power quality measurements.

SYSTEMS FOR PROVIDING INDOOR COMFORT IN ENERGY EFFICIENT BUILDINGS RESEARCH GROUP

Contact details

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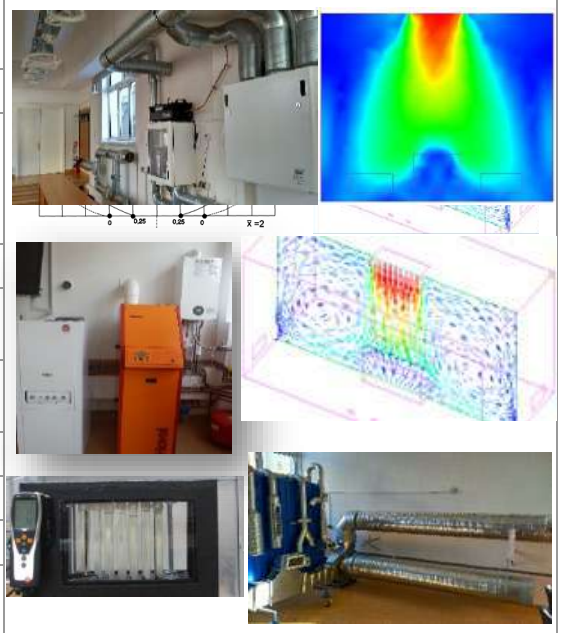

Areas of expertise

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 and near zero energy buildings (nZEB); Life Cycle Assesment (LCA), Carbon Footprint analisys.
Indoor air quality (IAQ): air cleanness; chemical composition of indoor air; indoor air movement.
Thermal comfort: indoor air parameters; outdoor-indoor heat exchange, finite element thermal analysis.
Energy efficient 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.

Team

Assoc.Prof.Dr.Eng. Florin DOMNIŢA, Assoc.Prof.Dr.Eng. Dorin BEU, Assoc.Prof.Dr.Eng. Carmen MÂRZA, Assoc.Prof.Dr.Eng. Ciprian BACOŢIU, Assoc.Prof.Dr.Eng. Ancuţa ABRUDAN, Assoc.Prof.Dr.Eng. Eugen VITAN, Lect.Dr.Eng. Gelu CHISĂLIŢĂ, Lect.Dr.Eng. Anca HOŢUPAN, Lect.Dr.Eng. Teodor CHIRA, Lect.Dr.Eng. Raluca MOLDOVAN, Lect.Dr.Eng. Georgiana CORSIUC, Lect.Dr.Eng. Tania RUS, Lect.Dr.Eng. Roxana MARE, Lect.Dr.Eng. Octavian POP, Lect.Dr.Eng.Constantin CILIBIU Asist.Dr.Eng.Horaţiu ALBU,.

Representative projects

Support of higher education system in a context of climate change mitigation through regional-level of carbon footprint caused by a product, building and organization - Hi-EduCarbon - Grant No. 2021-1-SK01-KA220-HED-000023274, 2022-2024;
Energy efficiency of air-cooling systems by using phase changer materials, CICDI 2017, nr.2013/12.07.2017;
Meeting of Energy Professional Skills (MEnS) - Energy analysis techniques and practices for implementing near zero energy buildings (nZEB), Project HORIZON 2020-EE-2014-2015, nr. 649773/30.03.2015; 2015-2017;
Energy Efficient Technologies for a Green University; CICDI 2014, nr. 29223/05.12.2014, 2014-2015;
Energy efficiency of ventilation systems, nr. 6079/04.03.2011; Program nr. 15-SK-RO-0010-10, code 3.5; 2011-2012.

Significant results

The most representative publications of the past 5 years:

1. Rus Tania, Cruciat Gheorghe; Nemeti Georgiana; Mare Roxana; Muresan Daniel. Thermal comfort in maternity wards: Summer vs. winter conditions. Journal Of Building Engineering. Volume 51. DOI10.1016/j.jobe.2022.104356. 2022. **IF 7.144**/2021
2. Kapalo Peter, Vojtasko Lubos, Vasilisin Daniel, Domnita Florin, Bacotiu Ciprian, Kandrac Robert, Batorova Michaela. Investigation of the influence of the level of physical activity on the air exchange requirements for a gym. Building And Environment. Volume 204. DOI 10.1016/j.buildenv.2021.108123. 2021**. IF 7.093**/2021.

3. Rus Tania, Nemeti Georgiana, Domnita Florin, Goidescu Iulian, Muresan Daniel. Indoor thermal environment evaluation of postpartum patients in a tertiary level maternity in Romania during summer. Science and Technology for the Built Environment. Volume 27. Issue7. DOI 10.1080/23744731.2021.1906084. 2021. **IF 1.99**/2020.
4. Kapalo Peter, Vilcekova Silvia, Meciarova L'udmila, Domnita Florin, Adamski Mariusz. Influence of Indoor Climate on Employees in Office Buildings-A Case Study. Sustainability. Volume 12. Issue 14. DOI 10.3390/su12145569. 2020. IF 3.251/2020.
5. Kapalo, P., Domnita, F., Pop, O., Adamski, M., Voznyak, O. Considerations about the Required Volumetric Air Flow Rate inside an Office Room with one Occupant - Case Study. Journal Of Applied Engineering Sciences. Volume 10. Issue 1. DOI 10.2478/jaes-2020-0006. 2020.
6. Peter Kapalo, Ludmila Meciarova, Silvia Vilcekova, Eva Kridova Burdova, Florin Domnita; Ciprian Bacotiu; Kinga-Eva Peterfi, Investigation of CO2 production depending on physical activity of students. Int. Journal of Environmental Health Research, Volume 29, Issue 1, 2019, WOS:000457284700003, ISSN: 0960-3123, IF 1.465/2018.
7. Ancuţa Abrudan, Octavian Pop, Alexandru Serban, Mugur Bălan, New perspective on performances and limits of solar fresh air cooling in different climatic conditions. Energies, 2019, 12/11, 2113; ISSN1996-1073, IF 2,67/2018.Florin Domniţa, Peter Kapalo; Inlet device with double exponential profile distributor for indoor air dispensation. Selected Scientific Papers – Journal of Civil Engineering, Volume 14, Issue 1, 2019, pag. 103-112, ISSN 1336-9024, DOI: 10.1515/sspjce-2019-0011.
8. Roxana Mare, Adriana Hadarean, Tania Rus, Dana Ilutiu-Varvara, Teodor Chira, Modelling of an Improved Hybrid Cooler Used in Sustainable Buildings, IOP Conf. Series: Materials Science and Engineering, 471, 2019, 022032, doi:10.1088/1757-899X/471/2/022032.
9. Octavian Pop, Lucian Tutunaru, Florin Bode, Ancuţa Abrudan, Mugur Bălan, Energy efficiency of PCM integrated in fresh air cooling systems in different climatic conditions. Applied Energy, vol 212, pag.976-996, 2018, DOI: 10.1016/j.apenergy.2017.12.122 ISSN 0306-2619, IF 8.426/2018.
10. Ancuţa Abrudan, Tania Rus, Roxana Mare, Thermal rehabilitation influence upon the comfort in hospitals, 5th International Conference on Advancements of Medicine and Health Care through Technology (MEDITECH), October 2016, Cluj-Napoca, IFMBE Proceedings, Volume: 59, pag.155-158 DOI: 10.1007/978-3-319-52875-5_35.
11. Peter Kapalo; Florin Domnita; Ciprian Bacotiu; Martin Podolak, The influence of occupants' body mass on carbon dioxide mass flow rate inside a university classroom - case study. International Journal of Environmental Health Research, Volume 28, Issue 4, 2018, WOS:000439887900007, pp. 432-447, ISSN: 0960-3123, IF 1.465/2018.
12. Tania Rus, Lucian Rus, Dana Iluţiu-Varvara, Roxana Mare, Ancuţa Abrudan, Florin Domniţa, Experimental Investigation on the Influence of Overlap Ratio on Savonius Turbines Performance. International Journal of Renewable Energy Research, Volume 8, Issue 3, 2018, WOS:000444037500037, pp. 1791-1799, ISSN 1309-0127.
13. Peter Kapalo; Florin Domnita; Ciprian Bacotiu; Nadija Spodyniuk, The impact of carbon dioxide concentration on the human health - case study. Journal of Applied Engineering Sciences, Volume 8, Issue 1, 2018, WOS:000442423900008, pp. 61-66, ISSN: 2284-7197.
14. Mârza C., Corsiuc G, Molvovan R., Dragos V., The concept of autonomous building in the context of sustainable development, Bulletin of The Transilvania University of Brasov, VOL. 11 (60) Special Issue No.1 – 2018, Series I: Engineering Sciences, Proceeding of the International Scientific Conference „CIBV 2018", 2018, Brasov, pp. 349-356, ISSN 2065-2127.

Significant solutions:
Indoor CO2 concentration measurements depending on activities, methods for determining fresh air supply, mathematical model for fresh air flow rate-based on statistics, Life Cycle Assesment (LCA) for products, carbon footprint analisys for building services systems, energy evaluation of ground air heat exchanger, thermal rehabilitation of buildings, mathematical model for latent heat thermal energy storage, accurate modelling of thermo-physical properties of PCM, optimisation of heat pumps with renewable energy sources, mathematical model for hybrid coolers, methodology for evaluation of led luminaires.
Products and technologies:
1. Double-Equal Strength Diffuser for air distribution
2. Efficient hybrid cooler
3. Energy audit of buildings
4. Savonius Turbines
5. Algorithm for selecting phase change materials based on climatic conditions
6. Adiabatic chamber for thermal analysis of LED luminaires
7. Software for evaluating heat gains through opaque building elements in transient sinusoidal regime

The offer addressed to the economic environment

Research & development	**Research & development in core areas:** Fundamental domain Building Services Engineering – technologies for assuring comfort and IAQ. **Research & development in applied fields:** Life Cycle Assesment, Carbon Footprint; nZEB, thermal energy recovery coupled with renewable sources, Influence of CO_2 concentrations on health and environment, thermal storage. **Development strategy:** National/International research contracts, contracts with third party, article publishing in Journals (WOS, SCOPUS), National/International conference participations, products presentations or technology development in the field of Building Services Engineering.
Consulting	Design, energy audit, consulting, research, product testing, HVAC systems airflow balancing, sound comfort analysis, thermal infrared analysis, evaluation of thermal comfort parameters.
Training	HVAC systems in nZEB, Courses for energy audit, Courses focused on IAQ and renewable energies.

ENVIRONMENTAL QUALITY ANALYSIS AND BUILDING SERVICES MATERIALS RESEARCH GROUP

Contact details

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Director	**Assoc. Prof. Dr. Eng. Dana - Adriana ILUŢIU - VARVARA**
e-mail	Dana.Adriana.Varvara@insta.utcluj.ro

Areas of expertise

Environmental factors pollution control; Environmental parameters monitoring; Environmental quality; Indoor air quality (IAQ); Outdoor air quality (OAQ); Quality of industrial microclimate; Prediction of the environmental quality factors; Industrial wastes; Hazardous wastes; Wastes recycling; Circular economy; Sustainable development; New materials with special properties; Advanced materials; Materials for building services engineering; Materials chemistry; Applied chemistry; Environmental chemistry.

Team

Assoc. Prof. Dr. Eng. Dana - Adriana ILUŢIU - VARVARA, Assoc. Prof. Dr. Eng. Carmen Maria MÂRZA, Prof. Dr. Eng. Daniela Lucia MANEA, Assoc. Prof. Claudiu ACIU, Lecturer Dr. Eng. Adriana HĂDĂREAN, Lecturer Dr. Marius FETEA, Lecturer Dr. Ioan GIURCA, Lecturer Dr. Anca HOŢUPAN, Lecturer Dr. Teodor Valeriu CHIRA, Lecturer Dr. Eng. Raluca - Paula MOLDOVAN, Lecturer Dr. Anagabriela DEAC, Lecturer Dr. Cristina IACOB, Lecturer Dr. Daniel RUSU, Lecturer Dr. Eng. Georgiana - Dorina CORSIUC, Lecturer Dr. Eng. Roxana MARE, Lecturer Dr. Eng. Tania RUS, Lecturer Dr. Ioana – Monica SAS – BOCA, Lecturer Dr. Marius TINTELECAN, Assist. Prof. Dr. Constantin CILIBIU.

Representative projects

"Studies and researches regarding the reduction of **the negative environmental impact** of the pollutants **and solid wastes from the steelmaking",** "Development and support of multidisciplinary postdoctoral programs in major technical areas of national strategy of Research - Development - Innovation" **4D-POSTDOC**, contract no. POSDRU/89/1.5/S/52603, project co-funded by the European Social Fund through Sectoral Operational Program Human Resources Development 2007-2013, http://193.226.17.4:8080/sites/fordoc/default.aspx (2010-2013).
"Creation of a cooling solar thermoelectric installation (ITERMSOR)", Internal competition for Research/ Development/ Innovation – Project 16671/12.07.2017, type 1.2 – CI2017_INST_1 (33/2017), Technical University of Cluj-Napoca (2017-2018).
"Research concerning the **characterization of the oily mill scale in order** to identify a optimum method **for reduction of the quantities of hazardous wastes landfilled**", Internal competition for Research/ Development/ Innovation –Project 16362/07.07.2016, C.I. type 1.1 - T4, Technical University of Cluj-Napoca (2016-2017).
"Studies of methods to optimize the use of sludge in the building materials industry", Internal competition for Research/ Development/ Innovation. Project C.I. type 1.1-T5 / 2016, Technical University of Cluj-Napoca (2016-2017).

Significant results

Articles in ISI rated journals, in the past 5 years:
1. D. A. Iluţiu – Varvara, C. Aciu, "Metallurgical Wastes as Resources for Sustainability of the Steel Industry". Sustainability, vol. 14(9), 5488, 2022.
2. D. A. Iluţiu – Varvara, M. Tintelecan, C. Aciu, C. M. Mârza, I. M. Sas-Boca, "An Assessment of the Metallic Iron Content from Steel Mill Scale - Essential Factor for Sustainability and Circular Economy". **Springer's Lecture Notes in Networks and Systems book series, vol. 386, 2022, pp. 64-70.**
3. D. A. Iluţiu – Varvara, M. Tintelecan, C. Aciu, I. M. Sas-Boca, "The Assessment of the Leaching Behavior of

Metallurgical Wastes for a Sustainable Circular Economy". **Springer's Lecture Notes in Networks and Systems book series, vol. 605, 2022, pp. 282-290.**
4. M. Tintelecan, D. A. Iluţiu – Varvara, O. R. Alabanda, I. M. Sas - Boca, G. A. Santana Martinez, "Zn-Al Anticorrosive Coating, Adapted to Obtain Protected Steel Wires". **Springer's Lecture Notes in Networks and Systems book series, vol. 386, 2022, pp. 3-12.**
5. M. Tintelecan, D. A. Iluţiu – Varvara*, I. M. Sas - Boca, C. Aciu, "The Behavior of a Zn-Al Anticorrosive Coating in the Wiredrawing Process". Materials, vol. 15(18), 6190, 2022.
6. I. M. Sas - Boca, D. A. Iluțiu - Varvara*, M. Tintelecan, C. Aciu, D. I. Frunză, F. Popa, "Studies on Hot-Rolling Bonding of the Al-Cu Bimetallic Composite". *Materials*, vol. *15(24),* 8807, 2022.
7. M. D. Roman, C. Sava, D. A. Iluţiu – Varvara*, R. Mare, L. L. Pruteanu, E. M. Pică, L. Jäntschi, "Biological Activated Sludge from Wastewater Treatment Plant before and during the COVID-19 Pandemic". *International Journal of Environmental Research and Public Health, vol. 19(18), 11323, 2022.*
8. C. Aciu, D. L. Manea, D. A. Iluțiu – Varvara*, "Study Regarding the Micro Filler Effect of Sludge Resulting from Steel Pickling". *Metals, vol. 11(2), 2021, pp. 361-372.*
9. D. A. Iluțiu – Varvara, M. Tintelecan, C. Aciu, I. M. Sas – Boca, "Reuse of the Steel Mill Scale for Sustainable Industrial Applications". Proceedings vol. 63 (1), 2020, pp. 14–17.
10. D. A. Iluțiu – Varvara, C. Aciu, M. Tintelecan, I. M. Sas – Boca, "Assessment of Recycling Potential of the Steel Mill Scale in the Composition of Mortars for Sustainable Manufacturing". Procedia Manufacturing vol. 46, 2020, pp.131–135.
11. D. A. Iluțiu – Varvara, M. Tintelecan, C. Aciu, I. M. Sas – Boca, A. Hădărean, T. Rus, R. Mare, "An Assessment of the Substance Losses from Charge Composition Used to the Steelmaking – Key Factor for Sustainable Steel Manufacturing"**.** Procedia Manufacturing, vol. 32, 2019, pp. 15-21.
12. C. Aciu, D. A. Iluţiu – Varvara, D. L. Manea, Y. A. Orban, F. Babota, "Recycling of Plastic Waste Materials in the Composition of Ecological Mortars". Procedia Manufacturing, vol. 22, 2018, pp. 274-279.
13. I. M. Sas – Boca, D. I. Frunza, D. A. Iluţiu – Varvara, I. Toma, "The Properties of Bimetallic Multi-layer (C45 and S235JR) and the Multi-layer Steel Made by Forging". Powder Metallurgy And Advanced Materials, vol. 8, 2018, pp.11-17.
14. M. Tintelecan, I. M. Sas – Boca, M. F. Pop, D. A. Iluţiu – Varvara," A New Technical Version of Wiping of the Steel Wire Surface after "Hot Dip" Zinc Coating". Procedia Manufacturing, vol. 22, 2018, pp. 93-98.
15. I. Aşchilean, I. Giurca, "Choosing a Water Distribution Pipe Rehabilitation Solution Using the Analytical Network Process Method". Water, vol. 10, 2018, pp. 484-490.
16. D. A. Iluţiu – Varvara, C. Aciu, C. M. Mârza, I. M. Sas - Boca, M. Tintelecan, "Assessment of Recycling Potential of the Oily Mill Scale in the Steelmaking Industry". Procedia Manufacturing, vol. 22, 2018, pp. 228-232.

Significant solutions:
New technologies for industrial wastes minimization;
New technologies for hazardous wastes minimization;
New methods for environmental factors pollution control;
New technologies for improvement the environment quality;
New methods for improvement the quality of industrial microclimate.

Products and technologies:
New materials for building services;
Technologies with low environmental impact.

The offer addressed to the economic environment

Research & development	Research and development for industry by using applied research. Research and development of new methods and technologies with low environmental impact. Recovery of industrial wastes / Recycling of industrial wastes. Research and development of new methods and technologies for hazardous wastes treatment. Research and development of new materials for building services. Research and development of advanced materials for building services.
Consulting	Consultancy for the industrial or academic environment, according to the skills of the research group members, in the following domains: Environmental Engineering; Indoor air quality (IAQ); Outdoor air quality (OAQ); Prediction of the environmental quality factors; Advanced materials; Wates management; Materials with Special Properties; Materials for Building Services.
Training	Training courses according to the skills of the research group members. Training courses in environmental factors pollution control. Training courses in environmental quality analysis. Training courses in industrial wastes and hazardous wastes. Training course in prediction methods for environmental quality factors. Training courses in waste management. Training courses in materials for building services. Training courses in indoor air quality (IAQ). Training courses in outdoor air quality (OAQ). Training courses in quality of industrial microclimate.

WATER & ENERGY SYSTEMS

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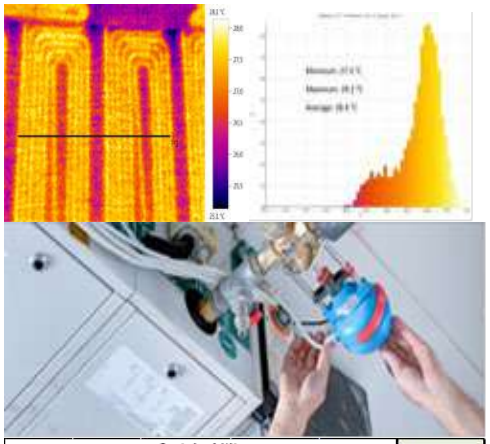

Sustainability				
Material¿ Material properties —	CO2 emission equivalent	Embodied Energy	LCC*	Utilities amount
UM—	[CO2 eq.]	MJ/kg	[Euro/year]	
Concrete	0.107	0.75	3.08	0.92
PVC-U	3.23	67.5	4.72	0.35
HDPE	2.52	84.4	5.15	0.26
GRP	8.1	100	3.06	0.42
Vitrified clay	0.56	7.9	2.54	0.96
Shares	0.3	0.3	0.4	

* Dn 600, road, 2 m deep

Areas of expertise

Water systems: Surveillance and measurements in water and sewer systems, Material selection methods, Water treatment, Water management
Energy in buildings: Energy performance certificate, Energy management, Thermal imaging, HVAC performance monitoring, Indoor Air Quality (IAQ)

Team

Assoc.Prof. Dr. Eng. Eugen Vitan, Assoc.Prof. Dr. Eng. Ciprian Bacoţiu, Assoc.Prof. Dr. Eng. Florin Domniţa, Assist. Prof. Dr. Eng. Anca Hoţupan, Assist. Prof. Dr. Eng. Cristina Iacob, Assist. Prof. Dr. Eng. Anagabriela Deac, Assist. Prof. Dr. Eng. Gelu Chisăliţă, Assist.Prof. Dr. Eng. Adriana Hădărean, Assist.Prof. Dr. Eng. Roxana Mare, Assist. Prof. Dr. Eng. Marius Fetea, Assist. Prof. Dr. Eng. Constantin Cilibiu, Assist. Prof. Dr. Eng. Raluca Moldovan, Drd. Eng.Angel Campianu

Representative projects

„Report of the technical expertise of the sewerage works in the localities of Șpring and Cuța„ contract with industry, 2023.
„Algorithm for determining water losses in water distribution systems"contract with industry, 2022.
"Design of drinking water and sewage systems, expansions, rehabilitation", contracts SAMTID, POS, POIM, 2004-2019.
"Study on the assessment of rainfall products by hydrological and hydrotechnical methods for 450 ha, elaboration of the 3D model and definition of their collection solutions", contract with industry, 2018.
"Water balance in county water supply systems, algorithms and applications for a county system", contract with industry, 2018.
"Good Practice Guide for achieving the optimum cost levels of the minimum energy performance requirements of the various categories of buildings", collaboration with UTCB, 2018.
"Methodology for calculating the energy performance of buildings, indicative norm Mc001/2006: Revision methodology; Review/elaboration of comments and examples of application", collaboration with UTCB, 2017**.**
"Shaping the degradation effects of water quality in distribution systems, associated with the situations of large discontinuities of consumption", contract with industry, 2016.
"Method of choice of materials for urban infrastructure", Life Cycle Analysis (LCC), SSM Engineering tool (based on Global utility method), contract with industry, 2014.
"Measurements for determining the performance of thermal rehabilitation works of buildings and related installations", contract with industry, 2011.
"Research and development of a membrane Reactor for the production of pure hydrogen usable in supplying fuel cells", collaboration with ICSI Râmnicu Vâlcea, 2010.
"Design and realization of the combustion pile assembly. Experimental determinations in order to establish functional performance. Elaboration of technical documentation to achieve a combination of hydrogen and air-

powered combustion cells with a useful electrical power of up to 1kW", collaboration with ICSI Râmnicu Vâlcea, 2006.

Significant results

The most representative publications of the past 5 years:

1. Roxana Mare, Codruța Mare, Adriana Hadarean, Anca Maria Hotupan and Tania Rus "COVID-19 and Water Variables: Review and Scientometric Analysis", Environmetal Research and Public Healt, 20, 957, 2023
2. E. Vitan, Anca Hotupan, Adriana Hadarean, C. Cilibiu "Overview and recommendations for analysis of water distribution systems based on performance indicators", JOURNAL OF APPLIED ENGINEERING SCIENCESVOL. 12(25), ISSUE 2/2022, ART.NO. 350 pp. 237-244, 2022
3. Hădărean, Adriana; Hoțupan, Anca; Mare, Roxana - ANALYSIS OF WATER CONSUMPTION AND STORAGE VOLUMES FOR RESIDENTIAL AREAS SITUATED IN BIG CITIES OF ROMANIA. Environmental Engineering & Management Journal (EEMJ). Jun 2022, Vol. 21 Issue 7, p1135-1146. 12p.
4. E. Vitan, Anca Hotupan, C. Cilibiu, V. Ștef "Methods for estimating water flows from storms and melting snow – case study", JOURNAL OF APPLIED ENGINEERING SCIENCES, VOL. 12(25), ISSUE 1/2022, ART.NO. 335 pp.107-112, 2022
5. E. Vitan, Anca Hotupan, Adriana Hadarean - Average operating pressure effect on water supply systems performances. a case study for 12 romanian small water distribution networks, JOURNAL OF APPLIED ENGINEERING SCIENCES, VOL. 11(24), ISSUE 2/2021,pp.143-150, 2021,
6. A Hotupan , A Hădărean- Experimental study of water losses through a circular leakage hole in PVC pipes, The 7th Conference of the Sustainable Solutions for Energy and Environment, IOP Conf. Series: Earth and Environmental Science 664 (2021) 012051, doi:10.1088/1755-1315/664/1/012051, 2021
7. E. Vitan, T. Rus, A. Hotupan and C. Cilibiu "The impact of the decreasing number of users on the evolution of a centralized heating system",IOP Conference Series: Materials Science and Engineering, Volume 1138 012043Published: 2021
8. Hoțupan Anca, Hădărean Adriana - Experimental Determination of the Discharge Coefficient Through Circular Orifice in PVC Pipes, JOURNAL OF APPLIED ENGINEERING SCIENCES, Dec 2020, Vol. 10 Issue 2, p133-138
9. M. Muste, C.Bacoţiu, D. Thomas, "Evaluation of the slope-area method for continuous streamflow monitoring", Proceedings of the 38th IAHR World Congress, September 1-6, 2019, Panama City, Panama, pp. 121-130,DOI:10.3850/38WC092019-1860.
10. Anca HOȚUPAN - INFLUENCE OF MANNING' ROUGHNESS COEFFICIENT AND ABSOLUTE ROUGHNESS IN VELOCITY CALCULATION, Bulletin of the Transilvania University of Braşov • Vol. 12 (61) No. 1 - 2019 Series I: Engineering Sciences, pg 63-68

Products and technologies:

1. SSM (Safety and Sustainability Method) - Engineering tool for the selection of pipe material.
2. Algorithms for determining water losses in water distribution systems.
3. Equipment for the measurement of the HVAC performance and energy of buildings.
4. Algorithms for analysing the performance of public water utilities systems.
5. Qualitative test rig for water magnetization devices.
6. Regulation norm Mc001, methodology for calculating the energy performance of buildings.
7. Good Practice Guide for achieving the optimum cost levels of the minimum energy performance requirements of the various categories of buildings

The offer addressed to the economic environment

Research & development	Problems associated with public water utilities systems, diagnostics, performance, quality. Energy performance measurements associated with buildings and the related installations. Decision support algorithms for the choice of materials and technologies.
Consulting	Performance measurements in the field of Building Services Engineering. Analysis of public water utilities systems, diagnostics, performance, quality. Decision support algorithms for the choice of materials and technologies.
Training	Problems associated with building services engineering and public water utilities systems, diagnostics, performance, quality, selection of materials and technologies

INTELLIGENT SYSTEMS GROUP

Contact details

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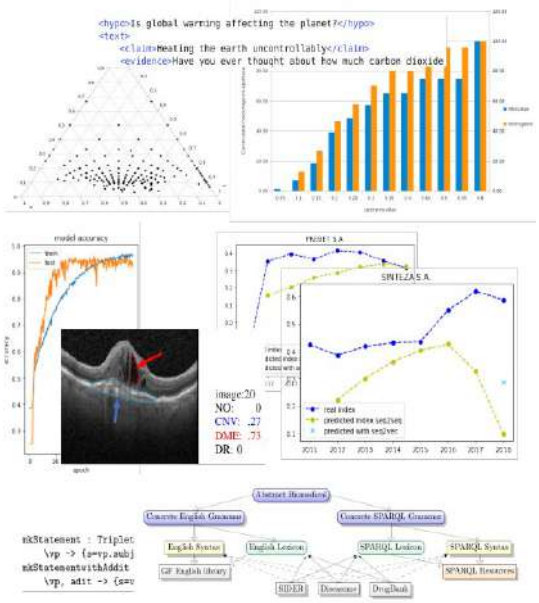

Areas of expertise

Explainable Artificial Intelligence -
Knowledge representation and reasoning - Semantic Web; Ontology engineering; Expert systems; Model checking
Natural Language Processing - Machine comprehension, Chatbots, Commonsense reasoning.
Multi-agent systems - Logic-based agents; Agreement technologies; Trust modelling; Ethics for AI, Dialogue protocols
Business processes re-engineering. - Decision support systems; Norm Compliance, E-contracts, Bayesian networks

Team

Prof. Dr. Eng. Ioan Alfred Letia; Assoc. Prof. eng. Emil Chifu, Prof. eng. Adrian Groza, Prof. eng. Radu Razvan Slavescu, Assoc. Prof. eng. Anca Marginean

Representative projects

"New Optical Coherence Tomography Biomarkers Identified with Deep Learning for Risk Stratification of Patients with Age-related Macular Degeneration, PED616, 2022-2024
"Extensive Capitalization of Experience in Spatial and Security Activities (VESS), project PN-III-P1-1.2-PCCDI-2017-0371 (2018-2020) - member
"Increasing understanding on climate change through public discourse analysis and stakeholders modelling", EEA Grant Romania-Norway, http://users.utcluj.ro/~agroza/projects/argclime/ (2016)
ARGSAFE, "Using Argumentation for Justifying Safeness in Complex Technical Systems", PNII-Capacitati, http://users.utcluj.ro/~agroza/projects/argsafe/ (2013-2015)
ASDEC, "Structural Argumentation for Decision Support with Normative Constraints", PNII-Capacitati, http://users.utcluj.ro/~agroza/projects/asdec/ (2013-2014)
LELA, "Collaborative Recommendation System in the Tourism Domain Using Semantic Web Technologies and Text Analysis in Romanian Language", PNII-INOVARE, http://users.utcluj.ro/~agroza/projects/lela (2013-2014)
GREEN-VANETS, "Improving Transportation Using Car-2-X Communication and Multi-Agent Systems", Intern project -Technical University of Cluj-Napoca, http://users.utcluj.ro/~agroza/projects/vanets
SmartCoDrive – Cooperative Advanced Driving Assistance System Based on Smart Mobile Platforms and Road Side Units", national research project (2012-2016) - member
ARGNET, "Structured Argumentation in a Web Context", PNII-IDEI 170, http://users.utcluj.ro/~agroza/argnet.html (2009-2011)
"Automating Online Dispute Resolution for B2B using multi-agent systems", CNCSIS-534 http://users.utcluj.ro/~agroza/odr.html (2007-2008)
"Collaborative/Competitive Multi-Agent System Oriented on E-Business", CNCSIS, (2005-2007)
"Software Agents for Processing the Semantic Web",CNCSIS, (2002-2004)

Significant results

The most representative publications of the past 5 years:

1. *A. Groza, A. Marginean, S.D. Nicoara: An ontology for age-related macular degeneration using ophthamologists and language models, Semantic web applications and tools for health care and life sciences, Basel, feb. 13-16, 2023.*
2. I.A. Letia, A. Groza: Modeling and simulation with ontology streams for agents Interactions, European Simulation and Modelling conference, Porto, Portugalia, oct. 26-28, 2022

3. A. Groza: Detecting fake news using machine learning and reasoning in description logic, Florence, jul. 18-20, 2022
4. *A. Groza, A. Katona: FACE: fact cheker with explanations, Linz, Austria, sep. 12-15, 2022*
5. *B.A. Marginean, A. Groza, G. Muntean, S.D. Nicoara: Predicting acuity in patients treated for AMD, Diagnostics MDPI, vol. 12, 2022*
6. *A. Groza, L. Toderean, G. Muntean, S.D. Nicoara: Agents that argue and explainopinion for retinal conditions, Journal of Medical and Biological Engineering, vol 41, 2021*
7. *A.N. Marginean, D.D. Muntean, G.A. Muntean, A. Priscu, A. Groza, R.R. Slavescu, …: Reliable learning with PDE-based CNNs and DenseNets for detecting COVID-19, pneumonia, and tuberculosis from chest X-ray images, Mathematics, vol. 9, 2021*
8. *C. Nica, V. P. Almasan, A.Groza. FastRCA-Seq: An efficient approach for extracting hierarchies of multilevel closed partially-ordered patterns, Knowledge-Based Systems, vol. 210, 106533, 2020.*
9. A. Groza, P. Ozturk, R.R. Slavescu, A. Marginean. "Climate Change Opinions in Online Debate Sites", In Computer Science and Information Systems, vol. 17 (1), 2020
10. A. Groza. Interleaved Argumentation and Explanation in Dialog in Logic, Cognition, Games, College Pub., 2020
11. A. Marginean, A. Groza, S.D. Nicoara, G. Muntean, R.R. Slavescu, I. A. Letia. "Towards Balancing the Complexity of Convolutional Neural Network with the Role of Optical Coherence Tomography in Retinal Conditions", IEEE 15th International Conference on Intelligent Computer Communication and Processing (ICCP), 2019
12. A. Farcas, A. Marginean. "EmotionSense: Real-time Emotional Feedback from the Audience", IEEE 15th International Conference on Intelligent Computer Communication and Processing (ICCP), 2019
13. R. R. Slavescu, C. Masca and K. C. Slavescu. "Sequence Labeling for Extracting Relevant Pieces of Information from Raw Texts Medicine Descriptions". MEDITECH , Springer, Singapore, pp. 215-219, 2019
14. A. Marginean and G. Pricop. "On the Impact of Semantic Roles on Text Comprehension for Question Answering." In International Conference on Mining Intelligence and Knowledge Exploration, pp. 53-63. Springer, Cham, 2018.
15. A. Onaciu, A. Marginean, "Ensemble of Artificial Neural Networks for Aspect Based Sentiment Analysis", IEEE 14th International Conference on Intelligent Computer Communication and Processing (ICCP), 2018

Significant solutions:
Automatic Diagnosis of retina conditions using deep learning; Analysing arguments on social media; Machine comprehension and natural language processing for chatbots; Recurrent networks for pedestrian identification with pose estimation; Crop classification from satellite images using ensemble learning; Checking compliance of business processes with description logic; Checking compliance against safety standards (e.g. Hazard Analysis at Critical Control Points)**;** Contributions to fundamental research in argumentation and demonstrate innovative technologies validated in real-world scenarios such as safety standards, justifying audit decisions, and structured arguments for medical decision support. Controlled Natural Languages with Grammatical Framework.

Products and technologies:
1.Train and visualize deep neural network for OCT B-scans (https://github.com/ancamarginean/retina_amd)
2. Chemical Reaction Network analysis tool (http://cs-gw.utcluj.ro/~anca/tools.html) CoNtRol
3. GFMEd (http://cs-gw.utcluj.ro/~anca/tools.html)- translating questions about drugs and diseases from English to SPARQL.
4. PEARLS (http://cs-gw.utcluj.ro/~srazvan/prj/perlas/) - Personal Expectations Aware Recommender of Landmarks and Sites
5. OntoEG (Ontology-based Essay Grading), 2015 (http://users.utcluj.ro/~agroza/tools/ontoeg/) Automated essay grading using ontologies and textual entailment.
6. AHP-OntoEval (AHP Ontology Evaluation), 2014, (http://users.utcluj.ro/~agroza/tools/ahp) Ontology evaluation system based on analytic hierarchy process.

The offer addressed to the economic environment

Research & development	Medical data and financial data analysis with machine learning. Natural language processing Norm compliance: verifying business processes against norm compliance and quality standards like HACCP or ISO 22000. Model checking of business processes against ISO-like quality standards. Support for dispute resolution for Small and Medium Enterprises in case of contract breach. Semantic-based business process re-engineering. Decision support systems based on domain-based safety arguments. Logistic planning. Agent oriented technology in support of e-business. Representing and reason on business rules for e-commerce applications. Modelling and simulating trust on the Web. Semantic search of business products. Opinion mining for e-business.
Consulting	Machine learning: design, train and evaluate models Consulting, design, research and prototyping on development of semantic-based intelligent systems. Applied engineering services: engineering safety critical systems, business process re-engineering, model checking verification, ontology engineering.
Training	**Explainable Artificial Intelligence: human-agent models for XAI** **Semantic Technologies:** ontology engineering, reasoning on ontologies, linked data, OWL, RDF **Model checking:** Computation Tree Logic, Kripke models, hybrid logics. **Agent-based programming:** Semantic Web services, multi-agent technologies

IMAGE PROCESSING AND PATTERN RECOGNITION RESEARCH CENTER

Contact details

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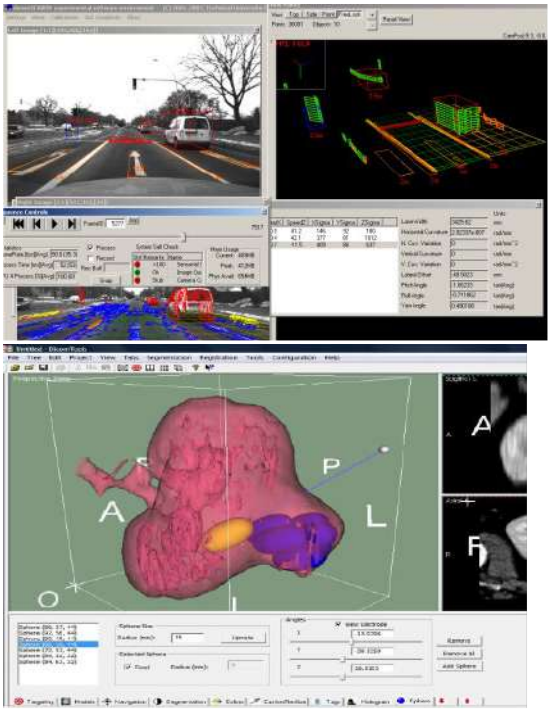

Areas of expertise

Image processing and pattern recognition: Color, grayscale and 3D image processing**;** Automatic image and media annotation
Stereovision based sensorial perception: Stereovision; Dense optical flow; Object detection, classification and tracking; Real-time computer vision
Object detection, classification and tracking: use of deep learning and probabilistic model-based techniques for object detection, classification and tracking from grayscale, colour and 3D information
Advanced driving assistance and Autonomous mobile systems: -Sensorial perception; Environment representation; Risk assessment, Autonomous vehicles. Autonomous drones
Medical image analysis:-Enhancement; Segmentation; Recognition; Prediction; Structured reporting; Ultrasonography, CT, MRI

Team

Prof. Dr. Eng. Sergiu Nedevschi, Prof. Dr. Eng. Radu Danescu, Assoc. Prof. Dr. Eng. Tiberiu Marița, Prof. Dr. Eng. Florin Oniga, Assoc. Prof. Dr. Eng. Raluca Brehar, Assoc. Prof. Dr. Eng. Mihai Negru, Assoc. Prof. Dr. Eng. Ion Giosan, Assoc. Prof. Dr. Eng. Delia Mitrea, Assist. Prof. Dr. Eng. Cristian Vicas, Assist. Prof. Dr. Eng. Anca Ciurte, , Assist. Prof. Dr. Eng. Andrei Vatavu, Assist. Prof. Dr. Eng Robert Varga, Dr. Eng. Arthur Costea, Assist. Prof. Dr. Eng. Vlad Miclea, Assist. Prof. Dr. Razvan Itu, Assist. Prof. Dr. Eng. Andra Petrovai
Phd. students: Eng. Marius Drulea, Eng. Catalin Golban, Eng. Mircea Muresan, Eng. Horatiu Florea

Representative projects

DeepPerception, "Deep Learning Based 3D Perception for Autonomous DriviDeeng", code: PN-III-P4-PCE-2021-1134, (2022-2024), https://cv.utcluj.ro/deepperception/
MEDALS, "Modeling, Estimation and Management of Dangerous Situations by Continuous Analysis of the Driver-Vehicle-Environment System, code: PN-III-P4-ID-PCE-2020-1700, (2021-2023), https://cv.utcluj.ro/medals/
SEPCA, "Visual Semantics and Integrated Control for Autonomous Systems", code PN III-P4-ID-PCCF-2016-0180, (2018-2022), http://vision.imar.ro/sepca/index.html
MULTISPECT, "Multispectral environment perception by fusion of 2D and 3D sensorial data from the visible and infrared spectrum", code PN-III-P4-ID-PCE-2016-0727, (2017-2019), https://cv.utcluj.ro/multispect/
UP Drive, "Automated Urban Parking and Driving", H2020 project, http://up-drive.eu/ (2016-2020)
MULTIFACE, "Multifocal System for Real Time Tracking of Dynamic Facial and Body Features", PN-II-RU-TE-2014-4-1746 project, (2015-2017). https://cv.utcluj.ro/multiface/index.php/home.en.html
"Reconfigurable ROS-based Resilient Reasoning Robotic Cooperating Systems", FP7 ARTEMIS (2014-2017).
Road surface measurement and modeling, funded by Rober Bosch GMBH, (2013-2016)
PAN-ROBOTS, **"Plug and Navigate ROBOTS for smart factories"**, FP7 project, (2012-2015)
CoMoSef, **"Co-operative Mobility Services of the Future",** Eureka project, (2012-2015)
INTERSAFE-2, **"Cooperative Intersection Safety"**, FP7 project, http://cv.utcluj.ro/intersafe-2.html (2008-2011)
SMARTCODRIVE, **"Cooperative Advanced Driving Assistance System Based on Smart Mobile Platforms and Road Side Units"**, PNII PT PCCA (Joint Applied Research Project), http://cv.utcluj.ro/smartcodrive/ (2012-2016)

AMHEOS, **"Automatic Medium and High Earth Orbit Observation System Based on Stereovision"**, PNII PCCA (Joint Applied Research Project), http://cv.utcluj.ro/amheos/ (2012-2016)
MULTISENS, **"Multi-scale multi-modal perception of dynamic 3D environments based on the fusion of dense stereo, dense optical flow and visual odometry information"**, PNII-Idei, http://cv.utcluj.ro/multisens/ (2011-2016)

Significant results

The most representative publications of the past 5 years:

1. A Petrovai, S Nedevschi, MonoDVPS: A Self-Supervised Monocular Depth Estimation Approach to Depth-aware Video Panoptic Segmentation, Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision, Pages 3077-3086, 2023.
2. H Florea, A Petrovai, I Giosan, F Oniga, R Varga, S Nedevschi, Enhanced perception for autonomous driving using semantic and geometric data fusion, Sensors 22 (13), 5061, 2022.
3. 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, pages 1578-1588, 2022.
4. V.C. Miclea, S. Nedevschi, "Monocular Depth Estimation With Improved Long-Range Accuracy for UAV Environment Perception", IEEE Transactions on Geoscience and Remote Sensing, Vol. 60, AN: 5602215, 2022, DOI: 10.1109/TGRS.2021.3060513.
5. A Petrovai, S. Nedevschi, "Semantic Cameras for 360-degree Environment Perception in Automated Urban Parking and Driving", IEEE Transactions on Intelligent Transportation Systems, vol. 23, Issue 10, pp. 17271-17283, Oct 2022, DOI10.1109/TITS.2022.3156794.
6. M.P. Muresan, S. Nedevschi, R. Danescu, "Robust Data Association using Fusion of Data-Driven and Engineered Features for Real Time Pedestrian Tracking in Thermal Images", SENSORS, Vol. 21, Issue 23, AN 8005, NOV 2021, DOI: 10.3390/s21238005.
7. R. Brehar, M.P. Muresan, M. Tiberiu, C. Vancea, N. Mihai, S. Nedevschi, "Pedestrian Street-Cross Action Recognition in Monocular Far Infrared Sequences", IEEE ACCESS, Vol. 9, pp. 74302-74324, JUN 2021, DOI:10.1109/ACCESS.2021.3080822.
8. A.D. Costea, A. Petrovai, S. Nedevschi, "Fusion Scheme for Semantic and Instance level Segmentation", *Proceedings of 2018 IEEE Intelligent Transportation Systems Conference (ITSC)*, Maui, Hawaii, USA, November 4-7, 2018, pp. 3469-3475.
9. D. Borza, R. Itu, R. Danescu, "In the Eye of the Deceiver: Analyzing Eye Movements as a Cue to Deception", *Journal of Imaging*, Vol. 4, No. 10, 2018, Art. No. 120.
10. V. Miclea, S. Nedevschi, „Real-Time Semantic Segmentation-Based Depth Upsampling Using Deep Learning", Proceedings of 2018 IEEE Intelligent Vehicles Symposium (IV), Changshu, China, June 26-30, 2018, 2nd best applicative paper

Significant solutions:

High accuracy dense stereovision; High accuracy dense optical flow; Stereovision based ego-motion estimation; Lane detection and tracking; Detection and classification of painted road objects; Obstacle detection and tracking; Obstacle classification; Perception & representation of unstructured environments; Forward collision detection; Dynamic environment perception; High level reasoning on perception and domain knowledge; Automatic image annotation; Omnidirectional stereovision, Deep learning based detection, semantic segmentation, panoptic segmentation; Spatio-temporal and appearance based representation of 3D environment.

Products and technologies:

1. Real-time stereovision-based perception solution stance sensorial system for highways
2. Real-time stereovision-based sensorial system for city driving assistance functions
3. Real-time stereovision-based advanced driving assistance for cooperative intersection safety.
4. Real-time GPU based solutions for accurate dense stereovision and accurate dense optical flow estimation.
5. Ground-base long baseline observation system for automatic detection and ranging of Low Earth Orbit objects.
6. Automatic visual annotation system
7. Medical diagnosis assistance system based on ultrasonic image texture analysis, for detection of diffuse diseases, malign and benign liver tumours, prostate cancer
8. Omnidirectional stereovision for surrounding perception used for robotic applications
9. Spatio-temporal and apparence based representation for environment representation; Panoptic segmentation solutions

The offer addressed to the economic environment

Research & development	Sensory perception based on 3D depth sensors and colour cameras: organization, identification and interpretation of the sensory information for environment representation and understanding. Advanced driving assistance and Autonomous mobile systems: environment perception and representation, risk assessment, planning. Medical imaging: textural analysis, probabilistic segmentation and machine learning for assisted diagnosis from ultrasonography and tomography.
Consulting	Consulting, design, research and prototyping towards development of 2D and 3D sensors based solutions for multiple industrial and scientific fields, autonomous mobile systems.
Training	Image processing, Pattern recognition, Deep Learning, Perception, Autonomous mobile systems

DISTRIBUTED SYSTEMS RESEARCH LABORATORY

Contact details

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Areas of expertise

DSRL has extensive experience in many fields of the distributed systems related research areas such as:

- Energy efficiency in large scale distributed systems
- IoT and Blockchain technology
- Ambient assisted living (AAL)
- Big data analytics and Machine Learning
- Multidisciplinary optimization
- Complex systems modelling, simulation, optimization and adaptation
- Bio-inspired optimization

DSRL carries out research activities within several EU HE / EU H2020 / PNIII projects and has developed techniques and tools for (i) nonlinear programming optimization of systems energy efficiency, (ii) energy flexibility assessment and budgeting, (iii) Demand Response load profile forecasting and estimation, (iv) load shifting/scheduling for energy consumption reduction, and (v) optimization of IT resources energy consumption. In the modelling and simulation domain DSRL has investigated and developed techniques for modelling of complex systems, machine learning for information extraction and decision making, multi-objective and multi-criteria problems solving using mathematical models and what-if model simulation. In relation with blockchain technology, DSRL has experience in the development of distributed shared ledgers, smart contracts, distributed peer to peer control and distributed consensus which has been successfully applied in domains such as management of smart grids and demand-response programs, ecosystem management and payment of ecosystem services trading, circular economy and smart manufacturing.

Team

Prof. Dr. Eng. T. Cioara, Prof. Dr. Eng I. Salomie, Prof. Dr. Eng. I. Anghel, Assoc. Prof. Dr. Eng. V. Chifu, Assist. Prof. Dr. Eng. C. Pop, Assist. Prof. Dr. Eng. M. Antal, Assist. Prof. Dr. Eng. C. Antal, PhD Stud. Eng. D. Mitrea, PhD Stud. Eng. L. Toderean, PhD Stud. Eng. A. Rancea, PhD Stud. Eng. O. Marin, Eng. G. Antonesi

Representative projects

- **DEDALUS** - Data-driven Residential Energy Carrier-agnostic Demand Response Tools and Multi-value Services, HORIZON-CL5-2022-D4-01 (2023-2026).
- **BRIGHT** - Boosting DR through increased communIty-level consumer engaGement by combining Data-driven and blockcHain technology Tools with social science approaches and multi-value service design, H2020 LC-SC3-EC-3-2020 (2020-2023), https://www.brightproject.eu/
- **engAGE** - Managing cognitivE decliNe throuGh theatre therapy, Artificial intelliGence and social robots drivEn interventions, AAL-2021, (2021-2024), https://engage-aal-project.eu/
- **H2HCare** - Social robot-based solution for elders' Care management and coaching after discharge from Hospital to Home, AAL-2019, (2020-2023), https://h2hcare-aal.eu/
- **ReMember-Me** - Smart assistant to prevent and detect cognitive decline, promote cognitive function and social inclusion among older adults, AAL-2019, (2020-2023), https://www.rememberme-aal.eu/
- **Increasing the involvement of energy consumers at the level community by combining technologies of data analysis and blockchain**, PP H2020 10/2021, (2021-2023), https://dsrl.eu/BRIGHT-PP10-2021/
- **ReMind** – Robotic ePartner for Multitarget INnovative activation of people with Dementia, AAL-2017, (2018-2021)
- **eDREAM** – enabling new Demand REsponse Advanced, Market oriented and Secure technologies, solutions and business models**,** H2020, (2018 – 2021)

- **CoolDC** - Data Centers Liquid Cooling: Novel Techniques for Optimal Thermal Flexibility Shifting and on-demand Waste Heat Re-use, PN-III-P1-1.1-PD-2019-0154, (2020-2022)
- **CATALYST** – Converting DCs in Energy Flexibility Ecosystems, H2020, (2017-2020)
- **MedGuide -** Integrated System for Coordinated Polypharmacy management in Elders with Dementia, AAL-2016-052, (2017-2019)
- **Distributed systems technology and services for electronic registration, transacting and processing of assets,** DSRL-MONTRAN USA, (2016-2019), ID 20143/2016
- **Eco2Cloud** – Technologies for efficient management and scheduling of cloud resources in cloud for reducing Alpis data centre energy consumption, PNCDI III – BG (2016-2018)
- **OptiPlan** – Technologies for Digitalization, Analysis and Optimization of Manufacturing of Flow Regulators and Monitors at Emerson Factory, PNCDI III – BG (2016-2018)
- **GEYSER** - Green nEtworked Data Centres as EnergY ProSumErs in smaRt city environments, EU FP7, (2013-2016)
- **Elders-UP!** - Adaptive system for enabling the elderly collaborative knowledge transference to small companies, EU FP7 – PNCDI/II, Active and Assisted Living Programme AAL-2013-6, (2014-2016)
- **DIET4Elders** - Dynamic Nutrition Behaviour Awareness System for the Elders, EU FP7 – PNCDI/II, Active and Assisted Living Programme AAL-2012-5, (2013-2016)
- **GAMES** - Green Active Management of Energy in IT Service centres**,** EU FP7, ICT-2009-6.3: ICT for Energy efficiency, (2010-2012)

Significant results

The most representative publications of the past 5 years:

1. M. Antal, V. Mihailescu, T. Cioara, I. Anghel, Blockchain-Based Distributed Federated Learning in Smart Grid. **Mathematics** 2022, 10, 4499 **WoS Q1**
2. C. B. Pop, T. Cioara, I. Anghel, M. Antal, V. R. Chifu, C. Antal, I. Salomie, Review of bio-inspired optimization applications in renewable-powered smart grids: Emerging population-based metaheuristic. **Energy Reports**, Vol. 8, 2022, ISSN 2352-4847 **WoS Q2**
3. C. Antal, T. Cioara, M. Antal, V. Mihailescu, D. Mitrea, I. Anghel, I. Salomie, G. Raveduto, M. Bertoncini, V. Croce, T. Bragatto, F. Carere, F. Bellesini, Blockchain based decentralized local energy flexibility market, **Energy Reports**, Volume 7, 2021, Pages 5269-5288, ISSN 2352-4847 **WoS Q2**
4. T. Cioara, M. Antal, V. T. Mihailescu, C. D. Antal, I. Anghel and D. Mitrea, Blockchain-Based Decentralized Virtual Power Plants of Small Prosumers, in **IEEE Access**, vol. 9, pp. 29490-29504, 2021 **WoS Q2**
5. I. Anghel, T. Cioara, D. Moldovan, M. Antal, C.D. Pop, I. Salomie, C.B. Pop, V. Chifu, Smart Environments and Social Robots for Age-Friendly Integrated Care Services. **Int. J. Environ. Res. Public Health** 2020, 17, 3801. **WoS Q1**
6. M. Antal, C. Pop, T. Cioara, I. Anghel, I. Salomie, F. Pop, A system of systems approach for data centers optimization and integration into smart energy grids, **Future Generation Computer Systems**, 2020, ISSN 0167-739X. **WoS Q1**
7. T. Cioara, I. Anghel, I. Salomie, M. Antal, C. Pop, M. Bertoncini, D. Arnone, F. Pop, Exploiting data centres energy flexibility in smart cities: Business scenarios, **Information Sciences**, 2019, ISSN 0020-0255 **WoS Q1**
8. M. Antal, C. Pop, T. Petrican, A. V. Vesa, T. Cioara, I. Anghel, I. Salomie, E. Niewiadomska-Szynkiewicz, MoSiCS: Modeling, simulation and optimization of complex systems–A case study on energy efficient datacenters, **Simulation Modelling Practice and Theory**, 2019, ISSN 1569-190X **WoS Q1**
9. C. Pop, T. Cioara, M. Antal, I. Anghel, I. Salomie and M. Bertoncini, Blockchain Based Decentralized Management of Demand Response Programs in Smart Energy Grids, **Sensors** 2018, 18(1), 162. > 500 citations, **WoS Q2**
10. T. Cioara, I. Anghel, M. Bertoncini, I. Salomie, D. Arnone, M. Mammina, T. Velivassaki, M. Antal, Optimized Flexibility Management enacting Data Centres Participation in Smart Demand Response Programs, **Future Generation Computer Systems**, Volume 78, Part 1, 2018, Pages 330-342. **WoS Q1**

Technological services (https://eeris.eu/ERIF-2000-000B-1205)**:**

1. Management and decentralization of the smart grid
2. Energy efficiency and multidisciplinary optimization
3. Green clouds
4. Digital twins of complex systems
5. Big data analytics platforms

The offer addressed to the economic environment

Research & development	Core research areas: distributed systems, blockchain, big data and machine learning, ambient assisted living. Support services in: IoT and healthcare, smart grid management, intelligent systems, data centres operation, linear and nonlinear systems optimization.
Consulting	Consulting activities for companies, institutions, international organizations, and government bodies.
Training	Training courses in the following domains: distributed ledger technologies, programming techniques, web applications development, big data pipelines.

COMPUTER GRAPHICS AND INTERACTIVE SYSTEMS LABORATORY

Contact details

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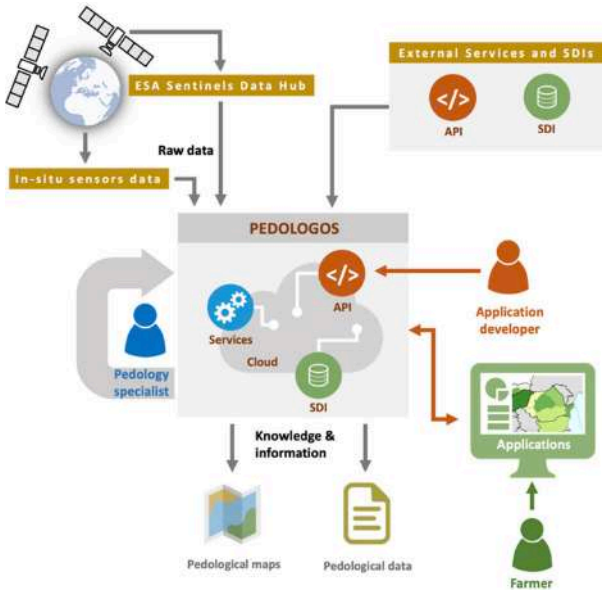

Areas of expertise

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, machine learning based satellite data classification, interdisciplinary research in the domains of Earth Sciences and Earth Observations.

Team

Prof.dr.eng. Dorian Gorgan, Assoc.prof.dr.eng. Victor Bâcu, Assoc.Prof.dr.eng. Teodor Ştefănuţ, Senior Lect. dr.eng. Adrian Sabou, Lect.dr.eng. Constantin Nandra, Senior Lect.dr.eng. Cornelia Melenti, Senior Lect.dr.eng. Mihaela Ordean, Drd.eng. Mihai Bica, Drd.eng. Pavel Valerica, Drd.eng. Elena Neacsu

Representative projects

EMPOWER - Design and evaluation of technological support tools to empower stakeholders in digital education, HORIZON-RIA, 2022-2025
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
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
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 PED, 2020-2022.
NEARBY – "Visual Analysis of Multidimensional Astrophysics Data for Moving Objects Detection", STAR 2017, (2017-2019) http://cgis.utcluj.ro/nearby
HORUS – "Software Toolbox for Pedological Monitoring of Transylvanian Area based on Sentinel-2 Data", STAR 2017, (2017-2019) http://cgis.utcluj.ro/horus/
BIGEARTH - Flexible processing of big earth data over high performance computing architectures, ROSA STAR project (2013-2016), http://cgis.utcluj.ro/projects/bigearth
PECSA - Experimental Computer Services Platform for Scientific and Entrepreneurial Development, PN-II-PT-PCCA project (2014-2017), http://cgis.utcluj.ro/pecsa
IASON - Fostering sustainability and uptake of research results through Networking activities in Black Sea & Mediterranean areas, FP7 project, funded by the European Commission (2013 - 2015), http://www.iason-fp7.eu/
EnviroGRIDS - Building Capacity for a Black Sea Basin Observation and Assessment System supporting Sustainable Development. FP7 project, funded by the European Commission (2009 - 2013), http://www.envirogrids.net/.
SEE-GRID-SCI - SEE-GRID eInfrastructure for regional eScience. FP7 project, funded by the European Commission (2008 - 2010), http://www.see-grid-sci.eu/
KEYSTONE - Semantic keyword-based search on structured data sources, COST Action IC1302 (2013-2017), http://www.keystone-cost.eu/keystone/
mEducator - Multi-type Content Repurposing and Sharing in Medical Education. eContentplus - Digital Content and Cognitive Systems Programme funded by European Commission (2009-2012), http://www.meducator.net/
GISHEO – On demand Grid services for high education and training in Earth observation. Funded by European Space Agency through PECS Programme (2008-2010), http://gisheo.info.uvt.ro/

Significant results

The most representative 10 publications of the past 5 years:

1. Dumitru R. G., Antonio Toma S. and Gorgan D., "3D Object Recognition Method Using CNNs and Slicing", *Proceedings of the 2022 IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR)*, pp. 1-6, (2022).
2. Nandra C., Grigor S., Gorgan D., Integrating Voice Based Interaction with Massive Data Process Description and Execution. In: Russo D., Ahram T., Karwowski W., Di Bucchianico G., Taiar R. (eds) Intelligent Human Systems Integration 2021. IHSI 2021. *Advances in Intelligent Systems and Computing, vol 1322*. Springer, Cham, pp.133-139, (2021).
3. Margin R., Gorgan D., Qualitative Classification of Local Satellite Data. Proceedings of the *2020 IEEE ICCP - 16th International Conference on the Intelligent Computer Communication and Processing*, ISBN:978-1-7281-9081-5, pp.589-596, (2020).
4. Gorgan D., Vaduvescu O., Stefanut T., Bacu V., Sabou A., Copandean D., Nandra C., Boldea C., Boldea A., Predatu M., Pinter V., Stanica A., "Nearby Platform for Automatic Asteroids Detection and Euronear Surveys". Proc. *1st NEO and Debris Detection Conference*, Darmstadt, Germany, 22-24 January 2019, published by the ESA Space Safety Programme Office Ed. T. Flohrer, R. Jehn, F. Schmitz, (2019).
5. Bacu V., Stefanut T., Gorgan D., "Building soil classification maps using HorusApp and Sentinel-2 Products". Proceedings of the 2019 IEEE *15th International Conference on the Intelligent Computer Communication and Processing (ICCP)*, pp.79-85, (2019).
6. Nandra C., Gorgan D., "Usability evaluation of a domain-specific language for defining aggregated processing tasks". Proceedings of the 2019 IEEE *15th International Conference on the Intelligent Computer Communication and Processing (ICCP)*, pp.87-94, (2019).
7. Gorgan D., Rusu T., Bacu V., Stefanut T., Nandra N., "Soil Classification Techniques in Transylvania Area Based on Satellite Data". *World Soils 2019 Conference*, 2 - 3 July 2019, ESA-ESRIN, Frascati, Italy (2019).
8. Bica M., Gorgan D., "Data Locality Aware Algorithm for Task Execution on Distributed, Cloud Based Environments". *Advances in Intelligent Systems and Computing book series, vol. 611*, pp.557-566. Springer, Cham, ISBN 978-3-319-61565-3, (2018).
9. Gorgan D., Stefanut T., Bacu V., Copandean D., Nandra N., Vaduvescu O., "Optical Detection of Asteroids by NEARBY Platform". *Journal of Aeronautics & Aerospace Engineering*, Vol.7, (2018).
10. Stefanut T., Bacu V., Nandra C., Balazs D., Gorgan D. and Vaduvescu O., "NEARBY Platform: Algorithm for Automated Asteroids Detection in Astronomical Images". Proceedings of the 2018 IEEE *14th International Conference on the Intelligent Computer Communication and Processing (ICCP)*, pp.365-369, (2018).

Software tools and platforms developed by CGIS Laboratory:

HORUS, HorusApp – platform and application for machine learning based soil classification by using satellite and spatial data processing.
NEARBY – cloud platform for astronomical moving objects detection and tracking.
BIGEARTH - platform for flexible description and adaptive processing of massive data over HPC infrastructures.
WorDeL – workflow oriented language for flexible description of parallel and distributed processes.
gSWAT - platform and application allows the user to calibrate and execute the SWAT hydrological models in a flexible and interactive manner by taking advantage of the Grid infrastructure.
gSWATSim – collection of Web services supporting the Grid based calibration and execution of the SWAT hydrological models. It provides the SWAT related basic functionality required to develop a remote Web application.
GreenLand – platform and application for Grid based satellite image processing and visualization. The processing is described by an interactive graphical editor. The application is connected by standard geospatial services to spatial data repositories.
ESIP – Grid based satellite image processing platform. GreenLand is layered on ESIP and gProcess.
gProcess – Grid oriented task management and execution platform. gProcess is the basic platform for ESIP, Greenland, and gSWAT.
eGLE – eLearning Platform for Earth Science domain. It supports the development and execution of teaching materials including Grid based processing of satellite images, and connectivity by geospatial Web services.
GreenView – supports the refinement of surface and vegetation parameters in South East Europe region based on satellite images.
eTrace – eLearning platform for developing learning materials by graphical annotations on 3D objects.
MedioGrid – first national Grid infrastructure for research and education (2006).

The offer addressed to the economic environment

Research & development in core areas	GPU cluster and Cloud computing; High performance processing and visualization
Research & development in applied fields	Development of Earth Science oriented applications; Earth Observation big data processing and classification
Consulting	Graphics modelling and simulation; User interactive application development methodology; Cloud computing
Training	User interactive application development methodology; Cloud computing

EMBEDDED AND DEDICATED COMPUTER SYSTEMS LABORATORY

Contact details

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Telephone	+40 264 401489
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Director	Prof. Dr. Eng. Gheorghe Sebestyen
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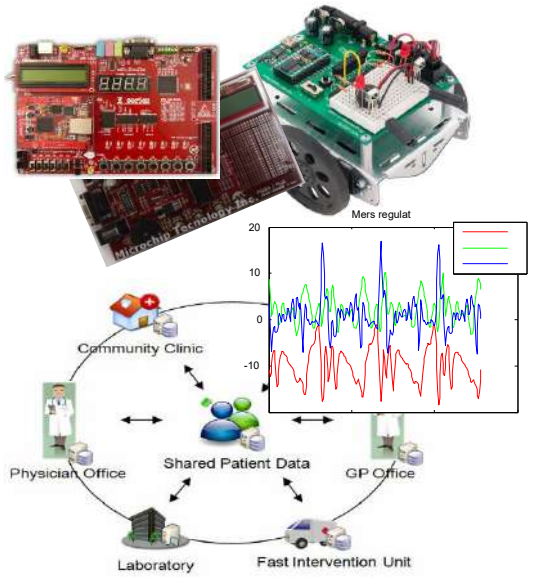

Areas of expertise

Embedded systems, Dedicated digital systems, Modeling, design and implementation of hardware & software systems adapted for various applications in industrial, medical and security domains.
Anomaly detection, AI and signal processing methods used for detecting anomalies in different areas: industry, medical field, finance, etc.
IoT, IIoT, Industry 4.0, industrial networks, cyber-physical systems, Design of applications in the area of IoT, Industrial IoT and cyber-phisical systems
Real-time systems: Real-time systems modeling and design, scheduling strategies and simulation
eHealth systems: Design and implementation of distributed medical information systems and remote patient monitoring applications
Real random number generators and Cryptography: Design and implementation of Real random generators based on the exploitation of physical phenomena known for their intrinsic random nature (eg quantum phenomena).

Team

Prof. Dr. Eng. Gheorghe Sebestyen, Prof. Dr. Eng. Alin Suciu, Assoc. Prof. Dr. Eng. Anca Hangan, Assoc. Prof. Dr. Eng. Lucia Vacariu, Senior Lecturer, Dr. Madalin Neagu, Senior Lecturer Dr. Eng. Kinga Marton,
PhD students: Eng. Zoltan Czako, Eng. Simion Tatar, eng.Tamas Bakos, eng. Dragos Hofner, eng. Ioan Ticovan

Representative projects

Watergame - Smart Urban Water-Based on Community Participation Through Gamification, Proiect experimental – demonstrativ – PED, 2020-2022
Members in the Development Team of CloudUT "Proiect: Cloud Cercetare UTCN – CLOUDUT"
Knowledge transfer on Sensor networks and RFID technologies, contract with CIA SA, Cluj, (2018-2019)
Anomaly detection in sensor networks, internal grant, 2017-2018
CyberWater, "Prototype Cyberinfrastructure-based System for Decision-Making Support in Water Resources Management", ", PNII PCCA (Joint Applied Research Project), http://cyberwater.cs.pub.ro/drupal-7.17/ (2012-2015)
Jeopard, "Java Environment For Parallel Realtime Development", European FP7 project, http://www.jeopard.org/index.php?option=com_content&view=article&id=53&Itemid=58 (2007-2010)
PRO-INOVA, "Educational Program in Innovation Management", POSDRU/21/1.5/G/24239, http://platinova.utcluj.ro/DetaliiProiect/index.php (2010-2012)
CryptoRand, "A High Performance System for Generation and Testing of Random Number Sequences for Cryptographic Applications", http://cryptorand.utcluj.ro/ (2007-2010)

Significant results

The most representative publications of the past 5 years:

1. Surdea-Blaga, T.; Sebestyen, G.; Czako, Z.; Hangan, A.; Dumitrascu, D.L.; Ismaiel, A.; David, L.; Zsigmond, I.; Chiarioni, G.; Savarino, E.; Leucuta, D.C.; Popa, S.L. Automated Chicago Classification for Esophageal Motility Disorder Diagnosis Using Machine Learning. *Sensors* **2022**, *22*, 5227.
2. Hangan, A.; Chiru, C.-G.; Arsene, D.; Czako, Z.; Lisman, D.F.; Mocanu, M.; Pahontu, B.; Predescu, A.; Sebestyen, G. Advanced Techniques for Monitoring and Management of Urban Water Infrastructures—An Overview. *Water* **2022**, *14*, 2174. https://doi.org/10.3390/w14142174
3. Czako, Z.; Surdea-Blaga, T.; Sebestyen, G.; Hangan, A.; Dumitrascu, D.L.; David, L.; Chiarioni, G.; Savarino, E.; Popa, S.L. Integrated Relaxation Pressure Classification and Probe Positioning Failure Detection in High-Resolution Esophageal Manometry Using Machine Learning. Sensors 2022, 22, 253.

4. A. Hangan, Z. Czako and G. Sebestyen, "IoT data collection and analysis services on CloudUT," 2021 IEEE 17th International Conference on Intelligent Computer Communication and Processing (ICCP), Cluj-Napoca, Romania, 2021, pp. 85-91, doi: 10.1109/ICCP53602.2021.9733537.
5. G. Sebestyen, A. Hangan and Z. Czako, "Anomaly detection in water supply infrastructure systems," 2021 23rd International Conference on Control Systems and Computer Science (CSCS), Bucharest, Romania, 2021, pp. 349-355, doi: 10.1109/CSCS52396.2021.00064.
6. A. Tosa, A. Hangan, G. Sebestyen and Z. István, "In-Storage Computation of Histograms with differential privacy," *2021 International Conference on Field-Programmable Technology (ICFPT)*, Auckland, New Zealand, 2021, pp. 1-4, doi: 10.1109/ICFPT52863.2021.9609899.
7. Claudiu Mihali, Anca Hangan, Gheorghe Sebestyen, and Zsolt István. 2021. The case for adding privacy-related offloading to smart storage. In Proceedings of the 14th ACM International Conference on Systems and Storage (SYSTOR '21). Association for Computing Machinery, New York, NY, USA, Article 10, 1–11.
8. Zoltan Czako, Gheorghe Sebestyen, Anca Hangan, AutomaticAI – A hybrid approach for automatic artificial intelligence algorithm selection and hyperparameter tuning,Expert Systems with Applications, Volume 182, 2021, 115225, ISSN 0957-4174
9. A. Suciu, A. Hangan, A. Marginean, M. Joldos, G. Voitcu and M. Echim, "Parallel implementation of a PIC simulation algorithm using OpenMP," 2020 15th Conference on Computer Science and Information Systems (FedCSIS), Sofia, Bulgaria, 2020, pp. 381-385, doi: 10.15439/2020F130.
10. G Kovács, G Sebestyen, A Hangan, “Evaluation metrics for anomaly detection algorithms in time-series”, Acta Univ. Sapientiae 11 (2), 113-130, 2019
11. Neagu, M., Manich, S., Hardware Level Security Techniques Against Reading of Cache Memory Sensitive Data, capitol în cartea Advances in Microelectronics: Reviews, Book Series, Vol. 2, IFSA Publishing, ISBN 978-84-09-08160-8, pp. 307 - 362, Barcelona, Spain, 2019
12. Gheorghe Sebestyen, Anca Hangan, “Anomaly Detection Using System Identification Techniques”, ICINCO 2018 - International Conference in Informatics in Control, Automation and Robotics, Porto, Portugal, 2018
13. G. Sebestyén, A. Hangan, G. Kovacs, Z. Czako, “A Platform for Anomaly Detection in Time-Series”, SIP’2018, Budapest, 2018
14. Neagu, M., Time performance and power efficiency of Interleaved Scrambling Technique for cache memories, ACAM Journal: Automation, Computers, Applied Mathematics, ISSN 1221-437X, Vol. 27, Nr. 1, pp. 7 – 12, 2018
15. K. Marton, L. Pârvu, A. Suciu, “The Impact of Post-processing Functions on Random Number Sequences”, in Proceedings - 2018 IEEE 17th Roedunet International Conference,DOI: 10.1109/ROEDUNET.2018.8514140, 2018
16. Sebestyen, Gheorghe; Hangan, Anca; Czako, Zoltan; et al., “A Taxonomy and Platform for Anomaly Detection”, 21st IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR THETA) Location: Cluj Napoca, ROMANIA Date: MAY 24-26, 2018

Tools and platforms developed:
Water consumption data collection and processing system – set of services developed for Watergame project.
IoT data collection and analysis service on CloudUT - set of integrated services for the collection and analysis of data from IoT devices used for monitoring in cyber physical systems.
AutomaticAi – Platform for artificial intelligence (AI) processing and anomaly detection – assures automatic selection and tooning of the best AI algorithm for a given classification problem.
CARDIONET - Computerized healthcare system designed to provide tracking and management of patients with cardiovascular disease.
PatInova - Platform type digital library for the acquisition, storage, processing and retrieval of information contained in patents
RTMultiSim - Integrated simulation and optimization of real-time systems on parallel and distributed structures
CryptoRand - Integrated high-performance system for generating and testing sequences of random numbers for cryptographic applications

The offer addressed to the economic environment.

Research & development	Anomaly detection techniques based on artificial intelligence Security of cyber-physical systems Efficient strategies for scheduling communication and tasks on real-time parallel and distributed architectures; integrated modelling, simulation and optimization of real-time systems. Advanced techniques for generating random numbers with applications in cryptography. Portable medical devices - for continuous monitoring of patients for prophylactic treatment of chronic diseases., Sensor networks for monitoring rivers
Consulting	Cyber-physical Systems, Cyber-Security, IoT, IIoT, Design of dedicated systems based on specialized processors. Development of real-time applications. Cryptography and random number generators Evaluating the quality of a random number generators. Evaluation of algorithms using random number generators Industrial Informatics, industrial networks, According to TRNG design and implementation of user specifications, wireless Sensor Networks
Training	Computer Architecture, Industrial Informatics, Parallel and Distributed Computing, Quality systems, Cryptography.

KNOWLEDGE ENGINEERING GROUP

Contact details

Name	**Knowledge Engineering Group**
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Site	http://keg.utcluj.ro
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Telephone	+40-264202389
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Director	Prof. Dr. Eng. Rodica Potolea
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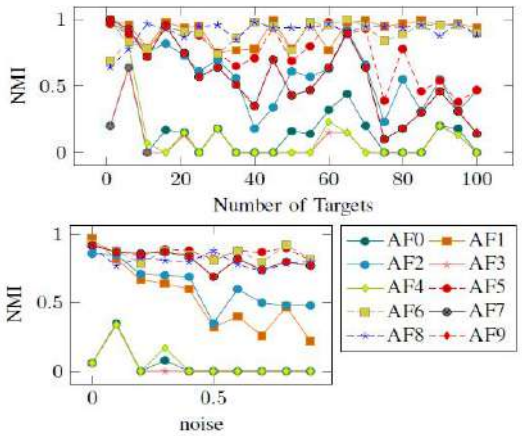

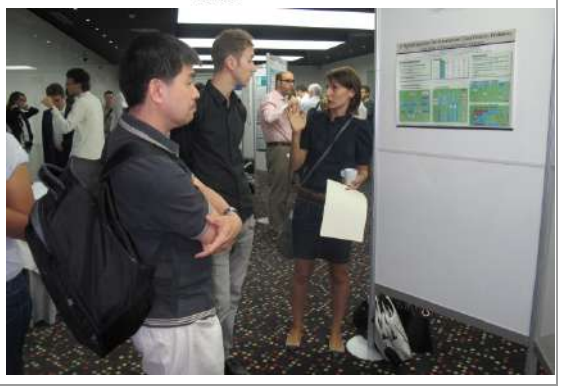

Areas of expertise

Fundamental theoretical aspects:
Data analytics methods and learning models for natural language understanding, explainable graph analysis, heterogenous data integration and analysis.

Practical approaches:
Natural language understanding: topic extraction, sentiment analysis, contradiction detection, semantic role labeling, semantic parsing, intent detection and slot filling,
Graph analysis: community detection, functional networks construction from brain signal, functional networks (dynamic) analysis,
Heterogenous data: (i) IoT: preventive maintenance, failure prediction, user profiling, smart driving (ii) brain signal: artefact detection, burst detection and spike sorting, information coding.

Team

Prof. Dr. Eng. Rodica Potolea, Prof. Dr. Eng. Mihaela Dinsoreanu, Assoc. Prof.Dr. Eng. Camelia Lemnaru.
PhD Students: Cristian Lungu, Octavian Hasna, Florin Macicasan, Vlad Topan, Paul Parau, Timotei Dolean, Lucian Cristea, Ramona Tolas, Raluca Portase, Andrei Mihalca, Dan Toderici, Loredana Dan

Representative projects

"Predictive Maintenance", international project with third parties (Electrolux Italy), 7981/27.03.2019, (2019-2020).
ROBIN - "Robotii si Societatea: Sisteme cognitive pentru Roboti Personali si Vehicule Autonome", PNCDI III, (2018-2020)
"Next generation product service", international project with third parties (company Electrolux Italy), (2014-2017)
SWARA – Sistem mobil de asistare vocala in Reintegrarea Persoanelor cu Afonii Chirurgicale, PCCA-2013-4 No. 6/2014 (2014-2016)
NOKIA, "Context-sensitive recommendation systems", Bilateral grant, (2011-2012)
SEArCH, "Adaptive eLearning Systems using Concept Maps", National research grant funded by CNMP Program 4: Research partnership for priority domains, (2008-2011)
GridMOSI, "Virtual Organization using Grid Technology for High Performance Modeling, Simulation and Optimization", National research grant funded by ANCS, CEEX program, (2005-2008)
ArhiNet, "Integrated System for developing semantically-enhanced archival content", National research grant funded by CNMP Program 4: Research partnership for priority domains,(2007-2010)
FOOD-TRACE, "Integrated IT system for assuring traceability and quality control in food industry", National

research grant funded by ANCS, CEEX program, (2006 - 2008)
IntelPro, "Intelligent system for assisting the therapeutically decision at patients with prostate cancer", National research grant funded by ANCS, CEEX - INFOSOC, (2005-2008)

Significant results

The most representative publications of the past 5 years:

1. Liana-Daniela Palcu, Marius Supuran, Camelia Lemnaru, Mihaela Dinsoreanu, Rodica Potolea and Raul Cristian Muresan, Discovering discriminative nodes for classification with deep graph convolutional methods, in print Lecture Notes in Artificial Intelligence, Springer 2019
2. I. Stan, V. Suciu and R. Potolea, "Smart Driving Methodology for Connected Cars," 2019 23rd International Conference on System Theory, Control and Computing (ICSTCC), 2019, pp. 608-613.
3. A. Stoica, T. Kadar, C.Lemnaru, R. Potolea, M. Dînsoreanu: The Impact of Data Challenges on Intent Detection and Slot Filling for the Home Assistant Scenario. ICCP 2019: 41-47
4. Eugen-Richard Ardelean, Alexander Stanciu, Mihaela Dînsoreanu, Rodica Potolea, Camelia Lemnaru, Vasile Vlad Moca: Space Breakdown Method A new approach for density-based clustering. ICCP 2019: 419-425
5. Borsos, Zalan; Lemnaru, Camelia; Potolea, Rodica, Dealing with overlap and imbalance: a new metric and approach PATTERN ANALYSIS AND APPLICATIONS Volume: 21 Issue: 2 Pages: 381-395 Published: MAY 2018
6. Dolean, Samuel; Dinsoreanu, Mihaela; Muresan, Raul Cristian; et al., A Scaled-Correlation Based Approach for Defining and Analyzing Functional Networks, Book Series: Lecture Notes in Artificial Intelligence Volume: 10785 Pages: 80-92 Published: 2018
7. P. Parau, C. Lemnaru, M. Dinsoreanu, and R. Potolea, OPINION LEADER DETECTION (Sentiment Analysis in Social Networks). San Francisco: Morgan Kaufmann Pub Inc, 2017, pp. 157-170.
8. I. Barbantan, M. Porumb, C. Lemnaru, and R. Potolea, "Feature Engineered Relation Extraction - Medical Documents Setting," *International Journal of Web Information Systems*, vol. 12, pp. 336-358, 2016.
9. Hasna Octavian Lucian, Macicasan Florin Cristian, Dinsoreanu Mihaela, Potolea Rodica, "Modeling Sentiment Polarity with Meta-features to Achieve Domain-Independence", *6th* (IC3K), 2014, Vol. 553, Pp. 212-227,
10. M.Dinsoreanu, R. Potolea, "Towards a Unified Thematic Model for Recommending Context-Sensitive Content", in *Knowledge Discovery, Knowledge Engineering and Knowledge Management , Communications in Computer and Information Science*, vol. 415, 2013, pp. 68–83
11. M.Dinsoreanu, R.Potolea, "A scalable approach for Contradiction Detection driven by Opinion mining", *iiWAS2013*, pp. 7-15

Significant solutions:

End to end explainable graph classification pipeline
A new metric for assesing imbalance and overlap in data
AMR semantic parsing solution

Products and technologies:

1. Specific solutions in the Neuro Science domain (Artefact identification, Burst detection and spike sorting, Functional networks extraction and analysis)
2. Intent detection and slot filling – Eng & Ro languages
3. Topic extraction and representation - identifying the topic polarity in a given document; projecting (very) large (un)structured data to relevant dimensions and providing representation to allow knowledge extraction
4. Community detection- identifying clusters from implicit and/or explicit connections; community detection social data; opinion driven community detection. Contradiction Detection - opinion mining driven contradiction detection
5. User profiling - finding groups of individuals with similar features, finding/defining patterns for various profiles, predicting trends and future behavior applied to the educational domain
6. Recommendation systems - context sensitive, semantic driven recommendation systems for online advertisement and tourism
7. Medical decision support systems - assisting medical diagnosis in prostate cancer and rheumatoid diseases

The offer addressed to the economic environment

Research & development	Recommendation systems in different areas – developing prototype recommendation systems according to state of the art techniques in the field and up-to-date technologies. User profiling – finding groups of individuals with similar features, finding/defining patterns for various profiles, predicting trends and future behaviour. Data integration – designing unified data (warehouse) structures to integrate heterogeneous data sources, designing corresponding ETL processes. Decision support systems – extracting knowledge from organizational data, predicting evolutions, trends, identify relationships and correlations. End-to-end data analysis and (deep) machine learning pipelines
Consulting	Consulting, design, research and prototyping ML solutions for multiple industrial and scientific fields.
Training	Data Analysis, Machine Learning, Deep Learning

COMMUNICATIONS NETWORKS AND PROTOCOLS RESEARCH LAB

Contact details

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Fax	+40-264-591690
Director	Prof. Dr. Eng. Vasile Teodor Dadarlat
e-mail	Vasile.Dadarlat@cs.utcluj.ro

Areas of expertise

Computer and communication networks, Communication protocols
- development of frameworks for efficient data transmissions within hybrid computer networks optimizing the use of available bandwidth; - design and implementation of Quality of Service aware frameworks; software defined networks; - security and virtualization

Wireless Sensor Networks
- development of new methods for routing within sensor networks and IoT, efficient use of resources and secure access to WSNs; - development of specific secure applications with WSNs, IoT, Sensors-Cloud systems, SDN and NFV

Grid communications
- grid based applications development (intensive computing, specific management)
- development of smart communication protocols, integration of real-time decision-making algorithms

Software products
- hybrid software and hardware computer networks, wireless and sensors communication, adaptive routing, secure communications, software networks, benchmarking, IoT architectures

Applied IT&C technologies in different domains
- data acquisition and data management, environmental monitoring, strategic communication

Team

Prof. Dr. Eng. Vasile Teodor DADARLAT, Assoc. Prof. Dr. Eng. Emil CEBUC, Assoc. Prof. Dr. Eng. Adrian PECULEA, Assoc. Prof. Dr Eng. Bogdan IANCU, Drd. Eng. Sorin BUZURA, Drd. Eng. Rudolf KOVACS

Representative projects

Cloud Cercetare UTCN – CLOUDUT, UTCN**,** Operational Program "Competitivitate 2014-2020" (POC), Manager infrastructure and acquisitions: Assoc. Prof. Dr. Eng. Emil CEBUC.

Study of security solutions for FinTech communications networks, categ. contracts with economic agents, 2020-2021, project coordinator: Assoc. prof. dr. ing. Bogdan IANCU.

Theoretical and experimental research on the development of sustainable employability of future IT engineers through cooperation with the business environment, Contract no. 12106 / 21.05.2020, Research-Development-Innovation Contract - RDI categ. contracts with economic agents, project coordinator: Assoc. prof. dr. ing. Adrian PECULEA.

Interconnection WSN (Wireless Sensor Network) networks for precision agriculture. Hybrid models of classification, recommendation and learning; Internal Competition for Research, Development, Innovation Grants UTCN CICDI 2017-2018, project coordinator: S.I. dr. ing. Bogdan IANCU.

Brained City: Innovative Development through Computerization of the Cluj-Napoca Urban Ecosystem ", innovative project of the ClujIT Cluster financed on POSCCE / Operation 1.3.3**,** subproject **"E-Health WSN Middleware:Middleware for adapting heterogeneous medical equipment and existing patients using an infrastructure WSN "** UTCN/AC project coordinator: Prof. dr. ing. Vasile-Teodor DADARLAT.

" Analysis and taxonomy of compromise solutions between security and the quality of services for wireless and mobile IP communications", postdoctoral project POSDRU/159/1.5/S/137516, 2014-2015, project coordinator: S.I. dr. ing. Adrian PECULEA.

GREEN-VANETS - Improving transportation using Car-2-X communication and multi agent systems, **Intern** CDI research project at Technical University of Cluj-Napoca, 2013 - 2014, member: Senior Lecturer Dr Eng. Bogdan IANCU.

QAF - "Quality of Service aware frameworks for networks and middleware", CNCSIS PNII Idei nr. 328, 2007 – 2010, project coordinator: Prof. dr. ing. Vasile-Teodor DADARLAT.

CG-UTCN, Technical University of Cluj-Napoca GRID Center, POS CCE Axa 2; Project 195, Op. 2.2.3, http://cgutcn.utcluj.ro/index.php (2009-2011), project coordinator: Assoc. Prof. dr. ing. Emil CEBUC.

Significant results

The most representative publications of the past 5 years:

1. S. Buzura, A. Peculea, B. Iancu, E. Cebuc, V. Dadarlat, R. Kovacs, A Hybrid Software and Hardware SDN Simulation Testbed, Sensors, vol. 23, no. 1, 2023.
2. S. Buzura, M. Lehene, B. Iancu, V. Dadarlat, Extendable Software Architecture for Mitigating ARP Spoofing-Based Attacks in SDN Data Plane Layer, Electronics, 11(13), 1965, 2022.
3. N. N. Kaashki, X. Dai, T. Gyarmathy, P. Hu, B. Iancu, A. Munteanu, Automatic and Fast Extraction of 3D Hand Measurements using a Deep Neural Network, 2022 IEEE International Instrumentation and Measurement Technology Conference (I2MTC), 2022.
4. V. Lazar, S. Buzura, B. Iancu, V. Dadarlat, Anomaly Detection in Software Defined Wireless Sensor Networks Using Recurrent Neural Networks, 2021 IEEE 17th International Conference on Intelligent Computer Communication and Processing (ICCP 2021).
5. I. Iancu, B. Iancu, Designing Mobile Technology for Elderly. A Theoretical Overview, Technological Forecasting and Social Change, ISSN: 0040-1625, https://doi.org/10.1016/j.techfore.2020.119977
6. V. Lazar, S. Buzura, B. Iancu, V. Dadarlat, Anomaly Detection in Software Defined Wireless Sensor Networks Using Recurrent Neural Networks, 2021 IEEE 17th International Conference on Intelligent Computer Communication and Processing (ICCP 2021)
7. B. Oniga, L. Denis, V. Dadarlat, and A. Munteanu, “Message-Based Communication for Heterogeneous Internet of Things Systems,” Sensors, vol. 20, no. 3, p. 861, Feb. 2020.
8. P. Hu, N.N. Kaashki, V. Dadarlat, A. Munteanu, Learning to estimate the body shape under clothing from a single 3-d scan, IEEE Transactions on Industrial Informatics 17 (6), 3793-3802, 2020.
9. S. Buzura, V. Dadarlat, B. Iancu, A.Peculea, E. Cebuc, R. Kovacs, Self-adaptive Fuzzy QoS Algorithm for a Distributed Control Plane with Application in SDWSN, International Conference on Automation, Quality and Testing, Robotics (AQTR), Cluj-Napoca, 2020.
10. B. Iancu, I. Illyes, V. Dadarlat, A. Peculea, Pollution Probes Application: the impact of using PVDM messages in VANET infrastructures for environmental monitoring, 2019 IEEE 15th International Conference on Intelligent Computer Communication and Processing, Cluj-Napoca, 2019.
11. B. Oniga, S. H. Farr, A. Munteanu and V. Dadarlat, "IoT Infrastructure Secured by TLS Level Authentication and PKI Identity System," 2018 Second World Conference on Smart Trends in Systems, Security and Sustainability (WorldS4), London, 2018, pp. 78-83.
12. A. Bumb, B. Iancu, E. Cebuc, Extending Cooja simulator with real weather and soil data, IEEE 17th RoEduNet Conference: Networking in Education and Research Technical University of Cluj-Napoca,September 6, 2018 – September 8, ISSN:2068-1038, pp.40-44,2018.
13. B. Oniga, V. Dadarlat, E. De Poorter and A. Munteanu, "A secure LoRaWAN sensor network architecture," 2017 IEEE SENSORS, Glasgow, 2017, pp. 1-3.

Significant solutions:

1. Drafting, development and implementation of a novel end-to-end quality of service sensitive framework for heterogeneous networks with admission control and self-adaptive bandwidth reconfiguration
2. Elaborating and proposing a new method for bandwidth organizing and dynamic allocation of bandwidth between classes in an autonomous system, to assure end-to-end QoS guarantees
3. Prototyping infrastructure for Software-Defined Networks and Software-Defined Wireless Sensor Networks solution development and testing

Products and technologies:

1. Data Center Room (str. Baritiu 26-28): HVAC system and hosts site grid with 512 core and 12 Terrabytes storage

Awards

1. B. Iancu, A. Peculea, V. Dadarlat – Diploma of Honour at: International Exhibition of Research, Innovation and Technological Transfer “Inventica”, Iaşi, 2011
2. B. Iancu, A. Peculea, V. Dadarlat - Excellence Award and Silver Medal at: International Exhibition of Inventions ‘ProInvent’, Cluj-Napoca, 2011
3. B. Iancu, A. Peculea, V. Dadarlat - Silver Medal at: 3rd European Exhibition of Creativity and Innovation ‘Euroinvent’, Iaşi, 2011
4. Peculea, B. Iancu, V. Dadarlat - Excellence Award and Gold Medal at: International Exhibition of Inventions 'ProInvent', Cluj-Napoca, 2010
5. A. Peculea, B. Iancu, V. Dadarlat - Bronze Medal at: International Exhibition of Inventions 'Inventika' Bucureşti, 2010

The offer addressed to the economic environment

Research & development	Network administration; QoS services implementation Software-defined networks and network function virtualization Wireless and sensors communications in Internet of Things (IoT) Algorithms for power consumption in WSNs; QoS aware routing in hybrid networks Applications to different domains: data acquisition, VANETs, smart grids, environmental monitoring, etc. Software products: wireless and sensors communications, adaptive routing, secure communications
Consulting	Network administration; Network design and testing QoS services implementation
Training	CCNA, CCNP, Security essentials, CyberOps Advanced issues in computer networks; Advanced issues in wireless sensor networks

FOUNDATIONS AND APPLICATIONS OF ADVANCED SOFTWARE TECHNOLOGY - RESEARCH GROUP

Contact details

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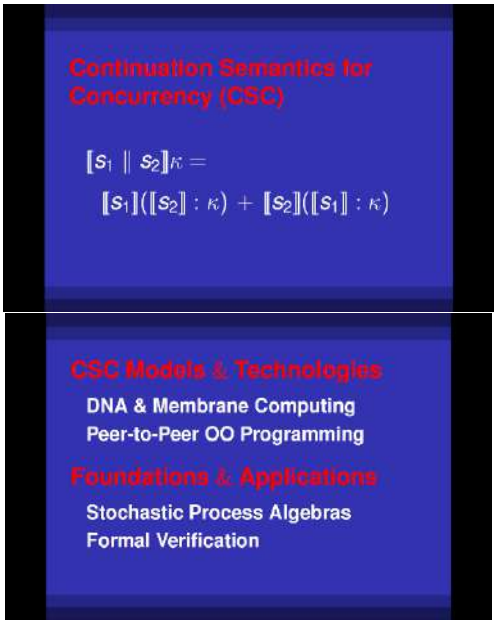

Areas of expertise

Software Engineering & Programming Languages:
- Formal Methods, Programming Languages Design and Semantics

Software Solutions for Smart City:
- eBusiness, eAdministration, eHealth, Medical Databases
- Smart Traffic, Urban Traffic Image Processing
- Cloud infrastructure based integrated architectures

Semantic Models and Technologies
- Membrane Computing, DNA Computing
- Global Computing (GC), Image Processing in GC Context

Computational models based on Big Data and predictive analysis
-mathematical models of predictive analysis
- computational models

Team

Prof. Dr. Eng. Eneia Nicolae Todoran, Assoc.Prof.Dr. Paulina Mitrea, Eng. Dorin Simina

Representative projects

Next Generation Brained City, "Innovative development through informatization of the Cluj-Napoca urban ecosystem" - POSCCE/Op.1.3.3, no. 13.C01.010, cod SMIS 49752 (2014-2015); sub-projects:
- **ProcessPlayer , "Platform for the optimization of process flows for and between the public authorities"**, collaboration with ARXIA SRL & UBB (Contract POSCCE No.1CLT/800.003/8/29.04.2014 / Subproject SP1)
- **"Software services design for intelligent routing in urban road traffic in Smart City context"** (Contract POSCCE No.1CLT/800.003/8/29.04.2014 / Subproject SF1)

SemNat, "Semantic models and technologies for natural computing" - CAPABILITIES, Module III, Greece-Romania bilateral collaboration project, no. 582/16.07.2012 (2012-2014)

BETTY, "Behavioral Types for Reliable Large-Scale Software Systems", ICT COST Action IC1201, http://www.cost.eu/domains_actions/ict/Actions/IC1201 Management Committee members for Romania: Prof.Dr. Gabriel Ciobanu, Prof.Dr. Eneia Nicolae Todoran (2012-2016)

DFA@eInclusion, "Design for All for e-inclusion", FP7 project no. 033838, (2008-2010)

"Distributed System for Early Prevention, Monitoring and Treatment of the Cardio toxicity Induced by Chemotherapy and Radiotherapy in Oncologic Patients", PNII/IDEAS Project no. 1340/2009; (2008-2010)

GlobalComp, "Models, semantics, logics and technologies for global computing", ANCS, CNMP-PC, no. 11052/18.09.2007; (2007-2010).

Computational models based on Big Data and predictive analysis for the platform 24BrokerRo – POC/AP1, no 378/390054/01.10.2021 (2021-2023)

Significant results

The most representative publications of the past 5 years:

1. G. Ciobanu, E.N. Todoran, “A Process Calculus for Spiking Neural P Systems”, *Information Sciences*, vol.604, pp. 298-319, 2022.
2. G. Ciobanu, E.N. Todoran, “Spiking Neural P Systems and Their Semantics in Haskell”, *Natural Computing*, in press, 2022 doi: 10.1007/s11047-022-09897-z.
3. E.N. Todoran, “Continuation Semantics for Interaction and Concurrency”, *Proc. IEEE ICCP 2021*, pp.189-197, 2021.
4. E.N. Todoran, “Equivalence Classes in Performance Evaluation Programming”, *Proc. IEEE SYNASC 2021*, pp. 194-199, 2021.
5. G. Ciobanu, E.N. Todoran, “A Study of Multiparty Interactions in Continuation Semantics”, *Proc. IEEE SYNASC 2020*, pp. 117-124, 2020.
6. G. Ciobanu, E.N. Todoran, “A Semantic Investigation of Spiking Neural P Systems”, *Lecture Notes in Computer Science*, vol. 11399, pp. 108-130, Springer, 2019.
7. E.N. Todoran, “Towards Performance Evaluation Programming”, *Proc. IEEE SYNASC 2018*, pp. 302-309, 2018.
8. G. Ciobanu, E.N. Todoran, "Denotational semantics of membrane systems by using complete metric spaces", *Theoretical Computer Science*, vol. 701, pp. 85-108, Nov 2017.
9. E.N. Todoran, N. Papaspyrou, "Concurrency Semantics in Continuation-Passing Style", *Fundamenta Informaticae*, vol. 153, no. 1-2, pp. 125-146, 2017.
10. E.N. Todoran, “An Approach to Performance Evaluation Programming”, *Proc. IEEE SYNASC 2017*, pp. 320-329, 2017.
11. D. Mitrea, S. Nedevschi, Paulina Mitrea, et al, *The role of the cooccurrence matrix based on complex extended microstructures in discovering the cirrhosis severity grades within US images* - 10th International Congress on Image and Signal Processing, BioMedical Engineering and Informatics, CISP-BMEI 2017, pp.1-6, Shanghai, China, October 14-16, 2017. IEEE 2017
12. G. Ciobanu, E. N. Todoran, “Correct Metric Semantics for a Language Inspired by DNA Computing”, *Concurrency and Computation: Practice and Experience*, vol. 28(11), pp. 3042-3060, Wiley, 2016.
13. E.N. Todoran, P. Mitrea, “Semantic investigation of a control-flow subset of BPMN 2.0”, *Proc. IEEE ICCP 2015*, pp. 483-490, 2015.
14. I. Chifor, P. Mitrea, et al, “Mathematical methods for assessing the prognostic of fixed partial dentures resulting from evaluating a group of dental patients”, *Computational and Mathematical Methods in Medicine*, vol. 2014, article ID 984901, http://dx.doi.org/10.1155/2014/98490, 2014.
15. S. Brad, P. Mitrea, “Functional and strategic aligned clusters towards more united economies and sustainable development”, JCI 2015 Proceedings, *ISBN print: 978-3-8487-2429-1, ISBN online: 978-3-8452-6588-9, DOI: 10.5771/9783845265889-126*
16. A.I. Mitrea, S. Nedevschi, D. Mitrea, P. Mitrea, “Diseased tissue area detection and delimitation by fusion between finite difference methods and textural analysis”, *Proc. AQTR 2014*, pp. 1-5, 2014.
17. E.N. Todoran, D. Simina, et al, “Mobile Objects and Modern Communication Abstractions: Design Issues and Denotational Semantics”, *Proc. IEEE ISPDC 2011*, pp. 191-198, 2011.

Significant solutions:

Continuation semantics for concurrency, Denotational semantics for models of natural (membrane, DNA) computing, Denotational semantics for multiparty interaction, Denotational semantics for models of global computing, Performance Evaluation Programming – a programming paradigm supporting performance analysis and formal verification of concurrent systems using dependent types and model checking techniques

Products and technologies:

Prototype interpreter for mobile objects with multiparty interaction in peer to peer systems
Prototype interpreter for a language supporting performance evaluation programming
Prototype interpreter for a control flow subset of BPMN 2.0
Prototypes for medical image processing in global computing context
Communication prototypes for smart sensor networks

The offer addressed to the economic environment

Research & development	Formal design of reliable distributed software systems and programming languages
Consulting	Formal design of reliable distributed software systems and programming languages
Training	**Software Engineering:** software development paradigms, UML class diagrams and OO analysis, modeling interaction and behavior, architecting and designing software, software testing techniques and strategies, PRISM probabilistic model checking **Advanced Topics in Software Engineering and Programming Languages:** formal methods, denotational and operational semantics, stochastic process algebras, type systems

INTELLIGENT EMBEDDED SYSTEMS

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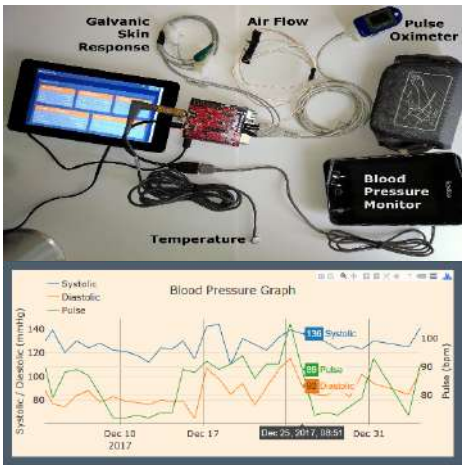

Areas of expertise

IES laboratory research topics are both fundamental (basic) and applied researches. The main topics for the theoretical research are learning systems, machine learning and for the applied research are wearable computing, mobile robotics, neural networks hardware implementation and ambient intelligent systems development.

Main research topics

- Implementation of Intelligent embedded systems with learning capacity and adaptive behaviour using field programmable gate areas (FPGA)
- Deep Learning Inference Acceleration using Adaptable accelerator cards
- Hardware implementation of artificial neural networks in FPGA circuits
- Assistive robots and automated guided vehicles (AGV)
- Activity and health status monitoring platform development
- e-Health and Ambient assisted living systems
- Human computer interfaces
- Intelligent sensors devices, adaptive interfaces with hardware implemented artificial neural networks

Team

Prof. Dr. Eng. Oniga Stefan, Assist. Prof. Dr. Eng. Buchman Attila, Assist. Prof. Dr. Orha Ioan, Assist. Prof. Dr. Lung Claudiu, Assist. Prof. Dr. Sabou Sebastian, PhD. Students: Alexan Anca, Alexan Alexandru, Pap Iuliu, Vancea Alexandru, Pop Adrian, Costea Marius, Sandor Roxana.

Representative projects

CRIMIGE: “Regional Center for Training and Monitoring of the Environmental Impact of Electrical Installations”, 2020-2022
Human Activity Recognition (HAR) and Physiological Parameters Monitoring Systems, 2018-2020
Theoretical and experimental contributions in the field of orientation and navigation of intelligent systems, 2017
Solutions regarding Intelligent Embedded Systems for Active and Assisted Living, 2016
Electromagnetic field simulation of capacitive touch sensors, 2015
Human activity recognition and physiological parameters monitoring systems, 2015
Intelligent embedded systems with learning capability and adaptive behaviour, 2013
“Research regarding the implementation of a neural network used to process signals generated by the muscular and nervous system.” CNCSIS Contract No. 171/02.10.2007, TD-11.
Electronic Nose, “Contributions regarding the study, the synthesis and the implementation of certain applications using systems with intelligent sensors” CNCSIS Contract No. 602/2007, code TD-277.
Sensorial system for hand gesture recognition using artificial neural networks, 2002-2005

Significant results

The most representative publications of the past 5 years

1. Pap, I.A.; Oniga, S. A Review of Converging Technologies in eHealth Pertaining to Artificial Intelligence. Int. J. Environ. Res. Public Health 2022, 19, 11413. DOI: 10.3390/ijerph191811413
2. Xie, Y.; Majoros, T.; Oniga, S. FPGA-Based Hardware Accelerator on Portable Equipment for EEG Signal Patterns Recognition. Electronics 2022, 11, 2410. DOI: 10.3390/electronics11152410
3. Majoros, T.; Oniga, S. Overview of the EEG-Based Classification of Motor Imagery Activities Using Machine Learning Methods and Inference Acceleration with FPGA-Based Cards. Electronics 2022, 11, 2293.

DOI: 10.3390/electronics11152293
4. A. Alexan, A. Alexan and Ș. Oniga, "Smartwatch activity recognition feature comparison using ML.net," 2022 IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR), 2022, pp. 1-6, DOI: 10.1109/AQTR55203.2022.9801919.
5. A. Alexan, A. Alexan and S. Oniga, "Activity recognition using unsupervised learning," in 2022 IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR), Cluj-Napoca, Romania, 2022 pp. 1-6. DOI: 10.1109/AQTR55203.2022.9801956
6. X. Yu, T. Majoros, S. Oniga, "Hardware Implementation of CNN Based on FPGA for EEG Signal Patterns Recognition," 2021 International Conference on e-Health and Bioengineering (EHB), 2021, pp. 1-4, DOI: 10.1109/EHB52898.2021.9657679
7. Majoros Tamás, Oniga Stefan, Xie Yu, Motor imagery EEG classification using feedforward neural network, ANNALES MATHEMATICAE ET INFORMATICAE 53 pp. 235-244, 10 p. (2021), DOI: 10.33039/ami.2021.04.007
8. T. Majoros and S. Oniga, "Comparison of Motor Imagery EEG Classification using Feedforward and Convolutional Neural Network," IEEE EUROCON 2021 - 19th International Conference on Smart Technologies, 2021, pp. 25-29, DOI: 10.1109/EUROCON52738.2021.9535592.
9. T. Majoros and S. Oniga, "Activity recognition using consumer-grade EEG device," 2021 13th International Conference on Electronics, Computers and Artificial Intelligence (ECAI), 2021, pp. 1-6, DOI: 10.1109/ECAI52376.2021.9515106.
10. Suto, J., Oniga, S., Lung, C. et al. Comparison of offline and real-time human activity recognition results using machine learning techniques. Neural Comput & Applic 32, 15673–15686 (2020).DOI: 10.1007/s00521-018-3437-x (IF: 4.774)
11. I. A. Pap, S. Oniga and A. Alexan, "Machine Learning EEG Data Analysis For eHealth IoT System," 2020 IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR), 2020, pp. 1-4, DOI: 10.1109/AQTR49680.2020.9129966.
12. A. Alexan, A. Alexan and O. Stefan, "SoC based IoT sensor network hub for activity recognition using ML.net framework," 2020 IEEE 26th International Symposium for Design and Technology in Electronic Packaging (SIITME), 2020, pp. 184-187, DOI: 10.1109/SIITME50350.2020.9292278.
13. A. Alexan, A. Alexan and O. Ştefan, "Machine learning activity detection using ML.Net," 2020 IEEE 26th International Symposium for Design and Technology in Electronic Packaging (SIITME), 2020, pp. 188-191, DOI: 10.1109/SIITME50350.2020.9292294.
14. J Suto, S Oniga, Efficiency Investigation from Shallow to Deep Neural Network Techniques in Human Activity Recognition, Cognitive Systems Research, Volume 54, May 2019, Pages 37-49, (IF: 1.425)
15. Suto, Jozsef; Oniga, Stefan, Efficiency investigation of artificial neural networks in human activity recognition JOURNAL OF AMBIENT INTELLIGENCE AND HUMANIZED COMPUTING Volume: 9 Issue: 4 Special Issue: SI Pages: 1049-1060 Published: AUG 2018, (IF: 1.91)
16. Alexan, Alexandru; Alexan, Anca; Oniga, Stefan; et al., Assisted living personal tracker framework 2018 IEEE INTERNATIONAL CONFERENCE ON AUTOMATION, QUALITY AND TESTING, ROBOTICS (AQTR) Book Series: IEEE International Conference on Automation Quality and Testing Robotics Published: 2018
17. Suto, Jozsef; Oniga, Stefan, Music Stimuli Recognition in Electroencephalogram Signal ELEKTRONIKA IR ELEKTROTECHNIKA Volume: 24 Issue: 4 Published: 2018
18. Pap, Iuliu Alexandru; Oniga, Stefan; Orha, Ioan; et al., IoT-Based eHealth Data Acquisition System 2018 IEEE INTERNATIONAL CONFERENCE ON AUTOMATION, QUALITY AND TESTING, ROBOTICS (AQTR) Book Series: IEEE International Conference on Automation Quality and Testing Robotics Published: 2018
19. Suto, Jozsef; Oniga, Stefan; Sitar, Petrica Pop, Music Stimuli Recognition from Electroencephalogram Signal with Machine Learning Conference: 7th International Conference on Computers Communications and Control (ICCCC) Location: Oradea, ROMANIA Date: MAY 08-12, 2018, Pages: 260-264 Published: 2018
20. Suto, J.; Oniga, S.; Sitar, P. Pop, Feature Analysis to Human Activity Recognition INTERNATIONAL JOURNAL OF COMPUTERS COMMUNICATIONS & CONTROL Volume: 12 Issue: 1 Pages: 116-130 Published: FEB 2017

Oniga Stefan – AGEPI Medal - International Fair of Inventions and Practical Ideas "INVEST-INVENT SIR 21" – Gesture recognition system.

Oniga Stefan, Pap Iuliu, Diploma of excellence of the Society of Inventors from Romania, for: “E-Health platform for measurement and monitoring physiological parameters” at the Maramures Inventors Salon, 2019.

The offer addressed to the economic environment

Research & development	Hardware implementation of artificial neural networks in FPGA circuits. Intelligent sensors network Adaptive interfaces with learning capabilities able to adapt to the input signals changes Development of an intelligent platform (with learning capabilities and adaptive behaviour) for health condition monitoring of elderly or persons with disabilities, using wearable wireless sensor Mobile applications
Consulting	Embedded systems with microcontrollers and FPGAs Data acquisition systems
Training	Design with microcontrollers Design with FPGA circuits

NUMERICAL MODELLING AND ELECTROMAGNETIC COMPATIBILITY RESEARCH CENTER

Contact details

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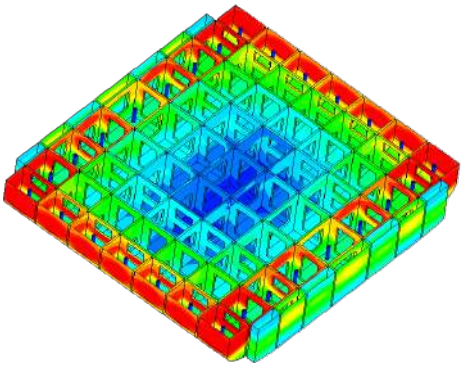
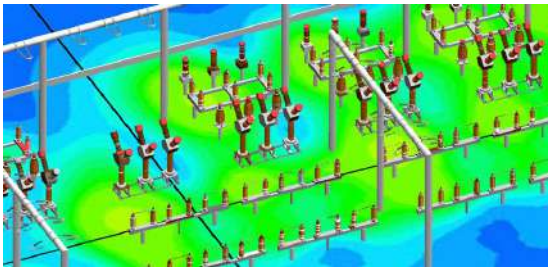




Areas of expertise

Numerical modelling and optimal design of electromagnetic devices.
Multiphysics modelling for advanced device and technology developments. Multiphysics modelling for microelectronics - Power Integrated Circuits. Numerical modelling of the electromagnetic field behaviour in complex systems. Time-varying electromagnetic fields. High-frequency electromagnetic fields analysis and waves propagation. Optimal design of the electromagnetic devices and systems. Optimization algorithms in electro
magnetics. Evolutionary algorithms for the optimization of the electromagnetic devices

Electromagnetic compatibility
Pre-compliance and compliance tests for conducted and radiated disturbances (emissions and susceptibility) according to the IEC 61000 standards. Analysis of the electromagnetic interferences generated by HV lines on neighbourhood metallic structures. Computation and measurements of the electric and magnetic field values in vicinity of power lines and high voltage substations for compliance with the EMC EU Directive.

Electrochemical systems and cathodic protection
Manufacturing techniques using the electrochemical process; Software for simulation of the electrochemical processes; Mitigation of the electromagnetic interference effects of HVAC and HV power transmission lines on pipeline networks; Optimal design of the cathodic protection systems.

Team

Prof. Calin MUNTEANU, Prof. Vasile TOPA, Assoc. Prof. Marius PURCAR, Assoc. Prof. Laura GRINDEI, Assoc. Prof. Adina GIURGIUMAN (RACASAN), Assoc. Prof. Claudia PACURAR (RACASAN), Lecturer Claudia CONSTANTINESCU (HEBEDEAN), PhD stud. Sergiu ANDREICA, PhD stud. Marian GLIGA, PhD stud. Adrian BOJITA

Representative projects

iDev40 - „Integrated Development 4.0”, ECSEL Call H2020-ECSEL-2017-1-IA-TWO STAGE 6/1.1.3.H/26.11.2019.

Trade-IT - ”Innovative Technologies for Advanced Materials Recovery from IT and Telecommunication Waste”,PN-III-P1-1.2-PCCDI2017-0652, 2017.

Set4CIP - „Multiscale Multigrid Simulator of Electro-Thermo-Mechanical Processes from Power Integrated Circuits”,- PN-III-P2-2.1-BG-2016-0388, 2016.

CEMIVA - “Coupled analysis electromagnetic interference / vibration for the development of electric actuators dedicated to automotive applications with low emissions”, PN II – PT – PCCA – 2013 – 4 – 1019, 2014.

“Measurements of electric and magnetic field in 220 / 110 kV Turnu Severin Est substation”, Research contract with industrial partner ENERGOBIT SA, no. 36526/2019.

“Computing services, analysis, numerical modeling and experimental measurements of electromagnetic field values in locations proposed by the beneficiary” Research contract with industrial partner CEPROM SA, no. 52/2018.

“Measurements of electric and magnetic field in 220 / 110 kV Campia Turzii substation”, Research contract with industrial partner ENERGOBIT SA, no. 55/2017.

Significant results

The most representetive publications of the past 5 years:

1. A. Bojiţă, M. Purcar, V. Ţopa, R. Oneţ and M. Neag, "Modelling Thermally-Induced Mechanical Faults in Power Integrated Circuits Assemblies," 2020 IEEE 26th International Symposium for Design and Technology in Electronic Packaging (SIITME), 2020, pp. 342-345, doi: 10.1109/SIITME50350.2020.9292136.
2. Vermeșan H., Tiuc A-E, Purcar M., ”Advanced recovery techniques of waste materials from IT and telecommunication equipment Printed Circuit Boards”, Sustainability 2020, 12(1), 74; https://doi.org/10.3390/su12010074.
3. Bojita A., Purcar M., Boianceanu C., Topa V., ”Efficient Computational Model Mesh of Thermo-Mechanical Phenomena in the Metal System of Power ICs”, 25th THERMINIC International Workshop, LECCO, Italy, 2019.
4. Florea C.I., Bostan C., Simon D., Țopa V., Purcar M., ”Extraction of Equivalent Mechanical Properties for Power ICs Metallization”, 25th THERMINIC International Workshop, LECCO, Italy, 2019.
5. Constantinescu C., Munteanu C., Pacurar C., Racasan A,, Gliga M., Andreica S., “High Frequency Analysis of Bowtie Antennas”, 11th International Symposium on Advanced Topics in Electrical Engineering, ATEE 2019, Bucharest, Romania, DOI 10.1109/ATEE.2019.8724972, WOS: 000475904500129, 2019.
6. Pacurar C., Topa V., Giurgiuman A., Munteanu C., Constantinescu C., Andreica S., Gliga M., “Modelling and Analysis of the Halbach Array Magnets”, 11th International Symposium on Advanced Topics in Electrical Engineering, ATEE 2019, Bucharest, Romania, DOI 10.1109/ATEE.2019.8724977, WOS:000475904500134, 2019.
7. Bojita, A., Purcar, M., Boianceanu, C., Florea, C., Simon, D., & Topa, V. "A Simple Metal-Semiconductor Substructure Model for the Thermal Induced Fatigue Simulation in Power Integrated Circuits”, *Lecture Notes in Mechanical Engineering*, DOI:10.1007/978-981-13-2273-0_3, 2019.
8. Constantinescu C., Munteanu C., Păcurar C., Răcășan A., “Influence of the Patch Antenna Feeding on their Parameters”, Proc. of the 2018 International Conference and Exposition on Electrical and Power Engineering, EPE 2018, pp. 235-240, Iasi, Romania, ISBN: 978-1-5386-5062-2, ISSN: 2471-6855, WOS: 000458752200044, 2018
9. Bojita A., Boianceanu C., Purcar M., Florea C., Simon D. and Pleșa C., “A simple metal-semiconductor substructure for the advanced thermo-mechanical numerical modeling of the power integrated circuits”, Journal of Microelectronics Reliability, Elsevier, Volume 87, pages 142-150, August 2018, https://doi.org/10.1016/j.microrel.2018.06.013.
10. Constantinescu C., Munteanu C., Pacurar C. et al., “Influence of the Patch Antenna Feeding on their Parameters”, International Conference and Exposition on Electrical and Power Engineering (EPE) Book Series: International Conference and Exposition on Electrical and Power Engineering Pages: 235-240, 2018.
11. Gliga M., Racasan A., Munteanu C. ”The Influence of Ferrite on the Spiral Inductors Inductance used for the Design of Wireless Power Systems”, 7th International Conference On Modern Power Systems (MPS), 2017.
12. Racasan A, Munteanu C., Topa V. et al., “Analysis and Improvement Techniques for the Transfer Function of a Planar Low - Pass Filter”, *Environmental Engineering and Management Journal*, Vol. 15, Issue 12, Pp. 2579-2586, 2016.
13. Paljanos A., Miclaus S., Munteanu C., “Occupational Exposure of Personnel Operating Military Radio Equipment: Measurements and Simulation”, *Electromagnetic Biology and Medicine*, Vol.34, Issue 3, Pp.221-227, 2015.

Significant solutions:
3D mathematical model of Laplace equation with nonlinear boundary conditions for electrochemical applications using the boundary element method (BEM) and finite element method (FEM); Mathematical and numerical model based on ”Level Set Method” for shape optimization; Mathematical and numerical model based on ”Level Set Method” and Nodal displacement method (NDM) for moving boundary simulation in electrochemical applications of electro-corrosion and electrodeposition.

Products and technologies:
Software package for the full 3D numerical analysis of the electromagnetic interferences between HV lines and pipelines and the optimal design of the cathodic protection systems arrangement; Software package for the numerical computation of the electric and magnetic field values in the vicinity of power lines and inside substations and the optimal design of conductor arrangements for the field mitigation.

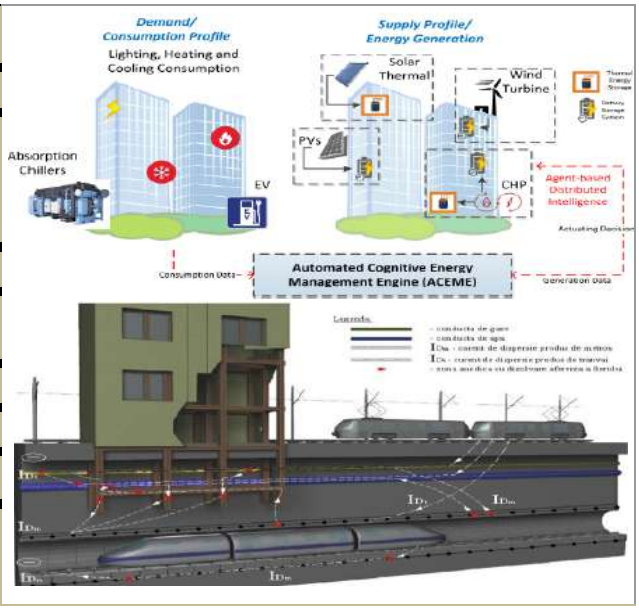
International Patents:
Van Den Bossche B. J. W.; Purcar M. I., International Patent Number: WO2008010090-A2; NL1032174-C2; WO2008010090-A3; EP2044242-A2; S2009288954-A1

The offer addressed to the economic environment

Research & development	Multiphysics modelling; CAD in electrical engineering; Optimal design of the electromagnetic devices. EMC in electrical and electronics engineering Analysis and optimal design of complex electromagnetic device structures; EMC analysis and mitigation solutions by measurements and numerical modelling;
Consulting	EMC tests according to IEEE 61000 standards series for compliance with the EMC Directive and CE marking; Compliance with 2004/40/EC Directive regarding the human exposure to electromagnetic fields; Manufacturing techniques using the electrochemical process; Mitigation of the inductive and resistive effects of HVAC and HV power transmission lines on pipeline networks; Investigation of fault conditions: 1-phase and 3-phase short circuits discharge current to soil that can lead to coating stress and bridge potentials pipe-soil. Multiphysics modelling for advanced device and technology developments.
Training	Training and postgraduate education in modelling and simulation of electromagnetic and electrochemical problems and process based on the specific software in the research centre. EMC solutions in order to avoid compliance tests failure.

ENERGY TRANSITION RESEARCH CENTER

Contact details

Name	**Energy Transition Research Center**	
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Areas of expertise

Energy Management; Energy Engineering; Energy Efficiency in Buildings & Industry; Energy Analytics & Numerical Tools; Energy Sustainability Engineering; Energy Consumption/Generation Profiling and Forecasting; Energy Optimisation at Building and Local Communities Level; Cognitive and Artificial Intelligence Energy Management Techniques; Energy Islands & Energy Cooperation; Sustainability and Climate Changes; Energy Culture and Consumer Behavior; Renewable Energy Sources Integration; nZEB adoption; Waste to Energy; Smart Grid; Energy Storage; Electromagnetic Field Numerical Modelling & Analysis; Electromagnetic Interferences; Electromagnetic Compatibility; Power Network Losses; Transient Overvoltage Analysis; Gas Insulated Substation.

Team

Prof. Dan D. MICU, Assoc. Prof. Denisa ȘTEȚ, Assoc. Prof. Mihaela CREȚU, Assoc. Prof. Laura DARABANT, Lecturer Levente CZUMBIL, Lecturer Andrei CECLAN, Prof. Radu A. MUNTEANU, Assoc. Prof. Ștefan CÎRSTEA, Assoc. Prof. Silviu ȘTEFĂNESCU, Assoc. Prof. Horia BELEIU, Assoc. Prof. Aurel BOTEZAN, Lecturer Cosmin DĂRAB, Dr. eng. Alexandru MUREȘAN; Drd. eng. Dacian JURJ; Drd. eng. Ștefan UNGUREANU; Drd. eng. Claudia MUREȘAN; Drd. eng. Bogdan BÂRGĂUAN; Eng. Timea FARKAS; Eng. Denisa BĂRAR; Eng. Medeea CĂPRAR; Stud. Mircea LĂNCRĂNJAN; Stud. Alexandru George BERCIU

Representative projects

LIFE21-CET-AUDITS-EnTRAINER - Energy Transition Audits towards Decarbonization, 101076424, LIFE-2021-CET, LIFE2027, (2022-2025),
OLGA - HOLISTIC GREEN AIRPORT, 101036871, H2020-LC-GD-5-1-2020, (2021-2026), https://www.olga-project.eu/
GEAR at SME - ***Generate Energy Efficient Acting and Results at Small & Medium Enterprises*** – 894356, H2020-LC-SC3-EE-2020-2023: -, https://www.gearatsme.eu/
RE-COGNITION - ***Renewable Cogeneration and Storage Technologies Integration for energy Autonomous Buildings*** - H2020-LC-SC3-2018-2019-2020/H2020-LC-SC3-2018-RES, 815301- (2019-2022) https://re-cognition-project.eu/
SMEmPower Efficiency - ***A holistic framework for Empowering SME's capacity to increase their energy efficiency***, H2020-LC-SC3-2018-2019-2020/H2020-LC-SC3-EE-2018, 847132, (2019-2022), https://smempower.com/
DR BOB - ***Demand Response in Blocks of Building*** - HORIZON 2020 – EE-2016: *s* – 696114, (2016-2019) http://www.dr-bob.eu/
MENs - ***Meeting the energy professional skills***, HORIZON 2020-EE-2014-CSA, 649773, (2015-2017) http://www.mens-nzeb.eu/en/

Significant results

The most representative publications of the past 5 years

1. AG Berciu, EH Dulf, DD Micu, Improving the Efficiency of Electricity Consumption by Applying Real-Time Fuzzy and Fractional Control, Mathematics, vol.10, Issue 20, Oct 2022, DOI10.3390/math10203807
2. Cristea C., Cristea, M., Micu, D.D., Ceclan A.,Tirnovan R.A.,Serban F.M., Tridimensional Sustainability and

Feasibility Assessment of Grid-Connected Solar Photovoltaic Systems Applied for the Technical University of Cluj-Napoca, Sustainability, vol. 14, Issue 17, sep.2022, DOI10.3390/su141710892

3. Dacian I. Jurj, Levente Czumbil, Bogdan Bârgăuan, Andrei Ceclan, Alexis Polycarpou, Dan D. Micu, „Custom Outlier Detection for Electrical Energy Consumption Data Applied in Case of Demand Response in Block of Buildings", Sensors 2021, 21(9), 2946; https://doi.org/10.3390/s21092946
4. Risteiu, M, Dobra, R, Avram, A, Samoila, F, Buica, G, Rizzo, R, Dan D. Micu, Designing a Smart Gateway for Data Fusion Implementation in a Distributed Electronic System Used in Automotive Industry, Energies 2021, Volume14, Issue11, DOI10.3390/en14113300.
5. M. Cretu; L. Czumbil, B. Bargauan, A. Ceclan, A. Berciu, A. Polycarpou, R. Rizzo, Dan D. Micu: "Modelling and evaluation of the Baseline Energy Consumption and the Key Performance Indicators in Technical University of Cluj-Napoca buildings within a Demand Response programme: a case study", *IET Renewable Power Generation*, Vol. 14, Issue 15, pp 2864-2875, **2020**, DOI: 10.1049/iet-rpg.2020.0096
6. A. Muresan, L. Czumbil, Dan D. Micu, R. Andolfato, H. Nouri: "Investigating the Effect of Several Model Configurations on the Transient Response of Gas Insulated Substation During Fault Events Using an Electromagnetic Field Theory Approach", *Energies*, Vol. 13, Art.no. 6231, **2020**, DOI: 10.3390/en13236231
7. C. Darab, A. Turcu, H. Beleiu, S. Pavel, I. Birou, Dan D. Micu, , S. Ungureanu, S. Cirstea: „Hybrid load forecasting using gaussian process regression and novel residual prediction", *Applied Sciences*, Vol. 10, Issue 13, Art.no. 4588, **2020**, DOI: 10.3390/app10134588
8. D. Jurj, Dan D. Micu, L. Czumbil, A. G. Berciu, M. Lancrajan, D. Bărar: „Analysis of Data Cleaning Techniques for Electrical Energy Consumption of a Public Building", *55th International Universities' Power Engineering Conference*, 1-4 Sept. **2020**, Torino, Italy, DOI: 10.1109/UPEC49904.2020.9209781
9. A.M. Măgurean, L. Czumbil, D.L. Manea, Dan D. Micu: „Artificial Intelligence based Prediction Model for the Long-Term Heat Flux Losses through Ground Applied to Large Non-Residential Buildings", *Procedia Manufacturing*, ISSN: 2351-9789, vol. 32, pp. 434-441, **2019**, DOI: 10.1016/j.promfg.2019.02.237
10. H. Beleiu, I. Beleiu, S. Pavel, C. Darab: „Management of Power Quality Issues from an Economic Point of View", Sustainability, Vol. 10, Issue 7, Art.no. 2326, 2018, DOI: 10.3390/su10072326
11. Y. Zhu, V. A. Rakov, M. D. Tran, W. Lyu, Dan D. Micu: "A Modeling Study of Narrow Electric Field Signatures Produced by Lightning Strikes to Tall Towers", Journal of Geophysical Research: Atmospheres, Vol. 123/18, Pp. 10.260-10.277, 2018, DOI: 10.1029/2018JD028916
12. M. Ruba, F. Jurca, L. Czumbil, Dan D. Micu, C. Marțiș, A. Polycarpou & R. Rizzo: „Synchronous Reluctance Machine Geometry Optimisation through a Genetic Algorithm based Technique", IET Electric Power Applications, ISSN: 1751-8660, Vol. 12/3, pp. 431-438, 2018, DOI: 10.1049/iet-epa.2017.0455
13. S. Cîrstea, C. Martiş, A. Cîrstea, A. Constantinescu-Dobra, M. Fülöp, „Current Situation and Future Perspectives of the Romanian Renewable Energy", Energies, 2018, 11, 3289. https://doi.org/10.3390/en11123289. WOS:000455358300050

Research and teaching stages (international collaborators)

University of Florida USA; San-Diego University, USA; Texas Southern University, USA; University of Chicago, USA; Lehigh University, USA; Temple University, USA; Beijing Jiaotong University, China; The University of Hong Kong; Shanghai Jiao Tong University, China; Novosibirsk State Technical University, Russia; Oita University, Japan; University of Sao Paolo, Brasil; Strathclyde University of Glasgow, Scotland; Brunel University London, UK; Teeside University, UK; Imperial College of London, UK; Cardiff University, UK; University of the West of England, UK; Cork Technological Institute, Ireland; Technical University of Dublin, Ireland; Technical University of Aachen, Germany; University of Novi Sad, Serbia; University of Nis, Serbia; Vrije Universitiet Brussel, Belgium; University of Padova, Italy; Federico II University Naples, Italy; Aristotle University of Salonic, Greece; Budapest University of Technology, Hungary; University of Sao Paolo, Brazil; Frederick University, Cyprus; Ecole Normale Superior Lyon, France; South Westphalia University, Germany; University of Western Macedonia, Greece;

Awards

1. Best European Energy Service Project, awarded by EU Commission, Brussels, 2019.
2. Eastern & Central Europe Region Institutional Energy Management Award, awarded by Association of Energy Engineers, New York, USA, 2018.
3. Romanian Energy Award – Special Jury Award, awarded by Energynomics, Bucharest, 2015.

The offer addressed to the economic environment

Design and implementation of energy analytic tools for sustainable energy use; Applied energy services; Numerical modelling techniques of electrical/electronic engineering applications; Electromagnetic field numerical analysis and synthesis; Long life learning programmes for energy professionals (www.decidfr.utcluj.ro)
The education and training of energy professional is a statutory objective of the EnTReC.
Create knowledge: Studies on increasing energy efficiency, integration of renewable energies and forward-looking technologies are our fundamental contribution to a sustainable transformation of the energy system.

MEDICAL ENGINEERING RESEARCH GROUP

Contact details

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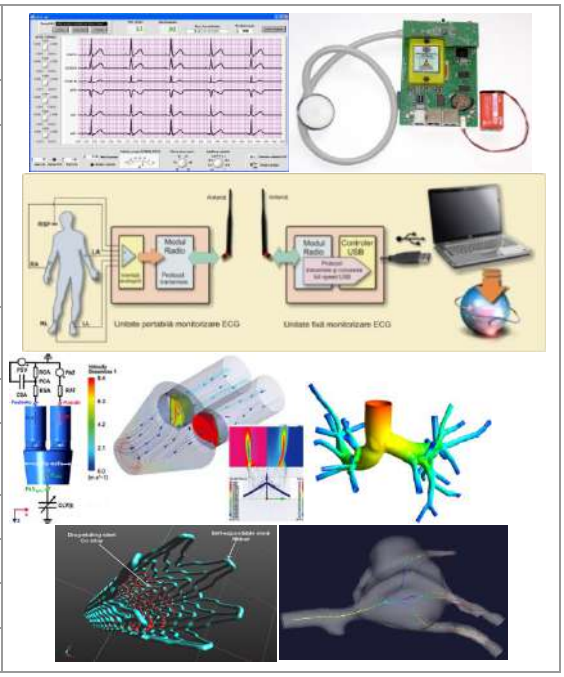

Areas of expertise

Laboratory of **Biomedical instrumentation, Applied medical electronics, Clinical engineering, Digital biosignal processing, Biometry**
Laboratory of **Biomedical Signal Processing, Biomedical Measurements**, **Biomedical Data Transmission**, **Medical Physics, Physiological modelling, Reverse engineering of cardiovascular devices, Medical Image Analysis**

Team

Prof. Dr. Eng. Radu Vasile Ciupa, Prof. Dr. Eng. Nicolae Marius Roman, Prof.Dr. Eng. Dan Rafiroiu, Prof. Dr. Eng. Mihai Munteanu, Assoc. Prof. Dr. Eng. Simona Vlad, Assoc. Prof. Dr. Eng. Rodica Holonec, Lecturer Dr. Eng. Anca Nicu, Lecturer Dr. Eng. Angela Lungu, Assoc. Prof. Med. Elena Gligor, Assoc. Prof. Dr. Med. Adrian Iancu, Senior Researcher Dr. Eng. Stefan Gergely, Dr. Eng. Vasile Pompas, Prof. Dr. Eng, Math, Dan Doru Micu, Drd. Eng. Ciprian Mugurel Fort

Representative projects

"COST Action MyWAVE CA17115", www.cost.eu/COST_Actions/ca/CA17115?management (2018-2023)
"Wheelchair for People with Locomotor Disabilities ", (2019-2022)
"Burse doctorale si postdoctorale pentru cercetare de excelenta ", POSDRU/159/1.5/S/134378 UTCN, (2014-2015)
" VIPRO Platform ", PN-II-PT-PCCA-2013-4-2009, (2013-2016)
" Advancing University Education in Biomedical Engineering and Health Management in Kyrgyzstan", KyrMedu
MeDDiCA, "Medical Devices Design in Cardiovascular Applications", European FP7 project, www.meddica.eu
"Sensors and equipment for the quality control of various food supplies", PN II, (2007-2013)
"**Complex architecture for monitoring and medical data transmission,** Exploratory research project, (2009-2012)
SPINSTIM, **"Functional stimulation of the spinal cord"**, Romanian-Austrian bilateral contract, (2009-2011)
"Neural magnetic stimulation", PNII-IDEI, (2007-2010)

Significant results

The most representative publications of the past 5 years:

1. Holonec R., Vlad S., Roman N.M., Rapolti L. "*Smart House Control using Hand Gestures Recognition LabVIEW Applications*", 7th International Conference on Advancements of Medicine and Health Care through Technology; 13–15 October 2020, *IFMBE Proceedings*, vol 88 (2021), ISBN 978-3-030-93563-4, pp.240-249, Springer Nature
2. Puscasiu A., Fanca A., Valean H., Gota D.I., Stan O., Roman N.M., Citan I., Muresan V., "Indoor Air Quality Monitoring System Applied in Healthcare Facilities", 7th International Conference on Advancements of Medicine and Health Care through Technology; 13–15 October 2020, *IFMBE Proceedings*, vol 88 (2021), ISBN 978-3-030-93563-4, pp.399-408, Springer Nature
3. Danciu A.S., Vlad S., Leordeanu M., "Automatic Liver and Hepatic Tumors Segmentation in CT Images Using Convolutional Neural Networks", 7th International Conference on Advancements of Medicine and Health Care through Technology; 13–15 October 2020, *IFMBE Proceedings*, vol 88 (2021), ISBN 978-3-030-93563-4, pp. 207-216, Springer Nature
4. Rapolti L., Holonec R., Grindei L., Vitman O., "Automated Sorting of Pharmaceutical Waste Using Machine Vision Technology", 7th International Conference on Advancements of Medicine and Health Care through Technology;

13–15 October 2020, *IFMBE Proceedings*, vol 88 (2021), ISBN 978-3-030-93563-4, pp.409-4016, Springer Nature
5. Nicu A.I., Martis C.S., "Current Trends in Assistive Upper-Limb Rehabilitation devices", 7th International Conference on Advancements of Medicine and Health Care through Technology; 13–15 October 2020, *IFMBE Proceedings*, vol 88 (2021), ISBN 978-3-030-93563-4, pp.355-361, Springer Nature
6. Munteanu M.S., Magda A., Ciorap R., Rusu C. and Vladareanu L. – "EOG Signal processing algorithm used in eye movement detection", Proceedings of Modern Power System Conference 2019
7. Farago P., Băbțan A-M., Galatus R., Groza R., Roman N.M., Feurdean C.N., Ilea A. *„A Side-Polished Flourescent Fiber Sensor for the Detection of Blood in the Saliva"*, IFMBE Proceedings, volume 71, pp. 23-28, 2018, Springer International Publishing, ISBN 978-981-13-6206-4, ISSN 1680-0737
8. Iudean, D., Laze, P., Munteanu, R., **Munteanu, M.**, Mercea, V. – "Pilot -study of a low-cost iontophoresiss device" 2019 7th E-Health and Bioengineering Conference, EHB 2019, Iasi, Romania
9. Mureșan V., Roman N.M., Coloși T., Abrudean M., Stan O.P., Bunta O. *„Numerical Simulation of the Temperature Propagation in Superposed Biological Media with Applications in Dental Treatment"*, IFMBE Proceedings, volume 71, pp. 123-130, 2018, Springer International Publishing, ISBN 978-981-13-6206-4, ISSN 1680-0737
10. Ancău D., Roman N.M., Ancău M., „ Evaluating a Method of Offline Detection of P_3 Waves*"*, IFMBE Proceedings, volume 71, pp. 139-143, 2018, Springer International Publishing, ISBN 978-981-13-6206-4, ISSN 1680-0737
11. Pop-Coman P., Roman N.M., Steopan M., Ispas V., Bugnar S. „ *Voice Controlled Weelchair for People With Disabilities "*, IFMBE Proceedings, volume 71, pp. 255-260, 2018, Springer International Publishing, ISBN 978-981-13-6206-4, ISSN 1680-0737
12. Holonec R., Vlad S., Roman A.I., Rápolti L. "Monitoring of Obstructive Sleep Apnea Using Virtual Instrumentation Techniques", 6th International Conference on Advancements of Medicine and Health Care through Technology; 17–20 October 2018, *IFMBE Proceedings*, vol 71 (2019), ISBN 978-981-13-6206-4, pp. 85-90. Springer, Singapore
13. Holonec R., Vlad S., Rapolti L. "Application for Detection of Epileptic Seizures", 6th International Conference on Advancements of Medicine and Health Care through Technology; 17–20 October 2018, Cluj-Napoca, Romania. *IFMBE Proceedings*, vol 71 (2019), ISBN 978-981-13-6206-4, pp. 91-96. Springer, Singapore
14. Fort C.M., Ciupe A.M., Vlad S., „An ECG Front-End Device based on ADS1298 Converter*"*, Int. Conf. on Advancements of Medicine and Health Care through Technology; 12th-15th October 2016 Cluj-Napoca, Romania, *IFMBE Proceedings*, Vol. 59 (2017), ISBN 978-3-319-52874-8, pp. 99-102
15. Forț C. M., Roman N. M., and Gergely S. "Development of Bluetooth Enabled Pediatric Temperature Monitoring Device" International Conference on Advancements of Medicine and Health Care through Technology; 17–20 October 2018, Cluj-Napoca, Romania, IFMBE, volume 71 DOI:10.1007/978-981-13-6207-1 pag.221-226,
16. Gergely S. and Fort C.M. "Integrated computing unit for autonomous solar tracker with concentrated power" 3th Bilateral meeting on green energy (12th ICPIM2019)
17. Kun R. Pop, Munteanu M., Rafiroiu D., "Development of a Complex Acquisition and Storage System of Medical Data used in a Clinical Environment" International Conference on Advancements of Medicine and Health Care through Technology , MEDITECH 2016 Book Series: IFMBE Proceedings Volume: 59 Pages: 223-227 Published: 2017
18. Ignat M.C., Farago P., Hintea S., Roman M.N., Vlad S., „A Single-Character Refreshable Braille Display with FPGA Control*"*, Int. Conf. on Advancements of Medicine and Health Care through Technology; 12th-15th October 2016 Cluj-Napoca, Romania, *IFMBE Proceedings*, Vol. 59 (2017), ISBN 978-3-319-52874-8, pp. 63-66

Significant solutions:
High efficiency solution for medical telemetry ECG. Proved method in pathological PCG analysis.
Efficient mathematical algorithms used in biomedical signal processing.
A data read algoritm based on ZACwire, the protocol for temperature precision sensor TSic 306
Development of portable biomedical instrumentation.
Smart solutions and low cost systems for medical and biomedical signal processing and transmission;
Smart solutions to assess the patient rehabilitation in post-traumatic periods;
High accuracy reconstruction of the 3D geometry of vessels, cavities and cardiovascular devices;
Development of a multiscale CFD-FSI double-valve model of the left ventricle to study the valve-valve interaction;
Experimental and computational study of the hemolytic and cavitation effects of bileaflet mechanical heart valves;
Computational analysis of thrombus absorption efficiency for different commercial catheter designs;
Computational assessment of high frequency electromagnetic (cell phone) field effects on implanted carotid stents;
Products and technologies:
Low consumption battery powered DSP devices for ECG and PCG signal analysis
Wheelchair for people with locomotor disabilities

The offer addressed to the economic environment

Research & development	Datronix Computer Ltd., Cluj-Napoca, www.datronix.ro National Institute for Research and Development of Isotopic and Molecular Technologies www.itim-cj.ro Military Emergency Hospital Dr. Constantin Papilian, Cluj-Napoca, www.smucluj.ro County Emergency Hospital Bistrita-Nasaud, http://spital.bistrita.ro/ S.C. Comelf S.A. Bistrița
Consulting	Consulting in the areas of medical signal measurements, medical signal processing and data transmission, medical image processing, FDA regulations of cardiovascular devices.
Training	CFD-FSI analysis, Multiphysics and multiscale modelling, Computational methods for cardiovascular devices design, Computational methods for electromagnetic dosimetry

RESEARCH LABORATORY AND SUSTAINABLE DEVELOPMENT ÎN ELECTRONICS AND POWER ELECTRONICS

Contact details

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Founder	Prof. Ph.D. Eng. Richard Marschalko
e-mail	Petre.Teodosescu@emd.utcluj.ro

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.

Team

Assoc. Prof. Ph.D. Eng. Petre-Dorel Teodosescu, Lect. Ph.D. Eng. Mircea Bojan, Lect. Ph.D. Eng. Călin Mărginean, Assist. Eng. Norbert Csaba Szekely, Assist. Eng. Vasile Mihai Suciu, Assist. Eng. Sorin Ionuț Salcu, Eng. Lucian Nicolae Pintilie, Eng. Mihai Adrian Iuoraș, Eng. Alexandru Mădălin Păcuraru.

Representative projects

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);
CIA_CLIM - "Smart buildings adaptable to the effects of climate change" - PNIII-P1-1.2 PCCDI 2018, (2018-2020);
IEDPFC – "**Innovative Electronic Device for Power Factor Correction**", PN-II-PT-PCCA-2013-4-0914, (2014-2017);
"Influence of DC-Link capacitor aging on the PWM converters operation", Mobility and Environment: Researches in the fields of motor vehicle industry, energetics and enviroment in teh Middele - and west -Transdanubian Regions of Hungary, by European Union and co-financed by the European Regional Developemend Fund" (2010-2013);
"Research on the Ecological Energy Conversion Methods with the help of PWM AC- to - DC Converters", CNCSIS, (2004-2006).

Significant results

The most representative publications of the past 5 years:

1. Teodosescu, P.D.; Szekely, N.C.; Bojan, M.: - " Flexible System for Practical, Hands-On Power Electronics Teaching", MPS 2019 - International Conference – 8th Edition International Conference on Modern Power Systems, 21-23 May 2019, Cluj-Napoca, Romania, DOI: 10.1109/MPS.2019.8759702; ISBN 978-1-7281-0750-9;
2. M. Chirca, M. Dranca, P. Teodosescu and S. Breban, "Limited-Angle Electromechanical Actuator for Micro Wind Turbines Overspeed Protection," 2019 11th International Symposium on Advanced Topics in Electrical Engineering (ATEE), Bucharest, Romania, 2019, pp. 1-6.
3. V. M. Suciu, S. I. Salcu, L. N. Pintilie, P. D. Teodosescu and Z. Mathe, "Theoretical efficiency analysis of a buck-boost converter for wide voltage range operation," 2018 10th International Conference on Electronics, Computers and Artificial Intelligence (ECAI), Iasi, Romania, 2018, pp. 1-4., doi: 10.1109/ECAI.2018.8679063;

4. Szekely, N.C.; Bojan, M.; Salcu, S.I.; Teodosescu, P.D.: - "LED performance analysis under various current waveforms", ECAI 2018 - International Conference – 10th Edition Electronics, Computers and Artificial Intelligence, 28 June -30 June, 2018, Iași, România, DOI: 10.1109/ECAI.2018.8678988; ISBN 978-1-5386-4901-5;
5. Teodosescu Petre Dorel, Szekely Norbert Csaba, Sabau Madalina Sabina and Bojan Mircea, Analysis of a Resonant AC-AC LED Driver, Optoelectronics, Advanced Device Structures, Edited by Sergei Pyshkin, Published: July 12th 2017, ISBN: 978-953-51-3370-4, DOI: 10.5772/65136;
6. Gros, Ioana-Cornelia; Popa, Dan-Cristian; Teodosescu, Petre Dorel; et al., A Survey on Green Energy Harvesting Applications Using Linear Electric Generators Conference: 7th International Conference on Modern Power Systems (MPS) Location: Cluj Napoca, ROMANIA Date: JUN 06-09, 2017;
7. Chirca, Mihai; Oprea, Claudiu; Teodosescu, Petre-Dorel; et al., Optimal Design of a Radial Flux Spoke-Type Interior Rotor Permanent Magnet Generator for Micro-Wind Turbine Applications Conference: International Conference on Applied and Theoretical Electricity (ICATE) Location: Craiova, ROMANIA Date: OCT 06-08, 2016, Book Series: International Conference on Applied and Theoretical Electricity Published: 2016;
8. Tiberiu Rusu, Petre Dorel Teodosescu, Adrian-Cornel Pop, Practical implementation of a half-bridge SRM converter for low power applications The 18th National Conference on Electrical Drives "CNAE 2016", ACTA ELECTROTECHNICA, Volume 57, Number 3-4, 2016, Special Issue, ISSN 2344-5637, pp. 473-477;
9. Petre Teodosescu, Madalina Sabau, Norbert Szekely, Mircea Bojan, Richard Marschalko, Theoretical Analysis of the Commutation Frequency Range for a PWM AC - to -DC Converter with Current Hysteresis Modulation, The 18th National Conference on Electrical Drives "CNAE 2016", ACTA ELECTROTECHNICA, Volume 57, Number 3-4, 2016, Special Issue, ISSN 2344-5637, pp. 490-496;
10. Sabau. M.S, Szekely N.C, Teodosescu PD, "Electronic device for LED lighting Systems", *The official Catalogue of the ~Cadet Inova~ Exhibition, The Scientific Bulletin Addendum*, No.1, 2016, "Nicolae Balcescu" Land Forces Academy Publishing House, pp 133-135;
11. Teodosescu, Petre-Dorel; Bojan, Mircea; Vese, Ioana-Cornelia; et al., RESEARCH CONCERNING UNIFIED ELECTRONIC LIGHTING DEVICES PROCEEDINGS OF THE ROMANIAN ACADEMY SERIES A-MATHEMATICS PHYSICS TECHNICAL SCIENCES INFORMATION SCIENCE Volume: 16 Issue: 2 Pages: 226-234 Published: APR-JUN 2015;
12. Teodosescu, P. D.; Bojan, M.; Marschalko, R., Resonant LED driver with inherent constant current and power factor correction, ELECTRONICS LETTERS Volume: 50 Issue: 15 Pages: 1087-1088 Published: JUL 17 2014
13. Teodosescu P.D.,Negrea S.T., Bojan M.,Marschalko R.,"Local Grid Power Quality Improvements by the use of a High Power Factor LED Device", *49th International Universities Power Engineering Conference (UPEC*), ClujNapoca, ROMANIA, Sep 02-05, 2014.

Patents:
1. RO131166-B1 – Electro-mechanical actuator with electronic control device, 30 Aug 2018 (Romanian);
2. EP3121952-B1 - Operating method of switched reluctance motor, 05 Dec 2018 (European);
3. RO131169-B1 - Electronic device for led lighting systems, 28 Jun 2019 (Romanian);
4. EP3300462-B1 - Capacitor direct current (DC)-link arrangement, 11 Dec 2019 (European).
5. A201900915 – Patent Application – Interleaved Buck-Boost electronic converter
6. A201900916 – Patent Application – DC Micro-grid and its control method

Significant solutions:
1. Introducing the new concepts of Line Conditioning Strategies - Simple Line Conditioning, Active Line Conditioning, Complex Line Conditioning and Complex Power Factor Corrections – with the help of PWM AC- to - DC Converters.
2. Development and practical implementation of several methods for Active Line Conditioning and Complex Power Factor Corrections strategies.
3. Development and practical implementation of new electronic converters for motor control, renewable energy and LED lighting applications.

The offer addressed to the economic environment

Research & development	RLSDEPE can cover fundamental research and development activities regarding electronics and power electronic domain, thus the mathematical analyses, software simulations, practical implementation and testing for different AC/DC power converters for small to medium power applications. The research activities can cover domains as: Energetics (power conditioning converters, uninterruptible power supplies, renewable energy converters and control strategies), Automotive (main power traction and battery charge converters, auxiliary converters for ventilation, trajectory control, electronic lighting, etc.), Lighting (High Efficiency LED drivers), converters for general motor control applications.
Consulting	The experience of the RLSDEPE members in the field of Electronics and Power Electronics could offer to the private sector technical consulting, documentation and feasibility studies. The practical implementation services are one of the strongest assets regarding RLSDEPE, thus the Laboratory can offer services regarding fundamental and theoretical research, concept studies, simulations, modelling and practical experimentations.
Training	RLSDEPE, trough the experience of his members could coordinate theoretical and/or applicative training services in the field of Electronics, Power Electronics, Energetics Power Electronics Systems, CAD Electronics Circuits Modelling and Simulation, Development, Testing and Technical Services of Electronic Equipment.

CENTER OF APPLIED RESEARCHES IN ELECTRICAL ENGINEERING FOR SUSTAINABLE DEVELOPMENT

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GreenMot Lab with a testbench for testing electrical machines up to 4 phases, 125kW and 12,000r/min

Permanent magnet synchronous machine of 20kW and 26,000r/min

150V and 200A power converter

Areas of expertise

Design, modeling and optimization of electrical machines & drives for energy efficient applications in industrial, automotive and renewable energy fields
Control of electric and electromechanical systems
Condition monitoring, fault tolerance and diagnosis of electromechanical systems
DSP, microcontroller and FPGA programming
Hardware-in-the-loop (HiL) simulation in hybrid-electric vehicles

Team

Prof. Dr. Loránd Szabó, Prof. Emer. Dr. Ioan-Adrian Viorel, Prof. Emer. Dr. Vasile Iancu, Prof. Dr. Horia Hedeșiu, Prof. Dr. Claudia Marțiș, Prof. Dr. Csaba Szász, Prof. Dr. Daniel Fodorean, Assoc. Prof. Dr. Dan-Cristian Popa, Assoc. Prof. Dr. Florin Jurca, Assoc. Prof. Dr. Ștefan Breban, Assoc. Prof. Dr. Mircea Ruba, Lecturer Dr. Claudiu Oprea, Lecturer Dr. Adrian Augustin Pop, Postdoc researcher: Dr. Radu Andrei Marțiș, Dr. Sorin Iulian Cosman, Dr. Claudia Pop, Ph.D. students: Sorina Ciornei, Andreea-Mădălina Nicorici, Răzvan Inte, Cristina Moldovan, Adriana Tintelecan, Iulia Văscan, Sebastian Ciceo, Simina Derban, Paula Jula, Matyas Erzsebet.

Representative projects

URBIVEL – Advanced technologies for intelligent urban electric vehicles, project co-financed by the European Regional Development Fund through Competitiveness Operational Program 2014-2020 (2016-2021). Director: Prof. Dr. Claudia Marțiș. https://urbivel.utcluj.ro.
INTERACT – European industrial doctorate on next generation for sustainable automotive electrical actuation, H2020-MSCA-ITN-2017 (2018-2021). Director: Prof. Dr. Claudia Marțiș. https://interact.utcluj.ro.
Electromagnetic modeling, simulation and optimization of induction machines for automotive industry. Beneficiary: Ohio State University (USA). Director: Assoc. Prof. Dr. Dan-Cristian Popa (2018-2019).
Zero airgap induction motor. Beneficiary: Ohio State University (USA). Director: Assoc. Prof. Dr. Dan-Cristian Popa (2018-2019).
PANDA – Powerful Advanced H-Level. Digitalization Architecture for models of electrified vehicles and their components, H2020-LC-GV-2018 (2018-2021). Partner coordinator: Prof. Dr. Claudia Marțiș. https://project-panda.eu.
SWTOMP – Small Wind Turbines Optimization and Market Promotion, ERANet-LAC – Network of the European Union, Latin America and the Caribbean Countries on Joint Innovation and Research Activities, (2017-2019). Partner coordinator: Prof. Dr. Loránd Szabó. https://memm.utcluj.ro/SWTOMP.
SMiLE-EV – Smart Conductive Charging Station, Fixed and MobiLE, for Electric Vehicles, PN III – PCCDI (2018-2021). Partner coordinator: Assoc. Prof. Dr. Daniel Fodorean. http://www.smile-ev.usv.ro.
EXTWIG – Experimental validation of a VAWT with counter-rotating rotors, PN III – PCCDI (2017-2018). Partner coordinator: Assoc. Prof. Dr. Ștefan Breban. http://www.comoti.ro/ro/Proiect_64%20PED.htm.
ESPESA – Strengthening the Research Potential of CAREESD in the Field of Electromechanical Systems and Power Electronics for Sustainable Applications, H2020-TWINN-2015 - Twinning Coordination and support actions

(2016-2018). Director: Prof. Dr. Claudia Marțiș. https://cordis.europa.eu/project/id/692224.
ELIMPUS – Efficient Lightweight Electro-Magnetic Propulsion System for Electric Vehicles, Young Team - TE PNII (2015-2017). Director: Assoc. Prof. Dr. Daniel Fodorean. https://elimpus.utcluj.ro.

Significant results

The most representative publications of the past 5 years:

[1] C.V. Pop, D. Fodorean, **Purely electromagnetic propulsion system with two transmission levels – design, numerical and experimental results**, IEEE Transactions on Industrial Electronics, vol. 70, no. 5, pp.4494- 4504, 2022.
[2] S. Ciceo, F. Chauvicourt, J. Gyselinck, C. Marțiș, **Data-driven electrical machines structural model using the vibration synthesis method**, IEEE Transactions on Transportation Electrification, vol. 8, no. 3, pp. 3771-3781.
[3] J.E. Ruiz-Sarrio, F. Chauvicourt, J. Gyselinck, C. Marțiș, **Impedance Modeling Oriented Toward the Early Prediction of High-Frequency Response for Permanent Magnet Synchronous Machines**, IEEE Transactions on Industrial Electronics, vol. 70, no. 5, pp. 4548-4557, 2022.
[4] R. Nemeş, M. Ruba, R. Raia, C. Marţiş, C. Oprea: **X-in the Loop based high accuracy test facility for industrial development of electric vehicles**. IEEE Transactions on Transportation Electrification, 2022.
[5] C.V. Pop, D. Fodorean, D.C. Popa, **Structural Analysis of an In-Wheel Motor with Integrated Magnetic Gear Designed for Automotive Applications**, Sustainability, vol. 14, no. 19, paper #12007, 2022.
[6] L. Szabó, D. Fodor, **The Key Role of 3D Printing Technologies in the Further Development of Electrical Machines**, Machines, vol. 10, paper #330, 2022.
[7] A.A. Pop, **Incremental Encoder Speed Acquisition Using an STM32 Microcontroller and NI ELVIS**. Sensors, vol. 22, no. 14, paper #5127, 2022.
[8] Ș Breban, M. Dranca, M. Chirca, A.M. Pacuraru, P.D. Teodosescu, C.A. Oprea, C. A.: **Experimental Tests on a Spoke-Type Permanent Magnets Synchronous Machine for Light Electric Vehicle Application**. Applied Sciences, vol. 12, no. 6, paper #3019, 2022.
[9] R.C. Nacu, D. Fodorean, **Lithium-Ion Cell Characterization, Using Hybrid Current Pulses, for Subsequent Battery Simulation in Mobility Applications**. Processes, vol. 10, aper #2108, 2022.
[10] C.V. Pop, D. Fodorean, D.C. Popa, **Structural Analysis of an In-Wheel Motor with Integrated Magnetic Gear Designed for Automotive Applications**", Sustainability 2022, 14, 12007. https://doi.org/10.3390, su141912007, ISSN 2071-1050.
[11] L. Szabó, **A survey on modular variable reluctance generators for small wind turbines**, IEEE Transactions on Industry Applications, vol. 55, no. 3, pp. 2548-2557, 2019.
[12] C.V. Pop, D. Fodorean, C. Husar, C. Irimia, **Structural behavior evaluation of an in-wheel motor based on numerical and experimental approach**, Electrical Engineering, 2019, DOI: 10.1007/s00202-019-00774-0.

Significant solutions:
Prototypes and laboratory models of special electrical machines; static converters; fault detection and fault tolerant systems; electrical machines MiL and HiL testing and evaluation procedures, etc.

Products and technologies:
Microcontroller based boards for motor control, energy management and position detection based on resolvers, DSP development boards for motor control and diverse applications, FPGA-based development boards for motor control and diverse applications, energy management: on board on light electric vehicles and hybrid power sources, HiL testing platforms for electric vehicle propulsion, and auxiliaries systems.

Patents:
[1] Ș Breban, M. Dranca, I. Mălăel: **Airborne wind power generation system**, no. RO133886.
[2] Ș Breban, M. Dranca, M. Fărtan, **Electric propulsion machine with direct drive wheel for guided track transport vehicles**, no. RO134496.
[3] Ș Breban, P.-D. Teodosescu, A.-V. Neag, M. Chirca, **Electronically controlled electromagnetic actuator**, patent no. RO131166.

The offer addressed to the economic environment

Research & development	Electrical machines design and optimization Electrical drives and control based on microcontrollers, DSPs and FPGA devices Electromechanical systems for smart, green and integrated transportation Secure, clean and efficient renewable energy generation and storage systems Energy management on hybrid electrical power sources Offering advanced technical solutions for industrial clients in all our research fields. Seeking for research & development partners (both from industry and academia) in all the fields of expertise of the center.
Consulting	Offering consultancy services for companies in all the fields of expertise of the center. Offering applied engineering services for companies in all our fields of expertise.
Training	Offering training for under and post graduate students, Ph.D. students, engineers working in research and industry in all the fields of expertise of the Center.

HIGH INTENSITY ELECTRIC FIELDS LABORATORY

Contact details

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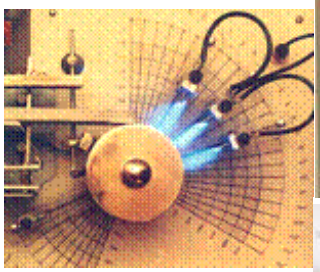
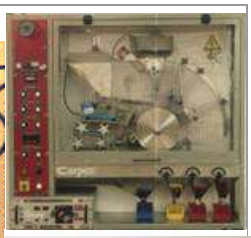

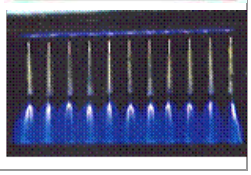

Areas of expertise

Equipment and technologies for electrostatic separation
Modelling of electrostatic processes
Ozonizing technologies for liquids
Biological effects of high intensity electric fields.
Consulting and technology transfer in these fields

Team

Prof. Adrian Samuila, Prof. Roman Morar, Prof. Alexandru Iuga, Prof. Lucian Dascalescu (Univ. Poitiers), s.l. Laur Calin, s.l. Mihai Bilici.

Representative projects

"Program for promoting of electroseparation and ozonizing modern electrostatic technologies, training of human resources for research and infrastructure consolidation of the High-Intensity Electric Fields Laboratory", Major Grant, World Bank, Romanian Government, (2000-2002)
"Experimental researches on ozone influence in rehabilitation of wastewater from public sewerage networks", Grant CNCSIS, (2001-2003)
"Researches on developing electrostatic separation technology of muscovite", Grant CNCSIS, (2005-2006)
"Optimization of innovative methods of electrostatic separation applied in the industry of recycling materials", (2005-2006)
"Quality Improvement of quartz sands by electrostatic separation in high intensity electric field", Grant CNCSIS, (2005-2007)
"Fluidized bed tribocharging of multi-component mixtures of recyclable plastic materials", Grant CNCSIS, (2005-2007)
"Recovery technologies of metals and plastics from wastes of informatics and telecommunications equipment", Proiect CEEX, (2005-2007)
"Electrostatic procedures for the recovery of copper and plastic materials from micronized waste" BRANCUSI 88 BM Project, (2017-2018)
"**Optimized technologies with reduced impact on the environment for the advanced recovery of waste materials IT equipment"** Proiect 84PCCDI - 01/03/2018 TRADE-IT (2018 – 2020)

Significant results

The most representative publications of the past 5 years:

1. Catinean A, Dascalescu L, Lungu M, Dumitran L, Samuila A. *Improving the recovery of copper from electric cable waste derived from automotive industry by corona-electrostatic separation*. Particulate Science and Technology, vol. 39. Issue 4,2021 DOI: 10.1080/02726351.2020.1756545 ISSN:0272-6351.
2. L. Calin, A. Catinean, M. Bilici, A. Samuila, L. Dascalescu. *Electrostatic separation of plastic mixture ABS/HIPS and ABS-PC/HIPS from IT equipment using fluidized bed*. Particulate Science and Technology, Published online 13 May 2021, http://doi.org/10.1080/02726351.2021.1922560 ISSN: 0272-6351.
3. L. Calin, A. Catinean, M. Bilici, A. Samuila. *A corona-electrostatic technology for zinc and brass recovery from the coarse fraction of the recycling process of spent alkaline and zinc-carbon batteries*. Journal of Cleaner Production, Volume 278, 1 January 2021, 123477. ISSN 0959/6526.
4. **M. Bilici, A. Catinean, L. Călin, A. Samuila.** *The Effect of Charged Granules Agglomerations on the Electric Field Distribution of a Tribo-aero-electrostatic Separator.* 11th International Symposium on Advanced Topics in Electrical Engineering (ATEE). Bucharest, Romania, 2019, pp. 1-6, DOI: 10.1109/ATEE.2019.8724939
5. Adrian Samuila, Lucian Dascalescu, Laur Calin, Mihai Bilici, Andrei Catinean. *Recent Researche in Electrostatic Separation Technologies for the Recycling of Waste Electric and Electronic Equipment***.** TIM 19 Physics Conference, 29-31 May, Timisoara, Romania, pp. 1-10. Published in AIP Conference Proceedings, Vol. 2218. American Institute of Physics Inc. https://doi.org/10.1063/5.0001074
6. L. Calin, M. Bilici, A. Samuila. *Improvement of the Fluidized Bed Tribocharging Device for Electrostatic Separation of Plastics from Electronic Medical Waste*. 6th International Conference on Advancements of Medicine and Health Care through Technology; 17–20 October 2018, Cluj-Napoca, Romania. IFMBE Proceedings, volume 71, pp 341-346.
7. Iuga, A., Samuila, A., Morar, R., Bilici, M., Dascalescu, L. *Tribocharging techniques for the electrostatic separation of granular plastics from waste electric and electronic equipment*. Particulate Science and Technology , Volume 34 (1), 2016, pp. 45-54. ISSN:0272-6351.
8. Buda, G., Samuila, A., Bilici, M., Atroune, S., Dascalescu, L. *Set Point Identification and Robustness Testing of a Triboelectrostatic Separation Process*. IEEE Transactions on Industry Application, Vol. 51(2), 2015, pp. 1153-1160.
9. Adrian Samuila, Mihai Bilici, Lucian Dascalescu. *Recycling of PS/PVC Granular Waste Using a Fluidized-Bed Two-Insulated-Rolls-Type Tribo-Aero-Electrostatic Separator*. The 9th International Symposium on Advanced Topics in Electrical Engineering, Bucarest, 2015, pp. 254-259
10. G. Buda, A. Samuila, S. Atroune, M. Bilici, L. Dascalescu, "Set point identification of a tribocharging process for mixed granular solids", in Journal of electrostatics, vol.7, no. 3, 2013, pp. 407-412
11. A. Iuga, A. Samuila, V. Neamtu, R. Morar, R. Beleca, S. Das, L. Dascalescu, "*Removal of Metallic Particles from Acrylonitrile Butadiene Styrene Wastes Using Electrostatic Separation Methods*", in IEEE Transactions on Industry Application, vol. 47, no. 1, 2011, pp. 322-330
12. L. Dascalescu, M. Bilici, C. Dragan, A. Samuila, Y. Ramdani, A. Tilmatine, „*Robust Design and Capability Evaluation of a Tribo-aerodynamic Charging Process for Fine Particle*" in IEEE Transactions on Industry Application, vol. 47, no. 3, 2011, pp. 1086-1092

The offer addressed to the economic environment

Research & development	HIEFL is equipped with installations for electrostatic separations of granular materials, unique on a national scale and competitive on an international scale: ELSEP and ILES-1 roll carrier corona-electrostatic separators, SEP-1 plate type electrostatic separator, ILES-2 and TESS free fall separators, insulated rolls tribo-aero-electrostatic separator, free-fall corona electrostatic separator, ELSMOD roll carrier pilot separator. The list of the research equipment of HIEFL includes: regulated high-voltage supplies (0-100)kV, electromagnetic vibratory feeders for granular materials, tribocharging devices, experimental installation for liquids treatment (5 grams ozone/hour), Keithley digital electrometer, (30-100)kV resistive dividers, electrostatic kilo-voltmeter**,** Laboratory cutting mill RETSCH SM300, TestPoint software, Modde -user-friendly software for the design of experiments, Superficial Charge Simulation Program.
Consulting & Training	Fundamental and applied research by projects, grants, programs in the domains: equipment and technologies for electrostatic separation, modelling of electrostatic processes, ozonizing technologies for liquids, biological effects of electric fields. Master and Doctoral studies in Electrostatics. Research and Development of experimental devices and industrial equipment using high-intensity electric fields. Promotion of new technologies in high intensity electric fields and orientation of research to medium and long term needs of the society. Scientific cooperation & integration in European Research Area. Quality in university education and scientific research.

POWER QUALITY AND ENERGY EFFICIENCY

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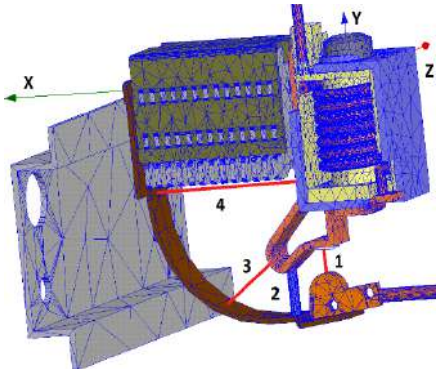

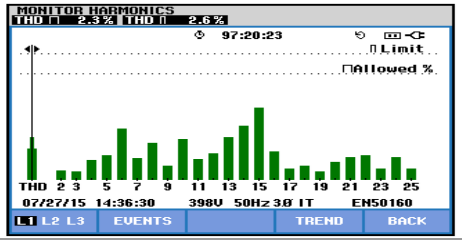

Areas of expertise

Modern computer aided design, analysis and optimization of electrical equipment, based on Finite Element Method.
Energy efficiency through power circulation improvement, enhanced technologies and renewable energies integration;
Photovoltaic potential estimation;
Monitoring, analysis and improvement of power quality;
Measurement, testing and diagnosis in electrical installations;
Measurement of non-ionising electromagnetic radiation in order to assess electromagnetic fields for the purpose of comparison against limits for human exposure

Team

Assoc. Prof. Dr. Eng. Liviu Neamt, Assoc. Prof. Dr. Eng. Olivian Chiver, Assoc. Prof. Dr. Eng. Mircea Horgos, Prof. Dr. Eng. Liviu Emil Petrean, Assoc. Prof. Dr. Eng. Zoltan Erdei, Assist. Prof. Dr. Eng. Eleonora Pop, Assist. Prof. Dr. Eng. Mihaela Stet, Assist. Prof. Dr. Eng. Cristian Barz.

Representative projects

"Assisted technology for electrical installation testing" - PN-III-P2-2.1-CI-2018-1296, 2018
"**Assisted technology for designing, building and verifying earthing installations**" - PN-III-P2-2.1-CI-2018-1293, 2018
"Electromagnetic field simulation of capacitive touch sensors". Electrolux, Italy, 2015;
"Investigation of the circumstances and causes of the LV electrical equipment failure due to HV commutation at CEFD Solaris 56 MWp Ciuperceni", Bester Generacion, Spain, 2015;

Significant results

The most representative publications of the past 5 years:

1. L. Neamt and O. Chiver, *A Simple Design Method of Unequal Spacing Arrangement for Substation Grounding Grid*, in IEEE Access, doi: 10.1109/ACCESS.2021.3119941.
2. Neamt, Liviu; Neamt, Alina; Chiver, Olivian, *Improved Procedure for Earth Fault Loop Impedance Measurement in TN Low-Voltage Network*, Energies, Volume: 14, Issue: 1, Article Number: 205, 2021.
3. Chiver, Olivian; Neamt, Liviu; Cristian, Barz; et al; *Study on the End Winding Inductance of Three-Phase Windings in Two Layers*, Tehnički vjesnik 26 (5), 1510-1514, 2019.
4. A. V. Hotea, R. Adrian Tirnovan and L. Neamt, *The Effects of Short Circuits at Medium Voltage Transformers*, 54th International Universities Power Engineering Conference (UPEC), Bucharest, Romania, pp. 1-3, 2019.
5. L. Neamt, H. Balan, O. Chiver and A. Hotea, *Considerations about Fault Loop Impedance Measurement in TN Low-Voltage Network*, 8th International Conference on Modern Power Systems (MPS), Cluj Napoca, Romania, pp. 1-4, 2019.
6. L. Neamt, H. Balan, O. Chiver and A. Hotea, *Considerations about Substation Grounding System Design*, 8th International Conference on Modern Power Systems (MPS), Cluj Napoca, Romania, pp. 1-4, 2019.
7. Neamt, Liviu; Petrean, Liviu; Chiver, Olivian; et al; *Some Considerations about Overvoltages During and After the Disconnection of a Photovoltaic Park*, 24th IEEE International Symposium on Design and Technology in Electronic Packaging (SIITME, Iasi, 239-242, 2018.

8. Chiver, Olivian; Neamt, Liviu; Cristian, Barz; et al., *Study on the Autonomous Asynchronous Generator*, 2018 International Conference and Exposition on Electrical and Power Engineering, EPE Iasi, 863-866, 2018.
9. Chiver, Olivian; Neamt, Liviu; Matei, Oliviu; et al., *Utilization of Finite Elements Programs and Matlab Simulink in the Study of a Special Electrical Motor*, International Journal of Advanced Computer Science and Applications, 8(4), 317-323, 2017,
10. Neamt, Liviu; Matei, Oliviu; Chiver, Olivian, *Finite Element Method Combined with Neural Networks for Power System Grounding Investigation*, International Journal of Advanced Computer Science and Applications, 8(2), 187-192, 2017,
11. Chiver, O.; Neamt, L.; Pop, E.; et al., *Single-phase PM synchronous motor simulation with Matlab/Simulink,* International Conference on Applied Sciences (ICAS2016), Book Series: IOP Conference Series-Materials Science and Engineering, Volume: 163, 2017.
12. Neamt, Liviu; Chiver, Olivian; Erdei, Zoltan; et al, *Considerations about Medium Voltage SF6 Switch Disconnector Framework Design based on 3D Electrostatic FEA,* IEEE 16th International Conference on Environment and Electrical Engineering (EEEIC), Florence, 2016.

The offer addressed to the economic environment

Research & development	Electrical equipment analysis and optimization, based on Finite Element Method; Energy efficiency and better power quality trough power circulation improvement, based on computer assisted simulation; Development of enhanced technologies in energy conversion; Development of new testing and diagnosis methods in electrical installations.
Consulting	Audit, energy efficiency and power quality; Renewable sources potential estimation for feasibility studies; Renewable energy conversion systems integration; Measurement, testing and diagnosis in electrical installations, data processing and results interpreting. Measurement of non-ionising electromagnetic radiation in order to assess electromagnetic fields for the purpose of comparison against limits for human exposure.
Training	Romanian Energy Regulatory Authority certified courses for electricians, project supervising, experts, Romanian Energy Regulatory Authority certified courses for: energy auditors and managers; Measurement, testing and diagnosis in electrical installations using modern equipment and techniques; Renewable energies integration. Energy efficiency and power quality at consumers.

SMART ENERGY RESEARCH AND DEVELOPMENT CENTER

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Telephone	+40 264 401231
Director	**Assoc. Prof. Dr. Eng. Phys. Andrei C. CZIKER**
e-mail	smarten@enm.utcluj.ro

Areas of expertise

Renewable energy and energy storage: wind power plants; hydroelectric power plants; photovoltaic power plants; biomass micro-plants; fuel cells; hydrogen power plants; geothermal power plants; batteries; hydrogen; supercapacitors.

Modeling, simulation and analysis of modern power systems: transmission power grid; distribution power grid; microgrids; integration of renewable power plants on a grid; analysis of distributed generation systems; power losses evaluation.
Energy efficiency: energy audits for industrial and residential consumers; power quality measurements, analysis and improvement solutions; SCADA implementation.
Artificial intelligence in power systems: machine-learning; fuzzy logic; neural networks; genetic algorithms.
Energy management: energy forecast; energy market.
Smart metering and demand-side integration: Intelligent sensors and data acquisition; analog to digital conversion; communication infrastructure and protocols for smart metering; demand-side integration.
Smart city: building management system, building automation system, nZEB concept implementation

Team

Assoc. Prof. Dr. Eng. Phys. Andrei C CZIKER, Prof. dr. eng. Silviu Ioan DARIE, Prof. dr. Eng. Mircea Dorin CHINDRIȘ, Prof. dr. eng. Sorin Gheorghe PAVEL, Prof. dr. eng. Radu TÎRNOVAN, Assoc. Prof. Dr. Eng Titus E. CRISAN, Assoc. Prof. Dr. Eng Bogdan ȚEBREAN, Eng. Daniela NISTE, Eng Mădălin ARDELEAN, Eng. Călin PAȘCALĂU

Representative projects

HORESEC - Holistic impact of renewable energy sources on the environment and climate, 31PCCDI / 2018, code PN-III-P1-1.2-PCCDI-2017-0404, 2018 – 2021

SAMGRID - Adaptive system for energy quality assurance, by correcting the electrical parameters of low voltage networks that can be integrated into SMART GRID networks, Grant PN-II-PT-PCCA-2013-4-1003
IR spectral measurements applied in biometrics and security systems, PN-II 616/2009, 2009-2012

Development strategies for photovoltaic power generation systems - PV development - Contract CNCSIS type A, consortium Nr. contract: 167 / 1.08.06, 2006-2007
Continuous voltage microgrids for optimal integration of distributed energy sources, CEEX type project, contract no. 109/ 10.10.2005, 2005-2007

Significant results

1. Ungureanu, S; Topa, V; Cziker, AC Deep Learning for Short-Term Load Forecasting-Industrial Consumer Case Study. APPLIED SCIENCES-BASEL. Volume 11, Issue 21, Article Number 10126, DOI 10.3390/app112110126, Published NOV 2021
2. Ungureanu, S; Topa, V; Cziker, AC. Analysis for Non-Residential Short-Term Load Forecasting Using Machine Learning and Statistical Methods with Financial Impact on the Power Market, ENERGIES, Volume 14, Issue 21, Article Number 6966, DOI 10.3390/en14216966 Published NOV 2021
3. Miron, A., Cziker, A.C., Bogariu, H.C., Knowledge-based system for the analysis of voltage fluctuations and flicker.
   Proceedings of 8th International Conference on Modern Power Systems (MPS), 2019, WOS: 000612401900024

4. M. Chindris, A. Cziker, Anca Miron, UPQC - the best solution to improve power quality in low voltage weak distribution networks, Proceedings Paper, 7th International Conference on Modern Power Systems (MPS) 2017, WOS:000428462600002, ISBN:978-1-5090-6565-3
5. Darie, S., Dynamics in Distribution Power System. Rev Energetica, Nr. 9, 2020
6. Darie, S., Harmonics in Power Systems. Part 1: Overview, Harmonics Indices, IEEE & IEC Standards. Rev Energetica, Nr. 10, 2020
7. Darie, S., Harmonics in Power Systems. Part 2: Computer Aided Harmonics Studies. Rev Energetica, Nr. 11, 2020 Darie, S., Smart Design in Power Systems. Part 1: Low Voltage Circuit Breakers; IEC Standards; Field Data Collection. Rev Energetica, Nr. 1, 2021
8. Darie, S., Smart Design in Power Systems. Part 2: How to Build a Digital Twin from a Given Power System Simulation. Rev Energetica, Nr. 2, 2021
9. Darie, S., Understanding Arc Flash Hazard - part 1. Rev Energetica, Nr. 6, 2021
10. Darie, S., Understanding Arc Flash Hazard - part 2. Rev Energetica, Nr.7, 2021
11. G. Beleiu, V. Maier, S. G. Pavel, I. Birou and C. Pică, "Synchronous Motor Behavior in Harmonics," 2019 54th International Universities Power Engineering Conference (UPEC), Bucharest, Romania, 2019, pp. 1-6. doi: 10.1109/UPEC.2019.8893511
12. V. Maier, S. G. Pavel, H. G. Beleiu and V. Farcas, "Aspects on Harmonics Analytical Identification of a Periodic Non- Sinusoidal Wave," 2019 8th International Conference on Modern Power Systems (MPS), Cluj Napoca, Romania, 2019, pp. 1-6. doi: 10.1109/MPS.2019.8759685
13. Pica, C., Munteanu, R., Pavel S.G. and Beleiu, H.G., Modeling of Photovoltaic Panels, *2018 International Conference and Exposition on Electrical And Power Engineering (EPE)*, Iasi, 2018, pp. 0769-0773. doi: 10.1109/ICEPE.2018.8559884
14. Ioaneş, Andrei; Tîrnovan, Radu, Power Grid Health Assessment Using Machine Learning Algorithms, 2019 11th International Symposium on Advanced Topics in Electrical Engineering (ATEE), Bucharest, Romania, DOI: 10.1109/ATEE.2019.8724920
15. C. Cristea, M. Cristea, R. -A. Tirnovan, I. Birou, C. E. Stoenoiu and F. Mioara Șerban, "Performance analysis of grid- connected rooftop solar photovoltaic systems using different photovoltaic technologies: a case study in Romania," 2021 International Conference on Electromechanical and Energy Systems (SIELMEN), 2021, pp. 310-314, doi: 10.1109/SIELMEN53755.2021.9600338.
16. R. Tîrnovan and M. Cristea, "Advanced techniques for fault detection and classification in electrical power transmission systems: An overview," 2019 8th International Conference on Modern Power Systems (MPS), Cluj-Napoca, Cluj, Romania, 2019, pp. 1-10, doi: 10.1109/MPS.2019.8759695.
17. A. Ioaneş and R. Tîrnovan, "Energy Price Prediction on the Romanian Market using Long Short-Term Memory Networks," 2019 54th International Universities Power Engineering Conference (UPEC), Bucharest, Romania, 2019, pp. 1-5, doi: 10.1109/UPEC.2019.8893550.
18. Septimiu Crisan, Bogdan Țebrean, Titus E. Crisan - Multimodal Liveness Detection System for Hand Vein Biometrics, 2018 IEEE International, Symposium on Medical Measurements and Applications (MeMeA 2018), ISBN 978-1-5386- 3393-9
19. Țebrean, S. Crisan, C. Muresan, T. E. Crisan - Coplanar capacitive matrix structures used for monitoring the recovery of burn injuries, 22nd IMEKO TC4 International Symposium and 20th International Workshop on ADC Modelling and Testing 2017: Supporting World Development Through Electrical and Electronic Measurements, Vol. 2017-September, 2017, Pag. 385-390, Code 134087
20. Crisan, T.E., Ardelean, M.I., Tebrean, B., Munteanu, R.A., Hand Movements Monitoring Device for Post Paresis Recovery Process, IFMBE Proceedingsthis link is disabled, 2022, 88, pp. 45–54
21. Crisan, T.E., Ardelean, M.I., Tebrean, B., Oltean, T. Low Cost Foot Pressure Measuring Device, Proceedings of 2021, 9th International Conference on Modern Power Systems, MPS 2021, 2021, 9492694

Patents

Sacerdoțianu Dumitru, Nicola Marcel, Ciontu Marian, Ivanov Sergiu, Chindris Mircea Dorin, Cziker Andrei Cristinel, Radu Alexandru, Dumitrescu Camil-Sorin, Sistem adaptiv pentru asigurarea calitatii energiei in retelele de joasa tensiune, Nr. : 132402

PhD Thesis

Bogdan Iuga, Studies regarding wireless energy transfer, PhD Supervisor: Prof. Eng. Radu-Adrian TÎRNOVAN, PhD,TCUN 2021

Andrei IOANES, Elements of artificial intelligence in the management of modern power systems, PhD Supervisor: Prof.Eng. Radu-Adrian TÎRNOVAN, PhD, TCUN 2022

Maria FĂGĂRĂȘAN, Contributions to management and design of electrical energy storage systems in distributed generation networks, PhD Supervisor: Prof. Eng. Radu-Adrian TÎRNOVAN, PhD, TCUN 2022

The offer addressed to the economic environment

Research & development	Power systems modeling Renewable integration on modern power grids Increase of energy efficiency
Consulting & Training	The SmartEn offers consultancy in all the center fields of expertise. Members of the center participate in the organization of postgraduate courses in Romanian like that. Auditori electroenergetici din industrie; Manageri energetici in industrie
Applied engineering services	The SmartEn offers applied engineering services to the economic environment through technical expertise in all the fields of our center

MULTIMEDIA TECHNOLOGIES AND TELECOMMUNICATIONS RESEARCH CENTRE

Contact details

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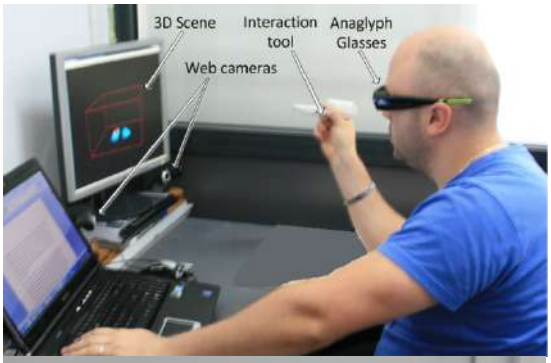

Areas of expertise

Main Field: Information and communications technologies
Key words: e-learning, e-health, e-business, e-government, e-citizen, e-content, digital television HD / 3D, new Media, web services, multimedia databases, 3D video coding & compression, collaborative cloud, artificial intelligence, cognitive systems, trainable systems, intelligent interfaces, multimodal analysis and integration, image processing and analysis, artificial vision.

Team

Prof. Dr. Eng. Aurel Vlaicu, Prof. Dr. Eng. Bogdan Orza, Assoc.prof. Dr. Eng. Șerban Meza, PhD. Stud. Aurelia Ciupe, PhD Stud. Alexandru Popa, Prof. Dr. Eng. Mircea Giurgiu, Dr. Eng. Adriana Stan, Assoc. Prof. Dr. Eng. Mihaela Gordan, Assist. Dr. Eng. Camelia Florea, Assist. Dr. Eng. Mihaela Caslariu, Assoc. Prof. Dr. Eng. Zsolt Polgar, Prof. Dr. Eng. Vasile Bota, Assist. Dr. Eng. Mihaly Varga, Prof. Dr. Eng. Virgil Dobrotă, Assoc. Prof. Dr. Eng. Daniel Zinca, Assist. Dr. Eng. Bogdan Rus, Assist. Dr. Eng. Tudor Blaga

Representative projects

VINIVITIS – "Complex, Integrated System for the Technological Optimisation and Superior Valorisation of Vineyard Sub-products", PCCDI 2018 (2018-2020)
DIONASYS - "Declarative and Interoperable Overlay Netowork. Applications to Systems of Systems", CHIST-ERA (2015-2017)
UCONNECT - " Implementation of Ubiquitous Connectivity for Public Transport, FP7 project, 2012-2014.
4WARD – "Architecture and Design for the Future Internet", FP7-ICT-2007-1 No. 216041, 2008-2010
Wi-QoST: "Traffic and QoS Management in Wireless Multimedia Networks", 2004-2008
CODIV " Enhanced Wireless Communication Systems Employing COoperative DIVersity", FP7, 2008-2010.
COST IC 1004 "Cooperative Radio Communications for Green Smart Environments"
COST 2100 "Pervasive Mobile & Ambient Wireless Communications", 2007-2010;
Simple4All – "Speech synthesis that improves through adaptive learning" FP7 project, (2011-2014), www.simple4all.org,
Sound2Sense – "Making sense of speech sounds" ,FP6 project (2007-2011), www.sound2sense.eu,
EU eContentPlus - "KeyToNature" (2008-2010), www.keytonature.eu
EU eTEN "EUROWEX – Online platform using digital signature for the management of university activities" (2006-2008), www.eurowex.org
"**Image Processing, Information Engineering & Interdisciplinary Knowledge Exchange**", CEEPUS Network CII-AT-0042-05-0910,
Text2Speech – „Development of software services for text to speech synthesis in Romanian language" PNII INOVARE (2008-2010),
COMODICI –„ Sistem de Control şi Monitorizare la Distanţă a Clădirilor Inteligente", CEEX project (2006-2008)
SIMIMED – „Sistem integrat de management a informaţiilor medicale utilizând standardul HL7", PNII project (2007-2010)
INVITE – „Platformă Inteligentă Colaborativă pentru Dezvoltarea şi Susţinerea Mecanismelor Intreprinderilor

Virtuale", PNII project – 12119 (2008-2011)

Significant results

The most representative publications of the past 5 years:

1. Meza, Radu Mihai; Meza, Serban Nicolae, A Triadic Formal Concept Analysis Approach to Analyzing Online Hate Speech in Facebook Comments BRAIN-BROAD RESEARCH IN ARTIFICIAL INTELLIGENCE AND NEUROSCIENCE Volume: 10 Issue: 1 Pages: 73-81 Published: JAN-FEB 2019
2. Diop, Abdou Khadre; Meza, Serban; Gordan, Mihaela; et al.,LDA Based Classification of Video Surveillance Sequences Using Motion Information 20TH INTERNATIONAL CONFERENCE ON ADVANCED COMMUNICATION TECHNOLOGY (ICACT) Book Series: International Conference on Advanced Communication Technology Pages: 499-502 Published: 2018
3. L. Cremene, N. Gasko, M. Cremene, M. Suciu, A. Vlaicu, and D. Dumitrescu, "Scarce-resource capacity sharing in cognitive radio environments: a new game theoretical model," Telecommunication Systems, vol. 66, no. 2, pp. 331-342, Oct 2017.
4. Gordan, Mihaela; Meza, Serban; Cislariu, Mihaela; et al., A Fuzzy Logic Approach for the Fast Approximate Computation of Image Transforms from Block JPEG DCT Coefficients PROCEEDING OF 2016 IEEE INTERNATIONAL CONFERENCE ON AUTOMATION, QUALITY AND TESTING, ROBOTICS (AQTR) Book Series: IEEE International Conference on Automation Quality and Testing Robotics Pages: 359-364 Published: 2016
5. Ciupe, Aurelia; Florea, Camelia; Orza, Bogdan; et al., A Bag of Words Model for Improving Automatic Stress Classification PROCEEDINGS OF THE SECOND INTERNATIONAL AFRO-EUROPEAN CONFERENCE FOR INDUSTRIAL ADVANCEMENT (AECIA 2015) Book Series: Advances in Intelligent Systems and Computing Volume: 427 Pages: 339-349 Published: 2016
6. Ciupe, Aurelia; Orza, Bogdan; Florea, Camelia; et al., Skill-Oriented Priority Scheduling for Solving the Resource Constrained Project Scheduling Problem 2015 IEEE 11TH INTERNATIONAL CONFERENCE ON INTELLIGENT COMPUTER COMMUNICATION AND PROCESSING (ICCP) Book Series: IEEE International Conference on Intelligent Computer Communication and Processing ICCP Pages: 85-92 Published: 2015
7. Ciupe, A.; Meza, S.; Vlaicu, A., DidaTec LMS as a Framework for Task Assignment Through Blended Learning Techniques International Conference on Social Media in Academia - Research and Teaching (SMART) Timisoara, ROMANIA SEP 18-21, 2014 SMART 2014 - SOCIAL MEDIA IN ACADEMIA: RESEARCH AND TEACHING Pages: 407-415 Published: 2015
8. Florea,Camelia, Gordan, Mihaela, Vlaicu, Aurel,et al., "Computationally Efficient Formulation of Sparse Color Image Recovery in the JPEG Compressed Domain", *Journal Of Mathematical Imaging And Vision*, Vol.49, Issue:1, Pp. 173-190, 2014
9. Moldovan, Roxana, Orza, Bogdan, Vlaicu Aurel, et al., "Advanced Human-Computer Interaction in External Resource Annotation", *IEEE 19th International Conference on Automation, Quality and Testing, Robotics*, Cluj Napoca, Romania,May 22-24, 2014
10. Z. I. Kiss, Z. A. Polgar, M. Giurgiu, and V. Dobrota, "Network coding based resource efficient congestion control for video streaming", *Telecommunication Systems*, vol. 55, pp. 499-512, Apr 2014.
11. Danciu, Marius, Gordan Mihaela, Florea Camelia, et al., "A Hybrid 3D Learning-and-Interaction-based Segmentation Approach Applied on CT Liver Volumes", *Radioengineering*, Vol.22, Issue 1,Special Issue: SI, Pp.100-113, Apr 2013

Products

www.didatec.ro – Learning content management system based on Microsoft technologies
www.e-start.ro – collaborative tool based on Moodle and Adobe Technologies
www.simac.utcluj.ro - SIMAC – sistem integrat de evaluare a activitatilor didactice, de cercetare si manageriale

The offer addressed to the economic environment

Research & development	text to speech synthesis, automatic speech recognition, Interactive Voice Response Systems, collaborative cloud systems for project management, data and network security, unified communication solutions, digital transmission systems: evaluation, design and optimization, Computational intelligence based image processing and analysis systems, color image enhancement and restoration for cultural heritage applications, 3D perception using stereoscopic techniques, Integrated platforms and services for innovative applications in eHealth, eGovernment, eBusiness, eMedia, eLearning and eLiving,
Consulting	Multimedia applications in the context of the mobile social web, cloud computing Education management and the use of IT&C for teaching in different blended-learning or e-learning scenarios: virtual collaboration tools, seroius games, on-line social learning. Integrated platforms and electronic services for innovative applications in eHealth, eGovernment, eBusiness, eMedia, eLearning and eLiving.
Training	Audio-video systems engineering, video signal editing and processing, Complex aquistion and processing of visual information for augmented 3D reality, systems and application for processing / editing / rendering 3D video. Bi-modal (audio & video) and multimodal methods for image and video analysis

SPEECH PROCESSING RESEARCH GROUP

Contact details

Name	**Speech Processing Research Group**
Acronym	**SPEECH**
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Site	http://speech.utcluj.ro
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Faculty Department	**Faculty of Electronics, Telecommunications and Information Technology, Telecommunications Department.**
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Director	Prof. Dr. Eng. Mircea.Giurgiu
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Areas of expertise

Speech Processing:
- Automatic Speech Recognition (ASR): Deep Neural Networks (DNN) architectures (DeepSpeech, Transformer);
- Text to Speech Synthesis (TTS): systems based on Tacotron2, DCTTS, and FastPitch DNN architectures;
- Speaker diarization, Emotion and speaking style automatic recognition;
- Speaker anonymization to ensure privacy and security;
- Neural network-based speech vocoders;
- Voice assistants using conversational AI tools.

Text Processing:
- Sentiment analysis using dimensional and categorical models;
- Automatic question and answer systems in natural language using Deep Neural Networks;
- Natural Language Processing using machine learning techniques;

Team

Prof. Dr. Eng. Mircea Giurgiu, Conf.dr.ing. Adriana Stan, drd.ing. Alexandra Drobut, drd.ing. Mihai Ciobanca.
External collaborators: Prof. Jozsef Domokos (Univ. Sapientia), dr.ing. Alin Cordos (PixelData), Bodor Eva (Bosch)

Representative projects

ReTeRom – "Resources and technologies for developing human-machine interfaces in Romanian", PCCDI 2018 – 2020, http://speech.utcluj.ro/sintero
SWARA – "Mobile System for Rehabilitative Vocal Assistance of Surgical Aphonia" PN-II-PCCA, 2014-2017, http://speech.utcluj.ro/swara
Simple4All – "Speech synthesis that improves through adaptive learning" (EC-FP7, 2011-2014), http://simple4all.org
Sound2Sense – "Making sense of speech sounds" (EC-FP6, 2007-2011), http://www.sound2sense.eu
Text2Speech – "Development of software services for text to speech synthesis in Romanian language" (PN II INOVARE, 2008-2010);.
KeyToNature – (EC - eContent Plus, 2008-2010), http://www.key2nature.eu
EUROWEX – "Online platform using digital signature for the management of university activities" (EC – eTEN Trans European e-Services in the Public Interest, 2006-2008), http://www.eurowex.org
Pool2Business – "Project Organisation Online" (EC–EACEA-LLP, 2008-2010), http://www.pool2business.eu/

Significant results

The most representative publications of the past 5 years:

1. A. Stan, B. Lorincz, M. Nutu, M. Giurgiu, "The MARA Corpus: Expressivity in End-to-end TTS Systems using Synthesised Speech Data", The 11th Conf. on SPED 2021, Bucharest, 13-15 Oct. 2021.
2. B. Lorincz, A. Stan, M. Giurgiu, "An objective evaluation of the effects of recording conditions and speaker characteristics in multi-speaker deep neural speech synthesis", Procedia Computer Sciences, Vol. 192, pp. 756-765, 2021, Elsevier.
3. B. Lorincz, A. Stan, M. Giurgiu, "Speaker verification-derived loss and data augmentation for DNN-based multispeaker speech synthesis", Proc of EUSIPCO 2021.
4. Beata Lorincz, Maria Nutu, Adriana Stan, "Romanian Part of Speech Tagging using LSTM Networks", In Proceedings of the IEEE 15th International Conference on Intelligent Computer Communication and Processing, Cluj-Napoca, Romania, 2019.
5. Maria Nutu, Beata Lorincz, Adriana Stan,"Deep Learning for Automatic Diacritics Restoration in Romanian", In Proceedings of the IEEE 15th International Conference on Intelligent Computer Communication and Processing, Cluj-Napoca, Romania, 2019.
6. David A. Braude, Matthew P. Aylett, Caoimhin Laoide-Kemp, Simone Ashby, Kristen M. Scott, Brian O Raghallaigh, Anna Braudo, Alex Brouwer, Adriana Stan,"All Together Now: The Living Audio Dataset", In Proceedings of Interspeech, Graz, Austria, 2019
7. Adriana Stan, "Input Encoding for Sequence-to-Sequence Learning of Romanian Grapheme-to-Phoneme Conversion", In Proceedings of the 10th IEEE International Conference on Speech Technology and Human-Computer Dialogue (SpeD), Timisoara, Romania, 2019.
8. Stan, Adriana; Dinescu, Florina; Tiple, Cristina; et al., The SWARA Speech Corpus: A Large Parallel Romanian Read Speech Dataset International Conference on Speech Technology and Human-Computer Dialogue (SpeD), published 2017
9. Stan, Adriana; Valentini-Botinhao, Cassia; Orza, Bogdan; et al., BLIND SPEECH SEGMENTATION USING SPECTROGRAM IMAGE-BASED FEATURES AND MEL CEPSTRAL COEFFICIENTS 2016 IEEE WORKSHOP ON SPOKEN LANGUAGE TECHNOLOGY (SLT 2016) Pages: 597-602 Published: 2016
10. Moldovan, Alexandru; Stan, Adriana; Giurgiu, Mircea, Improving Sentence-level Alignment of Speech with Imperfect Transcripts using Utterance Concatenation and VAD 2016 IEEE 12TH INTERNATIONAL CONFERENCE ON INTELLIGENT COMPUTER COMMUNICATION AND PROCESSING (ICCP) Book Series: IEEE International Conference on Intelligent Computer Communication and Processing ICCP Pages: 171-174 Published: 2016
11. Adriana Stan, Yoshitaka Mamiya, Junichi Yamagishi, Peter Bell, Oliver Watts, Rob Clark, Simon King, "ALISA: “An automatic lightly supervised speech segmentation and alignment tool", In *Computer Speech and Language*, vol. 35, pp. 116-133, 2016

Significant solutions:

Voice cloning in TTS using small amount of speech data, Automatic alignment of speech and text data, Improve the speech synthesis by improved speaker similarity, Accent prediction in text using only speech data, Text processing using Finite State Transducers, Statistical language modelling for speech recognition and text to speech synthesis, Blind speech denoising and dereverberation, Automatic speech segmentation at syllable level, Unsupervised and language independent syllabification using statistical methods, Broadcast news speaker diarization and speech music discrimination, Emotion and speaking style recognition from audiobook data; Sentiment polarity prediction using categorigal and dimensional models, Polarity prediction using Vector Space Models,

Products and technologies:

1. RONNA – ROmanian Neural Network Api for Speech Synthesis (http://speech.utcluj.ro/ronna)
2. ALISA - A lightly supervised speech segmentation and alignment tool;
3. TUNDRA - A corpus of 14 European languages collected from audiobooks;
4. NORMA - Statistical machine translation-based text NORMAlization tool;
5. DEXTER - Speaker recognition and diarization in audio-video talk shows;
6. AUDIOOR - AUDIO Online Repository, a web based repository of audio and text resources;
7. VoiA – Voice Assistance tool using the conversational AI tool Nvidia NeMo;
8. SENTIMENT - Sentence polarity predictor for SENTIMENT analysis;
9. TextPREDICT - Fast Text input PREDICTionon mobile devices.

The offer addressed to the economic environment

Research & development	Text to speech synthesis integrated in specific solutions for telecommunications, Automatic speech recognition and assistive technologies for human computer interface, Interactive Voice Response Systems, Online multimedia repositories using intelligent indexing and content searching.
Consulting	Multimedia technologies, data modelling, data mining, advanced methods for signal processing, eLearning solutions, project management, data security.
Training	Speech Processing, Statistical methods for data processing, Microprocessor-based systems.

ITEC – EMBEDDED GROUP

Contact details

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Areas of expertise

Embedded systems for Automotive
- Circuit design: modeling, simulation and cross-simulation of electronic circuits (analog, digital, power, RF/EMI) using: Multisim, Pspice, Matlab, Pcad;
- System design: modeling and simulation for electro-mechanical systems: power devices, actuators, mechatronics; using: Matlab, Simulink, LabVIEW;
- HW Application design: fast-prototype design, PCB design for mass production, BOM/AVL design, DfT and testability for embedded applications, power supplies, interface/signal conditioning boards;
- SW Application design: embedded control applications for OS and non-OS targets, broad range of targets (from small 8bit up to TriCore), V-modell development for SW, SW re-use;
- TW Application design: testing and design of testing systems: SW and HW testing process, HiL and SiL, design of test-cases for SW;
- Training services: LabVIEW trainings, Embedded Systems trainings, TW and HiL operation;
Power systems
- design, simulation and testing of power supplies with power factor correction
- PLC (Power Line Communication) for energy measurements equipment
- inductive heating technologies
SCADA systems
- control for automotive systems
- heating/oven control
- control systems for electrical motors
- data loggers for power industrial control, medical apps
Certifications
LabVIEW Certified Developer, FMEA Specialist, Zuken Sch & PCB, Mentor Graphics PI & SI

Team

Prof. Dr. Eng. Dan Pitica, Prof. Dr. Eng. Ciascai Ioan, Assoc. Prof. Dr. Eng. Gabriel Chindriş; Prof. Dr. Eng. Ovidiu Pop, Assoc. Prof. Dr. Eng. Liviu Viman, Assoc. Prof. Dr. Eng. Septimiu Pop, Lect. Dr. Eng. Vlad Bande, Lect. Dr. Eng. Mihai Dărăban, Lect. Dr. Eng. Raul Fizeșan, Lect. Dr. Eng. Rajmond Jánó, Lect. Dr. Eng. Adrian Tăut, Lect. Dr.Eng. Ionel Baciu, Assist.Dr. Eng. Alexandra Fodor, PhD student Eng. Marius Taut; PhD student Eng. Adelina Ilies; PhD student Eng. Elena Mirela Stetco, Eng. Aurelia Haragus;

Representative projects

"**Test environment development for ECU/TCU software for Continental AG, Germany**" – director Assoc.Prof. Gabriel Chindriş, PhD;
"**Development and maintenance of a SIL/HIL testing model for automotive ECU/TCU for Continental AG, Germany**"

– director Assoc.Prof. Gabriel Chindriş, PhD;
"**Induction Cooking Project**", research project no. 3/5.03.2008, Diehl-AKO Stiftung&Co.Kg Germany – director lect. eng Ovidiu Pop, PhD;
"**Stop/Start System for double clutch TCU**" - Continental AG, Germany – director Assoc.Prof. Gabriel Chindriş, PhD;
"**Embedded Data Logger for Heart Rate**" – Blatand GmBH, Germany - director Assoc.Prof. Gabriel Chindriş, PhD;

Significant results

The most representative publications of the past 5 years:

1. Alexandra Fodor, Gabriel Chindris, Rajmond Jano, and Dan Pitica, Thermal Modelling and Simulation Techniques for Multicore Processors, 42nd International Spring Seminar on Electronics Technology, ISSE 2019, Wroklaw, Poland, ISBN 978-83-7493-070-3
2. Marius Alexandru Taut, Gabriel Chindris, and Dan Pitica, Real-Time System with Integrated PID Algorithm used for DC Motor Control, 42nd International Spring Seminar on Electronics Technology, ISSE 2019, Wroklaw, Poland, ISBN 978-83-7493-070-3
3. Adelina Ioana Ilieș, Ioan Ciascai, and Dan Pitică, Methods for Reusing Li-ion Cells from Discarded Battery Packs, 42nd International Spring Seminar on Electronics Technology, ISSE 2019, Wroklaw, Poland, ISBN 978-83-7493-070-3
4. Mihai Alexandru Ilie, Elena-Mirela Stetco, Liviu Viman and Dan Pitica, AC Coupled Instrumentation Amplifier with Gyrators, 42nd International Spring Seminar on Electronics Technology, ISSE 2019, Wroklaw, Poland, ISBN 978-83-7493-070-3
5. Adelina Ioana Ilies, Dan Pitica, Gabriel Chindris, Alexandra Fodor, Test Bench for Electrical and Performance Evaluation of Lithium-Ion Batteries, 2019 IEEE 25th International Symposium for Design and Technology in Electronic Packaging (SIITME), **ISBN:** 978-1-7281-3330-0
6. V. Bande, S. S. Pop, Triaxial Vibrating – Wire Transducer Implementation and Measurements, 2019 IEEE 25th International Symposium for Design and Technology in Electronic Packaging (SIITME), **ISBN:** 978-1-7281-3330-0
7. S. Pop, V. Bande, Digital Processing Method used to Improve the Frequency Measurement Accuracy for Vibrating-Wire Transducers, 2019 IEEE 25th International Symposium for Design and Technology in Electronic Packaging (SIITME), **ISBN:** 978-1-7281-3330-0
8. M.A. Dăbâcan, L. Viman, and V. Bande, New Laboratory Concept Used with the Data Acquisition System Fundamentals Course, 2019 IEEE 25th International Symposium for Design and Technology in Electronic Packaging (SIITME), **ISBN:** 978-1-7281-3330-0
9. R. G. Voina, L. Viman and D. Pitica, Enhanced Stack-up for EMC, SI and PI in Mixed-Signal Systems, 2019 IEEE 25th International Symposium for Design and Technology in Electronic Packaging (SIITME), **ISBN:** 978-1-7281-3330-0
10. M. A. Taut, G. Chindris, and D. Pitică, PID Algorithm used for DC Motor Control, 2018 IEEE 24th International Symposium for Design and Technology in Electronic Packaging (SIITME), ISBN: 978-1-5386-5577-1
11. I. M. Alexandru, A. Grama, L. Viman and D. Pitica, FFT Radix2 Core implemented on FPGA with DSP48 slices, 2018 IEEE 24th International Symposium for Design and Technology in Electronic Packaging (SIITME), ISBN: 978-1-5386-5577-1
12. R. Fizesan, and O. Pop, PI timing measurements in high speed flash memory embedded systems, 2018 IEEE 24th International Symposium for Design and Technology in Electronic Packaging (SIITME), ISBN: 978-1-5386-5577-1
13. Marius Alexandru Taut, Gabriel Chindris, Adrian Catalin Taut, and Dan Pitica, Model-in-the-Loop for Determining the Speed and Position of a DC Motor, 41st International Spring Seminar on Electronics Technology (ISSE), Zlatibor, Serbia, ISBN: 978-1-5386-5731-7, ISSN: 2161-2536
14. Adrian Taut, Gabriel Chindris, Mihai Daraban, Marius Taut, Resonant Power Converters used for Wireless Power Transfer, 41st International Spring Seminar on Electronics Technology (ISSE), Zlatibor, Serbia, ISBN: 978-1-5386-5731-7, ISSN: 2161-2536
15. Elena Mirela Stetco, Ovidiu Aurel Pop, Alin Grama, Doris Csipkes, Design, Modelling and Simulation of a Fifth Order Low-Pass Gm-C Filter, 2018 41st International Spring Seminar on Electronics Technology (ISSE), Zlatibor, Serbia, ISBN: 978-1-5386-5731-7, ISSN: 2161-2536 , DOI: 10.1109/ISSE.2018.8443770 , WOS:000449866600091
16. Elena-Mirela Stetco; Ovidiu Aurel Pop; Alin Grama; Doris Csipkes ; Emilian Ceuca, Design and Simulation of a Sixth Order Band-Pass Gm-C Filter, 2018 IEEE 24th International Symposium for Design and Technology in Electronic Packaging (SIITME), ISBN: 978-1-5386-5577-1, DOI: 10.1109/SIITME.2018.8599271
17. Daraban, Mihai; Chindris, Gabriel; Taut, Adrian; et al., Uncertainty Budget for Hardware-In-the-Loop Test System 41st International Spring Seminar on Electronics Technology (ISSE) Location: Zlatibor, SERBIA Date: MAY 16-20, 2018, Book Series: International Spring Seminar on Electronics Technology ISSE Published: 2018

The offer addressed to the economic environment

Research & development	Calculus, design, simulation and analysis of power electronics circuits; Numerical methods of analysis; Control algorithms;Transducers physics;Electronic materials; Software, hardware and testware for embedded systems; Real-time measurements;Power electronics;Power dam SCADA systems; Applied electronics for white-goods;
Consulting	Electronics circuits and devices modeling and simulation; IP and patent analysis; Test equipment proof-of-concept; Design for technological transfer (DFx); EMI/EMC in PCB; PCB/PWB design; Software for embedded; Measurement, analysis and simulation for electronics;Real-time systems calibration; Design of electronics systems;
Training	LabVIEW training; Training for modeling and simulation; Training for embedded and real-time systems; Training for PCB design; Training for measurements, analysis and testing;

DIGITALLY ENHANCED ANALOG AND RF INTEGRATED CIRCUITS

Contact details

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Acronym	**DERFAIC**
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Site	http://www.icdesign.utcluj.ro/
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Faculty Department	**Faculty of Electronics, Telecommunications and Information Technology** **Basis of Electronics Department**
Telephone	+40 264 401243, +40 264 402454
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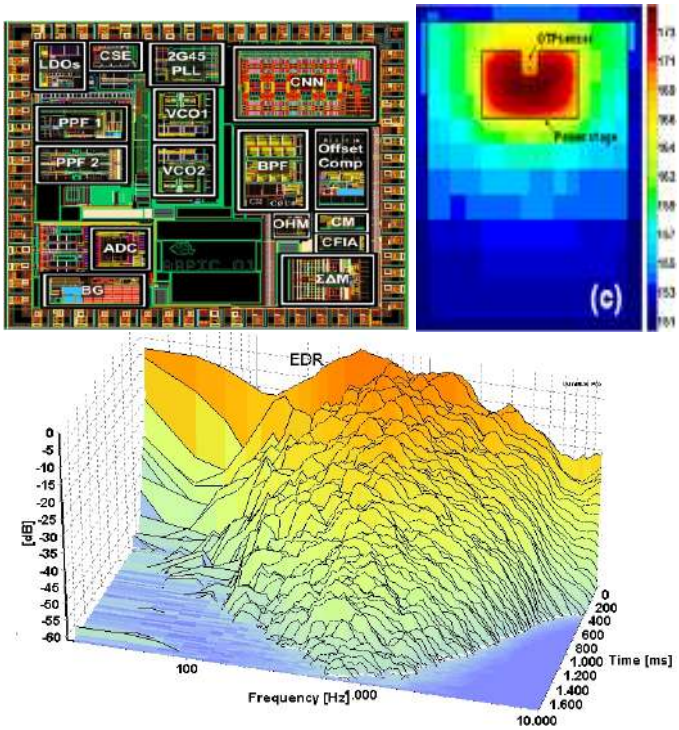


Areas of expertise

Design of RF, Analog and Mixed–Signal Integrated Circuits
- High performance Power Management circuitry, including Energy harvesting and conversion
- Reconfigurable and programmable analog circuits; Analog Front-Ends for sensors
- Digitally-intensive frequency synthesizers and Low-power radio transceivers

Circuit and Signal Theory and Applications
- Systematic and optimized design of analog and digital circuits; Feedback theory & stability
- System modelling and analysis; Electro-thermo-mechanical 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

Methodologies for optimized design and testing of electronic circuits and systems
- Multivariate performance analysis for application verification. Yield analysis.
- Automated pre- and post-silicon verification methods

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

Team

Prof. Dr. Marina Topa, Assoc.Prof. Dr. Marius Neag, Assoc.Prof. Dr. Botond-Sandor Kirei, Lect. Dr. Ioana Sărăcuţ, Lect. Dr. Erwin Szopos, Lecturer Dr. Raul Onet, Assist. Prof. Dr. Călin Fărcaș, Dr. Ingrid Kovacs, 10+ PhD and Master students

Representative projects

HELP - Home Electronic Laboratory Platform; Erasmus+ ; Grant No. 2020-1-IE02-KA226-HE-000786, 2021-2023
PartEnerIC - Parteneriate pentru transfer de cunoștințe şi tehnologie în vederea dezvoltării de circuite integrate specializate pentru creșterea eficienței energetice a noilor generații de vehicule, POC2014, Ctr.19 (2016-2022)
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)
NAPOSIP – "New Approaches to Analyzing and Designing High Frequency Sintetizers Performance for Modern Communication Systems", PNIII 43 BG/2016 (2016-2018), https://naposip.utcluj.ro/node/1
"Regulatoare LDO integrate de mare performanță ("High-performance integrated LDO regulators", R&D Consultancy for Romanian industrial partner, 2021-2022
"Analog Front-End for Automotive Sensors", R&D Consultancy for foreign industrial partner, 2015-2017
"Optimized power-management circuits for automotive applications", R&D Consultancy, RO partner, 2014-2017
"Analog Front-End for Automotive Sensors", R&D Consultancy for foreign industrial partner, 2015-2017
"New Methodologies for multivariate performance analysis", R&D Consultancy for RO industrial partner, 2014-2016

Significant results

Representative publications in the last 5 years:

1. 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
2. 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,
3. 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
4. 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,
5. 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,
6. P. Coste, I. Kovács, M. Neag, A. -T. Grăjdeanu, V. -A. Ionescu and M. D. Ţopa, "Type-II Compensation for Automotive Buck Converters Implemented by Fully Integrated Capacitor Multiplier," in IEEE Access, vol. 10, 2022,
7. V. Beleca, C.-S. Pleșa, R. Onet, M. Neag, "Methods for Assessing the Stability of Conditionally Stable Circuits by Using Small-signal Simulations", ROMJIST, Volume 25, No 2, 2022, pages 205-223
8. I.Sularea, C.Răducan, M.Neag, - "High Power Supply Rejection Capacitor-less Low Dropout Regulators Based on High Slew Rate Symmetrical Operational Transconductance Amplifiers", ROMJIST, Vol. 25, No 2, 2022, pp 179-204
9. P. Miresan, M. Neag, M. Topa, I. Kovacs, L. Vărzaru, "Multipurpose Drivers for MEMS Devices Based on a Single ASIC Implemented in a Low-Cost HV CMOS Process Without Triple Well", Journal of Sensors, vol. 2021
10. G. Petrasuc, P.Miresan, M. Neag, C. Chira, "A Novel Full-Wave Current Sensor for Automotive Synchronous Buck Converters"- ROMJIST, Volume 24, Number 2, June 2021, pages 161-181
11. Marius Neag, István Kovács, Raul Oneț, Iulian Câmpanu, "Design options for high-speed OA-based fully differential buffers able to drive large loads", Microelectronics Journal, Volume 114, (2021), 105115,
12. Paul Coste, Paul Mărtari, Marius Neag, Marina Topa, Vlad Ionescu, "Programmable Capacitor Multiplier Based on Gm-cell with Two Outputs – Topology, Circuit Implementations and Applications" - Romanian Journal of Information Science and Technology, Volume 24, Number 1, March 2021, pages 4–27
13. Fărcaș, C.A., Szopos, E., Sărăcuț, I., Neag, M., Topa, M.D. - Experiments on Multiple-point Room Equalization Applied to Medium-sized Enclosed Spaces. Acoustical Physics, vol 67, issue 5, pp. 537–552 (2021).
14. Paul Miresan , Raul Onet, Marius Neag, Marina Topa, Cosmin Chira – "Design options for implementing in standard CMOS drivers for MEMS body biasing", Microelectronics Journal, vol. 97 (2020) 104705
15. C. Răducan, A.-T. Grăjdeanu, C.-S. Plesa, M. Neag, A. Negoiță, M. Țopa – "LDO with Improved Common Gate Class-AB OTA Handles any Load Capacitors and Provides Fast Response to Load Transients", IEEE Trans. on Circuits and Systems I - Regular Papers, vol 67, issue 11, November 2020, pp. 3740-3752
16. N. Braic, C.Răducan, M. Neag, M.Țopa, V.Ionescu, " Ascertaining the root-cause of discrepancies between simulations and measurements for a SC DC-DC converter", ROMJIST, Vol. 23, No 4, 2020, pages 333 - 353
17. C.-S. Plesa, B. Dimitriu, M.s Neag – Design Options for Thermal Shutdown Circuitry with Hysteresis Width Independent on the Activation Temperature, *Advances in Electrical and Computer Engineering*, Vol. 19, No 1, 2019,
18. C.-S. Plesa, M. Neag, C. Boianceanu - "Design of Over-Temperature Protection for Switched-Capacitor DC-DC Converter Based on Electro-Thermal Simulations", *ROMJIST*, Volume 22, Number 2, 2019, pages 144–157
19. B.S.Kirei, V.I.M. Chereja, S.Hintea, M.D.Ţopa, "PAELib: A VHDL Library for Area and Power Dissipation Estimation of CMOS Logic Circuits", *Advances in Electrical and Computer Engineering,* Volume 19, Number 1, pp. 9-16, 2019

Patents:

D. Petreus, M. Neag, B. Morley – Improved MPPT control for PWM-based DC-DC converters with average current control, Republic of Ireland, 2010, IES20100461 (A2), WO2012010613 (A1)

M. Neag, M. McCullagh, G. Marow, M. McLaughlin, I. Kovács - Frequency Comparator and Early-Late Detector, US patent 2015, US20160191035

Cristian Răducan, Alina-Teodora Cirlescu, Marius Neag - "Voltage regulator and method of voltage regulation, German patent 2021, DE102020115851B3

Product realized for industrial beneficiaries:

1. Low-power, high-performance Low dropout voltage regulators, DC-SC converters with and without inductors
2. High-Voltage LDO for automotive applications: IC designed for Infineon Technologies Romania, in mass production
3. Analog Front-End for automotive sensors – integrated in 0.18um CMOS technology, for Melexis Technologies NV,
4. Frequency synthesizer integrated within an UWB transceiver produced in 90nm technology

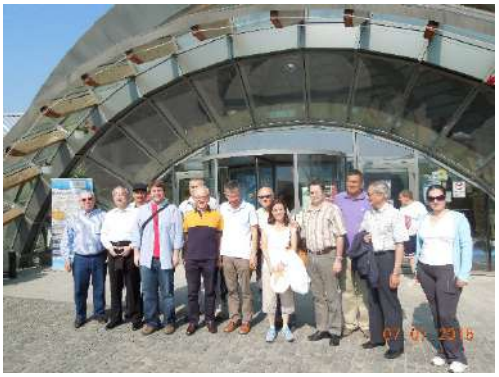
The offer addressed to the economic environment

Research & development	Low-Power, High-Performance RF, Analog and Mixed-signal Integrated Circuits and Systems Development of adaptive filters for processing of non-stationary signals by non-linear systems Design of electronic systems and circuits using advanced modelling and optimization methods Adaptive filters for signal processing and system analysis, with applications in acoustics Electronic systems and circuits for harvesting power from un-conventional energy sources
Consulting	Analysis and design of analog, RF and mixed-signal integrated circuits Analysis and design of digital systems, including FPGA and/or ASIC implementation Design of electro-acoustic systems – echo cancellation, reverberation, signal separation, equalization
Training	Systematic & Optimized Design of RF, Analog and Mixed-Signal Integrated Circuits

SIGNAL PROCESSING GROUP

Contact details

Name	**Signal Processing Group**
Acronym	**SPG**
Logo	Signal Processing Group
Site	www.sp.utcluj.ro
Address	26-28 G. Bariţiu Str., 400027, Cluj-Napoca, Romania
Faculty Department	**Faculty of Electronics, Telecommunications and Information Technology** **Bases of Electronics Department**
Telephone	+40 264 202382
Fax	+40 264 591689
Director	Prof. Dr. Eng. Corneliu Rusu
e-mail	Corneliu.Rusu@bel.utcluj.ro



RTSP 2015
https://sp.utcluj.ro/RTSP2015/HomeRTSP2015.html

RTSP 2017
https://sp.utcluj.ro/RTSP2017/HomeRTSP2017.html

Areas of expertise

Adaptive filters for data echo cancellation – A family of stochastic gradient algorithms and their behaviour in the data echo cancellation work platform have been studied. The cost function adaptation algorithms use an error exponent update strategy based on an absolute error mapping, which is updating at every step. Performances similar to standard variable step-size methods have been obtained.
Signal reconstruction and phase retrieval – The phase retrieval problem is to reconstruct a signal given the modulus of its Fourier transform. This problem is associated with various applications including antenna design, filter design, image reconstruction. Recent research results relate phase retrieval to properties of zero-phase sequences or trigonometric polynomials.
Extracting a digital elevation model from a colour-coded relief scanned map – The focus of the project is in extracting a digital elevation model (DEM) from a colour-coded relief scanned map. The map is pre-processed in order to remove the dithering effect that appears during the printing process. For the pre-processing we propose a WHMM based algorithm, which preserves better the thin edges than the vector median filtering.
Exploration of singing voice individuality – The human voice is the result of a complex biological mechanism. It carries out information about our thoughts, feelings, and state of health. This great amount of information of different types can be extracted and interpreted. A new research domain is the acoustic configuration of the vocal sounds in singing. The singing voice analysis is useful for training singers in a professional manner.
Audio based solutions for detecting intruders in wild areas – The motivation of such an application is related to protection of large wildlife regions, such as forests, lakes, and other natural reservations. The sounds of interest are represented by humans, engines, birds and animals. In order to simulate various environmental situations, different types of noisy environments have been considered. Both low complexity and standard audio classification methods are delivered. Standard audio classification methods prove to be more robust, but at an expense of significantly increased complexity. Since low complexity systems are more feasible for monitoring remote areas, the complexity issue is analyzed and solutions are proposed.

Team

Prof. Dr. Eng. Corneliu RUSU, Assoc. Prof. Dr. Eng. Lăcrimioara GRAMA, Lecturer. Dr. Eng. Alexandru LODIN, Dr. Marius Claudiu POPESCU, Phd. Students Andrei CIUPARU, Toma TELEMBICI, Lorena MUSCAR, Horatiu POP

Representative projects

OMNI-Z – "Versatile and economically viable robotic platform for indoor navigation in cluttered environments with obstacles", PN-III-P2-2.1-PTE-2019-0867, (2020-2022), http://www.citst.ro/projects/omni-z/
SASID – "Smart Acoustic Sensor for Intruder Detection", PN-III-P2-2.1-PED-2016-1608, (2017-2018), https://sp.utcluj.ro/SASID2017/HomePage.html
ROXAC – "Improving contextual awareness of a robot through the analysis of acoustic information", PN-III-P2-2.1-BG-2016-0378, https://sp.utcluj.ro/ROXAC2016/HomePage.html
PAV3M – "Intelligent management system, monitoring and maintenance of pavements and roads using modern imagistic techniques", PCCA (2014-2016), http://193.231.19.17/PAV3M/
RTSP 2015, "International Workshop on Recent Trends on Signal Processing" http://sp.utcluj.ro/RTSP2015/HomeRTSP2015.html **(2015)**
SpeD, **"The 7th International Conference on Speech Technology and Human-Computer Dialogue"**, http://www.sped2013.ro/ (2013)
SPAMEC, **"Signal Pocessing and Applied Mathematics for Electronics and Communication"**, ANCS, http://sp.utcluj.ro/SPAMEC/HomeSPAMEC2011.html (2012)
SPSWC, **"Signal Processing Systems for Wireless Communications"**, CNCSIS, http://sp.utcluj.ro/SPSWC/HomeSPSWC2008.html (2008)

Significant results

The most representative publications of the past 5 years:

1. C. Rusu, L. Grama, "Analog Phase Samples Approximation from Gain Samples by Discrete Hilbert Transform", Circuits, Systems, and Signal Processing, 2022.
2. L. Grama, L. Muscar, C. Rusu, "Sound Classification Algorithms for Indoor Human Activities", 2021 16th International Conference on Engineering of Modern Electric Systems (EMES)
3. O. Pop, C. Rusu, L. Grama, "Acoustic monitoring of outdoor areas by a sensor consisting of four microphones", 2021 International Symposium on Signals, Circuits and Systems (ISSCS)
4. L. Muscar, L. Grama, C. Rusu, "Sound Classification by the TIAGo Service Robot for Healthcare Applications ", 2021 International Symposium on Signals, Circuits and Systems (ISSCS)
5. C. Popescu, L. Grama, C. Rusu, "A Highly Scalable Method for Extractive Text Summarization Using Convex Optimization", Symmetry, Vol. 13 (10), 2021
6. T. Telembici, L. Grama, L. Muscar, C. Rusu, "Results on the MFCC extraction for improving audio capabilities of TIAGo service robot", 2021 International Conference on Speech Technology and Human-Computer Dialogue (SpeD),
7. C. Popescu, C. Rusu, L. Grama, "Word Embeddings for Romanian Language and Their Use for Synonyms Detection", 2021 International Conference on Speech Technology and Human-Computer Dialogue (SpeD)
8. P. Rarago, L. Grama, M. Farago, S. Hintea, "A Novel Wearable Foot and Ankle Monitoring System for the Assessment of Gait Biomechanics ", Applied Sciences, Vol. 11 (1)
9. L. Grama, C. Rusu, "Extending Assisted Audio Capabilities of TIAGo Service Robot," International Conference on Speech Technology and Human Computer Dialog (SpeD 2019), 10-12 Oct. 2019, Timisoara, Romania, pp. 1-8, DOI: 10.1109/SPED.2019.8906635
10. A. Lodin, L. Grama, C. Rusu," Python Implementation of the State-Space Method to Convert Analog Filters Described by a Netlist to Digital Filters," 6th International Symposium on Electrical and Electronics Engineering (ISEEE 2019), 18-20 Oct. 2019, Galati, Romania
11. C. Popescu, L. Grama, C. Rusu, "Automatic Text Summarization by Mean-absolute Constrained Convex Optimization," 41st International Conference on Telecommunications and Signal Processing (TSP 2018), pp. 706-709, July 4-6, 2018, Athens, Greece, DOI: 10.1109/TSP.2018.8441416, WOS: 000454845100158
12. L. Grama, C. Rusu, "Adding audio capabilities to TIAGo service robot," 13th International Symposium on Electronics and Telecommunications (ISETC 2018), pp. 263-266, November 8-9, 2018, Timișoara, Romania, DOI: 10.1109/ISETC.2018.8583897, WOS: 000463031500059
13. A. Lodin, L. Grama, C. Rusu, "From bulky analog active filters to digital filters," 13th International Symposium on Electronics and Telecommunications (ISETC 2018), pp. 271-274, November 8-9, 2018, Timișoara, Romania, DOI: 10.1109/ISETC.2018.8583912, WOS: 000463031500061

See https://sp.utcluj.ro/SPGroup/SPG_Pub_Database.html for SPG publications.

The offer addressed to the economic environment

Research & development	Signal Processing Group makes research - in the core areas: signal reconstruction, adaptive filtering, compressive sampling, acoustic sensors, processing of signals obtained from specific sensors or from medical devices. - in the applied fields: sensor arrays, image processing, security and protection, intruder detection and forensics.
Consulting	Signal Processing Group provides consulting in the areas of digital signal and image processing, digital filtering, optical signal processing, computer analysis and synthesis of circuits, algorithms for signal processing, numerical methods, medical electronics, sensors and devices, wireless networks.
Training	Digital signal processing, digital filter design, adaptive filtering, signal modeling, mathematical methods for signal processing, applied statistics, optical processing and storage of information, Fourier optics.

INTEGRATED CIRCUITS AND SYSTEMS GROUP

Contact details

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Faculty Department	**Faculty of Electronics, Telecommunications and Information Theory** **Basis of Electronics Department**
Telephone	+40 264 401227
Fax	+40 264 591340
Director	Prof. Dr. Eng. Sorin Hintea
e-mail	Sorin.Hintea@bel.utcluj.ro

Areas of expertise

Design of mixed analog/digital circuits for telecommunication systems
The study and the development of some analog adaptive circuits, aimed for the practical realization of the "software defined radio" concept. The emphasis was the development of some reconfigurable filter architectures with programmable parameters, and their digital control with evolutionary methods.
Design of low-power programmable analog/mixed-signal circuits for biomedical applications
The development of some analog programmable circuits, aiming for bio-potential monitoring, bio-sensing and electro-stimulation of the human tissue. The emphasis was signal acquisition (amplification and artefact removal), signal processing (determination of the ECG or EMG morphology) and
correlation of the physiological measurements.
Application of computational intelligence / deep learning techniques
Development and implementations of applications based of computational intelligence / deep learning techniques: analysis and design of some analog circuits; modelling (function fitting, pattern recognition, prediction); control applications; deep neural network implemented in Python.
Optoelectronics and photonics with optical communications
Applications with optical distributed sensors; Modelling and simulation of the special optical fibres (LMA, rare earth doped fibres); applications with optical biosensors based on plasmonic effect and fluorescence; optical integrated circuits modelling and simulation; photonic point-of care platforms with VR/AR capabilities; wearable devices based on embedded systems.
Advanced design techniques of analog and digital integrated circuits
The design of complex electronic circuit structures under the Mentor Graphics and Cadence design environment: reconfigurable circuits with applications in auditory prosthesis, transmission of the biomedical parameters over an electromagnetic link, radiofrequency receptors, low-power integrated circuits.

Team

Prof. Dr. Eng. Sorin Hintea, Prof. Dr. Eng. Gabriel Oltean, Assoc. Prof. Dr. Eng. Ramona Galatus, Assist Prof. Dr. Eng. Gabor Csipkes, Assist Prof. Dr. Eng. Paul Farago, Assist Prof Eng. Lorant Szolga, Asist prof Emilia Sipos, Asist prof Laura Ivanciu, Assoc. Prof. Dr. Doris Csipkes, Asist prof Robert Groza, Asist prof Albert Fazakas, Assoc. Prof. Dr. Eng. Mihaela Cirlugea, Teacher Assistant, PhD student Adriana Potarniche

Representative projects

ERANET-„ Innovative Technological Approaches for validation of Salivary AGEs as novel biomarkers in evaluation of risk factors in diet-related diseases" , UMF Cluj, https://salivages.wordpress.com/team/ (2018-2021)
DAM-FU – "Intelligent hydro-dams behavior monitoring system through information fusion", PN-III-CERC-CO-PTE-2016, 2016-2018.
nSensOFWater – "Nano-Enabled Optical Fiber Biosensor Device with Smartphone Interface for Fast and Selective Detection of Antibiotics in Water", PN-III-P2-2.1-PED-2016-0172, (2017-2018), http://www.bel.utcluj.ro/~galatusr/PED67UEFISCDI.html
"**Design of a portable biomedical monitoring system with intelligent parameter control**", CICDI-2017, 2000/12.07.2017 (2017-2018)

StableNextSo – "Stable Next-Generation Photovoltaics: Unraveling degradation mechanisms of Organic Solar Cells by complementary characterization techniques" FP7-COST MP1307 (I), (2014-2018) link: https://www.cost.eu/actions/MP1307
PARTING -"**Design of some integrated circuits for biomedical applications using evolutionary computation techniques**" POSDRU/159/1.5/S/137516 „Parteneriat interuniversitar pentru excelenta in inginerie - PARTING"
"**Design of analog reconfigurable circuits using evolutionary algorithms for fourth generation mobile communication terminals**" (IDEI 657/2009-2011)
INTEREVISS – "**Serviciu interactiv, in timp real pentru cresterea sigurantei publice in aglomerari urbane**", PN-II-PT-PCCA-2013-4, 2014 (2014-2016).
"European Network for High Performance Integrated Microwave Photonics", HORIZON2020-COST-CA16220 (4 Oct 2017-3 Oct 2021), Link: https://www.cost.eu/actions/CA16220
"Advanced Fibre Laser and Coherent Source as tools for Society, Manufacturing and Lifescience", (10 Dec 2014-9 Dec 2018), HORIZON2020- COST-MP 1401 Link: https://www.cost.eu/actions/MP1401 ,
"Innovative methods in radiotherapy and radiosurgery using synchrotron radiation", HORIZON 2020-COST-TD1205**-** (21 May 2013-20 May 2017), Link: https://www.cost.eu/actions/TD1205/

Significant results

The most representative publications of the past 5 years (2019-2015):

1. **Farago, P., Galatus, R., Hintea**, et al, An Intra-Oral Optical Sensor for the Real-Time Identification and Assessment of Wine Intake, SENSORS, Volume: 19 Issue: 21, Article Number: 4719, DOI: 10.3390/s19214719, NOV 2019
2. **R. Galatus, P. Farago**, et al, Distributed fluorescent optical fiber proximity sensor Towards a proof of concept, Spectrochimica Acta Part A-Molecular and Biomolecular Spectroscopy, vol. 198, pp. 7-18, 2018, ISSN: 1386-1425.
3. P**. Farago, R. Groza, S. Hintea**. High precision activity tracker based on the correlation of accelerometer and EMG data. 2019 42ND TSP Conference, JUL 01-03, 2019, Budapest, Hungary, pp. 428-431, ISBN:978-1-7281-1864-2
4. **P. Farago, R. Groza, L. Ivanciu, S. Hintea**. A Correlation-based Biometric Identification Technique for ECG, PPG and EMG. 2019 42ND TSP Conference, JUL 01-03, 2019,Budapest, Hungary,pp.716-719,ISBN:978-1-7281-1864-2
5. **Gabriel Oltean**, Victor Oltean, Horea Alin Balea, Method for Rapid Development of Arduino-based Applications Enclosing ANN, 45th Annual Conference of the IEEE Industrial Electronics Society, IEEE, Lisbon, Portugal, 14-17 Oct, 2019;
6. **Gabriel Oltean**, Camelia Florea, Radu Orghidan, Victor Oltean, Towards Real Time Vehicle Counting using YOLO-Tiny and Fast Motion Estimation , 25th International Symposium SIITME, IEEE, Cluj-Napoca, Romania, 23-26 October, 2019;
7. **Oltean, G, Ivanciu, Laura**, Implementation of a Fuzzy Logic-Based Embedded System for Temperature Control, IEEE 40th International ISSE2017, DOI: 10.1109/ISSE.2017.8001006, 10-14 May, Sofia, Bulgaria, 2017
8. **Oltean, G, Ivanciu, Laura**, Gordan, Mihaela, Stoian, I.,Kovacs, I., Predictive model for the horizontal displacement of a dam using autoregressive neural network, IEEE 21st International Conference INES 2017, Larnaca, Cipru, 20-23 octombrie, Electronic ISBN: 978-1-4799-7678-2 2017, 2017;
9. Blidar, A., Feier, B., Tertis, M., **Galatus, R.**, Cristea, C., Electrochemical surface plasmon resonance (EC-SPR) aptasensor for ampicillin detection, Anal Bioanal Chem (2019) 411: 1053. Doi: 10.1007/s00216-018-1533-5 (Impact factor= 3.28)
10. N Cennamo, F. Mattielo, **R. Galatus**, et al, Plasmonic sensing in D-shaped POFs with Fluorescent optical fibers as light sources, IEEE Transactions on Instrumentation & Measurement, Issue 4, April 2018, pp 754 - 759
11. C Cristea, M Tertis, **R. Galatus** -"Magnetic Nanoparticles for Antibiotics Detection, Nanomaterials 2017, 7(6), 119;
12. Cecilia Cristea, Florin Graur, **R. Galatus**, et al, Nanobiomaterials for Cancer Diagnosis and Therapy, INTERNATIONAL BOOKS- CHAPTER in "Nanobiomaterials: Applications in Drug Delivery, CRC Press, 2017
13. **Szolga, L. A.; Galatus, R.; Oltean, G.;** et al., Intrusion Detection System Based on Plastic Optical Fiber 2017 IEEE 23RD INTERNATIONAL SYMPOSIUM SIITME Pages: 403-408 Published: 2017

Diploma of Excellence and Medal Inventica 2019 - **Faragó Paul, Gălătuș Ramona-Voichița, Groza Robert-Gheorghe**, The XXIII International Exhibition of inventics „Inventica 2019", 26-28 June 2019, Iaşi, Romania.
Diploma and Silver Medal - **Faragó Paul, Gălătuș Ramona-Voichița, Groza Robert-Gheorghe**, Salonul Internațional de Invenții și Inovații "TRAIAN VUIA" Timișoara, 12-14 iunie, 2019, Romania.

The offer addressed to the economic environment

Research & development	Analog, digital and mixed-signal VLSI integrated circuit design methods; Analysis, synthesis and design techniques for current-mode analog VLSI circuits; Evolutionary techniques used in the synthesis of VLSI electronic circuits; Application development with HDL languages (Verilog, VHDL); Design and implementation of digital systems with FPGAs; Application of computational intelligence / deep learning techniques; Synthesis of some analog digital and mixed signal integrated circuits up to mask layer, using the Mentor Graphics and Cadence VLSI design environment;
Consulting	Analog, digital and mixed-signal design, non-conventional design techniques: neural networks, deep neural networks, fuzzy systems, genetic algorithms; optical sensors and optoelectronic systems; electronic and optoelectronic systems for biomedical applications
Training	The Integrated Circuits and Systems Group offers instruction/training in the following domains: computer aided design of analog and digital circuits; computational intelligence / deep learning techniques; photonic sensors and biosensors, optoelectronic systems; electronic systems for medical applications.

RENEWABLE ENERGIES GROUP

Contact details

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Director	Prof. Dorin Petreuș, PhD
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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 new topologies in the field of SMPS.

Digital Control
- Study and develop 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.

Team

Prof. Dorin Petreuș PhD, Assoc. Prof. Niculaie Palaghiță PhD, Assoc. Prof. Cristian Fărcaș PhD, Lecturer Toma Pătărău PhD, Lecturer Radu Etz PhD, Lecturer Ionuț Ciocan PhD, Lecturer Lazar Eniko PhD, Dan Filip PhD, Andreea Ignat PhD, Izsak Ferencz PhD, Gherman Tudor PhD, PhD student Anamaria Petri, PhD student Nicolae Alexandru Sârbu

Representative projects

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, http://helios-energy.utcluj.ro 2022 – 2024.

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.

MVDC-ERS - "Flexible medium voltage DC electric railway systems", H2020-S2RJU-OC-2018, (2018-2021)

MICROINV – "Microinverters with high power density and high efficiency for renewable energies" POC-A1-A1.2.3-G-2-15.

REMSIS, "Renewable energy management system used for small isolated communities", http://remsis.utcluj.ro/, (2013-2016)

MICROCCP, **"Miniaturized Equipment with Capacitively Coupled Plasma Microtorch and Analytical Technologies for Simultaneous Elemental Determination used in Environment and Foods control"**, http://www.chem.ubbcluj.ro/~edarvasi/Proiect/index.html (2012-2015)

INNOWECS, **"Innovative wind energy conversion micro-system with direct-driven electric generator for residential uses"**, http://innowecs.utcluj.ro/ (2012-2015)

FLUOROSPEC, **"Optoelectronic Equipment and Innovative Method of High Precision and Sensitivity Based on Non-conventional Fluorescence Spectrometry for Testing and Control of Some Environmental Agents"**, PNCDII,

(2008-2010) **TRANS-SUPERCAP**, **"Energy Optimized Electrical Systems for Land Transport using Batteries and Supercapacitors"**, PNII-P4, (2007-2009)

Significant results

The most representative publications of the past 5 years:

1. 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.
2. Sharifi Sina, Ferencz Izsák, Kamel Tamer, **Petreus Dorin**, Tricoli Pietro. Medium-voltage DC electric railway systems: A review on feeding arrangements and power converter topologies, 2022 IET Electrical Systems in Transportation. 12. 10.1049/ els2.12054, 2022.
3. Ferencz, I., & **Petreus, D**. (2021). A power electronic traction transformer model for a new medium voltage DC electric railway. Advances in Electrical and Computer Engineering, 21(3), 99-108. doi:http://dx.doi.org/10.4316/AECE.2021.03012. ISSN 1582-7445, 2021
4. Ignat-balaci Andreea, Szilagyi Eniko, **Petreus Dorin**. Advances in Electrical and Computer Engineering; Suceava Vol. 21, Iss. 4, pg. 89-98. DOI:10.4316/ AECE.2021. 04010, 2021.
5. Gherman, T; **Petreus, D**; Cirstea, MN, A Real Time Simulator of a Phase Shifted Converter for High Frequency Applications, ADVANCES IN ELECTRICAL AND COMPUTER ENGINEERING, Vol. 20, Issue: 3, pp. 11-22, ISSN: 1582-7445, DOI: 10.4316/AECE.2020.03002, 2020,.
6. **Dorin Petreus**, R. Etz, T. Patarau, I. Ciocan, Comprehensive Analysis of a High-Power Density Phase-Shift Full Bridge Converter Highlighting the Effects of the Parasitic Capacitances, Energies, vol. 13, issue 6, eISSN: 1996-1073, DOI: 10.3390/en13061439, 2020.
7. **Petreus, D**.; Etz, R.; Patarau, T.; et al., An islanded microgrid energy management controller validated by using hardware-in-the-loop emulators INTERNATIONAL JOURNAL OF ELECTRICAL POWER & ENERGY SYSTEMS Volume: 106 Pages: 346-357 Published: MAR 2019
8. Lazar, Eniko; **Petreus, Dorin**; Etz, Radu; et al., Software Solution for a Renewable Energy Microgrid EmulatorADVANCES IN ELECTRICAL AND COMPUTER ENGINEERING Volume: 18 Issue: 1 Pages: 89-94 Published: 2018

Significant solutions:

Power supplies with power factor correction, grid tied inverters, UPS, low/high power battery chargers from photovoltaic panels, maximum power point tracking algorithms, power optimizers for improving energy harvesting, bidirectional converters, battery equalizers, digital control applied in switched mode power supplies (DSPs, FPGA), class E amplifier for plasma generator, hybrid storage system using supercapacitors and battery packs, battery inverters, low power induction generators, energy management algorithms used in renewable energy microgirds, algorithms for sizing microgrids with renewable energies.

Products and technologies:

1. Design and implementation of switched mode power supplies/inverters; **2**. Embedded programming for DSPs (dsPIC and TMS328F28/F24) and microcontrollers (Microchip, TI, Atmega, 8051) with industrial applications; **3**. Design and implementation of systems for energy harvesting (photovoltaics, wind energy, geothermal and biomass); **4**. Power optimizers (Distributed maximum power point tracking systems)/microinverters for energy harvesting; **5**. Design and implementation of battery/supercapacitor chargers; **6**. Implementation of analog/digital control; **7**. Implementation of electronic systems to be used for chemical/medical experiments (plasma generator, magneto therapy, electrotherapy).

Patents: International

D. Petreus, M. Neag, B. Morley – "Improved MPPT-Control for PWM-based DC-DC converters with average current control", international no. WO 2012/010613 A1, January 26, 2012.

Patents: National

1. T. Frentiu, M. Ponta, E. Darvasi, A. Mihaltan, A. Mathe, S. Cadar, M. Senila, M. Frentiu, **D. Petreus**, R. Etz, F. Puskas, D. Sulea, Analizor miniatural de mercur utilizand spectrometria de emisie optica, OSIM Bucuresti, nr. 130186, 2014, RO130186 B1, 2020.
2. T. Frentiu, M. Ponta, E. Darvasi, S. Butaciu, S. Cadar, M. Senila, A. Mathe, M. Frentiu, **D. Petreus**, R. Etz, F. Puskas, D. Sulea, Analizor miniaturizat pentru determinarea simultana a elementelor din microprobe lichide prin spectrometrie de emisie optica, OSIM Bucuresti, nr. 131066, 2014, RO131066 B1, 2020
3. BIPOLAR CURRENT PULSE AMPLIFIER IN HYBRID BRIDGE WITH SYMMETRICAL CONTROL, Patent(s) no. RO128681-A2; RO128681-B1, 2018
4. Low power plasma generator at la low atmospheric pressure - OSIM Bucharest: Patent no. 128077/2016

The offer addressed to the economic environment

Research & development	Supporting local industry to be more competitively on the market by using applied research.
Consulting	Consultancy and applied research for the industrial or academic environment, according to the skills of the laboratory members: high efficient power supplies, digital control, embedded programming, system modeling and simulation and renewable energy.
Training	Specialized courses according to the skills of the laboratory members: high efficient power supplies, digital control, embedded programming, system modeling and simulation and renewable energy.

CELLULAR AND WIRELESS COMMUNICATIONS RESEARCH LABORATORY

Contact details

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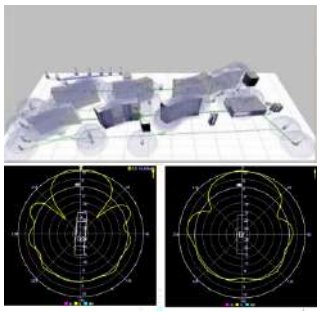

Areas of expertise

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), smart antenna arrays / MIMO systems (direction finding and beamforming), 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 sensor networks

Team

Prof. Tudor Palade, Prof. Emanuel Puschita, Lect. Andra Pastrav, Lect. Paul Dolea, Assist. Cristian Codau, Assist. Rares Buta

Representative projects

IntraSAT-Tech, Centre of competence for wireless Intra-SATellite Technologies, STAR 115/2016, ROSA, 2016-2019.
RDAntenna, Compact retro-directive wireless antenna network for wireless systems in IEEE 802.11 and IEEE 802.11 communication protocols, 6 SOL/2017, PNCDI III, 2017-2020.
SIRIUS, Ionospheric propagation predictions and wide-band communications with SDR sensors in the HF range for emergency informational support in Romania, PCCA, 2014 - 2016.
SIM-SCP, Implementation of an integrated system for acquisition and transmission of monitoring data from hazardous substances in Cluj, RO04-0006, SEE Grant, 2015 – 2016.
WiSAT, Wireless Communication Bus for Satellite Applications**,** ESA (European Space Agency), 2014-2015.
SMANT, New Algorithms for adaptive/smart antennas in 3G and post-3G communication systems, PN2, 2007-2010.
RAMA, Experimental weak radio signals monitor for ionospheric disturbances analysis, STAR, 2012-2014.
PABMAR, Integrated wireless platform of local access for broadband and mobility based on self-organizing resources, PN2, 2007-2010.
COSMOS, S band mobile satellite communications platform, PN2, 2007-2010.
CERVIT, Virtual network IT&C for education and research units geographical spread, PN2, 2007-2010.
4WARD, Architecture and design for the future internet, FP7-ICT, 2007-2009.
BROADWAN, Broadband services for everyone over fixed wireless access networks, FPVI, 2003-2006.
EMBRACE, Efficient millimeter broadband radio access for convergence and evolution, PCV, 1999-2002.
MARCH, Multilink architecture for multiply services, Eureka Cluster Project, 2008-2011.

Significant results

The most representative publications of the past 5 years:
Research Articles

1. Minteuan, G., Palade, T., Puschita, E., Dolea, P., Pastrav, A., "Monopulse Secondary Surveillance Radar Coverage—Determinant Factors", Sensors 2021, 21, 4198. WOS:000666787600001 https://doi.org/10.3390/s21124198.
2. 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. WOS:000660682900001. https://doi.org/10.3390/s21113600
3. Domuta, I. and Palade, T., "On-line Estimation of Base Station Location", in IEEE Wireless Communications Letters. 2019 (jurnal ISI, IF=3.546, Q1) https://doi.org/10.1109/LWC.2019.2953848.
4. Domuta, I., Palade, T.P., Puschita, E., Pastrav, A., "Timestamp Estimation in P802.15.4z Amendment", Sensors 2020, vol. 20(18), Article Number: 54225422, WOS: 000580143100001 (IF=3.275, Q1). https://doi.org/10.3390/s20185422
5. Popescu, D., Jacquet, P., Mans, B., Dumitru, R., Pastrav, A., Puschita, E., "Information Dissemination Speed in Delay Tolerant Urban Vehicular Networks in a Hyperfractal Setting", IEEE/ACM Transactions on Networking, vol. 27, no. 5, Oct. 2019, p. 1901-1914, doi: 10.1109/TNET.2019.2936636, WOS: 000502059800010. (IF=3.597, Q1). https://doi.org/10.1109/TNET.2019.2936636
6. 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, doi: 10.1109/CAMA49227.2021.9703524. WOS:000853691500024.
7. Buta, R., Codau, C., Pastrav, A., Palade, T., Dolea, P., Puschita, E., "Performance evaluation of sub-band MVDR beamforming for IEEE 802.11ac wideband signals", 2020 International Symposium on Electronics and Telecommunications (ISETC), Timisoara, Romania, 2020, pp. 1-4. WOS:000612681000087.
8. Padrah, Z., Pop, C., Jecan, E., Pastrav, A., Palade, T., Ratiu, O., Puschita, E., "An ISA100.11a Model Implementation for Accurate Industrial WSN Simulation in ns-3", 2020 International Workshop on Antenna Technology (iWAT), Bucharest, Romania, 2020, doi: 10.1109/iWAT48004.2020.1570616114, p. 1-4. WOS: 000627803200027.
9. Borz, I., Palade, T., Puschita, E., Dolea, P., Pastrav, A., "Wireless Sensor Networks for Healthcare Monitoring" In: Vlad, S., Roman, N.M. (eds) 7th International Conference on Advancements of Medicine and Health Care through Technology. MEDITECH 2020. IFMBE Proceedings, vol 88. Springer, Cham. https://doi.org/10.1007/978-3-030-93564-1_26
10. Pastrav, A., Dolea, P., Puschita, E., Codau, C., Palade, T., Palade, I., "Exposure to UHF Electromagnetic Radiation in Urban Areas", 6th International Conference on Advancements of Medicine and Health Care through Technology, Volume 71, p. 97-101, Springer, 2018. (https://doi.org/10.1007/978-981-13-6207-1_16, https://link.springer.com/chapter/10.1007%2F978-981-13-6207-1_16)

Significant solutions:
1. Optimized models for radio channel using MIMO mechanisms and cognitive radio approaches.
2. Profile and fuzzy-logic based QoS support for wireless access networks.
3. Network planning and performance evaluation of the QoS support (active and passive site survey for WLAN).
4. Wireless sensors network implementation in pollution monitoring systems and industrial IoT.

Products and technologies:
1. Network planning for various radio technologies: satellite links, broadcasting systems, fixed broadband radio links, mobile cellular networks, wireless systems for metropolitan, local and personal use.
2. Professional simulation tools for wireless networks (sensor, local, cellular and satellite) and electromagnetic field analysis in different propagation environments.
3. Tools and equipment for microwave antenna design and measurement.
4. Evaluation of electromagnetic pollution in urban areas.
5. Wireless sensors networks design, deployment, calibration, and maintenance following standards and custom requirements.

The offer addressed to the economic environment

Research & development	Terrestrial and satellite radio channel analysis and modelling. Terrestrial and satellite network architecture optimization. Heterogeneous network planning. Smart antenna arrays using SDR (direction finding, beamforming).
Consulting	Consulting on radio networks planning and optimization for efficient resource allocation, smart antenna design and positioning using adaptive beamforming and direction finding.
Training	**SICAS** Master (Integrated Communication Systems for Special Applications) including: Wireless systems, Interferences and electromagnetic compatibility, Satellite communications systems, Measurement of radio systems, Radio networks planning. http://master-sicas.utcluj.ro

UNIFIED COMMUNICATIONS IN CLOUD

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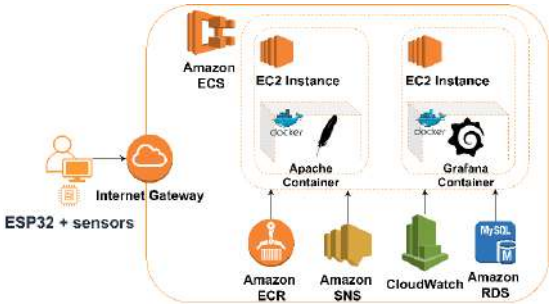

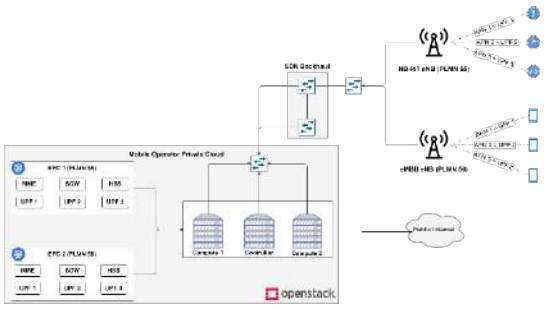

Areas of expertise

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.

Team

Prof. Virgil Dobrota, Ph.D.; Assoc. Prof. Daniel Zinca, Ph.D.; Assist. Prof. Tudor-Mihai Blaga, Ph.D., Assist. Prof. Andrei-Bogdan Rus, Ph.D., Assist. Prof. Iustin-Alexandru Ivanciu, Ph.D.; Assist. Robert Botez, Ph.D. student; Gabriel Lazar, Ph.D. student, Calin-Marian Iurian, Ph.D. student; Gheorghe-Romeo Andreica, Ph.D. student; Diana Deac, Ph.D. student; Dan-Andrei Margin, Ph.D. student; Catalin-Marian Petruti, Ph.D. student; Maria Salagean (Popescu), Ph.D. student.

Representative projects

EUt+ " European University of Technology", https://www.univ-tech.eu/ (2020-2022)
CLOUDUT "Cloud Cercetare UTCN", Contract No. 235/21.04.2020, POC, MySMIS ID:124493, https://cloudut.utcluj.ro/en/ (2020-2022)
URBIVEL "Advanced Technologies for Intelligent Urban Electric Vehicles", ID P_40_333 project, POC-A1-A1.2.3, https://urbivel.utcluj.ro/ (2016-2020)
DIONASYS "Declarative and Interoperable Overlay Networks, Applications to Systems of Systems", CHIST-ERA project, https://www.dionasys.eu/ (2015-2018)
UCONNECT " Implementation of Ubiquitous Connectivity for Public Transport", FP7-SME-2012-1/315161 project, https://cordis.europa.eu/project/rcn/105670/factsheet/en (2012-2014)
4WARD "Architecture and Design for the Future Internet", FP7-ICT-2007-1 No. 216041 project, https://cordis.europa.eu/project/rcn/85316/factsheet/en (2008-2010)
Wi-QoST "Traffic and QoS Management in Wireless Multimedia Networks", COST 290 project, https://www.cost.eu/actions/290 (2004-2008)

Significant results

The most representative publications of the past 5 years:

1. 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, (ISI Q2 Journal).
2. 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).

3. D.A. Margin, I.A. Ivanciu and V. Dobrota, “Deep Reservoir Computing Using Echo State Networks and Liquid State Machine”, Proc. of the 10th Intl. Black Sea Conf. on Communications and Networking BlackSeaCom 2022, Sofia, June 6-9, 2022, pp. 208-213, doi: 10.1109/BlackSeaCom54372.2022.9858322, WOS:000865848800036.
4. A.F. Sicoe, R. Botez, I.A. Ivanciu and V. Dobrota, “Fully Automated Testbed of Cisco Virtual Routers in Cloud Based Environments”, Proc. of 10th Intl. Conf. BlackSeaCom 2022, Sofia, June 6-9,2022, pp.49-53, doi: 10.1109/BlackSeaCom54372.2022.9858288, WOS:000865848800009.
5. 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).
6. 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).
7. 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).
8. 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).
9. A. Cepuc, R. Botez, O. Craciun, I.A. Ivanciu, V. Dobrota, “Implementation of a Continuous Integration and Deployment Pipeline for Containerized Applications in Amazon Web Services Using Jenkins, Ansible and Kubernetes”, Proc. of the 19th RoEduNet Conference: Networking in Education and Research, PUB Bucharest, Romania, Dec.11-12, 2020, pp.1-6, DOI: 10.1109/RoEduNet51892.2020.9324857, WOS:000654265900011.
10. C.M. Iurian, I.A. Ivanciu, B.M. Marian, D. Zinca, V. Dobrota, “An SDN Architecture for IoT Networks Using ONOS Controller”, Proc. of the 19th RoEduNet Conference: Networking in Education and Research, PUB Bucharest, Romania, Dec.11-12, 2020, pp. 1-6, DOI: 10.1109/RoEduNet51892.2020.9324887, WOS:000654265900035.
11. M. Csoma, B. Kone, R. Botez, I.A. Ivanciu, A.D. Kora, V. Dobrota, “Management and Orchestration for Network Function Virtualization: An Open Source MANO Approach”, Proc. of the 19th RoEduNet Conference: Networking in Education and Research, PUB Bucharest, Romania, Dec.11-12, 2020, pp. 1-6, DOI: 10.1109/RoEduNet51892.2020.9324847, WOS:000654265900002.
12. G.R. Andreica, L. Bozga, D. Zinca, and V. Dobrota, “Denial of Service and Man-in-the-Middle Attacks against IoT Devices in a GPS-based Monitoring Software for Intelligent Transportation Systems”, Proc. of the 19th RoEduNet Conference: Networking in Education and Research, PUB Bucharest, Romania, Dec.11-12, 2020, pp. 1-4, DOI: 10.1109/RoEduNet51892.2020.9324865, WOS:000654265900017.
13. C.M. Iurian, I.A. Ivanciu, and V. Dobrota, “Couchbase Server in Microsoft Azure Cloud: A Docker Container Approach”, Proc. of the 14th Intl. Symposium on Electronics and Telecommunications ISETC 2020, Timisoara, Romania, November 5-6, 2020, pp. 1-4, DOI: 10.1109/ISETC50328.2020.9301052, WOS:000612681000084.
14. I.A. Ivanciu, L. Ivanciu, D. Zinca and V. Dobrota, “Securing Health-Related Data Transmission Using ECG and Named Data Networks”, Proceedings of the 25th IEEE Intl. Symp. on Local and Metropolitan Area Networks LANMAN 2019, Paris, France, July 1-3, 2019, DOI: 10.1109/LANMAN.2019.8846993, WOS:000617951400007.
15. C.M. Petruti, B.A. Puiu, I.A. Ivanciu, and V. Dobrota, “Automatic Management Solution in Cloud Using NtopNG and Zabbix”, Proc. of the 17th RoEduNet Conference: Networking in Education and Research, Cluj-Napoca, Romania, Sept. 6-8, 2018, pp. 148-153, DOI: 10.1109/ROEDUNET.2018.8514142, WOS:000517570500020.
16. E. Luchian, A. Taut, I.A. Ivanciu, G. Lazar, and V. Dobrota, “Z-Wave-Based Vehicular Blackbox with Automatic Emergency Assistance”, Proceedings of the 24th IEEE International Symposium on Local and Metropolitan Area Networks LANMAN 2018, Washington, DC, USA, 25-27 June 2018, pp.85-90, DOI: 10.1109/LANMAN.2018.8475110, WOS:000447699400015.

Significant solutions: SDN-based Network Slicing Mechanism for a Scalable 4G/5G Core Network; Quantum computing implementation of Modified Dijkstra’s Algorithm; Seamless Connectivity for Intra/ Inter-Cloud Applications; Automatic Deployment of Infrastructure and Services for a Private Cloud Orchestrated by OpenStack; Active Measurements of the One-Way Delay; Gearbox-Like Routing Algorithm Selection in Runtime.

The offer addressed to the economic environment.

Research & development	SDN and NFV implementations based on Kubernetes; Development of active measurements of QoS parameters in Internet (available transfer rate, latency); Development of cross-layer techniques for congestion control; Development of a solution for permanent Internet connection independent to the network access technologies; Development of implementation for automatic management in cloud; Extension of libtins library for a packet-based VoIP analyser and an Intrusion Detection System.
Consulting	Consulting, design, research, and prototyping towards development of private cloud solutions; Evaluation of security vulnerabilities in computer networks and operating systems; IP-based solution for unified communications; DevNet solutions.
Training	Cisco Networking Academy programs offered by UC Labs staff: https://el.el.obs.utcluj.ro/cisco/ CCNA: Introduction to Networks (IN), version 7.02; CCNA: Routing, Switching and Wireless Essentials (RSWE), version 7.02; CCNA: Enterprise Networking, Security and Automation (ENSA), version 7.02; IoT Fundamentals: IoT Security, version 1.1; CyberOps Associate, version 1.02; CCNA Security version 2.02; DevNet Associate, version 1.01;

CENTRE OF COMPETENCE FOR WIRELESS INTRA-SATELLITE TECHNOLOGIES

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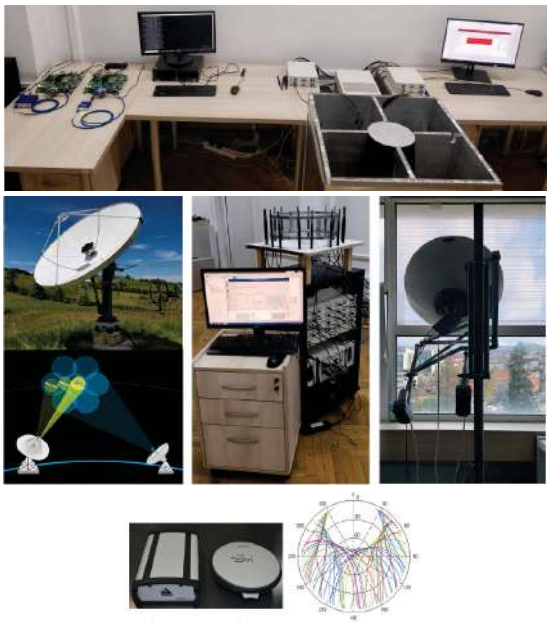

Areas of expertise

Satellite communications and radio channel characterization: smart site diversity for high throughput satellite (HTS) systems, advanced atmospheric channel modelling, Q/V band (40-50 GHz) propagation analysis for next generation satellite communication systems and fading mitigation, Global Navigation Satellite Systems (GNSS)**.**
Space surveillance and tracking (SST): multi-feed reception systems, SST antenna design, FMCW space radars.
Intra-satellite wireless communications: Transmissions in highly reflective environments, replacement of wired connections with wireless UWB links, SpW-to-wireless bridge, development of software interfaces to bridge the On-Board Computer-to-instrument connection, validation tests on dedicated laboratory testbed (TRL4).
Wireless positioning and location: outdoor and indoor positioning and location
Smart antenna arrays: SDR-based direction finding and beamforming (including UAV detection and localization)**.**

IntraSAT-Tech received an award (with the "ROSA – ROMANIA 100" medal) from the Romanian Space Agency (ROSA) for the significant contributions in the development of the Romanian spatial activities.

Team

Prof. Tudor Palade, Prof. Emanuel Puschita, Prof. Calin Munteanu, Prof. Catalin Popa, Prof. Ovidiu Pop, Assoc. Prof. Botond Kirei, Lect. Paul Dolea, Lect. Andra Pastrav, Assist. Cristian Codau, Assist. Rares Buta, Eng. Raluca Simedroni

Representative projects

1. **RoNaQCI,** Romanian National Quantum Communication Infrastructure, DIGITAL-2021-QCI-01, Project ID 101091562, 2023 – 2025.
2. **SIMoRF,** Intelligent System for RF spectrum monitoring**,** 05PSCD/2022 (A2 9038 / 01.11.2022), MApN, 2022-2025**.**
3. **ROSSA**, System for analysis and assessment of risks from outer space, PCCDI 36SOL/2021, 2021-2023.
4. **SDR4SST**, SDR based multi feed reception system for SST, AO8856 EXPRO-PLUS, ESA 4000128680/19/D/CT, 2019-2022.
5. **HiSAT,** High throughput Wireless-SpaceWire Bridge for intra-satellite transmissions**,** PN-III-P2-2.1-PED-2019-3427, 2020-2022.
6. **IntraSAT-Tech**, Centre of competence for wireless Intra-SATellite Technologies, STAR 115/2016, ROSA, 2016-

2019, https://intrasat-tech.utcluj.ro/drupal/node/2
7. **RDAntenna**, Compact retro-directive wireless antenna network for wireless systems in IEEE 802.11 and IEEE 802.11 communication protocols, 6 SOL/2017 within PNCDI III, 2017-2020
8. **ASAPE**, Group of the AlphaSat Aldo Paraboni propagation Experimenters, Open forum of researchers performing propagation campaigns with the Aldo Paraboni payload and other satellite payloads at Ka band.

Significant results

Research Articles (The most representative publications of the past 5 years):

1. Buta R-C, Drobczyk M, Firchau T, Luebken A, Palade TP, Pastrav A, Puschita E, “SpaceWire-to-UWB Wireless Interface Units for Intra-spacecraft Communication Links”, Sensors, 2023; 23(3):1363. https://doi.org/10.3390/s23031363.
2. Puschita, E., Pastrav A., Palade T., et al., “A UWB Solution for Wireless Intra-Spacecraft Transmissions of Sensor and SpaceWire Data”, International Journal of Satellite Communications and Networking, John Wiley & Sons, Ltd., p. 1–21, 2019 (jurnal ISI, IF=1.633, Q2). https://doi.org/10.1002/sat.1307.
3. Dolea, P., Palade, T., Codau, C., Buta, R., Simedroni, R., Puschita, E., Cristea, O., Pastrav, A., “Parabolic Antenna Retrofit for Operation at 5.84GHz – Preliminary Feedhorn Design”, 2022 International Workshop on Antenna Technology (iWAT), Dublin, Ireland, 2022, pp. 82-85, doi: 10.1109/iWAT54881.2022.9811062. WOS:000853691500023.
4. Codau, C., Buta, R., Kirei, B., Pastrav, A., Simedroni, R., Dolea, P., Palade, T., Hedesiu, H., Puschita, E., “Design and Validation of a Wireless Bridge for Intra-Spacecraft Communications”, 2021 44th International Conference on Telecommunications and Signal Processing (TSP), Brno, Czech Republic, 2021, pp. 386-389, WOS:000701604600082.
5. Buta, R., Kirei, B., Codau, C., Pastrav, A., Farcas, C., Simedroni, R., Dolea, P., Palade, T., Puschita, E., “Design and Validation of a SpW Converter for Intra-Spacecraft Communications”, 2021 44th International Conference on Telecommunications and Signal Processing (TSP), Brno, Czech Republic, 2021, pp. 381-385, WOS:000701604600081.
6. Pastrav, A., Palade, T., Dolea, P., Simedroni, R., Codau, C., Puschita, E., "The Alphasat Experiment at Cluj-Napoca – Preliminary Results," 2018 International Symposium on Electronics and Telecommunications (ISETC), Timisoara, 2018, pp. 1-4. WOS:000463031500051. https://doi.org/10.1109/ISETC.2018.8583877.
7. Pastrav, A., Codau, C., Puschita, E., Dolea, P., Palade, T., "Conceptual Architecture of a Retrodirective Antenna System with Beamforming Capabilities," 2018 International Conference on Communications (COMM), Bucuresti, 2018, pp. 225-230. WOS:000449526000041. https://doi.org/10.1109/ICComm.2018.8484740.
8. Rares, B., Codau, C., Pastrav, A., Palade, T., Hedesiu, H., Balauta, B., Puschita, E., "Experimental Evaluation of AoA Algorithms using NI USRP Software Defined Radios," 2018 17th RoEduNet Conference: Networking in Education and Research (RoEduNet), Cluj-Napoca, 2018, pp. 1-6. https://doi.org/10.1109/ROEDUNET.2018.8514133.
9. Codău, C., Buta, R., Palade, T., Păstrăv, A., Dolea, P., Simedroni, R., Puschita E., "Experimental Evaluation of a Beamforming-capable System using NI USRP Software Defined Radios," 2019 18th RoEduNet Conference: Networking in Education and Research (RoEduNet), Galati, Romania, 2019, pp. 1-6. doi: 10.1109/ROEDUNET.2019.8909456.

Case Study (National Instruments)

1. Direction-Finding System Deployment Based on the NI Platform, Buta, R., Codau, C., Pastrav, A., Palade, T., Dolea, P., Hedesiu, H., Balauta, B., Chirap, C., Puschita, E., Radiocommunications Research Group, Communications Department, Technical University of Cluj-Napoca and National Instruments Romania [Available online]: http://sine.ni.com/cs/app/doc/p/id/cs-17758?nisrc=RSS-featured-en

Significant solutions:

1. SDR-based multifeed reception system for SST.
2. SDR-based FMCW radar.
3. FPGA-based intra-satellite wireless communication modules designed to interconnect intra-spacecraft components.
4. Software communication stack for encapsulation of the SpaceWire packets.
5. SpW-to-UART bridge to interface On-Board Computer (OBC), payload and instrumentation.
6. Localization and positioning solution, smart antenna arrays for direction finding and beamforming.

The offer addressed to the economic environment

Research & development	Custom SDR-based SST solutions. Terrestrial, satellite and intra-satellite radio channel analysis and modelling. Adaptive beamforming techniques and MIMO systems applications.
Consulting	Consulting on satellite systems and radio channel modeling for intra-satellite and Earth-to-satellite communications, SST, smart antenna design, adaptive beamforming, and direction finding.
Training	**SICAS** Master (Integrated Communication Systems for Special Applications) including: Wireless systems, Interferences and electromagnetic compatibility, Satellite communications systems, Measurement of radio systems, Radio networks planning. http://master-sicas.utcluj.ro

NATIONAL CENTRE OF INNOVATIVE MANUFACTURING

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Areas of expertise

Industrial Engineering (Laser Beam Machining, Water Jet Cutting, Electrical Discharge Machining, Rapid Prototyping of complex parts and master models for Rapid Tooling, etc.); **Flexible Manufacturing Systems** (CNC Manufacturing Systems); **CAD/CAM Systems** (Applied Industrial design for products and technologies); **Production Engineering** (Innovative Manufacturing for product development and Rapid Tooling technologies); **Automotive Engineering** (Competitive Manufacturing of car components); **Composite Materials** (Manufacturing technologies of complex parts made out of composite materials enforced with carbon fiber); **Engineering and Technologies** (Concurrent engineering, Methodologies and Software tools in Design for Manufacture and Assembly); **Biomedical engineering**, (Prototypes, customized implants, new biocompatible materials); **Operational Research**. Development of algorithms for solving TSP, Flowshop Scheduling, Optimal Nesting etc. **Technology Processes Optimization Development of algorithms** for linear and nonlinear optimization, without/with constraints.

Team

Prof. Dr. Eng. Petru Berce, Prof. Dr. Eng. Nicolae Bâlc, Prof. Dr. Eng. Mircea Ancău, Prof. Dr. Eng. Domniţa Frăţilă Assoc.Prof. Dr. Eng. Mihai Damian, Assoc.Prof. Dr. Eng. Alexandru Cărean,, Assoc.. Prof. Dr. Eng. Răzvan Păcurar Assist. Prof. Dr. Eng. Cristian Caizar, Assist. Prof. Eng. Horea Chezan, Assist., Assist. Prof. Dr. Eng. Radu Sever Adrian, Assist. Prof. Dr. Eng. Ancuţa Păcurar, Assoc.. Prof. Dr. Eng Dan Leordean, Assoc.. Prof. Dr. Eng Paul Bere, Assoc.. Prof. Dr. Eng. Nicolae Panc, Assoc.. Prof. Dr. Eng. Emilia Sabă. Assoc.. Prof. Dr. Eng Alexandru Popan, Assoc.. Prof. Dr. Eng Alina Luca

Representative projects

DigiTech – "Implementation of additive technologies in complex and overbuilt components manufacturing", PNIII-P1-1.2 PCCDI 2018, (2018-2021)
"**AMaTUC – Boosting the scientific excellence and innovation capacity in additive manufacturing of the Technical University of Cluj-Napoca**", HORIZON 2020 – twinning, 2016-2018
"Research concerning the development of new stochastic heuristic algorithms for solving flowshop scheduling problems",PNII-Idei,http://www.ci579.utcluj.ro (2008-2011)
"**Expert Systems for Technology Processes Optimization. The research contracts deals with rapid prototyping and tooling optimization"**, PNII, http://www.esop.utcluj.ro (2007-2010)
Adm-ERA, **"Reinforcing Additive Manufacturing research cooperation between the Central Metallurgical Research and Development Institute and the European Research Area"**, European FP7 Project, (2011-2013)

BIOMAPIM, **"New Biocompatible Materials for personalized implants made by SLS and SLM"**, PCCE, (2010-2013)
OP3MET, **"Optical 3D Metrology - Automated in-line metrology for quality assurance in the manufacturing industry"**, European FP6 Project, (2006-2008)
"Innovative Manufacturing Network", (2005-2008)

Significant results

The most representative publications of the past 5 years:

1. Cosma, C., Teusan, C., Gogola, P., Berce, P.Balc,N. Investigation of the Interface between Laser-Melted CoCr and a Stainless Steel Substrate. In:Metals, 2022, 12(6), 965
2. Pacurar, R.; Berce, P.; Petrilak, A.; Neme¸s, O.; Borzan, C. ¸S.M.; Harnicárová, M.; Pacurar, A. Selective Laser Melting of PA 2200 for Hip Implant Applications: Finite Element Analysis, Process Optimization, and Morphological and Mechanical Characterization. Materials 2021, 14, 4240. https://doi.org/10.3390/ma14154240 (ISI-Q1, IF: 3,623)
3. O. Jucan, R. Gadalean, H. Chicinas, M. Hering, N. Balc, C. Popa, "Study on the indirect selective laser sintering (SLS) of WC-Co/PA12 powders for the manufacturing of cemented carbide parts", International Journal of Refractory Metals and Hard Materials, Elsevier, Volume: 96, 2021, (ISI-Q1, FI: 3.407); https://doi.org/10.1016/j.ijrmhm.2021.105498;
4. Cosma, C; Drstvensek, I; Berce, P; Prunean, S.; Legutko, S; Popa, C.; Balc, N; „Physical-Mechanical Characteristics and Microstructure of Ti6Al7Nb Lattice Structures Manufactured by Selective Laser Melting", MATERIALS, Volume: 13 Issue: 18, 2020. Article Number: 4123, DOI:10.3390/ma13184123,
5. Perini, M; Bosetti, P; Balc, N," Additive manufacturing for repairing: from damage identification and modeling to DLD", Rapid Prototyping Journal, Publisher: Emerald Group Publishing LTD, UK, Volume: 26, Issue 5, ISSN: 1355-2546 / eISSN: 1758-7670, DOI: 10.1108/RPJ-03-2019-0090, Published 2020, Q1-FI: 3.937;
6. Todea, M.; Vulpoi, A.; Popa, C.; Berce, P., et al., Effect of different surface treatments on bioactivity of porous titanium implants, JOURNAL OF MATERIALS SCIENCE & TECHNOLOGY Volume: 35 Issue: 3 Pages: 418-426 Published: MAR 2019
7. Petru Berce, et. al., „Medical applications of Additive Manufacturing technologies", *Romanian Academy Publishing House*, Bucharest, 2015
8. Leordean, Dan; Dudescu, Cristian; Marcu, Teodora; P. Berce et al "Customized implants with specific properties, made by selective laser melting" *RAPID PROTOTYPING JOURNAL* Volume: 21 Issue: 1 Pages: 98-104, Published: 2015
9. Leordean, Dan; Radu, S. A.; Fratila, D.; P. Berce, "Studies on design of customized orthopedic endoprostheses of titanium alloy manufactured by SLM", *INTERNATIONAL JOURNAL OF ADVANCED MANUFACTURING TECHNOLOGY* Volume: 79 Issue: 5-8 Pages: 905-920 Published: JUL 2015
10. Petru Berce, et.al., „Additive Manufacturing Technologies and their applications", *Academy Publishing House*, Bucharest, 2014.

International Patent: "Acting Device", registered in USA and Germany;
Others:
Competitive Manufacturing techniques transferred to industrial partners and used in commercial contracts with companies from Germany and England

The offer addressed to the economic environment

Research & development	Develop new materials, suitable for Rapid Prototyping using the SLS and SLM equipment. Development of optimization algorithms. Design for Competitive Manufacturing of Industrial Products. Rapid Tooling and Additive Manufacturing Rapid Prototyping using the well known CNC machines, available within DME-TUCN. Researches concerning the technological processes optimization.
Consulting	External evaluation of products/projects; Select the optimal RP technological route; Consulting in the area of operational research (industrial application of combinatorial optimization: calculation of minimum path length, optimal nesting, flowshop scheduling etc.).
Training	We offer training in the field of Numerical Optimization Techniques in Computer Aided Design. Training for people from industry, in the following fields: Use modern CAD systems for integrated applied design; Rapid Tooling; Modern Manufacturing Technologies; Using the modern RP equipment; CNC machining; Metrology and Quality Engineering.

RESEARCH CENTRE IN SHEET METAL FORMING-CERTETA

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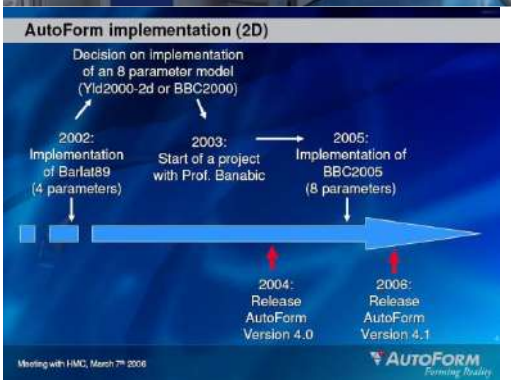

Areas of expertise

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

Team

Prof. Dr. Eng. Dorel Banabic, Assoc. Prof. Dr. Eng. Dan-Sorin Comșa, Assoc. Prof. Dr. Eng. Lucian Lăzărescu

Representative projects

Analysis of formability and mechanical behavior of metallic materials – research contract with FONTANA Pietro SPA Italy (2018)
"From micro to macro - continuum scale modelling of advanced materials in virtual fabrication", PNII, (2009-2013)
"Holistic, extensible, scalable and standard Virtual Factory Framework", European FP7 Project, (2009-2013)
"Sheet metal formability for special metal forming processes", Humboldt Foundation (Joint Research Project), (2005-2008)
"Improvement of performances of formability models for sheet metals using new constitutive laws", Swiss National Science Foundation (Joint Research Project), (2005-2008)
VIRFAB, **"Integrated platform for the simulation of forming processes in virtual manufacturing"**, CEEX, (2006-2008)
VIF, **"Virtual Intelligent Forging"**, European FP6 Project, (2004-2008)

Significant results

Books and contribution to books:

1. Lăzărescu L., Comşa D.S., Banabic D., Analiza cu elemente finite a proceselor de prelucrare prin deformare plastică, Casa Cărţii de Ştiinţă, Cluj Napoca, 2018
2. Lăzărescu L., Comşa D.S., Banabic D., Proiectarea tehnologiilor si a matritelor pentru prelucrarea tablelor metalice, Casa Cărţii de Ştiinţă, Cluj Napoca, 2018.
3. Banabic D., Balan T., Comsa D.S., Anisotropic Yield Criteria for Aluminum Alloy Sheets, In: Encyclopedia of Aluminium and its Alloys (ed. Totten G.E.), CRC Press, New York, 2019.
4. Banabic D., Comsa D.S., "BBC2005 yield criterion used in the numerical simulation of sheet metal forming processes", In: (Ed.:Tekkaya E.A.), 60 Excellent Inventions in Metal Forming), *Springer, Heidelberg Berlin*, 2015
5. Banabic D., Lazarescu L., Comsa D.S., "An innovative procedure for the experimental determination of the Forming Limit Curves", In: (Ed.:Tekkaya E.A.), 60 Excellent Inventions in Metal Forming), *Springer, Heidelberg Berlin*, 2015
6. D. Banabic, "Sheet Metal Forming Processes", in *Science Press*, Beijing, 2015

The most representative publications of the past 5 years:

1. Y. Ma, Y. Xu, S. Zhang, D. Banabic, A.El-Aty, D. Chen, M. Cheng, H. Song, A.I. Pokrovsky, G. Chen, Investigation on formability enhancement of 5A06 aluminium sheet by impact hydroforming, Annales of CIRP, 67(2018), 281-284.

2. Alharthi H., Hazra S., Banabic D., Dashwood R., Determination of the yield loci of four sheet materials (AA6111-T4, AC600, DX54D+Z, and H220BD+Z) by using uniaxial tensile and hydraulic bulge tests, International Journal of Advanced Manufacturing Technology, 98(2018), 1307–1319.
3. 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.
4. 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.
5. 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.
6. Lucasz Madej, Dorel Banabic, Professor Zdzisław Marciniak—A life dedicated to metal forming, Journal of Materials Processing Technology, 287(2021), 1168762.
7. 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
8. 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.
9. Johan 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.
10. 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.
11. 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
12. H.L. Zhu, Y. Xu, W.J. Chen, S.H. Zhang, D. Banabic, L. Lăzărescu, A. I. Pokrovsky, Research on hydroforming through combination of internal and external pressures for manufacturing the structure of double-layer tube with gap, International Journal of Materials Forming, 15 (2022) Article number: 55, DOI 10.1007/s12289-022-01699-z
13. J. Yanagimoto, D. Banabic, M. Banu, L. Madej, Simulation of metal forming – Visualization of invisible phenomena in the digital era, CIRP Annals Manufacturing Technology, CIRP Annals Manufacturing Technology, 71(2022), Vol 2, DOI: 10.1016/j.cirp.2022.05.007.

Significant solutions:

The members of the CERTETA Centre developed a yield criterion for anisotropic metallic materials called BBC2005. Its mathematical formulation has been implemented in the commercial finite element code AutoForm in order to simulate the sheet metal forming processes. One may notice the fact that the AutoForm program is used by 95% of the world's leading manufacturers of automobiles and airplanes, which assures a global scale application of the model BBC2005. This means that the model is applicable at the global scale and CERTETA Centre is visible in automotive and airplane production industries (according to the AutoForm official site www.AutoForm.com, over 2500 users from 500 companies located in 40 countries). The Material Modelling Committee of the Japan Association for Nonlinear CAE (JANCAE) has recently developed a unified user-subroutine (called UMMDp, Unified Material Model Driver for Plasticity), which couple different hardening rules and yield functions, including BBC 2005 and BBC2008 models developed by the CERTETA team. This subroutine can be used within any commercial FE software (Abaqus, LsDyna, ANSYS, MSC Marc, Radioss) by using the unified interface routine.

Other remarkable results consist in the fact that CERTETA developed a program for the calculation the forming limit curves, called FORM-CERT. This program is used by several automotive companies (Daimler, Audi, etc.).

The third major achievement consists in the development of a model for the prediction of Forming Limit Bands. In this research field, CERTETA is a pioneering laboratory at international level.

Products and technologies:

The yield criteria developed in order to describe the plastic anisotropic behavior of the metallic sheets. The BBC2005 yield criterion has been implemented in the AutoForm FE commercial code and in the UMMPd user subroutine.

Hierarchical Multi-Scale (HMS) model coupled with BBC2008 yield criterion.

FORM-CERT commercial program for the determination the forming limit curves.

Technology and expertise to determine the mechanical parameters of the metallic sheets

The offer addressed to the economic environment

Research & development	CERTETA currently develops constitutive models for anisotropic metallic materials, with special emphasis on cold-rolled sheet metals. The theoretical prediction of the forming limits is also an important domain of research. The models are developed with the aim of being implemented in the programmes used for the numerical simulation of the forming processes and computer-aided design of the forming tools. The members of the CERTETA are also involved in the development of experimental methods for the determination of the mechanical parameters and limit strains of metallic sheets.
Consulting	The research centre provides consulting services in the field of materials testing, numerical simulation of the sheet metal forming processes, and computer-aided design of forming tools.
Training	The research centre offers training courses in the field of numerical simulation of the metal forming processes using finite element programmes. The members of team have also a sound expertise in the field of metal forming procedures and their implementation in industry.

RESEARCH CENTER FOR INDUSTRIAL ROBOTS SIMULATION AND TESTING

Contact details

Name	**Research Center for Industrial Robots Simulation and Testing**
Acronym	**CESTER**
Logo	CESTER RESEARCH CENTER FOR INDUSTRIAL ROBOTS SIMULATION AND TESTING
Site	www.cester.utcluj.ro
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Faculty Department	Industrial Engineering, Robotics, and Production Management Faculty Mechanical Systems Engineering Department
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Fax	+40 264 401765
Director	Prof. Doina Pisla, PhD
e-mail	doina.pisla@mep.utcluj.ro

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 patient 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

Team

Senior researchers: Prof. Doina Pisla; Prof. Nicolae Plitea; Prof. Adrian Pisla; Prof. Calin Vaida; Prof. Dan Opruta; Prof. Tiberiu Antal; Assoc. Prof. Bogdan Gherman; Assoc. Prof. Ovidiu Detesan
Postdoctoral researchers: Florin Covaciu, PhD; Paul Tucan, PhD; Eng. Iuliu Nadas, PhD; Eng. Nicoleta Pop, PhD
Doctoral researchers: Alin Burz; Ionut Ulinici; Alexandru Banica; Alexandru Pusca; Gabriela Rus; Jefte Nagy; Alin Horsia; Remus Crisan; Bianca Baldean; Gabriel Todea; Ionut Zima
Master students: Eng. Daniel Horvath; Eng. Stefan Iakab; Eng. Andrei Cailean

Representative projects

APOLLO, "**Intelligent tele-robotic systems for the personalised treatment of neuromotor deficit to increase the patients quality of life**", PTI-2022 (Technologic Transfer), MySMIS code 155988, (2023)
MAN-X, "**Exoskeleton structure for human augmentation**", 1-PSCD/2022, (2022-2025)
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)
Enhance, "**Innovative safe robotic system for enhanced patient-centered treatment of liver cancers**", Code PN-III-P2-2.1-PED2021-2790, (2022-2024)
Hope2Walk, "**An innovative modular rehabilitation robot for the efficient therapy of lower limb motor deficit**", Code: PN-III-P2-2.1-PED2021-3430, (2022-2024)
Wisdom of Age, "**A Seniors Digital Platform for Knowledge Transfer towards Industrial Companies**", Code AAL-2020-7-83-CP, (2021-2023)
IMPROVE, "Innovative approach precision on robotic assisted surgical treatment of liver tumors based onintegrated diagnostic imaging molecular", Code PN-III-P1-1.2-PCCDI 2018, (2018-2020)
AGEWELL, "Innovative approaches rehabilitation and Asssistive Robotics for Healthy Ageing", POC project ID37_215, MySMIS code 103415, (2016-2020)
INNOHEALTH, "An innovative robotic system for upper limb rehabilitation", RIS 2019 Innovation Call, 21540/07.08.2019, EIT Health (2019)
TASUK, "**Manipulation Systems for Sample Handling in a Sample Receiving Facility**", TASUK/16/11305/NBO/1424, ESA European Space Agency (2015-2020)
ROBOCORE, "Robotic assisted prostate biopsy, a high accuracy innovative method", Code PN-II-PT-PCCA-2013-4-0647 (2014-2017)
ACCURATE, "A multi-purpose needle insertion device for the diagnosis and treatment of cancer", Code PN-II-RU-TE- 2014-4-0992, (2015-2017)

Significant results

The most representative publications of the past 5 years (10 selected papers):

1. 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 Efficacity of the NeuroAssist Robotic System for Motor Rehabilitation of the Upper Limb—Promising Results from a Pilot Study. J. Clin. Med, 12, 425, 2023, (IF: 5.583)
2. Tucan, P.; Vaida, C.; Horvath, D.; Caprariu, A.; Burz, A.; Gherman, B.; Iakab, S.; Pisla, D. (c.a.) Design and Experimental Setup of a Robotic Medical Instrument for Brachytherapy in Non-Resectable Liver Tumors. Cancers 2022, 14, 5841, 2022, (IF: 6.575)
3. Graur, F.; Ciocan, R.A.; Ciocan, A.; Puia, I.C.; Mois, E.; Furcea, L.; Zaharie, F.; Popa, C.; Schlanger, D.; Vaida, C.; Pisla, D.; Al Hajjar, N. Trends in Minimally Invasive Approaches for Liver Resections–A Systematic Review. J. Clin. Med. 2022, 11, 6721, 2022, (IF: 4.964)
4. Pisla, D., Birlescu, I., Pusca, A., Tucan, P., Gherman, B., Vaida, C., Kinematics and Workspace Analysis of an Innovative 6-Dof Parallel Robot for SILS, Proc. of the Rom. Acad., Series A, 23(3), pp.277-286, 2022, (IF: 0.734)
5. Pisla, D.; Birlescu, I.; Crisan, N.; Pusca, A.; Andras, I.; Tucan, P.; Radu, C.; Gherman, B.; Vaida, C. Singularity Analysis and Geometric Optimization of a 6-DOF Parallel Robot for SILS. Machines 2022, 10, 764, (IF: 2.899)
6. Tucan, P.; Vaida, C.; Ulinici, I.; Banica, A.; Burz, A.; Pop, N.; Birlescu, I.; Gherman, B.; Plitea, N.; Antal, T.; Carbone, G.; Pisla, D. Optimization of the ASPIRE Spherical Parallel Rehabilitation Robot Based on Its Clinical Evaluation. Int. J. Environ. Res. Public Health 2021, 18, 3281. (IF 4.614)
7. Major, Z.Z.; Vaida, C.; Major, K.A.; Tucan, P.; Brusturean, E.; Gherman, B.; Birlescu, I.; Craciunaș, R.; Ulinici, I.; Simori, G.; Banica, A.; Pop, N.; Burz, A.; Carbone, G.; Pisla, D. Comparative Assessment of Robotic versus Classical Physical Therapy Using Muscle Strength and Ranges of Motion Testing in Neurological Diseases. J. Pers. Med. 2021, 11, 953, 2021, (IF: 3.508)
8. Radu, C.; Fisher, P.; Mitrea, D.; Birlescu, I.; Marita, T.; Vancea, F.; Florian, V.; Tefas, C.; Badea, R.; Ștefănescu, H.; Nedevschi, S.; Pisla, D.; Hajjar, N.A. Integration of Real-Time Image Fusion in the Robotic-Assisted Treatment of Hepatocellular Carcinoma. Biology 2020, 9, 397, 2020, (IF: 5.079)
9. Vaida, C., Birlescu, I., Pisla, A., Ulinici I., Tarnita, D., Carbone, G., Pisla, D., "Systematic Design of a Parallel RoboticSystem for Lower Limb Rehabilitation", IEEE ACCESS, vol. 8, 34522(15), 2020 (IF: 4.098)
10. Husty, M., Birlescu, I., Tucan, P., Vaida, C., & Pisla, D. An algebraic parameterization approach for parallel robots analysis. Mechanism and Machine Theory, 140, 245–257, 2019, (IF: 4.93)

Patents:

1. Pisla, D., Birlescu, I., Vaida, C., Gherman, B., Tucan, P., Carbone, G., Plitea, N.: Parallel robot for lower limb rehabilitation, Decision No. 4.3/163 from 28/05/2021
2. Pisla D., Gherman B., Nadas I., Pop N., Craciun F., Tucan P., Vaida C., Carbone G.: Innovative paralel robot for lower limb rehabilitation, Decision No. 4.3/164 from 28/05/2021
3. Vaida, C., Plitea, N., Pisla, D., Carbone, G., Gherman, B., Ulinici, I., Pisla, A., Spherical robot for medical rehabilitation of proximal area of upper limb, RO-132233 (2020)
4. Gherman, B., Pisla, D., Plitea, N., Vaida, C., Carbone, G., Pisla A., Parallel robotic system for medical rehabilitation of upper limb, RO-132234 (2020)
5. Vaida, C., Plitea, N., Pîslă, D., Gherman, B., Suciu, M., "Orientation module with multiple curvatures", Patent RO 129923 B1 (2019)
6. Plitea, N., Pisla, D., Vaida, C., Gherman, B., „Surgical Robot", Patent RO 126271 (2012)

Significant products:

1. Intelligent medical parallel robot for lower limb rehabilitation - RECOVER, 2022
2. Innovative safe robotic system for enhanced patient-centered treatment of liver cancers – PROHEP-LCT, 2020
3. Intelligent medical parallel robot for lower limb spatial rehabilitation – RAISE, 2020
4. Intelligent medical parallel robot for upper limb rehabilitation – ASPIRE, 2019 (validated clinically in two hospitals)
5. Intelligent medical parallel robot for upper limb rehabilitation – PAREEX, 2019
6. Intelligent medical parallel robot for transperineal prostate biopsy – ROI-PROS1, 2015

The offer addressed to the economic environment

Research & development	**Medical Robotics** Development, testing validation and technological transfer of intelligent, application oriented robotic systems and instrumentation **Adaptive control solutions including AR/VR/AI integration** Development of intelligent control solutions, including human-centered approaches and multi-modal **Precision Robotics and Micro-robotics** The development of innovative solutions for parallel robots, micro-robots and reconfigurable structures with parallel architecture for industrial applications interactive interfaces **Mechanisms synthesis** Advanced studies in the field of synthesis of new conceptual models of mechanisms with complex structure, focused on parallel architectures, modelling, design, digital twin validation, numeric and generative design optimizations
Consulting	**Product Lifecycle Management.** Consultancy in product and process development using competitive tools and the new concepts of Design for X, IoT, Digital Twin **High power drives.** Consultancy in development of custom-made high-power drives and applications **Renewable energies.** Consultancy in the design of custom-made solutions for energy harvesting
Training	Through its training center, CESTER offers those interested in advanced training Solid Edge and Siemens NX courses as well as basic courses in control systems with the B & R Automation Platform

Additive Manufacturing and Rapid Product Development Research Centre

Contact details

Name	**Additive Manufacturing and Rapid Product Development**
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Faculty Department	**Faculty of Industrial Engineering, Robotics and Production Management** **Department of Manufacturing Engineering**
Telephone	+40 264 401794
Fax	+40 264 415653
Director	Prof. Dr. Eng. Nicolae Balc
e-mail	Nicolae.Balc@tcm.utcluj.ro

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).

Team

Prof. Nicolae Bâlc, Prof. Petru Berce, Prof. Mircea Ancău, Prof. Domniţa Frăţilă, Assoc. Prof. Alina Popan, Assoc. Prof. Dan Leordean, Assoc. Prof. Alexandru Popan, Assoc. Prof. Paul Bere, Assoc. Prof. Răzvan Păcurar, Assoc. Prof. Emilia Sabău, Senior Lect. Horea Chezan, Senior Lect. Cosmin Cosma, Prof. Adrian Trif, Senior Lecturer Vlad Bocăneţ.

Representative projects

H2020 – DiCoMI, „Directional Composites through Manufacturing Innovation", 2018–2023, TUCN Leader: Prof. N. Balc, http://www.dicomi.eu;
PP H2020, Contract 71/2022: "Fabricaţia inovativă a compozitelor prin tipărire 3D", 2022-2023, Director Prof. N. Bâlc
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;
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, http://www.digimanproject.eu;
FP7 – Adm-ERA, „Reinforcing Additive Manufacturing research cooperation between the Central Metallurgical Research and Development Institute and the European Research Area",2011–2013,TUCN Leader: Prof. N. Balc; http://www.fp7-admera.org;
PCCDI, „Implementarea tehnologiilor aditive în fabricarea componentelor complexe şi suprasolicitate", 2018-2020, TUCN Coordinator: Prof. P. Berce;
Bridge Grant – OpTi-DeP, Optimizarea tipăririi 3D pentru Aplicaţii Dentare Personalizate, 2016-2018, Director: Prof. N. Bâlc;
Bridge Grant – PreMCo, „Dezvoltarea posibilităţilor de prelucrare a materialelor compozite avansate prin tăiere de precizie cu jet de apă", 2016-2018, Director: Assoc.Prof. Alexandru Popan; http://www.premco.utcluj.ro;
Bridge Grant, „Optimizarea materialelor compozite polimerice armate cu fibre şi a tehnologiei de fabricaţie utilizate în construcţia elementelor de caroserie pentru vehicule electrice", 2016-2018, Director: Assoc.Prof. Paul Bere;
PP H2020, "Support AMaTUC", 2016-2018, Director Prof. N. Bâlc;
PCCA – PECIFCO, „Implanturi cranio-faciale personalizate obtinute prin prototipare inovativa 3D din materiale compozite ranforsate cu fibra de sticla", 2014-2017, TUCN Coord: Prof. N. Bâlc;

Significant results

Selected publications in the last 3 years:

1. Popan, IA; Balc, N; Popan, AI; „Avoiding carbon fibre reinforced polymer delamination during abrasive water jet piercing: a new piercing method" International Journal of Advanced Manufacturing Technology, DOI10.1007/s00170-021-08294-7, 2022, (Q1-ISI, FI: 3.226);
2. Cosma, C; Teusan, C; Gogola, P; Simion, M; Gabalcova, Z; Trif, A; Berce, P; Balc, N., "Investigation of the Interface between Laser-Melted CoCr and a Stainless Steel Substrate", Metals – MDPI 12, 965, 2022, https://doi.org/10.3390/met12060965, (ISI, FI: 2.758);
3. Cuc, S; Cosma, C; Leordean, D; Rusu, M; Balc, N; Prodan, D; Ene, R; „Adhesion between Biocomposites and Different Metallic Structures Additive Manufactured" COATINGS, DOI10.3390/coatings11040483, Volume11, Issue 4, Article No. 483, 2021, (Q2-ISI, FI: 3.038)
4. O. Jucan, R. Gadalean, H. Chicinas, M. Hering, N. Balc, C. Popa, "Study on the indirect selective laser sintering (SLS) of WC-Co/PA12 powders for the manufacturing of cemented carbide parts", Int Journal of Refractory Metals and Hard Materials, Elsevier, Volume: 96, 2021, (ISI-Q1, FI: 3.407); https://doi.org/10.1016/j.ijrmhm.2021.105498;
5. P. Pradel, R.I. Campbell, N. Balc, „A taxonomy of customers' characteristics influencing product personalisation", Proceedings of the Romanian Academy Series A-mathematics physics technical sciences information science, Vol 22 , Issue 2, pg. 153-161, 2021, (ISI, FI: 1.523);
6. C. Cosma, M. Moldovan, M. Simion, N. Balc, "Impact of laser parameters on additively manufactured cobalt chromium restorations", J of Prosthetic Dentistry, 2021, (ISI-Q1, FI: 2.76): (https://www.sciencedirect.com/science/article/pii/S0022391321000330;
7. Perini, M; Bosetti, P; Balc, N, "Additive manufacturing for repairing: from damage identification and modeling to DLD", Rapid Prototyping Journal, Publisher: Emerald Group Publishing LTD, UK, Vol. 26, Issue 5, 2020, ISSN: 1355-2546 / eISSN: 1758-7670, (Q1, FI: 3.937); DOI: 10.1108/RPJ-03-2019-0090;
8. Cosma, C; Drstvensek, I; Berce, P; Prunean, S.; Legutko, S; Popa, C.; Balc, N; „Physical-Mechanical Characteristics and Microstructure of Ti6Al7Nb Lattice Structures Manufactured by Selective Laser Melting" Materials, Vol.13, Issue: 18, Art. no. 4123, 2020, DOI: 10.3390/ma13184123, 2020, (ISI, FI: 3.424)
9. Cosma, C; Kessler, J; Gebhardt, A; Campbell, I; Balc, N., "Improving the Mechanical Strength of Dental Applications and Lattice Structures SLM Processed", Publisher: MDPI, ST Alban-Anlage 66, CH-4052 Basel, Switzerland, Vol.13, Issue 4, Article no: 905, 2020, eISSN: 1996-1944, (ISI, FI: 3.057); DOI: 10.3390/ma13040905;

Selected Books

10. Berce, P., Bâlc, N., Păcurar R.., ş.a., (2014), *Tehnologii de fabricaţie prin adaugare de material şi aplicaţiile lor,* Editura Academiei Romane, Bucureşti.
11. Berce, P., Bâlc, N., Leordean Dan, ş.a., (2015), *Aplicaţiile medicale ale tehnologiilor de fabricaţie prin adăugare de material,* Editura Academiei Romane, Bucureşti - Awarded with "Henri Coandă" prize at The annual awarding ceremony of Romanian Academy, 15 December 2017, Bucharest (Romania).
12. Nicolae Balc, Dan Leordean, Editors: "Research and Applications in Manufacturing Engineering", MATEC Web of Conferences – EDP Sciences, France, Volume 299, 2019, ISBN- ISBN: 978-2-7598-9083-5, https://www.matec-conferences.org/articles/matecconf/abs/2019/48/contents/contents.html
13. Nicolae Balc, Editor: "Modern Technologies in Manufacturing", MATEC Web of Conferences – EDP Sciences, France, Volume 137, 2017, ISBN- ISBN: 978-2-7598-9083-5, https://www.matec-conferences.org/articles/matecconf/abs/2017/51/contents/contents.html
14. Nicolae Balc, Editor: "Modern Technologies in Manufacturing", Trans Tech Publications - Applied Mechanics and Materials, Switzerland, Vol. 808, 394 pagini, 2015, ISBN-13: 978-3-03835-653-0, http://www.scientific.net/AMM.808/book

International Patents:

15. „Acting Device", registered in USA and Germany; N. Balc, D. Leordean, No. US9199358 B2, 2015;
16. Betätigungsvorrichtung – European patent, owner: DE-STA-CO Company, D. Leordean, N. Bâlc, ş.a., No. EP2433750

Chairman of the **International Conference on Modern Technologies in Manufacturing** - MTeM 2013, 2015, 2017 and 2019", held in Cluj-Napoca, Romania - http://www.mtem.utcluj.ro/;

Competitive Manufacturing techniques transferred to industrial partners and used in commercial contracts with companies from Germany and England.

The offer addressed to the economic environment

Research & development	Design for Competitive Manufacturing of Industrial Products, Rapid Tooling and Additive Manufacturing
Consulting	External evaluation of products/projects
Training	Training for people from industry, in the following fields: - Use modern CAD systems for integrated applied design - Rapid Tooling - Modern Manufacturing Technologies

RESEARCH CENTER FOR ENGINEERING AND MANAGEMENT OF INNOVATION

Contact details

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Director	Prof. Stelian Brad, PhD (eng.), PhD (econ.)
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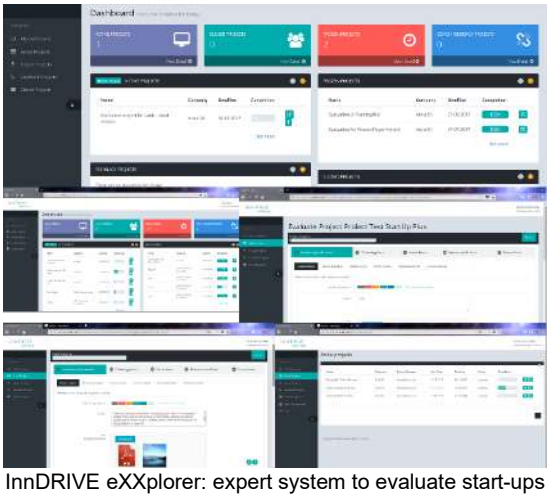

InnDRIVE eXXplorer: expert system to evaluate start-ups businesses (technology transferred to Arxia) (2019)

Areas of expertise

RESIN is focused on two major areas:1. innovation engineering and 2. innovation management. The subfields of research in the case of innovation engineering are: 1.1. science and engineering of artificial intelligence in robotics systems; 1.2. science of interdisciplinary design for breakthrough innovations; 1.3. innovation for X. The subfields of research in the case of innovation management are: 2.1. science of smart innovation, 2.2. science of collaborative innovation, 2.3. innovation by structural transformation, 2.4. micro, mezzo and macro innovation systems.

Team

Academic staff: Stelian Brad (1.1-2.4), Mircea Murar (1.1, 1.2), Stefan Craciun (1.2), Ionut Chis (1.3), Claudiu Ratiu (1.3), Emilia Brad (1.3), Anca Stan (2.4), Dragos Bartos (2.3), Sanda Timoftei (1.1), Claudiu Nedeski (1.3), Cristina Miron-Borzan (1.2, 1.3) **PhD researchers:** Daniel Homorodean (2.1), Eugen Otava (2.2), Diana Veltan (2.3), Gabriela Uglea (1.3), Cristian Lang (2.4), Dan Balan (2.1), Andreas Zagos (1.3), Nino Hoch (2.3), Cosmina Mendoiu (1.1), Vlad Florian (1.1), Maria Slavoaca (1.2) **Students:** Miruna Peris (1.2), Micsku Tamas (1.1), Roxana Morar (1.1)

Representative projects

InnoCAP Transylvania, Services to Enhance the Innovation Management Capacity of SMEs, code: 831250, H2020, 2019-2020.
Ready2Go International, PROMOS, Italia, Grant Agreement no. 760 / 21.03.2018, 2018.
MARKET-IT – „Demonstrating the Industrial Validity and Market Feasibility of IT Tool to Support SMEs in Systematic Innovation Processes", Project FP7, Code: 311517, Call FP7-SME-2011, 2012-2014.
Scale-Up Transylvania: code: 764354, COSME, 2017-2018.
Study on Circular Economy Principles in SMEs from the Danube Region in: Mobilising Institutional Learning for Better Exploitation of Research and Innovation for the Circular Economy, code: MOVECO, DTP1-1-349-1.1, 2018.
CRONOS, **„Consolidation of the Innovation Ecosystem of Cluj IT by Smart Specialization towards Structural Transformation and Internationalization based on IP"**, PN-III-P2-2.1-CLS-2017-0041, 2018-2020.
Design and Development of a Package of Mobile Apps for Quality Reporting, Product Improvement and Safety Interventions, CSi Industries B.V. Holland, 2016-2018.
Innovation Management System design to Meet SR CEN TS 16555 Requirements, no. 72/ 28.12.2018, PRODIMA, 2018-2019.
Digitalization Strategy for Cluj County, Consiliul Judetean Cluj, no. 21.127/ 184 / 20.06.2018, 2018-2019.
Improving Key Production Process Performances Using Advanced "Lean" Tools, Nova Grup, 57/27.01.2016, 2016-2019.
Integrated Innovation Management Systems for SMEs, PNIIPTPCCA201341319, 2014-2017.
Active Perception Techniques for Flexible Manipulation of Objects in Smart Factories, BG, PN-III-P2-2.1-BG-2016-0140, 2016-2018.
ICT Clusters' Sustainable Cooperation for Smart and Inclusive Growth, START, DANUBE ICT - 17_PA08-C2, 2015-2016.
Innovative Design of the Security Fences for Fast Assembly and Installation, CSi Industries B.V. Holland, Grant Agreement no. 28343/10.11.2015, 2015-2016.
Expert System for Smart Robots, CSi Industries B.V. Holland, Code 2013111901, 2013-2016.
Smart Redesign of Clamp-Hook Tool to Achieve a Mass Reduction with 70%, CSi Industries B.V. Holland, 2013111902, 2013-2014.
Geiger Cybersecurity Counter, GEIGER, code: 883588, H2020-SU-DS-2019, 2020-2022.

Conception, Design and Optimization of a Connected Smart Equipment for Sublimation of Benzoic Acid from Styrax Resins, Plant Extrakt, 2366/28.01.2020, 2020.
Design and Optimization of a Underground Waste Collection System, Sky-Park, 6135/08.03.2019, 2019.

Significant results

The most representative publications of the past 5 years:

1. Brad, S., *TRIZ to Support Creation of Innovative Shared Value Business Initiatives,* in: Advances and Impacts of the Theory of Inventive Problem Solving, 101-112, Springer, ISBN 978-3-319-96531-4, https://doi.org/10.1007/978-3-319-96532-1, 2018.
2. Brad, S., Brad, E., *Quantifying and Leading Innovation with TRIZ within Competitiveness Strategies*, in: Advances and Impacts of the Theory of Inventive Problem Solving, 65-74, Springer, ISBN 978-3-319-96531-4, https://doi.org/10.1007/978-3-319-96532-1, 2018.
3. Brad, S., Murar, M., Brad, E., *Design of Smart Connected Manufacturing Resources to Enable Changeability, Reconfigurability and Total-Cost-of-Ownership Models in the Factory-of-the-Future,* International Journal of Production Research, 56 (6), 2018, 2269-2291, 10.1080/00207543.2017.1400705.
4. Brad, S., Brad, E., *Directed Innovation of Business Models*, International Journal of Management, Knowledge and Learning, 5(1), 97-119, 2016.
5. Brad, S., Murar, M., Brad, E., *Methodology for Lean Design of Disruptive Innovations*, Procedia CIRP, Elsevier, 50(2016), 153-159, 2016.
6. Brad, S., Mocan, B., Brad, E., Fulea, M., *Environmentally Sustainable Economic Growth*, Amfiteatru Economic, 18(42), 446-460, 2016.
7. Brad, S., Drăghici, A., *Lean Agile Technology Transfer Approach*, International Journal of Sustainable Economy, 8(3), 224-236, 2016.
8. Brad, S., Mocan, B., Brad, E., Fulea, M., *TRIZ to Support Blue-design of Products,* Procedia CIRP, 39 (2016), 125-131, 2016.
9. Brad, S., Mocan, B., Brad, E., Mocan, M., *Economic Development of Peripheral/Lagging Zones through Smart Innovation*, International Journal of Transitions and Innovation Systems, 4(3/4), 201-220, 2015.
10. Chioreanu, A., Brad, S., Porumb, C., Porumb, S., *E-Maintenance Ontology-Based Approach for Heterogeneous Distributed Robotic Production Capabilities*, International Journal of Computer Integrated Manufacturing, Taylor & Francis, DOI: 10.1080/0951192X.2014.880802, 28(2), 200-212, 2015.
11. Brad, S., Murar, M., *Employing Smart Units and Servitization towards Reconfigurability of Manufacturing Processes*, Procedia CIRP, Elsevier, 30 (2015), 498-503, 2015.
12. Brad, S., Mocan, B., Brad, E., Fulea, M., *Leading Innovation to Improve Complex Process Performances by Systematic Problem Analysis with TRIZ*, Procedia Engineering, 131(2015), 1121-1129, Elsevier, 2015.
13. Brad, S., Brad, E., *Enhancing SWOT Analysis with TRIZ-based Tools to Integrate Systematic Innovation in Early Task Design*, Procedia Engineering, 131(2015), 616-625, Elsevier, 2015.
14. Murar, M, Brad, S., Fulea M., Chis, I., Craciun, S., *Industrial Equipment Enhancement Using Cyber Physical Systems Towards Smart Equipment,* 2016 International Conference on Production Research, 347-354, 2016.

Technologies:

- innDrive eXXplorer: expert system for assessing innovations
- inovex : software platform for supporting knowledge management and process innovation (TRIZ-M; ARIZ-M)
- MARKET-IT: web application of advanced web semantic technologies to support the innovation processes in SMEs

Patents:

Brad, S., Murar, M., Intelligent Automation System Based on a Distributed, Reconfigurable and Adaptive Architecture, EPO Patent app. no. 13465501.8-1807, UTC-N.

The offer addressed to the economic environment

Research & development	Industry 4.0, mechatronic products and systems, disruptive product design, lean robotics, AI/data analytics in industrial production, AI in robotics, customized robotic system design, robotics for special applications/services, collaborative robots, green/blue-design and circular economy, production robotization
Consulting	Innovation management systems, digital transformation of businesses, scaling-up of businesses, business internationalization, assessment of innovations, smart specialization of businesses, lean and agile management, servitization of businesses, collaborative innovation, IP valuation, technology transfer
Training	*Management:* innovation management, product management, project management, contract negotiation and management, business model innovation, entreprenurial plan development, inventive problem solving in management, competitive engineeirng of new products and services *Engineering:* robot programming (ABB, Fanuc, Motoman, Kuka), tools for innovation engineering, PLC programming and TIA portal, I-IoT, programming of social robots, offline robot programming and computer aided robotics

MICRO - NANO SYSTEMS LABORATORY

Contact details

Name	**Micro – Nano Systems Laboratory**
Acronym	**MiNaS**
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Faculty Department	**Faculty of Machine Building** **Mechanical Systems Engineering Department**
Telephone	+40 264 202787
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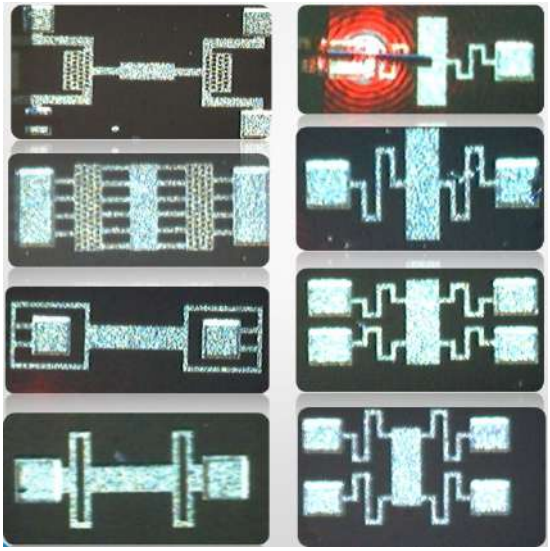
Director	**Prof. Dr. Eng. Marius Pustan**
e-mail	Marius.Pustan@omt.utcluj.ro



Areas of expertise

Micro & Nano -systems
Micro & Nano -mechanics
Micro & Nano -tribology
MEMS & NEMS, Microstructures and materials
Adhesion, Friction, Fatigue, Reliability Design and Optimization

Team

Prof. Dr. Eng. Marius Pustan, Prof. Dr. Eng. Corina Birleanu, Prof. Dr. Eng. Cristian Dudescu, Dr. Eng. Violeta Merie, Math. Florina Maria Rusu, Eng. Radu Chiorean, Dr. Eng. Horea Crisan, PhDs Ionut Maries

Representative projects

MatSpaceTEG, "**High Performance Materials for the next generation Space Thermoelectric Generators**", Romanian Space Agency (STAR) 193/15.09.2017, 2017-2019
ROMEC, Fabrication of a MEMS switch with robust metal contact, PN-III-P2-2.1-PED-2016-1727, (2016-2018)
multiDOF, "**Advanced Design of micromembranes with multiple degrees of freedom for optical MEMS applications**, PN-II-RU-TE-2014-4, 2015-2017
ROBOGRIP, "**Microgrippers as end-effectors with integrated sensors for microrobotics applications**" MANUNET ERA-NET 22/ 2016, 2016-2018
NARDEMS, "**Nano mechanical and Nano tribological characterizations for reliability design of MEMS resonators**", PNII-RU-TE-2011, 2011-2014
3SMVIB, "3 Scale modeling for robust-design of vibrating micro sensors", ERA Net, 2012-2015
REDEMS, "**Reliability design of RF-MEMS switches for space applications**, The Research, Development and Innovation Space Technology and Advanced Research", Romanian Space Agency (STAR), 2012-2015
MEMSMAT, "**Tribomechanical Characterization of MEMS Materials for Space Applications under harsh environments**", Romanian Space Agency (STAR), 2013 – 2016

Significant results

The most representative publications of the past 5 years:

1. M Pustan, C Birleanu, V Merie, S Garabagiu, D Marconi, L Barbu-Tudoran, R Voicu " Thermal effect on mechanical properties of titanium oxide thin films for thermoelectric applications", Symposium on Design, Test, Integration and Packaging of MEMS/MOEMS, DTIP 2019 – IEEE, 2019
2. C Birleanu, M Pustan, V Merie, MS Pop „Temperature Effect on Tribo-Mechanical Properties of Dental Materials", 6th International Conference on Advancements of Medicine and Health Care through, Springer, Singapore, 2019
3. A Baracu, R Muller, R Voicu, C Tibeica, A Dinescu, M Pustan, C Birleanu „Microfabrication and experimental characteriztion of an out-of-plane MEMS switch", Romanian Journal of Information Science and Technology, 22/2, pp 124-134, 2019
4. C Birleanu, M Pustan, F Serdean, V Merie, S Craciun „Temperature effect on pull-off force for gold cantilevers array", IOP Conference Series: Materials Science and Engineering, 499/1, 2019
5. C Birleanu, M Pustan, M Merie, H Crisan „Effect of film thickness on the tribo-mechanical properties of chrome-gold thin films", Proceesings of the Romanian Academy Series A – Mathematics, Physics, Technical Science, Information Science, 20/ 2, pp 174-183, 2019

6. F Șerdean, M Pustan, V Merie, C Bîrleanu, H Crișan „ Analysis of humidity influence on adhesion and tribological properties of niobium nitride thin films", IOP Conference Series: Materials Science and Engineering, 499/1, 2019
7. V Merie, M Pustan, G Negrea, C Bîrleanu, F Șerdean „Temperature effect on the mechanical characteristics of niobium nitride thin films", IOP Conference Series: Materials Science and Engineering, 499/1, 2019
8. C Birleanu, M Pustan, F Rusu, C Dudescu, R Muller, A Baracu A. „Relative humidity influence on adhesion effect in MEMS flexible application", Journal Microsystem Technologies, Micro- and Nanosystems Information Storage and Processing Systems, ISSN: 0946-7076 (Print) 1432-1858 (Online), 2018
9. M Pustan, C Birleanu, C Dudescu, JC Golinval "Dynamical Behavior of Smart MEMS in Industrial Applications", in book Smart sensors and MEMS: Intelligent devices and microsystems for industrial applications, Edited by S Nihtianov and A L Estepa, Woodhead Publishing Series in Electronic and Optical, 2017
10. M Pustan, C Dudescu, C Birleanu, F Rusu "Nanocharacterization of the Mechanical and Tribological Behavior of MEMS Micromembranes", Book chapter in Nanomechanics, book edited by Intech, ISBN 978-953-51-3182-3, Print ISBN 978-953-51-3181-6, Published: May 24, 2017 under CC BY 3.0 license. 2017
11. V Merie, M Pustan, G Negrea "Atomic force microscopy analyses on metallic thin films for optical MEMS", 5th International Conference on Powder Metallurgy and Advanced Materials, Book Series: Materials Research Proceedings, 8, pp 125-133, 2018
12. M Pustan, C Birleanu, C Dudescu "Nanocharacterization of the adhesion effect and bending stiffness in optical MEMS", APPLIED SURFACE SCIENCE, 421, pp 191-199, 2017
13. M Pustan, R Chiorean, C Birleanu, Corina et al. "Reliability design of thermally actuated MEMS switches based on V-shape beams", Microsystem Technologies-Micro-and Nanosystems-Information Storage and Processing Systems, 23/ 9, pp 3863-3871, 2017
14. M Pustan, C Dudescu, C Birleanu "Influence of the excitation modes on the resonators quality factor", Romanian Journal of Information Science and Technology, 20/ 4, pp 342-353, 2017
15. C Birleanu, M Pustan, R Müller, C Dudescu, V Merie, R Voicu, A Baracu "Experimental investigation by atomic force microscopy on mechanical and tribological properties of thin films", Int. J. of Mat. Res., 107, pp. 429 – 438, 2016
16. M Pustan, C Dudescu, C Birleanu "The effect of sensing area position on the mechanical response of mass-detecting cantilever sensor", Microsystems Technologies, 21/ 9, pp 1827-1834, 2015.
17. M Pustan, C Dudescu, C Birleanu "Nanomechanical and nanotribological characterization of a MEMS micromembrane supported by two folded hinges", Analog Integrated Circuits and Signal Processing, 82/ 3, pp 627-635, 2015
18. R Voicu, M Pustan, C Birleanu, A Baracu, R Muller "Mechanical and tribological properties of thin films under changes of temperature conditions", Surface and Coatings Technology, 271, pp 48-56, 2015
19. F Rusu, M Pustan, C Birleanu, R Muller, R Voicu, A Baracu "Analysis of the surface effects on adhesion in MEMS structures", J. Applied Surface Science, 358 Part B, pp 634-640, 2015
20. V Merie, M Pustan, G Negrea, C Birleanu "Research on titanium nitride thin films deposited by reactive magnetron sputtering for MEMS applications", J. Applied Surface Science, 358 Part B, pp 525-532
21. C Birleanu, M Pustan M. "Analysis of the adhesion effect in RF-MEMS switches using atomic force microscope", Analog Integrated Circuits and Signal Processing, 82/ 3, pp 571-581, 2015.

Significant solutions:

Development of a new method to estimate the stiffness of micro/ nano -flexible structure by atomic force microscope
Experimental determination of the energy dissipation in oscillating structure in order to increase the lifetime of vibrating sensors
Design-Fabrication-Testing of reliable mass-detection sensors
Design-Fabrication-Testing of micromembranes with high flexibility
Software development for lifetime estimation of vibrating MEMS structures
Advance nano-investigations of dental materials

Products and technologies:

Micromembrane from optical and RF applications
Paddle MEMS cantilevers for mass detection
Electrostatically actuated resonator
MEMS Software Development

The offer addressed to the economic environment

Research & development	- Micro and Nano - Systems - Micro and Nano - Tribology - Micro and Nano - Mechanics Team members have great knowledge in: reliability design of micro and Nano systems, Nano /micro / macro tribological characterizations, experimental mechanics, material testing and numerical simulations. Due to a close collaboration with the productive sector, the research team is capable of collaboration with various industrial partners and research institutes. Already the laboratory is involved in collaborations with industrial partners, universities and research institutes from Romania, Belgium, Poland, Italy and France.
Consulting	Consulting in any of the above mentioned fields can be done.
Training	The members of the team have a vast experience in the educational field (academics). Also, the team has experience in the development of the professional formation and reorientation trainings for engineers in the field of Micro and Nano system design, advance testing at Micro & Nano devices.

RAPID PROTOTYPING LABORATORY

Contact details

Name	**Rapid Prototyping Laboratory**
Acronym	**FARAP**
Logo	
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Faculty Department	**Faculty of Machine Building Faculty, Department of Manufacturing Engineering**
Telephone	+40 264 415653
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Director	Prof. Dr. Eng. Petru Berce
e-mail	Petru.Berce@tcm.utcluj.ro

Areas of expertise

Industrial Engineering (Rapid Prototyping of complex parts and master models for Rapid Tooling)
CAD/CAM Systems
Biomedical engineering (Prototypes, customized implants, new biocompatible materials)

Team

Prof. Dr. Eng. Petru Berce, Prof.dr.ing. Nicolae Balc,Assoc. Prof. Dr. Eng. Răzvan Păcurar Assoc. Prof. Dr. Eng. Mihai Damian, Assoc. Prof. Dr. Eng. Cristian Caizar, Assist. Prof. Dr. Eng. Horea Chezan, Assoc. Prof. Dr. Eng. Dan Leordean, Assoc. Prof. Dr. Eng Radu Sever Adrian, Assist. Prof. Dr. Eng. Ancuţa Păcurar, Assist.Prof.Dr.Eng. Cristina Borzan

Representative projects

OP3MET, **"Optical 3D Metrology - Automated in-line metrology for quality assurance in the manufacturing industry"**, European FP6 Project, (2006-2008)
Adm-ERA, **"Reinforcing Additive Manufacturing research cooperation between the Central Metallurgical Research and Development Institute and the European Research Area"**, European FP7 Project, (2011-2013)
BIOMAPIM, **"New Biocompatible Materials for personalized implants made by SLS and SLM"**, PCCE, (2010-2013)
"Innovative Manufacturing Network", (2005-2008)
"**AMaTUC – Boosting the scientific excellence and innovation capacity in additive manufacturing of the Technical University of Cluj-Napoca**", HORIZON 2020 – twinning, 2016-2018

Significant results

The most representative publications of the past 5 years:

1. Cosma, C., Teusan, C., Gogola, P., Berce, P.Balc,N. Investigation of the Interface between Laser-Melted CoCr and a Stainless Steel Substrate. In:Metals, 2022, 12(6), 965
2. Pacurar, R.; Berce, P.; Petrilak, A.; Neme¸s, O.; Borzan, C. ¸S.M.; Harnicárová, M.; Pacurar, A. Selective Laser Melting of PA 2200 for Hip Implant Applications: Finite Element Analysis, Process Optimization, and Morphological and Mechanical Characterization. Materials 2021, 14, 4240. https://doi.org/10.3390/ma14154240 (ISI-Q1, IF: 3,623)
3. O. Jucan, R. Gadalean, H. Chicinas, M. Hering, N. Balc, C. Popa, "Study on the indirect selective laser sintering (SLS) of WC-Co/PA12 powders for the manufacturing of cemented carbide parts", International Journal of Refractory Metals and Hard Materials, Elsevier, Volume: 96, 2021, (ISI-Q1, FI: 3.407); https://doi.org/10.1016/j.ijrmhm.2021.105498;
4. D. Ostas, M. Hedesiu, C.R. Roman, C. Cosma, M. Ciurea, H. Rotaru, Design Workflow for Mandibular Reconstruction. Opportunities and Limitations of In-house Virtual Surgical Planning, Journal of Medical and Biological Engineering, vol. 1,

2021, (IF 1.5).
5. C. Cosma, M. Moldovan, M. Simion, N. Balc, Impact of laser parameters on additively manufactured cobalt-chromium restorations, Journal of Prosthetic Dentistry, vol. 1, 2021 (IF 3.4).
6. S. Cuc, A. Burde, C. Cosma, D. Leordean, M. Rusu, N. Balc, D. Prodan, M. Moldovan, Adhesion between Biocomposites and Different Metallic Structures Additive Manufactured, Coatings, vol. 11 (4), 483, 2021 (IF 2.8).
7. Cosma, C; Drstvensek, I; Berce, P; Prunean, S.; Legutko, S; Popa, C.; Balc, N; „Physical-Mechanical Characteristics and Microstructure of Ti6Al7Nb Lattice Structures Manufactured by Selective Laser Melting", MATERIALS, Volume: 13 Issue: 18, 2020. Article Number: 4123, DOI:10.3390/ma13184123,
8. M. Harničárová, J. Valíček, M. Kušnerová, Z. Palková, I. Kopal, C. Borzan, M. Kadnár and S. Paulovič, A New Method of Predicting the Structural and Mechanical Change of Materials during Extrusion by the Method of Multiple Plastic Deformations, Materials 2021, 14, 2594, ISSSN 1996-1944, IF 3.057, (Q2).
9. Cosma, C; Kessler, J; Gebhardt, A; Campbell, I; Balc, N., "Improving the Mechanical Strength of Dental Applications and Lattice Structures SLM Processed", Publisher: MDPI, St Alban-Anlage 66, CH-4052 Basel, Switzerland, Volume: 13, Issue 4, Article no: 905, 2020, eISSN: 1996-1944, DOI: 10.3390/ma13040905, Published 2020, Q2-FI: 3.057;
10. Perini, M; Bosetti, P; Balc, N," Additive manufacturing for repairing: from damage identification and modeling to DLD", Rapid Prototyping Journal, Publisher: Emerald Group Publishing LTD, UK, Volume: 26, Issue 5, ISSN: 1355-2546 / eISSN: 1758-7670, DOI: 10.1108/RPJ-03-2019-0090, Published 2020, Q1-FI: 3.937;
11. Armencea, G., Cosma, C., Dinu, C., Onisor, F., Lazar, M., Berce, P., Balc, N., Baciut, M., Bran, S., Technical queries of a 3D design custom-made implant made from titanium particles for maxillofacial bone reconstruction, Particulate Science and Technology, Volume: 38 Issue 6 Pages 676-684, TAYLOR & FRANCIS INC, ISSN: 0272-6351, DOI: 10.1080/02726351.2019.1578846, Published 2020, Q3- FI=1.619
12. C. Cosma, J. Kessler, A. Gebhardt, I. Campbell, N. Balc, Improving the Mechanical Strength of Dental Applications and Lattice Structures SLM Processed, Materials, vol. 13 (4), 905, 2020 (IF 3.0).
13. M Todea, A Vulpoi, C Popa, P Berce, S Simon. Effect of different surface treatments on bioactivity of porous titanium implants, In: Journal of materials science & technology 35 (3), 418-426, 2019

The offer addressed to the economic environment

Research & development	Develop new materials, suitable for Rapid Prototyping using the SLS and SLM equipment. Rapid Prototyping using the well known CNC machines, available within DME-TUCN
Consulting	Select the optimal RP technological route
Training	Training for people from industry, in the following fields: - Using the modern RP equipment; - CNC machining; - Metrology and Quality Engineering.

DASSAULT SYSTÈMES SOLUTIONS CENTER

Contact details

Name	**Dassault Systèmes Solutions Center**
Acronym	**DSSC**
Logo	CENTRUL DE COMPETENTE SI SOLUTII DASSAULT SYSTEMES
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Director	Prof. Dr. Eng. Daniela Popescu
e-mail	daniela.popescu@muri.utcluj.ro

Areas of expertise

The main focus of the center is **Digital Product and Production Design Development and Simulation** based on the following topics:
CAD/CAM/CAE – the center is the first Dassault Systèmes academic partner from Romania and offers solutions in the fields of computer aided design, as well as modelling and simulation of products and manufacturing systems**.**
Reverse engineering and digitization –with interdisciplinary applications in: innovative product development, digital archaeology and reconstruction of history, medical prosthetics and others.
Virtual and augmented reality – complex computer-generated 3D environments that allow users to access and interact with an alternative reality. Users are able to interact with 3D models, in a proportion 1:1 or bigger overview of complex assembly parts and conduct virtual inspections, pick apart parts and break them down to its individual components for measurement, inspection, ergonomics, etc.

Team

Prof. Dr. Eng. Daniela Popescu, Prof. Dr. Eng. Mircea Galiş, Prof. Dr. Eng. Călin Neamţu, Lect. Dr. Eng. Florin Popişter, Assist. Dr. Eng. Rareș Ghinea, Assist. Dr. Eng. Radu Comes, Dr. Eng. Buna Zsolt, Dr. Eng. Ionuț Badiu, Eng, Sabau Radu, Eng. Zabala Ioan

Representative projects

IDArt – "Elaborating Complex Methodologies Regarding the Attribution and Authentication of Medieval and Early Modern Paintings Belonging to the National Cultural Heritage", PNIII-P1-1.2 PCCDI 2018, (2018-2020)
DACIT, "The conservation and revitalisation of cultural and natural heritage, When ancient everyday life becomes UNESCO heritage. The scanning, digital restoration and contextualization of Dacian artefacts from Orăştie Mountains", EEA grants - PA16/RO12, (2015-2016)
CAD/CAM/CAE, projects contracts with industrial partners Comelf SA, Turdeana SA, RAAL SA, Robert Bosch SRL, Continental Automotive Romania, Elcom Cablaje, Leoni Wirings System Romania, etc.
NoGAP, **"Knowledge Transfer Community to bridge the gap between research, innovation and business creation"**, European FP7 project, (2013-2016)
"Digitizing and reconstructing the historic artifacts from the "Grădiştea de munte" archaeological site (Sarmisegetuza Regia)", The National Museum of History of Transylvania, (2012)
"Blended learning course on Measurement Uncertainty for advanced vocational training", Leonardo da Vinci - Transfer of Innovation, (2011-2013)
"Realizing a virtual museum for promoting the patrimony of The National Museum of History of Transylvania",

The National Museum of History of Transylvania (2010)
"Project concerning research on new product design, development and simulation", HAMK Univ. Finland , (2007-2009)
"Scanning and generating surfaces for a orthopedic prosthesis", SC Gibas CNC East Europe SRL, (2008)

Significant results

The most representative publications of the past 5 years:

1. Neamtu, Calin; Marutoiu, Victor Constantin; Bratu, Ioan; et al., Multidisciplinary Investigation of the Imperial Gates of the 17th Century Wooden Church in Salisca, Cluj County, Romania SUSTAINABILITY Volume: 10 Issue: 5 Article Number: 1503 Published: MAY 2018
2. Todorovic, Oliver; Constantinescu, Carmen; Popescu, Daniela, FOUNDATIONS FOR ECONOMIC EVALUATION OF EXOSKELETONS IN MANUFACTURING, ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING Volume: 61 Issue: 3 Special Issue: SI Pages: 221-230 Published: SEP 2018
3. Popescu, D.; Dragomir, M.; Popescu, S.; et al., FROM SMART PRODUCTS TO SMART MANUFACTURING IN EMERGING ECONOMIES: CHALLENGES AND INSIGHTS FROM THE FURNITURE INDUSTRY 24TH INTERNATIONAL CONFERENCE ON PRODUCTION RESEARCH (ICPR) Book Series: DEStech Transactions on Engineering and Technology Research Pages: 93-97 Published: 2017
4. Bratu, I.; Siluan, Monk; Marutoiu, C.; et al., Science Applied for the Investigation of Imperial Gate from Eighteenth Century Wooden Church of Nicula Monastery JOURNAL OF SPECTROSCOPY Article Number: 6167856 Published: 2017
5. Măruţoiu, C., I. Bratu, L. Troşan, C. Neamtu, V. C. Măruţoiu, D. Pop, C. Tănăselia, and S. Garabagiu. "Scientific investigation of the Imperial Gates belonging to the wooden church from Săcel, Turda County, Romania." *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy* 152 (2016): 311-317.
6. C. Marutoiu, L. Nica, I. Bratu, O. F. Marutoiu, Z. Moldovan, C. Neamtu, et al., "The Scientific Investigation of the Imperial Gates Belonging to Sanmihaiul Almasului Wooden Church (1816)," *Revista De Chimie*, vol. 67, pp. 1739-1744, Sep 2016.
7. C. Radu, C. Neamtu. "Design a low-cost eyewear display adapted to additive manufacturing." *Acta Technica Napocensis-Series: Applied Mathematics, Mechanics, and Engineering*, 58, no. 4 (2015).
8. D. Popescu, F. Popister, S. Popescu, C. Neamtu, and M. Gurzau, "Direct toolpath generation based on graph theory for milling roughing", *Procedia CIRP*, 25, 2014, pp.75-80.
9. D. Popescu, S. Popescu, C. Neamţu, "Framework for increasing adequacy of simulation software in training CMM specialists", in *10th CIRP International Conference on Computer Aided Tolerancing*, pp. 243-250
10. D. Popescu, S. Popescu, C. Neamţu, D. Mihai, "Model for developing design of the electronic courses" in *IEEE International Conference Automation, Quality and Testing, Robotics*, pp. 483-488

Significant solutions:
Measurement uncertainty evaluation in case of classical measurements hand tools for length
Mold Design for injected plastic part
Reverse engineering of mechanical parts
Terrestrial laser scanning

Products and technologies:
Virtual reality application for museum
Augmented reality application for measurement

Others:
Neamțu Călin, Popescu Daniela, Popișter Florin, *Module CAD/CAM în Catia V5*, Editura Mega, Cluj-Napoca, 2013
Neamţu Călin, Dragomir Mihai, Popescu Daniela, Popescu Sorin, Răcăsan Radu *Uncertainty of conventional measurements / Incertitudinea de măsurare în metrologia clasică*, Editura UT PRESS, Cluj-Napoca, 2012
Wojciech Plowucha (ed.) et al. – *Didactics of Coordinate Metrology*, Editura Wydawnictwo naukowe Akademii Techniczo-Humanistycznej W Bielsku-Bialej, - Bielsko Biala 2012, - capitolul Virtual Laboratory, autori: Călin Neamțu, Mihai Dragomir, Daniela Popescu, Rareș Ghinea

The offer addressed to the economic environment

Research & development	Virtual reality in training and education; E-education; Designing and optimization of products and industrial manufacturing systems; Reverse engineering; Digital Archaeology; Research in the field of Digital Factory simulations; Research on adapting the reverse engineering techniques in various interdisciplinary fields (art, medicine, etc.) Reverse engineering and reconstruction of complex surfaces Designing, modelling and 3D simulating of manufacturing systems 3D modelling of components and complex assemblies
Consulting	Consultancy regarding the optimization of CAD/CAM processes; Consultancy regarding production planning; Consultancy regarding advance 3D modelling; Consultancy in virtual simulation
Training	CAD/CAM/CAE: using the Dassault Systèmes software packages Training on various topics with the help of virtual reality Advanced reverse engineering technique, 3D Shet metal design, Measurement Uncertainty

QUALITY ENGINEERING AND MANAGEMENT RESEARCH CENTER

Contact details

Name	**Quality Engineering and Management Research Center**
Acronym	**QEMRC (CCIMC)**
Logo	
Site	http://qemrc.utcluj.ro
Address	103-105 Muncii Blvd., rooms B01, B07, B08, M110, M405, M406, Cluj-Napoca, Romania
Faculty Department	**Faculty of Industrial Engineering, Robotics and Production Management** **Design Engineering and Robotics Department**
Telephone	+40 722 588 538
Director	Prof.Dr.Eng. Sorin Popescu
Co-Director	Prof.Dr.Eng. Mihai Dragomir
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Areas of expertise

Quality management and engineering - Interdisciplinary research area, with applicability in industry, in the service sector and in the public sector (education, health, administration) for improving products/services, processes and organizations

Quality and sustainability-oriented development - applying specific algorithms, techniques and methods for developing products/services, processes and organizations to meet current and future market needs and environmental challenges

Industrial metrology - high precision 3D measurement and scanning in industrial engineering; 3D surface scanning for reverse engineering, modeling and simulation of products and systems, as well as interdisciplinary applications

Team

Prof. Dr. Eng. Sorin Popescu, **Prof.Dr.Eng. Mihai Dragomir**, Prof.Dr.Eng. Liviu Crişan, A/Prof.Dr.Eng. Dan Hurgoiu, Assoc. Prof. Dr. Diana Dragomir, Assoc.Prof.Dr.Eng. Grigore Pop, Assoc.Prof.Dr.Eng. Ștefan Bodi, Assoc.Prof.Dr.Eng. Emilia Câmpean, PhD students and external collaborators

Representative projects

Smart hospital bed - HOpE, UEFISCDI, PN-III-P2-2.1-PED2019-5430 (2020-2022)
Danube Chance 2.0 - Embracing failure to facilitate second-chance entrepreneurship in the Danube region, Interreg - Danube Transnational Programme, DTP2-012-1.2 (2018-2020)
Mainstreaming technology commercialization in Romania (MACRO), Junior Achievement Romania "Entrepreneurial university" competition (2020)
Made in Danube (MiD) - Transnational Cooperation to transform knowledge into marketable products and services for the Danubian sustainable society of tomorrow, Interreg - Danube Transnational Programme, DTP1-1-072-1.1 (2017-2019)

Significant results

Representative publications of the past 5 years:

Articles in journals and international conference proceedings:

1. Dragomir, Mihai; Blagu, Diana Alina; Popescu, Sorin; Fulea, Mircea; Neamțu, Călin; How Well Are Manufacturing Companies in Transylvania, Romania Adapting to the Low-Carbon Economy in Order to Become Sustainable?. Int. J. Environ. Res. Public Health, 19(4):2118, 2022. https://doi.org/10.3390/ijerph19042118

2. Salem, Tareq; Dragomir, Mihai; Options for and Challenges of Employing Digital Twins in Construction Management, Applied Sciences, 12(6):2928, 2022. https://doi.org/10.3390/app12062928
3. Popescu D, Dragomir M, Popescu S, Dragomir D.; Building Better Digital Twins for Production Systems by Incorporating Environmental Related Functions—Literature Analysis and Determining Alternatives. Applied Sciences. 12(17):8657, 2022. https://doi.org/10.3390/app12178657
4. Blagu D., Szabo D., Dragomir D., Neamțu C., Popescu D. Offering Carbon Smart Options through Product Development to Meet Customer Expectations. Sustainability. 2022; 14(16):9913. https://doi.org/10.3390/su14169913
5. Popescu S., Rusu D., Dragomir M., Popescu D., Nedelcu Ș., Competitive Development Tools in Identifying Efficient Educational Interventions for Improving Pro-Environmental and Recycling Behavior, International Journal of Environmental Research and Public Health, 2020, 17(1):156. https://doi.org/10.3390/ijerph17010156
6. Teleabă, F., Popescu, S., Olaru, M., Pitic, D., Risks of Observable and Unobservable Biases in Artificial Intelligence Predicting Consumer Choice, Amfiteatru Economic, 2021, 23(56), pp. 102-119. https://doi.org/10.24818/EA/2021/56/102
7. Weckenmann A., Bodi Ş., Popescu S., Dragomir M., Hurgoiu D., Comes R., Hit or Miss? Evaluating the Potential of a Research Niche: A Case Study in the Field of Virtual Quality Management, Sustainability, vol. 11, issue 5, p. 1450, 2019. https://doi.org/10.3390/su11051450
8. Popescu, S., Santa, R., Teleabă, F., Ileșan, H., A structured framework for identifying risks sources related to human resources in a 4.0 working environment perspective, Human Management Systems, 2020, Volume 39, Issue 4, Pages: 511-527. https://doi.org/10.3233/HSM-201034
9. Diana Dragomir, Diana Pitic, Mihai Dragomir, Daniela Popescu, Overview of Technology Commercialization Options in Romania, In The International Symposium for Production Research (Lecture Notes in Mechanical Engineering), 24-26 September 2020, Antalya, Turkey (online), pp. 658-664. Springer, Cham, 2020. https://doi.org/10.1007/978-3-030-62784-3_56
10. Teleabă F., Popescu S., Santa R., Managing Quality Perception Along the Customer Journey: A Behavioral Economics Approach. In: Durakbasa N., Gençyılmaz M. (eds) Proceedings of the International Symposium for Production Research 2019. ISPR 2019, ISPR 2019. Lecture Notes in Mechanical Engineering. Springer, Cham, 2020. https://doi/org/10.1007/978-3-030-31343-2_43
11. Pop, G. M., Crișan, L. A., Tripa, M., Neamțu, C., Dragomir, M., On the Association of Datums and Measurements Using Conventional Measuring Devices-Topics Within the GPS Toolbox Project, Proceedings of the 12th International Conference on Measurement and Quality Control - Cyber Physical Issue, Belgrade, Serbia, June 4th-7th, 2019, pp. 209-216, Springer, Cham, ISBN 978-3-030-18176-5. https://doi.org/10.1007/978-3-030-18177-2_20

Books / chapters:

1. Dragomir Diana, Dragomir Mihai, Acs Daniel, Popescu Sorin, International Cooperation for Smart and Sustainable Agriculture, Chapter in "Sustainability assessment at the 21st Century", IntechOpen, DOI: 10.5772/intechopen.86464. https://www.intechopen.com/online-first/international-cooperation-for-smart-and-sustainable-agriculture, 2019
2. Popescu Daniela, Dragomir Diana, Comes Radu, Popescu Sorin, Dragomir Mihai, Neamțu Călin; Enhancing Management and Marketing in Cultural Heritage by Using New Technologies, Trivent Publishing, https://www.trivent-publishing.eu/books/romanianmanagementstudies/2.%20Daniela%20Popescu%20et%20al..pdf, Chapter in "The best Romanian Management Studies", 2017-2018, ISBN 978-615-81353-5-1, pp. 20-32, 2020

Significant solutions:

Design and development of standardized management systems
Customer and sustainability-oriented product and process development
Precision measurements using multiple sensor technologies
3D scanning and interdisciplinary reverse engineering

The offer addressed to the economic environment

Research & development	Quality and sustainability-oriented product and process development Optimizing the implementation of standardized management systems High precision 3D measurement and complex 3D surface scanning
Consulting	Designing, implementing, and improving standardized management systems Consultancy on developing new products or improving existing ones
Training	Quality engineering and management (solutions and instruments) Industrial metrology and 3D scanning (techniques and operation)

RESEARCH LABORATORY FOR MANUFACTURING PARTS FROM COMPETITIVE MATERIALS

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Director	Prof. Dr. Eng. Sorin Grozav
e-mail	Sorin.Grozav@tcm.utcluj.ro

Areas of expertise

Composite and plastic material
- Conception, manufacturing and mechanical behavior of polymer composites, Mechanical behavior of materials at low and cryogenic temperature.

Design of cutting tools
- Cutting and cutting tools, Metalworking technology, Tools for machine tools.

Device design and maintenance
- Design devices, Technologies, and equipment for reconditioning.

Processing machinery
- Forming machines, Forming Machines and technologies, Mechanization, and automation of technological processes of cutting and forming, CNC machine tools.

Medical devices
- Osteosynthesis material, Intramedullary nailing

Team

Prof. Dr. Eng. Sorin Grozav, Prof. Dr. Eng. Marian Borzan, Prof. Dr. Eng. Liana Hancu, Assoc. Prof. Dr. Eng. Gheorghe Gligor, Assist. Prof. Dr. Eng. Adrian Trif, Assist. Prof. Dr. Eng. Paul Bere, Assist. Prof. Dr. Eng. Vasile Ceclan, Senior Lect. Dr. Eng. Adrian Popescu, PhD Eng. Alexandru Dumitru Sterca

Representative projects

BELCO – "Optimizing the fiber reinforced polymer composite materials and manufacturing technology used in the producing body elements for electric vehicles", PNIII-P2-2.1-BG-2016-0210, (2016-2018)
"**3D modeling of complex surfaces" –** contract with industry, (2017-2018)
"Informatics Platform for Engineering Fluid PIIF", POSDRU, (2010-2013)
"Advanced Solutions to Improve Performance in Bending with Active Plates of Elastomer", CNCSIS, (2009-2012)
"Development of a Computer System for Assessing of Occupational Hazards Type Mechanical Vibrations and Impact on Human Operator Workplace", VIBROM, (2008-2011)

Significant results

The most representative publications of the past 5 years:

1. Grozav S.D., Sterca A.D., Kociško M., Pollák M. and Ceclan V.," Feasibility of Predictive Models for the Quality of Additive Manufactured Components Based on Artificial Neural Networks", MACHINES, Volume 10, Issue 2, DOI: 10.3390/machines10020128, https://www.mdpi.com/2075-1702/10/2/128, 2022;

2. Pollak M., Kocisko M., Petrus J., Grozav S.D., Ceclan V.," Research into the Impact of Spindle Speed and Feed Rate Changes on the Life of a Deep-Drilling Technology Tool", MACHINES, Volume 10, Issue 4, DOI: 10.3390/machines10040268, Repository link: https://www.mdpi.com/2075-1702/10/4/268, 2022.
3. Serban, Florica Mioara; Grozav, Sorin, Ceclan, Vasile; Turcu, Antoniu - Artificial neural networks model for springback prediction in the bending operations - TEHNICKI VJESNIK - TECHNICAL GAZETTE, Volume 27, Issue 3, Pages: 868-873, Published: Jun 14, 2020, https://doi.org/10.17559/TV-20141209182117
4. Alexandru D. Sterca, Roxana-Anamaria Calin, Lucian Cristian, Eva Maria Walcher, Osman Bodur, Vasile Ceclan, Sorin Dumitru Grozav, Numan M. Durakbasa - Evaluation of Fused Deposition Modeling Process Parameters Influence on 3D Printed Components by High Precision Metrology - Digitizing Production Systems, Selected Papers from ISPR2021, October 07-09, 2021, Online, Turkey, SPRINGER 2022, ISBN: 978-3-030-90421-0
5. David Tica, Sorin Cosmin Cosma, Osman Bodur, Numan M. Durakbasa, Sorin Grozav, Vasile Ceclan, Jan Rehor, Dumitru Alexandru Sterca, Eva Maria Walcher, Effects of Drag Finishing on a SLM-manufactured Titanium Reconstruction Plate, ISPR 2022 Conference, 06-08 October 2022, Antalya, Turkey.
6. Lucian-Nicolae Cristian, Osman Bodur, Eva Walcher, Sorin Grozav, Vasile Ceclan, Numan M. Durakbasa, Dumitru Alexandru Sterca, Study of Improving Spur Gears with the Generative Design Method, ISPR 2022 Conference, 06-08 October 2022, Antalya, Turkey.
7. Mark Kovacs, Razvan-Ioan Pacurar, Sorin Grozav, Numan Durakbasa, Osman Bodur, Jan Rehor, Tomas Marik, Research on Mechanical Characteristics of parts made of 316L Stainless Steel (material) by using Selective Laser Melting Technology, ISPR 2022 Conference, 06-08 October 2022, Antalya, Turkey.Gabriel CIUSCA, Teodor POTRA, Vasile CECLAN, Sorin GROZAV - *Determination of Field Temperature for Composite Materials using Empirical Methods*, Springer Nature Switzerland AG 2020, N.M.Durakbasa and M.G. Gencyilmaz(Eds.): ICPR1 2019, LNME, pp. 416-421, 2020. https://link.springer.com/chapter/10.1007%2F978-3-030-31343-2_36
8. Simona Sorina GABRIAN, Sorin-Dumitru GROZAV, Gabriel Nicodim CIUŞCĂ, Vasile, Adrian CECLAN, Antoniu TURCU and Stanislaw LEGUTKO, - *New materials obtained by rubber recycling from industrial waste*, MATEC Web of Conferences; Les Ulis Vol. 299, Les Ulis: EDP Sciences.(2019)05010(2019) https://doi.org/10.1051/matecconf/201929905010
9. V Ceclan, A Popan, S Grozav, A Popan - *Study on milling strategies influence on the quality characteristics in case of composite material* - MATEC Web of Conferences; Les Ulis Vol. 299, Les Ulis: EDP Sciences. (2019) 04012 (2019) https://doi.org/10.1051/matecconf/201929904012
10. Grozav, Sorin Dumitru; Ceclan, Vasile Adrian; Ciusca, Gabriel Nicodim, CALCULATION OF THE CONTACT SURFACE IN THE ORBITAL DEFORMATION OF THE CYLINDRICAL WORKPIECE ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING Volume: 61 Issue: 4 Pages: 695-700 Published: NOV 2018

Products and technologies:

- Self-locking intramedullary nail for major trauma, such as when intramedullary nailing.
- Seat passenger rail industry.
- Industrial plant RTM for SC VRG Bistrita Company.

Patents:

1. S. Grozav, Coste Camilio, "*Self-locking intramedullary nail*" patent: RO127480, 30.01.2014, Excellence Award and Gold Medal with special mention at the salon PROINVENT 2014
2. I. Vuscan - Patent: no. 123184 OSIM, 2011; Diploma of excellence and gold medal for the group of inventions PROINVENT edition a-VIII-a, Cluj-Napoca 2010; Diploma and silver medal – EUROINVENT, Iaşi, 2011; Diploma and medal AGEPI from the State Agency for Intellectual Property from Republica Moldova, - PROINVENT, Cluj-Napoca, 2011.
3. P. Bere, P. Berce, H. Iancau, "*Method and device for obtaining bent tubular parts with variable section of fiber reinforced polymer composites*", Request invention no. A 2011 1004/05.02.2011, Excellence Award and Silver Medal with special mention at the salon PROINVENT 2014

The offer addressed to the economic environment

Research & development	Study regarding the mechanical behavior of polymer composite structures. Micromechanics and mechanical of high-performance composite structures. Study of phenomena that accompany the process of orbital forming metal matrix composite materials. Applied research regarding the influence of process parameters on the mechanical characteristics of composite structures. Determination of mechanical characteristics by testing tensile, compression, bending and delamination specific the composites. Experimental research regarding the manufacture of on polymer composite. Manufacturing of automotive gears by orbital forming.
Consulting	This collective provides consultancy in the field of replacing metal parts with composite structures based on fiberglass, carbon, Kevlar and so on, used in top fields such as aeronautics, aerospace and transportation.
Training	It provides training in the application materials and competitive technologies. The research structure proposed has the potential to provide economic environment training in a highly dynamic field, but relatively new in our country, as is the use of competitive material in peak areas in order to increase the quality and competitiveness of industrial products.

ACOUSTICS, APPLIED MECHANICS AND CAD RESEARCH LABORATORY

Contact details

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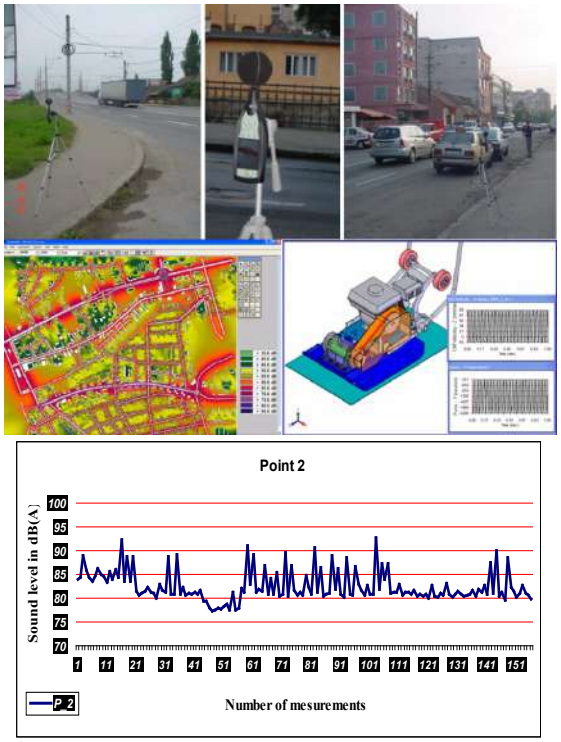

Areas of expertise

Acoustics
- Physical acoustics, Industrial/Environmental noise and vibration control, Urban acoustics, Bioacoustics

Applied mechanics
- Mechanical vibrations, Machine dynamics, Analytical mechanics, Computational mechanics, Biomechanics

Computer Aided Design
- Surface and solid modeling, Parametric modeling, Theoretical foundation of CAD, Mechanical drafting, CAE

Team

Prof.Dr.Eng. Diana Ioana Popescu, Prof.Dr.Ing.Math. Nicolae Ursu-Fischer, Şl. Dr. Ing. Lucia Margareta Ghiolțean, Conf.Dr.Eng. Radu-Mircea Morariu-Gligor, Assist.Dr.Ing. Luminiţa Pleşa, Şl.Dr.Ing. Iuliana Fabiola Moholea, Drd.Ing. Viorel Aşchilean

Representative projects

"Modelling, simulation and precision in the study of mechanical systems vibrations, with applications for crankshafts of internal combustion engines and piston compressors", CNCSIS A41-1049, (2004-2005)
"Modelling, algorithms and precision in the study of mechanical systems vibrations", CNCSIS A-1259, Ministry of Education and Research, (2006)
"Development of engineering models and methods for assessment and prediction of the environmental noise", PNII-Idei, (2007-2010)
"Fundamental and applied research on the modernization of the vibrating plate compactors - design and execution", Managerial Agency for Scientific Research, Innovation and Technological Transfer, RELANSIN, (2001-2003)
"Research and studies on perception, assessment, control and prediction of industrial noise", CNCSIS, A33, Ministry of Education and Research, (2004-2005)

Significant results

The most representative publications of the past years:
1. Morariu-Gligor, R.M. The Study of the Dynamic Behavior for a Tamping Rammer, *Symmetry*, 2022, 14, 980.
2. Plesa, L., Manea, L.D., Istoan, R., Recycling plastic wastes in order to obtain new building materials, *Journal, IOP Conference Series: Materials Science and Engineering*, Vol. 1251, Issue 1, Pages 012013, IOP Publishing, 2022.
3. Ursu-Fischer, N., Popescu, D.I., Moholea, I.F., The accurate computing of clothoid coordinate values and of the distance between a point and a clothoid, *Acta Technica Napocensis, Series Applied Mathematics, Mechanics and*

Engineering, Vol. 64, Issue 2, pag. 207-218, Jun. 2021.
4. Ursu-Fischer, N., Popescu, D.I., A Geometric Method for Optimize the Ackermann-Type Steering Mechanism, *Acta Technica Napocensis, Series: Applied Mathematics, Mechanics and Engineering,* vol.64, Issue II, pag. 219-226, June 2021
5. Popescu, D.I., Case Study of the Environmnetal Noise and its Perception in the City of Cluj-Napoca, Romania, *Archives of Acoustics*, Vol.45 No.4, pag. 625-631, 2020
6. Popescu, D.I.,Popescu, A.D., Analysis of the Subjective Perception of Noise in Cluj-Napoca, Romania, *ICSV26 – The 26th International Congress on Noise and Vibration, Montreal, Canada*, 7-11 July 2019, Proceedings, Montreal bridges 2019, Edited by: ICSV26 Local Committe in Montreal, ISSN 2329-3675, ISBN 978-1-9991810-0-0, Published by: Canadian Acoustical Association, Copyright © International Institute of Acoustics and Vibration (IIAV), 2019, Paper no. 541, 6 pag.
7. Popescu, D.I., "Environmental Noise in Urban Areas, between Acceptance and Taking Measures", *18th International Conference Noise Control , 26-29 May 2019*, Janow Podlaski, Poland, Conference Proceedings on CD, Central Institute of labour Protection – CiopPib, Polish Academy of Science, ISBN 978-83-7373-273-5, 10 pag.
8. Crişan, A., Morariu-Gligor, R., A Study on the Impact Force in Case of Tamping Rammers, *Romanian Journal of Acoustics and Vibration*, Vol. 16 / I, 2019, pag. 78 – 83, 2019;
9. Ursu-Fischer, N., Popescu, D.I., Radu, I., Moholea, I.F., "Multiple solutions of interpolation with second and third degree Bézier polynomials", *Acta Technica Napocensis, Series: Applied Mathematics, Mechanics and Engineering,* Vol. 61, Issue 2, pag. 159-166, Jun 2018.
10. Ursu-Fischer, N., Popescu, D.I., Radu, I., "Spline interpolation with third-degree Bézier functions", *Acta Technica Napocensis, Series Applied Mathematics, Mechanics and Engineering*, Vol. 61, Issue 2, pag. 167-174, Jun. 2018.
11. Popescu, D.I., Ursu-Fischer, N., Moholea, I.F., "Road Traffic Noise in Cluj-Napoca City – Ten Years after the First Strategic Noise Map", *Acta Technica Napocensis, Series Applied Mathematics, Mechanics and Engineering*, Vol. 60, Issue 4, pag. 515-520, Nov. 2017.
12. Popescu, D.I., Ursu-Fischer, N., Moholea, I.F., "Road Traffic Noise Reduction Strategy in Cluj-Napoca – A Briaf Analysis", *Acta Technica Napocensis, Series Applied Mathematics, Mechanics and Engineering*, Vol. 60 , Issue 4, pag. 521-526, Nov 2017.
13. Morariu-Gligor, R.M.,Crisan, A.V., Serdean, F.M., "Optimal Design of an One-way Plat Compactor", *Acta Technica Napocensis, Series Applied Mathematics, Mechanics and Engineering*, Vol. 60 , Issue 4, pag. 557-564, Nov 2017.
14. Morariu-Gligor, R.M., "Factors Influencing the Degree of Soil Compaction", *Acta Technica Napocensis, Series Applied Mathematics, Mechanics and Engineering*, Vol. 60 , Issue 1, pag. 125-130, March 2017.
15. Popescu, D.I., "Study of Particle Motion on a Helical Vibrating Surface", The Third International Conference of Mechanical Engineering, Faculty of Mechanics, University of Craiova, 8-9 October 2015, Proceedings on CD, *Trans Tech Publication: Current Solutions in Mechanical Engineering, Applied Mechanics and Materials*, vol. 823, pag. 13-16, Jan. 2016, DOI 10.4028/www.scientific.net/Amm.823.

Books:
- Ursu-Fischer, N., "Elemente de cinematică", Ed. Casa Cărţii de Ştiinţă, Cluj-Napoca, 2021, 746 p.
- Șerdean, F.M., Moholea, I.F., Morariu-Gligor, R.M., Programare în limbajul Matlab cu aplicații în inginerie mecanică, vol. I, Ed. UTPRESS, Cluj-Napoca, 2021, 247 p.
- Morariu-Gligor, R.M., Moholea, I.F., Șerdean, F.M., Programare în limbajul C cu aplicații în inginerie mecanică, vol. I, Ed. UTPRESS, Cluj-Napoca, 2021, 225 p.
- Ursu-Fischer, N., Ursu M., "Metode numerice în tehnică", Ed.Casa Cărţii de Ştiinţă, Cluj-Napoca, 2019.
- Ursu-Fischer, N., "Elemente de mecanică analitică", Ed. Casa Cărţii de Ştiinţă, Cluj-Napoca, 2015.

Significant solutions:
Development of specific methods for assessment and prediction of road and railway traffic noise
Assessment of environmental and industrial noise impact on human
Solutions to improve the urban acoustic environment and reduce the exposure to noise
Development of models, simulations and dynamical studies of vibrating machines: vibrating compactors, elevators, feeders and mills.
Theoretical and practical solutions on the field of mechanics (statics, kinematics, dynamics).

The offer addressed to the economic environment

Research and development	The research team is interested in new ideas for cooperation in the field of acoustics and vibrations, for completing projects aiming the assessment, prediction and reduction of pollution.
Consulting	Consulting in the fields of: Acoustics, Noise mapping Vibrations, Machine dynamics, Vibro-acoustic diagnostics Computer aided design and engineering graphics.
Applied engineering services	Assessment of noise and vibration Computer aided drafting, design and engineering 3D modelling
Training	CAD training courses (AutoCAD)

MANAGEMENT RESEARCH CENTER FOR ORGANIZATIONAL SUSTAINABILITY

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Areas of expertise

Business and Management
New Marketing and Entrepreneurial Development Managerial Methods for Organizational Competitiveness

Team

Prof. Eng. Ec. Laura Bacali, Prof. Dr. Eng. Florin Lungu, Assoc. Prof. Dr. Eng. Sorin Suteu, Assoc. Prof. Dr. Eng. Radu Vlad , Assoc. Prof. Dr. MsC Ec. Camelia Ucenic, , Assoc . Roxana Cordos, , Assoc. Prof. Dr. Eng. Emilia Ciupan, Assoc. Prof. Dr. Eng., Ec. Cristina Feniser, Assoc. Prof. Dr. Eng.,Ec. Adriana Sava, Assoc. Prof. Dr. Eng. Daniel Filip, Lect. Dr. Eng. Violeta Firescu, Lect. Dr. Eng. Calin Otel, Lect. Dr. Eng.,Ec. Daniela Jucan, Lect. Dr. Ec. Monica Bogdan, Lect. Dr. Eng.Gabriela Bacila, Lect. Dr. Eng. Carmen Maria Muresan, Lect. Dr. Eng. Dan Simion, Lect. Dr. Eng. Ec. Claudiu Ioan Abrudan, Lect. Dr. Eng. Remus Lungu.

Representative projects

Mathematics online learning model in engineering education
Proiect Structuration et accompagnement de l'Entrepreneuriat etudiant au Maghreb, SALEEM, funded by AUF, 2017-2021
Research and opportunity to regarding the activity expansion of in the North-Western area of Romania. Identification an IT solution for the management of enterprise resource planning (ERP system)

Significant results

1. Arik Sadeh, Claudia Florina Radu, Fenișer Cristina , Andrei Borșa, Governmental Intervention and Its Impact on Growth,Economic Development, and Technology in OECD Countries , Sustainability, 13(1), 166, 2021.
2. Varga, V., Lungu, F., Performance increasing researches in the value chain stages within the petroleum industry, International Journal of Advanced and Applied Sciences, nr. 7(12), Pages: 62-67, ISSN 2313-626X, E-ISSN: 2313 – 3724, 2020.
3. Carmen Gabriela Băcilă, Călin Ciprian Oţel,An overview on the importance of sustainability and the environment, Proceedings of the 7th Review of Management and Economic Engineering International Management Conference „Management Challenges Within Globalization", Ed. Todesco , ISSN 2247-8639, 590- 597, 17-19.09, 2020
4. Sava Adriana, Bogdan Monica şi Kocsi Kinga, Online disclosure of non-financial information in Romanian large companies, Acta Technica Napocensis – Series: Applied Mathematics, Mechanics and Engineering vol. 61, Issue Special, September2018, pp. 203-208, 2018
5. Bogdan Monica şi Sava Adriana, Supply chain finance – a solution to improve business efficiency, Acta Technica Napocensis – Series: Applied Mathematics, Mechanics and Engineering, vol. 61, issue IV, November 2018, pp. 625-630, 2018
6. Gaspar M., Firescu V., New skills and qualifications required by the current approaches in the software development industry, Acta Technica Napocensis – Series: Applied Mathematics, Mechanics and Engineering, vol. 61, Issue Special, September 2018, pp. 97-106, 2018
7. E. Ciupan, C. Ciupan, E.-M. Câmpean, L. Stelea, C.-E. Policsek, F. Lungu, D.-C. Jucan, Opportunities of Sustainable Development of the Industry of Upholstered Furniture in Romania. A Case Study. *Sustainability* ISSN 2071-1050, *10*(9), 2018

8. Ciupan C., Steopan M., Pop E., Campean E., Filip I., Ciupan E., Comparative analysis of different ribs used to rigidize the resistance structure of a sofa side made of composite materials based on vegetable fibers, Acta Tehnica Napocensis, Applied Mathematics, Mechanics and Engineering, Vol. 61, No. 1, Ian.2018
9. Ciupan C., Comsa D.-S., Ciupan E., Simulating the Thermoforming Process of a Box for Upholstered Furniture, Acta Technica Napocensis, Series: Applied Mathematics, Mechanics and Engineering, Vol 61, No 3, Special Issue, pp. 21-28, Sept.2018
10. Ciupan M., Popa M., Sosa I.P., Contiu G., Ciupan E. , Development and Testing of Mineral Casting for Use in Structural Elements and Mold Making, Acta Technica Napocensis, Series: Applied Mathematics, Mechanics and Engineering, Vol 61, No 3, Special Issue, pp. 29-34, Sept 2018.
11. Javier Bilbao, Cristina Fenișer, Olatz García, Carolina Rebollar, Eugenio Bravo, Concepción Varela, Management Applied Directly to University World: Chance to Empower Students INTED, 12th International Technology,Education and Development Conference, INTED, 5-7 March, 2018, Valencia, Spain, ISBN: 978-84-697-697-9480-7 ISSN: 2340-1079, Pp.: 5998 – 6001, 2018
12. Cristina Fenișer, Javier Bilbao, Ken Brown, Eugenio Bravo Carolina Rebollar, Concepción Varela, Olatz, Is Flipped Classroom an Effective Model to Respond to the Training Requirements of Our Century s Engineering? EDULEARN, 10th International Conference on Education and New Learning Technologies, EDULEARN Palma, Spain. 2-4 July, 2018, Pp: 5024-5031
13. Ken Brown, Cristina Feniser, Vic Lally , Javier Bilbao, Arik Sadeh, Sharing cultures and society in Technology enhanced Learning mediated Environments ICERI, November 12-14, 2018, Sevilla, Spain, Pages: 7369-7373, 2018
14. Cristina Fenișer, Arik Sadeh, Javier Bilbao, Florin Lungu, Alina Solovăstru, Innovative Perceived Conduct of Industrial Firms, Acta Technica Napocensis, ISSN 1221-5872, ISSN (online) 2393-2988, Series: Applied Mathematics, Mechanics, and Engineering, Vol.61, Issue Special, September, 2018, pp. 65-68, 2018
15. Elena Simina LAKATOS, Laura BACALI, Ligia Maria NAN, Alina Maria DANCIU, Matthew GREENLEY., THE DEVELOPMENT OF THE PRODUCTION PROCESSES IN AN ACTIVE CIRCULAR ECONOMY SYSTEM, A VIEW OF RECIRCULATION, ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING, Vol. 61,nr. 4, pg. 735-742, ISSN: 1221-5872, 2018.
16. Lakatos, ES ; Bacali, L ; Ciomos, AO ; Rosca, MG ; Mateiciuc, C., THE BEHAVIOUR OF NEW GENERATIONS CONSUMERS RELATED TO THE CIRCULAR ECONOMY, ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING, Vol. 61, pg. 727-734, ISSN: 1221-5872, 2018
17. Bacali, LA ; Botos, A ; Nan, LM ; Bacali, L., THE INFLUENCE OF THE ENVIRONMENTAL LEVEL ON THE PROFESSIONAL RESULTS OF THE ROMANIAN STUDENTS, ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING, Vol. 61, pg 617-624, ISSN: 1221-5872, 2018.
18. Bacali, LA ; Botos, A ; Lakatos, SE ; Bacali, L., THE IMPORTANCE OF AMBIANCE IN ROMANIAN UNIVERSITY EDUCATIONAL SPACES, ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING, Vol. 61, pg. 609-616, ISSN: 1221-5872, 2018.
19. Adrian Pisla, Raluca Dorina BAIDOC, Lorand Kacso-Vidrean, Daniela Corina Jucan, Factors In The Life Cycle Of Airport Activities, ACTA TECHNICA NAPOCENSIS-Series: APPLIED MATHEMATICS, MECHANICS, and ENGINEERING, Vol. 61, nr. 4, Pag.753-762, Nov. 2018
20. Lorand Kacso-Vidrean, Raluca, Dorina Baidoc, Daniela Corina Jucan, Adrian PÎSLĂ, Dust Deposition Calculation For Pannels Robotized Cleaning And Maintenance, ACTA TECHNICA NAPOCENSIS-Series: APPLIED MATHEMATICS, MECHANICS, and ENGINEERING, Vol. 61, nr. 4, Pag.701-710, Nov.2018
21. Daniel FILIP, Modern methods and tools to improve the production processes from small series and unique production, ACTA TECHNICA NAPOCENSIS, Series: Applied Mathematics, Mechanics, and Engineering, Vol. 61, nr. 4, 2018, 575-584 Dec 2018
22. Daniel FILIP, Applying to the mathematical methods to optimize the launching process in manufacturing ACTA TECHNICA NAPOCENSIS, Series: Applied Mathematics, Mechanics, and Engineering, Vol. 61, nr. 4, 2018, 585-592, Dec 2018
23. Radu Constantin Vlad, An Integrated Planning and Scheduling Model for Wiring Systems Assembly, Acta Technica Napocensis, Vol. 61, no. 3, pag 263-270,2018
24. Paul Farcas, Carmen Maria Muresan, THE IMPORTANCE OF THE ARCHETYPAL TRAITS ON MILLENNIALS IN THE CONTEXT OF BRAND DIFFERENTIATON – A QUALITATIVE APPROACH, Acta Technica Napocensis – Series: Applied Mathematics, Mechanics and Engineering, vol. 61, issue IV, November 2018, pp. 59-64, 2018

The offer addressed to the economic environment

Research & development	Development of cooperation with other research groups Strategies for sustainability The elaboration and implementation of managerial systems which drive to performance on the three sustainability poles: long run economic performance, social and environmental performance Organizational development toward the learning organization
Consulting	Collaboration with the economic environment and other sectors of the social life for relevant topics regarding sustainability The transfer of the research results toward the end users, Support for start-ups and innovative spinoffs Market research, Business plan, Feasibility studies, Cost benefit analysis
Training	Training and research opportunities for PhD students Training and research opportunities for young researchers Training for economic environment Cource :Integration of Management Systems, Change and Learning Organization, Communication Strategies, Cleaner Productionm, Corporative governance, Business simulation games

THE CENTER FOR RESEARCH IN ENGINEERING AND TECHNOLOGY MANAGEMENT

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Areas of expertise

Applied research in industrial engineering: a) development of applications in manufacturing processes; b) development of applications in mechanical systems; c) development of applications in technology management; **Competitive and pre-competitive research:** a) technological equipment; b) machinery and equipment manufacturing technology; c) special technological processes; d) optimization of the manufacturing technological system; e) monitoring technological systems and equipment; f) information technology integration into production systems (PDM, PLM etc.)
Product innovation and technological innovation in engineering and their impact on technology management
Research knowledge capitalization and dissemination

Team

Prof. Dr. Eng. Mircea Lobonțiu, Prof. Dr. Eng. Vasile Năsui, Prof. Dr. Eng. Radu Iacob Cotețiu, Prof. Dr. Eng. Nicolae Stelian Ungureanu, Prof. Dr. Eng. Adrana Cotețiu, Assoc. Prof. Dr. Eng. Mihai Bănică, Assoc. Prof. Dr. Eng. Horia Cioban, Assoc. Prof. Dr. Eng. Lucian Butnar, Assoc. Prof. Dr. Eng. Flavia Suciu, Assoc. Prof. Dr. Eng. Dinu Stoicovici, Assist. Prof. Dr. Eng. Marius Cosma, Assist. Prof. Dr. Eng. Ec. Gabriela Lobonțiu, Assist. Prof. Dr. Eng. Sandor Ravai Nagy, Assist. Dr. Eng. Vlad Diciuc
Phd. student: Eng. Nicolae Medan

Representative projects

"Product Development Research Activities - Technological production lines with CAD site", contract with industry, (2013-2014)
"Increasing the capacity of institutional management for the work of CD&I in engineering and technological management", ANCS
„Study and solutions regarding the hydraulic calculations made for the treatment plants of the Fierbinţi objective", SC ADISS S.A. Baia Mare, (2012)
"Competitive research activities regarding the 2+3cm multifunctional truck product and the electrical installation command of the 5mc cesspool emptier", (2011)
"Study the solutions to drive mechanical and hydraulically a sewage cleaning equipment on Renault chassis", SC Grup4 SA., SC ADISS SA., (2012)

Significant results

The most representative publications of the past 5 years:

1. Ungureanu, Nicolae Stelian; Petrovan, Adrian; Ungureanu, Miorita, Contributions to the Development of an Ontology in Logistics of Manufacturing International Conference on Manufacturing Engineering and Materials (ICMEM) Location: Novy Smokovec, SLOVAKIA Date: JUN 18-22, 2018 Book Series: Lecture Notes in Mechanical Engineering Pages: 299-306 Published: 2019
2. Ruggiero, Alessandro; D'Amato, Roberto; Calvo, Roque; Ungureanu Nicolae et al., Measurements of the Friction Coefficient: Discussion on the Results in the Framework of the Time Series Analysis ADVANCES IN MANUFACTURING ENGINEERING AND MATERIALS, ICMEM 2018 Book Series: Lecture Notes in Mechanical

Engineering Pages: 443-455 Published: 2019
3. Ruggiero, Alessandro; D'Amato, Roberto; Ungureanu, Nicolae , Fluid Film Pressure Description in Finite Turbulent Lubricated Journal Bearings by Using the Warner's Theory ADVANCES IN MANUFACTURING ENGINEERING AND MATERIALS, ICMEM 2018 Book Series: Lecture Notes in Mechanical Engineering Pages: 465-475 Published: 2019
4. Nadolny, Krzysztof; Kaplonek, Wojciech; Krolczyk, Grzegorz; Ungureanu Nicolae et al., The effect of active surface morphology of grinding wheel with zone-diversified structure on the form of chips in traverse internal cylindrical grinding of 100Cr6 steel PROCEEDINGS OF THE INSTITUTION OF MECHANICAL ENGINEERS PART B-JOURNAL OF ENGINEERING MANUFACTURE Volume: 232 Issue: 6 Pages: 965-978 Published: MAY 2018
5. Medan, Nicolae; Lobontiu, Mircea; Banica, Mihai, Full factorial DOE to determine the influence of the process parameters in cleaning water jets used in sewer cleaning, 4th International Conference on Computing and Solutions in Manufacturing Engineering (CoSME) Location: Brasov, ROMANIA Date: NOV 03-04, 2016 Book Series: MATEC Web of Conferences Volume: 94 Article Number: UNSP 07005 Published: 2017
6. V. Ilic, N. Jorgovanovic, A. Antic, S. Moraca, and N. Ungureanu, "A NOVEL FULLY FAST RECOVERY EMG AMPLIFIER FOR THE CONTROL OF NEURAL PROSTHESIS", *Tehnicki Vjesnik-Technical Gazette*, vol. 23, pp. 1131-1137, Jul-Aug 2016.
7. Basarman, Adrian-Paul; Lobontiu, Mircea, Aspects regarding the surface roughness on a steel part cutted using AWJ technology 13th International Conference on Modern Technologies in Manufacturing (MTeM-AMaTUC) Location: Cluj Napoca, ROMANIA Date: OCT 12-13, 2017 MODERN TECHNOLOGIES IN MANUFACTURING (MTEM 2017 - AMATUC) Book Series: MATEC Web of Conferences Volume: 137 Article Number: UNSP 01001 Published: 2017
8. A. Cotetiu, R. Cotetiu, N. Ungureanu, “Research about automatic adjustment solution of the advance force at the perfusion drills using fluid elements”, in *Archives of Mining Sciences*, vol. 58, no. 4, 2014, pp 1201-1208
9. G. Lobonţiu, “Planned Obsolescence and the Product Lifecycle”, in *Applied Mechanics and Materials*, vol. 371, 2013, pp. 857-861
10. R. S. Nagy, M. Lobonţiu, “Technological Solutions for Manufacturing Gears with Asymmetric Teeth” in *Academic Journal of Manufacturing Engineering*, vol.11, no. 3, 2013, pp. 68-73
11. V. Diciuc, ”A Comparison between the Wear of the Ball Nose End Mill generated in 4 Axes Milling and in 5 Axes Milling” in *Applied Mechanics and Materials*, vol. 371, 2013, pp. 106-110

Products and technologies:

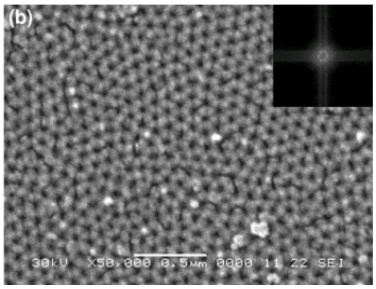
1. The water treatment plants;
2. Multifunctional truck product for sewage cleaning;
   Technologies for manufacturing of the asymmetric tooth gear.

The offer addressed to the economic environment

Research & development	Development of products and equipment needed in the field of wastewater treatment; Product development in the field of wastewater disposal and transport: multifunctional trucks, cesspool emptiers; The study of cutting tools durability for real technological conditions; The study of the machined surfaces’ quality depending on the process parameters and on the cutting conditions; Studies and research activities on the mechanical parameters of the components of the industrial systems; Studies and research activities in logistics, maintenance and reliability.
Consulting	Consulting in: manufacturing technologies, product development, Technology Management, human resources issue in Engineering, logistics, maintenance and reliability, Tribology.
Training	Training courses for NCMT operators, usage, programmers; Training in CAD.

THE POROUS MATERIALS AND COMPOSITES RESEARCH GROUP

Contact details

Name	**The Porous Materials And Composites Research Group**	
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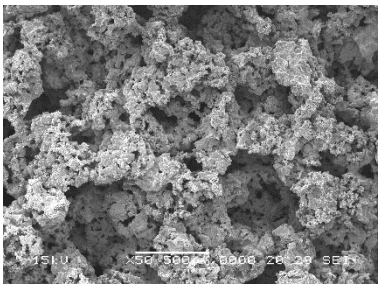
Faculty Department	**Faculty of Materials and Environmental Engineering Materials Science and Engineering Department**	
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Areas of expertise

Field: Materials Science and Engineering
Expertise in Powder Metallurgy
- Sintered porous materials, cellular materials (metallic foams)
- Material metal and ceramic matrix composites produced by powder metallurgy.

Team

Assist. Prof. Dr. Eng. Gyorgy Thalmaier, Prof. Dr. Eng. Ioan Vida-Simiti , Assist. Prof. Dr. Eng. Niculina Sechel,

Representative projects

MATAVSUD: **"Innovative Research on development of new materials for welding and other production processes"** - CEEX Contract no. 8/2005-2008
BRONZINV 'Fundamental and applied research on 12-15% tin bronzes for obtaining anti-friction layers "_ CEEX Contract No. 11/2005-2008
"**Manufacturing Aluminium - Graphite composites by casting and sintering**", Contract CEEX Nr.2/2005-2008
NANOGRAD "Advanced research on the development of nanostructured graded composite materials for excessive wear applications " Contract CEEX Nr.91/2006: -2008
ELSUD "**Multi-layered electrodes for electrical resistance spot and line welding"** Program 4 Partnerships in priority areas, PNCDI 2 - 2007-2009
ELMOD – "**Innovative technologies for the development of modular manufacture of forming tools"**, Program 4 Partnerships in priority areas, PNCDI 2, 2007-2009
"**Exploratory research projects. Studies and research on obtaining structurally graded materials by controlled sedimentation of metallic and ceramic powders**" Program Ideas ID_214, no. 749 / 19.01.2009
"**Development and support of multidisciplinary postdoctoral programs in priority technical areas of the national strategy for research - development - innovation 4D-postdoc**" Postdoctoral research fellowship funded by the Managing Authority for Sectorial Operational Programme Human Resources Development under the project Contract Code: POSDRU/89/1.5/S/52603

Significant results

The most representative publications of the past 5 years:

1. Gy. Thalmaier, N. Cobîrzan, A.-A. Balog, H. Constantinescu, M. Streza, M Nasui, B.V. Neamtu, Influence of sawdust particle size on fired clay brick properties, Materiales de Construcción, accepted for publication oct. 2019
2. Thalmaier, Gyorgy; Sechel, Niculina Argentina; Vida-Simiti, Ioan, Heat Transfer Enhancement of Paraffin Phase Change Composite Material Using Recycled Aluminum Sawing Chips JOM Volume: 71 Issue: 3 Pages: 1049-1055 Published: MAR 2019
3. Cobirzan, Nicoleta; Thalmaier, Gyorgy; Balog, Anca-Andreea; et al., Thermophysical properties of fired clay bricks with waste ceramics and paper pulp as pore-forming agent JOURNAL OF THERMAL ANALYSIS AND CALORIMETRY Volume: 134 Issue: 1 Pages: 843-851 Published: OCT 2018
4. Thalmaier, Gyorgy; Vida-Simiti, Ioan; Sechel, Niculina Argentina , Influence of the palladium coating on the hydrogen embrittlement of Ni61Nb33Zr6 amorphous tapes obtained by melt spinning POWDER METALLURGY AND ADVANCED MATERIALS Book Series: Materials Research Proceedings Volume: 8 Pages: 89-94 Published: 2018
5. M. Bosca, L. Pop, L. Bolundut, N. Tothazan, G. Borodi, I. Vida-Simiti, et al., "Effects of Gd3+ : Ag co-doping on structural and magnetic properties of lead tellurite glass ceramics," *Ceramics International*, vol. 42, pp. 1169-1176, Jan 2016.
6. C. V. Prica, T. F. Marinca, F. Popa, N. A. Sechel, O. Isnard, and I. Chicinas, "Synthesis of nanocrystalline Ni3Fe powder by mechanical alloying using an extreme friction mode," *Advanced Powder Technology*, vol. 27, pp. 395-402, Mar 2016.
7. Gherasim, Gabriel; Thalmaier, Gyorgy; Sechel, Niculina; et al., RESEARCHES ON OBTAINING SINTERED Al80Fe10Ti10 FOAMS ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING Volume: 58 Issue: 4 Pages: 585-590 Published: NOV 2015
8. S. Şuta, G. Gherasim, G. Thalmaier, N. Sechel, I.Vida – Simiti, “Ti-Al membranes for microfiltration”, *Conferinta international, Advanced Materials and Structures* 16-17 October 2015, Timişoara, Romania
9. Gy. Thalmaier, N.A.Sechel, I. Vida-Simiti, “Metalurgia pulberilor - aplicații practice”, Editura UTPress, 2015.

Patents:

1. I. Vida-Simiti, C. Ciupan, Process for Making Porous Tubes by the Rolling With Elastic Layer of Sintered Sheet Metal. RO 123245 B1/29.04.2011.
2. H. Binchiciu, V. Geantă, I. Voiculescu, A. Binchiciu, R. Stefănoiu, E. Binchiciu, R. Negriu, I. Vida-Simiti, Bronze coated electrode for thick load welding, RO 125855 B1/2012.
3. Vida-Simiti I, Thalmaier Gy., Moldovan V, Sechel A. N., Nasca O., Process and device for preparing sintered materials of gradual porous structure by gravitational settling of powders, RO128489-A2, RO128489-B1

The offer addressed to the economic environment

Research & development	Fundamental research on the process of sedimentation metallic and ceramic powders for achieving gradual sintered porous structures Obtaining sintered porous media with porosity gradient for manufacturing filters for microfiltration; Preparation and characterization of metal matrix composites and ceramics for various applications.
Consulting	Dimensioning filtering elements
Training	Powder metallurgy

BIOMATERIALS RESEARCH GROUP

Contact details

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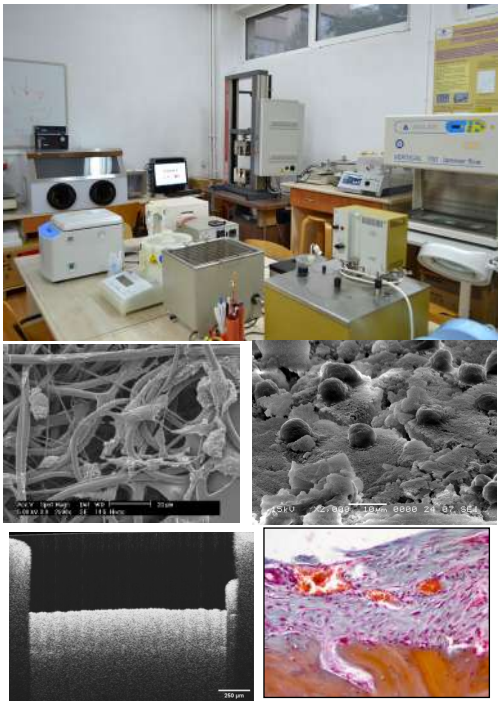

Areas of expertise

Biomaterials
- Synthesis and characterization of biomaterials designed for soft / hard tissue implants; functionalization of implants surface in view of a designed body reaction; titanium-base structures with ultralow Young's modulus and / or osseintegration optimized surface.

Tissue Engineering
- Synthesis and characterization of scaffolds designed for the growth of tissue from stem / primary cells; design and manufacturing of synthetic – tissue hybrid materials for grafts; synthesis of drug delivery systems / biologically active hydrogel-base microspheres.

Medical Microfluidics
- Design, additive manufacturing and testing of microfluidic devices for cells selection / culturing. Paper microfluidic devices for the selection and controlled actuation of biologic fluids.

Team

Prof. Dr. Eng. Cătălin Popa, Dr. Eng. Violeta Pașcalău, Lect. Dr. Eng. Violeta Merie, Lect. Dr. Eng. Gabriel Batin, Eng. Alexandra Csapai, Eng. Razvan Lupse, Eng. Victor Tosa

Representative projects

IMPROVE – "**Development of robot assisted minimally-invasive treatment methods through brachytherapy and target delivered drugs for non-resecable liver tumours**", PN-III-P1-1.2-PCCDI-2017-0221/59PCCDI/2018 (2018 – 2020);
STEMREG – "**Hybrid composite grafts obtained through Tissue Engineering and stem cells with application in Regenerative Medicine"**, PN II Partnerships (2012 – 2016);
BIOMAPIM – "**New biocompatible materials manufactured through SLS and SLM"**, PN II Complex Ideas (2010 – 2013);
BIOINTECH – "**Application of Tissue Engineering innovative methods in the pathology of digestive tube – multidisciplinary approach"**, PN II, Partnerships (2008 – 2011;
"Neutron Reflectivity Study of the Response of Membrane Proteins in Model Bilayers to AC Fields", ISIS Beamtime Application RB720167, 2007, U.K.
"Composite biomaterials for radiotherapy and simultaneous hyperthermia", CEEX 100/2006;
"Innovative methods in the reconstructive surgery of cancer patient – composite tissue grafting and employment of biocompatible synthetic materials", CEEX 109/ 2006;
"Optimization of the management for the polytraumatised patient through therapeutic protocols of miniinvasive methods and through the use of biocompatible materials in the reconstruction of tissue or organ post-traumatic defects", CEEX 145/ 2006;

"Functionalized conjugated polymers – based nanostructures and related nanocomposites", CEEX 12/ 2005;
"Microfluidics with Electrode Integration for Blood Cells Dynamic Studies", EPSRC Grant IRC A1 B3R (IRC, Queen Mary, University of London), 2005;
"Porous nanocrystalline silicon – polypyrole multi-layered materials destined to the selective dielectrophoresis of blood cells", Matnantech 208(403)/2004;
"Functionally graded biomaterials, biomimetically structured, destined to personalised endosseous implants", Matnantech 163(303)/2003;

Significant results

The most representative publications of the past 5 years:

1. A. Csapai, D.A. Toc, F. Popa, N. Tosa, V. Pascalau, C. Costache, A. Botan, C. Popa, 3D Printed Microfluidic Bioreactors Used for the Preferential Growth of Bacterial Biofilms through Dielectrophoresis, *Micromachines* 2022, *13*(9), 1377;
2. A, Csapai, D.A. Toc, V. Pascalau, N. Tosa, S. Tripon, A. Ciorita, R.M. Mihaila, B. Mociran, C. Costache, C. Popa, Study of the Influence of the Dielectrophoretic Force on the Preferential Growth of Bacterial Biofilms in 3D Printed Microfluidic Devices, Applied Sciences 2023, 11, Article Number 60;
3. G. Dindelegan, A. Caziuc, I. Brie, O. Soritau, M.G. Dindelegan, V. Bintintan, V. Pascalau, C. Mihu, C. Popa,
4. Multilayered Porous Titanium-Based 3rd Generation Biomaterial Designed for Endosseous Implants, Materials 2021, 14(7), Article Number 1727;
5. V. Paşcalău, C. Bogdan, E. Pall, S. Matroş, Pandrea, M. Suciu, G. Borodi, C. Iuga, R. Ştiufiuc, T. Topală, C. Pavel, C. Popa, M. Moldovan, Development of BSA gel/Pectin/Chitosan polyelectrolyte complex microcapsules for Berberine delivery and evaluation of their inhibitory effect on Cutibacterium acnes, Reactive and Functional Polymers 2020, 147, Article number 104457;
6. V. Paşcalău, M. Tertis, E. Pall, M. Suciu, T. Marinca, M. Pustan, V. Merie, I. Rus, C. Moldovan, T. Topala, C. Pavel, C. Popa, Bovine serum albumin gel/polyelectrolyte complex of hyaluronic acid and chitosan based microcarriers for Sorafenib targeted delivery, Journal of Applied Polymer Science 2020, Article number 49002;
7. V. Paşcalău, E. Pall, M. Tertis, M. Suciu, C. Cristea, G. Borodi, A. Bodoki, T. Topala, R. Stiufiuc, A. Moldovan, C. Pavel, T. Marinca, C. Popa, In vitro study of BSA gel/polyelectrolite complexes core shell microcapsules encapsulating doxorubicin for antitumoral targeted treatment, International Journal of Polymeric Materials and Polymeric Biomaterials 2019, 68(1-3), 60-72;
8. V. Paşcalău, G. Dindelegan, N. Dirzu, A.-M. Salantiu, C. Pavel, M. Dudescu, F. Popa, G. Borodi, F. Tabaran, C. Iuga, C. Popa, Bioactive Ti-base biomaterial with sustained anti-bacterial response for endosseous applications, Reactive and Functional Polymers 2018, 125, 37-46;

Significant solutions:
Design – synthesis – characterisation of controlled porosity PM titanium for endosseous implants;
Functionalization of titanium implants for enhancing osseointegration;
Functionalization of surgical meshes in view of controlled tissue adhesion;
Design – synthesis – characterisation of biodegradable polymers scaffolds for culturing cells / organelles;
Design - synthesis of delivery systems for active agents in Tissue Engineering and wound healing;
Design, manufacturing and testing of medical microfluidic devices;
Design, manufacturing and testing of medical applications of paper microfluidics.
Technologies:

1. PM processing of titanium and titanium – base alloys;
2. Synthesis of drug / active factors containing microspheres;
3. Electrospinning of composite structures;
4. Sol-gel coating and surface conditioning of metallic biomaterials;
5. Additive manufacturing of complex microfluidic systems;
6. Microfluidic devices on various types of paper ;

Patents:
C. Popa, L. Cont, G. Dindelegan, V. Simon, I. Brie, C. Pavel, V. Candea – Method for the manufacturing of scaffolds and composite materials destined to Tissue Engineering, RO patent Nr. 127534;

The offer addressed to the economic environment

Research & development	Design and synthesis of new bioactive or hybrid materials for implants / grafts; Development of application designed complex structures for medical accessories: dental and maxillary-facial implants, orthopedic implants, "wound dressing", personalized medical instruments, surgical clips and staples; Development of new 3D scaffolds for the seeding of stem / primary cells / organelles in view of growing tissue / organ grafts; Development of new drug delivery systems with applications in Tissue Engineering, cancer, wound healing, diabetes, postoperative therapy; Development of microfluidic devices for the active selection / separation of live cells;
Consulting	Improvement of constructive / technologic design for dental, maxillary-facial and orthopaedic implants; consultancy in the field of materials and technologies for medical units.

MAGNETIC MATERIALS AND NANOMATERIALS RESEARCH GROUP

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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).

Team

Prof. Dr. Eng. Phys. Ionel Chicinaş, Associate Prof. Dr. Eng. Florin Popa, Associate Prof. Dr. Eng. Bogdan Viorel Neamţu, Associate Prof. Dr. Eng. Traian Florin Marinca; Lecturer Dr. Eng. Calin Virgiliu Prica, Researcher. Dr. Eng. Adriana Lidia Sorcoi, Phd. students: Eng. Ana Cotai, Eng. Katalin Ildiko Szasz, Eng. Loredana Cotojman, Eng. Emrah Karacay, Master students: Eng Cosmin Oprea, Eng. Mariana Sas; Students: Gabriela Cupa, Răzvan Miclea.

Representative projects

„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
„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
„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
“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
“MagCore-MHF - High magnetic flux density sintered magnetic cores produced from pseudo core-shell/core-shell powders for medium to high frequencies applications”, PN-III-P2-2.1-PED-2016-1816, (2017-2018), http://www.sim.utcluj.ro/contracte/PN-III-P2-2.1-PED-2016-1816/
“Soft magnetic cores via powder metallurgy. Technology development and implementation”, PN-III-P2-2.1-BG-2016-0365, (2016-2018), http://www.sim.utcluj.ro/contracte/PN-III-P2-2.1-BG-2016-0365/
New technology of iron content reduction from quartz sands by magnetic separation, PN-III-P2-2.1-BG-2016-0214, (2016-2018) http://www.sim.utcluj.ro/contracte/PN-III-P2-2.1-BG-2016-0214/
“Researches on synthesis of spark plasma sintered nanocomposite compacts of Permalloy/Fe-Si type using mechanically alloyed powders”, Bilateral cooperation project: France-Romania, (2013-2014)
“Soft magnetic nanocrystalline/nanostructured powders and compacts obtained by mechanosynthesis and spark plasma sintering”, PNII-ID-PCE, (2012)
“Amorphous soft magnetic Fe-based and Co-based powders and cores prepared by mechanical alloying and spark plasma sintering”, PNII-RU-TE, (2012)
“Powders and soft magnetic materials nanocomposites of ferrite/transition metal (MeFe2O4/(Fe, Ni, Fe-Ni-X) type exchange coupled, obtained by mechanical alloying”, PNII-ID-PCE - ID, (2008)

Significant results

The most representative publications of the past 5 years (2018-2022):

1 B.V. Neamţu, F. Popa, T.F. Marinca, I. Chicinaş, Soft magnetic composites based on Fe fibres and powders prepared by cold sintering process, *Journal of Alloys and Compounds 933 (2023) 167799, Q1 ranked*

2 T.F. Marinca, A.I. Sule, R. Hirian, A.N. Sechel, F. Pop, B.V. Neamțu, I. Chicinaș, Al-Permalloy (Ni71.25Fe23.75Al5) obtained by mechanical alloying… *Advanced Powder Technology 33 (2022) 10364, Q2 ranked*

3 T.F. Marinca, M.C. Sas, A. Mesaroș, R. Hirian, F. Popa, B.V. Neamțu, I. Chicinaș, Al-Supermalloy and Al-Supermalloy@oxide magnetic powder… *Materials Chemistry and Physics 291 (2022) 126727, Q2 ranked*

4 A. Cotai, B.V. Neamțu, F. Popa, T.F. Marinca, O. Isnard, I. Chicinaş, Synthesis and characterisation of amorphous $Fe_{38.5}Co_{38.5}Nb_7B_{15}Cu_1$ powders via mechanosynthesis using industrial raw materials, *J. Alloys Compd 880 (2021) 160497 Q1 ranked*

5 B.V. Neamțu, M. Pszola, A. Opris, F. Popa, T.F. Marinca, I. Chicinaș, Influence of fibres diameter on the AC and DC magnetic characteristics of Fe/Fe_3O_4 fibres based soft magnetic composites, *Ceramics Int. 47 (2021) 1865 Q1 ranked*

6 B.V. Neamțu, A. Irimie, F. Popa, M.S. Gabor, T.F. Marinca, I. Chicinaș, Soft magnetic composites based on oriented short Fe fibres coated with polymer, *Journal of Alloys and Compounds 840 (2020) 155731, Q1 ranked*

7 B.V. Neamţu, A. Opriş, P. Pszola, F. Popa, T.F. Marinca, N. Vlad, I. Chicinaş, Preparation and characterization of soft magnetic composites based on Fe fibres, J. *Materials Science* 55 (2020) 1414–1424, February 2020, *Q2 ranked.*

8 C. D. Stanciu, J.B. Marimon da Cunha, I. Chicinaş, O. Isnard, Structural, magnetic and Mössbauer spectroscopy characterisation of the Fe-15 wt. %Si nanocrystalline powder obtained by mechanical alloying and annealing, *Journal of Alloys and Compounds*, 797 (2019) 865-873, *Q1 ranked*

9 C.V. Prică, T.F. Marinca, B.V. Neamţu, F. Popa et al., Structural and thermal investigation of Ta-25 % wt. Cu alloy prepared by mechanosynthesis route, *Journal of Thermal Analysis and Calorimetry 136 (2019) 995–1001*, *Q2 ranked*

10 N. Maat, R. Larde, V. Nachbaur, J.M. Le Breton, O. Isnard, V. Pop, I. Chicinaş, Investigation by Mossbauer spectroscopy and atom probe tomography of the phase transformation of Nd-Fe-B alloys after high-energy ball milling, *Journal of Applied Physics*, 124 (2018) Issue: 22, Article Number: 223905, *Q2 ranked*

11 H.F. Chicinaş, T.F. Marinca, B.V. Neamţu et al., Influence of process control agent type on the mechanosynthesis of Fe_3O_4 particles, *Advanced Powder Technology* 29 (2018) 1838-1847 Published: AUG 2018, *Q2 ranked*

12 C.V. Prica, B.V. Neamţu, F. Popa et al., Invar-type nanocrystalline compacts obtained by spark plasma sintering from mechanically alloyed powders, *Journal of Materials Science* 53 (2018) 3735-3743 *Q2 ranked*

Significant solutions: Synthesis routes for obtaining nanocrystalline/nanosized, composite/nanocomposite and amorphous magnetic materials
Nanocrystalline/nanosized, composite, nanocomposite and amorphous powder compaction.

Products and technologies (Designed and developed of home-made spark plasma sintering equipment):

1. The group obtained nanocrystalline magnetic powders of Ni_3Fe, Supermalloy (NiFeMo, NiFeCuMo) and developed 2 mechanical alloying method (mechanical alloying combined with annealing, MA with germ of product insertion)
2. Nanocomposite magnetic powders of spring-magnet type ($SmCo_5$/α-Fe, $SmCo_2Cu_3$/α-Fe, $Nd_2Fe_{14}B$/α-Fe, $(Pr,Dy)_2Fe_{14}B$/α-Fe) obtained by mechanical milling
3. Soft magnetic nanocomposite materials, from nanocrystalline powders obtained by mechanical alloying
4. Soft nanocrystalline ferrites obtained by mechanical alloying
5. Nanocomposite powder of soft ferrite/alloy type ($ZnFe_2O_4$/Fe or Ni, $NiFe_2O_4$/Fe etc) and nanocomposite compacts
6. Soft magnetic composite cores based on Fe fibers prepared by cold sintering

Patents/patents pending:

1. P. Cârlan, I. Chicinaş, *Process for preparing the powder of IrAl and $IrAl_3$ intermetallic compounds and irradiation target for industrial gammagraphy obtained there with, Patent Number(s): RO123425-B1*

2. I. Chicinaş, T.F. Marinca, F. Popa, B.V. Neamţu, Process to obtain the n*anostructured powder of permalloy (supermalloy) Rhometal type, Patent Number(s): RO130354-A0; RO130354-B1*.

3. I. Chicinaş, T.F. Marinca, F. Popa, B.V. Neamţu, *Pulberi compozite de tipul Fe sau aliaj feromagnetic/ferită magnetic moale cu structură pseudo „core-shell" și procedeu de obținere*, OSIM-Nr. A10083/18.12.2015, patent pending.

The offer addressed to the economic environment

Research & development	Preparation of nanocomposite/nanocrystalline/nanosized magnetic powders and composite/ nanocomposite compacts. Structural, morphological and magnetic characterisation of powders and compacts. Study of exchange coupling in nanocomposites. Researches on the development of magnetic materials for medium and high frequencies. Production of the bonded magnets, production of the nanocrystalline and nanostructured powders by mechanical alloying/milling and reactive milling, production of magnetic cores (sintered and composite), specific measurements, structural analysis, SEM and EDX analysis.
Consulting	Soft and hard magnetic materials, magnetic hysteresis measurement in DC & AC (up to 10 kHz) for permanent magnets & magnetic cores, mechanosynthesis, reactive milling, X-ray diffraction, SEM+EDX
Training	Lectures in: magnetic materials, mechanosynthesis, XRD, SEM, EDX, DSC-TG. Coordination for PhD projects related to elaboration of magnetic powders produced by mechanical alloying, bonded magnets, sintered soft&hard composites&nanocomposite magnetic materials.

RESEARCH CENTRE FOR ENVIRONMENTAL ENGINEERING

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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

Team

Assoc. Prof. Dr. Eng. Viorel Dan, Prof. Dr. Eng. Tiberiu Rusu, Prof. Dr. Eng. Valer Micle, Assoc. Prof. Dr. Eng. Ovidiu Nemeş, Assoc. Prof. Dr. Eng. Emil Riţi-Mihoc, Assist. Prof. Dr. Eng. Marius Crişan, Assist. Prof. Dr. Eng. Dan Porcar, Assist. Prof. Dr. Eng. Ioana Deneş-Pop, Assist. Prof. Dr. Eng. Cristina Horju-Deac, Assist. Prof. Dr. Eng.Simona Avram, Assist. Prof. Dr. Eng. Timea Gabor, Assist. Prof. Dr. Eng. Bianca Soporan, Assist. Prof. Dr. Eng. Andrei Rusu, Assist. Prof. Dr. Eng. Ancuţa Tiuc

Representative projects

"Tehnologie inovativă de bioremediere ex-situ a solurilor poluate cu hidrocarburi, PN-II-PT-PCCA-2013-4-1717, 2014-2017
"Stabilirea corelației între conductivitatea băii și cantitatea de fosfați acumulată la lubrifiere", C.I.1.1.T.2, 2016.
"Design of an Equipment to recycle used PET bottles", Industry Research Project, (2014)
"Network of Excellence HighTech Europe", (2009-2013)
"Biomedical application of metal compounds – Metallomics", PCCE, (2010-2013)
"Center for Molecular Modeling and Quantic Computational Chemistry", Capacities Project, (2007-2009)
"Innovative technology for contaminated soils remediation by metallurgical specific activities", PNCDI II, (2008-2011)
"Regeneration system for recycling organic waste chemically bonded moulding sand in the foundry industry", CEEX, (2006-2008)
"Technologies for metals and plastics recovery from waste and telecommunications equipment", CEEX, (2005-2007)
"Advanced optimization methods of bonded joints in metal, composite and mixed materials", PNII-ID, (2007-2010)

Significant results

The most representative publications of the past 5 years:

1. Ancuţa Elena Tiuc, Ovidiu Nemeş, Horatiu Vermesan, Adina Cristina Toma, New sound absorbent composite materials based on sawdust and polyurethane foam, Composites Part B: Engineering, Volume 165, 15 May 2019, Pages 120-130.
2. Ancuţa Elena Tiuc, Ovidiu Nemeş, Horatiu Vermesan, Roxana Tamas-Gavrea, Ovidiu Vasile, New sound absorbing materials obtained from waste rigid polyurethane foam, Materiale Plastice, vol.56, No.4, 2019.
3. Olteanu, M., Septelean, R., Nemes, O., Deak, G., Baraitaru, A. Functionalization of mesoporous silica materials using Calix[4]arenes, Materiale Plastice, 56(3), pp. 554-558, 2019

4. Bere, Paul; Dudescu, Mircea; Neamtu, Calin; Nemes Ovidiu et al., Fabrication and Mechanical Characterization of Short Fiber-Glass Epoxy Composites MATERIALS PERFORMANCE AND CHARACTERIZATION Volume: 8 Issue: 1, Pages: 163-174 Published: 2019
5. Plugaru, Sebastian Cristian Radu; Dan, Viorel; Mentiu, Xenia Paula, USE OF GREEN ALGAE TO REDUCE HEAVY METALS FROM INDUSTRIALLY POLLUTED WATERS SCIENTIFIC PAPERS-SERIES E-LAND RECLAMATION EARTH OBSERVATION & SURVEYING ENVIRONMENTAL ENGINEERING Volume: 7 Pages: 136-139 Published: 2018
6. Lakatos, Elena Simina; Cioca, Lucian-Ionel; Dan, Viorel; et al., Studies and Investigation about the Attitude towards Sustainable Production, Consumption and Waste Generation in Line with Circular Economy in Romania SUSTAINABILITY Volume: 10 Issue: 3 Article Number: UNSP 865 Published: MAR 2018
7. Tiuc, Ancuta Elena; Vasile, Ovidiu; Vermesan, Horatiu; et al., New Multilayered Composite for Sound Absorbing Applications ROMANIAN JOURNAL OF ACOUSTICS AND VIBRATION Volume: 15 Issue: 2 Pages: 115-121 Published: 2018
8. Gabor, Timea; Dan, Viorel; Badila, Iulian-Nicolae; et al., IMPROVING THE ENERGY EFFICIENCY OF RESIDENTIAL BUILDINGS BY USING A DRAIN WATER HEAT RECOVERY SYSTEM ENVIRONMENTAL ENGINEERING AND MANAGEMENT JOURNAL Volume: 16 Issue: 7 Pages: 1631-1636 Published: JUL 2017
9. G. E. Popita, C. Rosu, D. Manciula, O. Corbu, A. Popovici, O. Nemes, et al., "Industrial Tanned Leather Waste Embedded in Modern Composite Materials", *Materiale Plastice*, vol. 53, pp. 308-311, Jun 2016.
10. A. E. Tiuc, V. Dan, H. Vermesan, T. Gabor, and M. Proorocu, "Recovery of Sawdust and Recycled Rubber Granules as Sound Absorbing Materials", *Environmental Engineering and Management Journal*, vol. 15, pp. 1093-1101, May 2016.
11. T. Gabor, V. Dan, A. E. Tiuc, I. M. Sur, and I. N. Badila, "Modelling And Simulation of Heat Transfer Processes for Heat Exchangers Used in Wastewater Treatment", *Environmental Engineering and Management Journal*, vol. 15, pp. 1027-1033, May 2016.
12. G. C. Rogozan, V. Micle, and I. M. Sur, "Maps of Heavy Metals in Cluj County Soils Developed using the Regression-Kriging Method", *Environmental Engineering and Management Journal*, vol. 15, pp. 1035-1039, May 2016.
13. I. Smical, A. Muntean, and V. Micle, "Influence of Some Natural Organic Additives on the Quality of Vegetal Compost", *Environmental Engineering and Management Journal*, vol. 15, pp. 1041-1048, May 2016.
14. Tiuc A.E., Vermeşan H., Gabor T., Vasile O., “Improved sound absorption properties of polyurethane foam mixed with textile waste”, *Energy Procedia*, Volume 85, January 2016, Pages 559–565, EENVIRO-YRC 2015 - Bucharest doi:10.1016/j.egypro.2015.12.245
15. A.E. Tiuc, O. Nemeş, I. Perhaiţa, H. Vermeşan, T. Gabor, V. Dan, “Thermal behaviour of polyurethane matrix composite materials”, *Studia Universitatis Babes-Bolyai Chemia* Issue 2, pp. 169-176, 2015
16. M.B. Soporan, O. Nemeş, “Quantitative analysis of the noncompliant landfill constituents”, *Studia Universitatis Babes-Bolyai Chemia* Issue 2, pp. 201-206, 2015
17. S.-A. Radu, V.D. Leordean, N. Bâlc, O. Nemeş, “Resin type influence on moulded parts final dimensions”, *Studia Universitatis Babes-Bolyai Chemia* Issue 2, pp. 219-228, 2015
18. J.D. Chelaru, L.M. Muresan, V.F. Soporan, O. Nemes, L. Barbu-Tudoran, “Investigation of a naturally patinated bronze artifact originating from the outdoor statuary group of Mathias Rex”, *Journal of Cultural Heritage* Volume: 15, Issue: 5, 2014, pp: 546-549

Significant solutions:
New technologies for waste recycling; New technologies for soil remediation; New and improved solution for water treatment

Products and technologies:
1. New materials from multi-layer packages, wood saw dust and vegetal wastes
2. New technologies for soil remediation
3. New technologies for water treatment

Patents:
1. PROCESS AND DEVICE FOR MAKING PLATES OF POLYMERIC COMPOSITE MATERIALS REINFORCED WITH FIBERS, Patent Number(s): RO128093-A0 ; RO128093-B1 ; RO128093-A8, **INVENTOR(S)**: BERE P, BERCE P, NEMES O, BALC N, BERE P P, 2015.
2. SOUNDPROOFING COMPOSITE MATERIAL COMPRISES FIR SAWDUST GRAINS AND POLYURETHANE FOAM, Patent Number(s): RO129228-A0 ; RO129228-B1 ; RO129228-A8, 2015, Authors: Ancuţa Tiuc, Tiberiu Rusu, Ovidiu Nemeş

The offer addressed to the economic environment

Research & development	Research in development of new methods and technologies of soil remediation Research and development of new methods and technologies of water treatment Research in environmental risk assessments Research in waste recycling and new materials manufacturing
Consulting	Consulting in soil remediation Consulting in water treatment technologies Consulting in waste management and recycling technologies Consulting in risk assessments
Training	Training courses in waste management; Training courses in recycling technologies Training courses in soil remediation technologies;Training courses in water treatment

CORROSION AND ANTICORROSION PROTECTION CENTER

Contact details

Name	**Corrosion and Anticorrosion Protection Centre**
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Director	Prof. Dr. Hab. Eng. Horatiu Vermesan
e-mail	Horatiu.Vermesan@imadd.utcluj.ro

Areas of expertise

Surface Engineering technologies for corrosion protection. Layers that alter the structure and / or chemical composition and deposition of anticorrosion coatings.
Analysis and characterization of surface layers. Characterization of deposit thickness, adhesion, degree of gloss, mechanical properties, tribological properties.
Evaluation of corrosion resistance in artificial atmosphere according to ISO 9227, ISO 10289 and ASTM B117. Electrochemical methods for the characterization of corrosion through accelerated corrosion tests. Cyclic voltammetry, polarization resistance, impedance spectroscopy

Team

Prof. Dr. Eng. Horațiu VERMEȘAN, Assoc. Prof. Dr. Eng. Gavril NEGREA, Assoc Prof. Ancuta TIUC
PhD student: Andreea PLEȘA, PhD student: Denisa CUIBUS

Representative projects

TheTRADE-IT: Innovative Technologies For Advanced Materials Recovery from IT and Telecommunication Waste PN-III-P1-1.2-PCCDI-2017-0652, project NR. 84PCCDI - 01/03/2018 TRADE-IT**.**
Establishing the correlation between bath conductivity and the amount of phosphates accumulated at lubrication, project code C.I.1.1.T.2, 2016, financed by TUCN
ZINITECH: "**Innovative technology for production of zinc-nickel alloy layers with anticorrosive properties by co-deposition of composite nano-particles**", INNOVATION Project 261/20.10.2008
"Thermal shock behaviour of functional gradient layers deposit on austenitic stainless steels", Grant 944/2005;
"Obtaining, characterization and modelling of thin layers with specific properties" Contract 33385 tema A67, code CNCSIS 404
"Theoretical and experimental research concerning the tribo-corrosion of diffusion layers obtained by surface engineering technologies", 66-1353-2001.
"The amelioration of wear and corrosion resistance by plastic deformation and plasma nitriding surface hardening" Project 7067-B4.
"Research concerning the influence of oxygen on the structure and properties of nitrided and nitrocarburized layers" Project AT, 3/225 2001
"Nano-crystalline electro-deposits - their processing, character and properties"
EC Research Project, NEPCAP, Contract No G1ST-CT-2002-50211;

Significant results

The most representative publications of the past 5 years:

1. Uriciuc, W.A.; Vermesan, H.; Tiuc, A.E.; Ilea, A.; Bosca, A.B.; Popa, C.O., Casting over Metal Method Used in Manufacturing Hybrid Cobalt-Chromium Dental Prosthetic Frameworks Assembles, MATERIALS, Volume: 14, Issue: 3, 539, DOI:10.3390/ma14030539, Published: 2021, WOS: 000615381900001;
2. Neamtu, BV; Pszola, M ; Vermesan, H ; Stoian, G; Grigoras, M; Oprisa, A ; Cotojman, L ; Marinca, TF; Lupu, N ; Chicinas, I, Preparation and characterisation of Fe/Fe3O4 fibres based soft magnetic composites, CERAMICS INTERNATIONAL Volume: 47 Issue: 1 Pages: 581-589 DOI: 10.1016/j.ceramint.2020.08.165 Published: 2021, WOS:000589639400002
3. Vermeșan H., Mangau, A., Tiuc A.-E. Perspectives of Circular Economy in Romanian Space, SUSTAINABILITY, Volume: 12, Issue: 1, Article Number: 74, DOI: 10.3390/su12176819, Published: 2020, WOS:000569589800001
4. Mihaila, L; Unguresan, M., Rada, M.; Popa, A.; Macavei, S., Vermesan, H.; Rada, S., Perspectives in the Recycling of High Sulphatized Electrodes from Lead Acid Batteries, ANALYTICAL LETTERS, AUG 2020 DOI: 10.1080/00032719.2020.1803349, Published: 2020, WOS:000556481700001
5. Borlea S. I., Tiuc A. E., Nemeş O., Vermeşan H., Vasile O., Innovative Use of Sheep Wool for Obtaining Materials with Improved Sound-Absorbing Properties, Materials 2020, 13(3), 694. Published: FEB 2020.
6. Vermeșan H., Tiuc A. E., Purcar M., Advanced Recovery Techniques for Waste Materials from IT and Telecommunication Equipment Printed Circuit Boards, Sustainability 2020, 12(1), Published: IAN 2020.
7. Tiuc, Ancuta Elena; Vasile, Ovidiu; Vermesan, Horatiu; et al., Sound Absorbing Insulating Composites Based on Polyurethane Foam and Waste Materials, MATERIALE PLASTICE Volume: 55 Issue: 3 Pages: 419-422 Published: SEP 2018
8. Rada, S.; Cuibus, D.; Vermesan, H.; et al., Structural and electrochemical properties of recycled active electrodes from spent lead acid battery and modified with different manganese dioxide contents ELECTROCHIMICA ACTA Volume: 268 Pages: 332-339 Published: APR 1 2018
9. Tiuc, Ancuta Elena; Vasile, Ovidiu; Vermesan, Horatiu; et al., The Use of Mathematical Models in Determining Acoustic Absorption Coefficient of New Composite Porous Materials ROMANIAN JOURNAL OF ACOUSTICS AND VIBRATION Volume: 14 Issue: 2 Pages: 97-101 Published: 2017
10. A. E. Tiuc, V. Dan, H. Vermesan, T. Gabor, and M. Proorocu, "Recovery of Sawdust and Recycled Rubber Granules as Sound Absorbing Materials", *Environmental Engineering and Management Journal*, vol. 15, pp. 1093-1101, May 2016.
11. S. Rada, M. L. Unguresan, L. Bolundut, M. Rada, H. Vermesan, M. Pica, et al., "Structural and electrochemical investigations of the electrodes obtained by recycling of lead acid batteries", *Journal of Electroanalytical Chemistry*, vol. 780, pp. 187-196, Nov 2016.
12. Vasile Rus, Horaţiu Vermeşan , Andreea Hegyi, Ancuţa Elena Tiuc, “Electrochemical Impedance Spectroscopy Study - Evolution Modeling of Corrosion Products Layer Formed at Hot Dip Galvanized Rebar–Fresh Concrete Interface”, *Revista Română de Materiale / Romanian Journal of Materials* 2016, 46 (2), 196 – 203
13. Tiuc A.E., Vermeşan H., Gabor T., Vasile O., “Improved sound absorption properties of polyurethane foam mixed with textile waste”, *Energy Procedia*, Volume 85, January 2016, Pages 559–565, EENVIRO-YRC 2015 - Bucharest doi:10.1016/j.egypro.2015.12.245.

Significant solutions:

Estimation of corrosive action of different natural atmospheric environments. Anticorrosive protection of materials in different aggressive climatic conditions: urban, industry, marine, mining etc. Testing of galvanic (contact) corrosion of different metals. Accelerated corrosion testing of protective paint coatings. Investigation of the micro-structural properties of protective coatings: thickness, impact tests, adherence (cross-cut and pull off methods), drawability, elasticity, relative hardness and abrasion. Improving corrosion resistance of hot-dip galvanized coatings. Choice of paints for effective protection of galvanized steel structures;

Products and technologies:

1. Technology for obtaining anti-corrosion layers by composite nano-particles codeposition
2. Technology for obtaining of zinc-nickel alloy layers with anticorrosive properties by co-deposition of composite nano-particles
3. Surface engineering technologies for improving wear resistance of austenitic stainless steels.
4. Nano-crystalline electro-deposits with high anticorrosion properties.
5. Diffusion layers obtained by surface engineering technologies for tribocorrosion applications.

The offer addressed to the economic environment

Research & development	Development of original solutions for protection against corrosion in various environments Security of social infrastructure and security of long service life coated steel sheet Study the fundamental characteristics of corrosion behaviour and utilise this knowledge to develop new technologies and processes to help solve challenging problems and issues. Partner with industry and continue to foster relationships to tackle pressing corrosion and surface related demands affecting our society.
Consulting	Choosing the Surface Engineering technologies for corrosion protection purposes. Research on corrosion behaviour of metallic deposits. Study of new layers with anticorrosive properties.
Training	Training courses for engineers in the field of corrosion and corrosion protection. The best available techniques in corrosion protection technologies. Training courses in electrochemical deposition of metals and alloys.

MATERIALS SCIENCE AND ENGINEERING RESEARCH CENTER

Contact details

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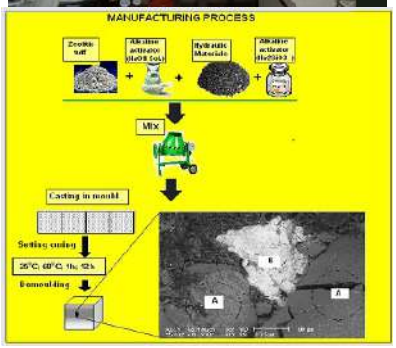


Areas of expertise

Nonferrous Alloys ,
-Casting of nonferrous alloys, metallic powders, Characterization mixtures, heat treatment
Heat and Cold Deformation
Attempts heat and cold deformation by traction and compression for aluminum alloys, extrusion, forging
Surface Engineering
Thin film layers, electroplating, anodizing, corrosion and anticorrosive protection
Analysis Techniques
Determination of physical, chemical and mechanical properties of materials, metallographic analysis of materials (optical microscopy), X-Ray diffraction, SEM
Environmental protection
Environmental protection of industry, Risk assessment

Team

Prof. Dr. Eng. Vasile Hotea, Assoc. Prof. Dr. Eng. Elena Pop, Lecturer. Dr. Eng. Gheorghe Iepure, Lecturer Dr. Eng. Jozsef Juhasz, Lecturer Dr. Eng. Aurica Pop, Lecturer. Dr. Eng. Brezoczki Valeria, Sing. Loredana Hutira

Representative projects

"Energy Recovery from Municipal Solid Waste by Thermal Conversion Technologies in Cross-border Region", Project Manager: Juhasz Jozsef; Brezoczki Valeria, Parteneri: Technical University of Kosice (Slovak Republic), University of Miskolc (Hungary), **Technical University of Cluj-Napoca, North University Center of Baia Mare** (2019-2020), **(Romania)** https://huskroua-cbc.eu/about/programme-description
"**Preventing and removing environmental impacts using geosynthetic materials"**, Grant CNCSIS, (2007-2009) Romanian Authority for Scientific Research (Joint Applied Research Project), http://frmm.ubm.ro/index_rom.htm
LEXIN, **"Applied research on green heating technology and biogenetic type LEXIN"**, LEXIN Group (AGDE RUITER BEHEER BV, LEXIN HOLDING BV, LEXIN International B.V.), LEXIN Produktion GMBH, http://frmm.ubm.ro/index_rom.htm (2008-2009)

Significant results

The most representative publications of the past 5 years:

1. **V. Hotea, J. Jozsef,** Analysis of the extrusion process parameters of high-strength aluminum alloys used in the aerospace industry, International Conference of the Carpathian Euro-Region Specialists in Industrial Systems, CEurSIS 2019, IOP Conference Series: Materials Science and Engineering, Paper ID006_CEURSIS-in press

2. Damian, Gheorghe; Andras, Peter; Damian, Floarea; **Iepure G** et al., The role of organo-zeolitic material in supporting phytoremediation of a copper mining waste dump INTERNATIONAL JOURNAL OF PHYTOREMEDIATION Volume: 20 Issue: 13 Pages: 1307-1316 Published: NOV 10 2018
3. Damian, Gheorghe; Lanzerstorfer, Christof; Damian, Floarea; **Iepure G** et al., Distribution of Heavy Metals and Minerals in the Various Size Fractions of Soil from CopE (TM) a Mic, RomAnia WATER AIR AND SOIL POLLUTION Volume: 229 Issue: 6 Article Number: 202 Published: JUN 2018
4. **Hotea, V.; Juhasz,** J.; Cadar, F. , Grain refinement of 7075Al alloy microstructures by inoculation with Al-Ti-B master alloy INNOVATIVE IDEAS IN SCIENCE 2016, Book Series: IOP Conference Series-Materials Science and Engineering, Volume: 200, Article Number: UNSP 012029 Published: 2017
5. **Pop, A.; Iepure, G.**, Research and development regarding the retaining mechanism of lead ions in industrial wastewaters using natural matter with remarkable properties Conference on Innovative Ideas in Science Location: Baia Mare, ROMANIA Date: NOV 10-11, 2016 Book Series: IOP Conference Series-Materials Science and Engineering Volume: 200 Article Number: UNSP 012068 Published: 2017
6. M. M. Chicos, Gh. Damian, D. Stumbea, N. Buzgar, T. Ungureanu, V. Nica, **Gh. Iepure**, „Mineralogy and geochemistry of the tailings pond from straja valley (Suceava county, Romania). factors affecting the mobility of the elements on the surface of the waste deposit", *Carpathian Journal of Earth and Environmental Sciences*, Vol.1, No.1, 2016, pp. 265-280
7. Chicos, Marian Marius; Damian, Gheorghe; Stumbea, Dan; **Iepure Gh** et al., Mineralogy and geochemistry of the tailings pond from Straja Valley (Suceava County, Romania). factors affecting the mobility of the elements on the surface of the waste deposit carpathian journal of earth and environmental sciences Volume: 11 Issue: 1 Pages: 265-280 Published: FEB 2016
8. **V. Hotea**, „Clean Technology of Lead Recovery from Spent Lead Paste", in *Recent Researches in Applied Economics and Management, Economic Aspects of Environment*, vol. 2, august 27-29, 2013, pp. 263-270
9. **J. Juhasz**, „Modern Systems for Processing of Brasses and Bronzes with Gas Filtration", in *Recent Researches in Applied Economics and Management, Economic Aspects of Environment*, vol. 2, august 27-29, 2013, pp. 259-263
10. **Pop, A**. I. Vida-Simiti, G. Damian, **G. Iepure,** "Removal of Heavy Metals from Wastewaters by Using Zeolitic Tuff", in *Carpathian Journal of Earth and Environmental Sciences*, vol. 7, no. 1, 2012, pp.239-248

Patents

V. Hotea, G. Badescu, **J. Juhasz**, Procedeu de reţinere prin absorbţie chimică a dioxidului de carbon din gazele reziduale, Patent No. RO 127080/30.03.2016

V. Hotea, The plant for Capture of Sulfur Dioxide and Carbon Dioxide in the Flue Gases, Patent No. RO 125756 B1 29.11.2012

J. Jozsef, Process of obtaining from the concentrates of cupric oxide pellets, Patent No. RO125453B1, 2010

V. Hotea, Installation of a Continuously Supply of Cold Materials Processed Through Melting, Patent No. RO 122230/27.02.2009

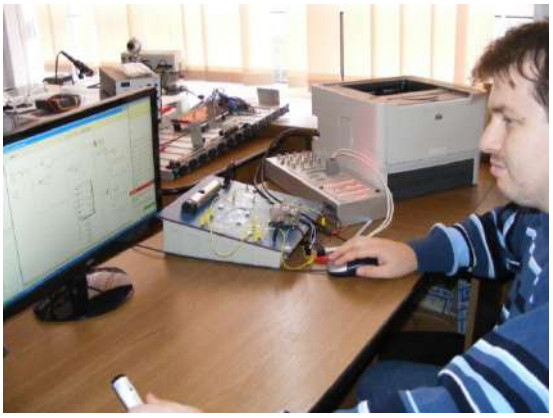
The offer addressed to the economic environment

Research & development	Initiative in attracting funds pre-competitive research projects in public-private partnership initiated, especially those that involve collaboration with our university. The objective of these projects is to create new products and technologies with potential commercial exploitation. Focus of research efforts of our team to clearly identified problems to businesses through involvement in research and development projects representatives demand, especially that coming from regional multinational companies (Universal Alloy Corporation-USA) in the field of Materials Engineering, and national public authorities.
Consulting	Attracting customers (public and private agencies) with little experience in Materials Engineering to acquisition technologies underlying our research excellence for the the correct choice of materials, electrochemical coating technologies, fault analysis, development ferrous alloys, environmental protection industry.
Applied engineering services	Analysis and characterization of metallic materials, metallographic analysis, mechanical characterization, thermal shock, mechanical and corrosive behavior.
Training	Applications on courses, informal training type, indirect training, community integration, knowledge management in the field of Engineering Materials practical activities training.

MECHATRONICS AND ENERGY LABORATORY

Contact details

Name	**Mechatronics and Energy Laboratory**
Acronym	**LME**
Logo	Laboratorul de Mecatronică şi Energie
Site	https://mdm.utcluj.ro/wp-content/uploads/2017/02/Laborator-de-Cercetare-ME.pdf
Address	103-105 Muncii Str., 400641, Cluj-Napoca, Romania
Faculty Department	**Faculty of Automotive, Mechatronics and Mechanical Engineering** **Mechatronics and Machine Dynamics Department**
Telephone	+40 264 401756
Fax	+40 264 415 490
Director	Prof. Dr. Eng. Radu Bălan
e-mail	radubalan@yahoo.com Radu.Balan@mmfm.utcluj.ro



Areas of expertise

Materials, processes and innovative products: Mechatronic systems, advanced industrial process control technologies, high precision mechanical products and technologies, advanced materials, innovative technologies for transportation. **Key words**: mechatronics, intelligent actuators, sensorial systems, advanced control, robotic systems;
Computer science technologies: Technologies for achieving high performance computing applications, opened, heterogeneous, scalable, fault tolerant and with a good connectivity between user and resources, artificial intelligence methods and systems**. Key words**: control algorithms, artificial intelligence, rapid control prototyping, human-machine interface systems**.**
Energy: Concepts, technologies and products that contribute to satisfy the energy needs at the lowest price, use of new energetic sources and improving the decisional process, increase of the technological competence and promotion of the knowledge transfer and technologies in energetic fields. **Key words:** energy efficiency, energy saving, renewable energy, control, sustainability, environment.

Team

Prof. Dr. Eng. Radu Bălan, Prof. Dr. Eng. Vistrian Mătieş, Prof. Dr. Eng. Victor Hodor, Assoc.Prof. Dr. Eng. Olimpiu Hancu, Assoc.Prof Dr. Eng. Ciprian Lăpuşan, Lecturer Dr. Eng. Sorin Besoiu, Lecturer Dr. Eng. Radu Donca, Lecturer. Dr. Eng. Alin Pleşa

Representative projects

MoniCult – "Design, manufacturing and testing of a mechatronic system for multispectral surveillance of crops vegetation status" PN-II-PT-PCCA-2013-4-1629, (2014-2017)
"Design of a mobile multifunctional platform for inner water pipe inspection", (2012)
DEHEMS, **"Digital Environment Home Energy Management System"**, Europen FP7 project, https://cordis.europa.eu/project/id/224609 (2008-2011)
FlexForm, **"Flexible professional forming program on mechatronic platforms"**, POSDRU, http://www.flexform.ro/
EQUATOR, **"Advanced strategies for high performance indoor Environmental Quality in Operating Rooms"**, PN-II-PT-PCCA, (2011)
"Research regarding advanced control in mechatronic applications", PNII-Idei (2007-2010)
"Simulation, Control and Testing Platform with Applications in Mechatronics", CEEX, (2006-2008)
"Numerical analysis and control of the combustion instability using acoustic analogy", IDEI,2007-2010

E-FARM, **"Informatics support system for design, implementation and control for hybrid energy farms"**, http://www.automation.ro/e-farm/index.html (2008)
AMFM," Implementing the shape memory effect in mechatronic systems using advanced materials obtained by powder metallurgy", 2008-2011
MMFEH, **"Design of an innovative hydro-pneumatic system by implementing the shape memory alloy effect using powder metallurgy technology"**, (2008)

Significant results

The most representative publications of the past 5 years:

1. Diudea H., Baldogi T., Balan R., A comparative analysis of model-based control methods applied for the active suspension system, IEEE 2021 9th International Conference on Modern Power Systems (MPS)
2. Baldogi T., Diudea H., Balan R., Improving the vibration reliability testing process, IEEE 2021 9th International Conference on Modern Power Systems (MPS)
3. Brai L., Bolchiş M., Blidar O., Balan R., Munteanu R., Active Filtering in Beamforming Circuit: Design, Calculation and Simulation. 2021 16th IEEE International Conference on Engineering of Modern Electric Systems (EMES).
4. Sandru,Vasile, Balan, Radu, A model-based approach to develop a mechatronic system, 2020 IEEE INTERNATIONAL CONFERENCE ON AUTOMATION, QUALITY AND TESTING, ROBOTICS (AQTR)
5. Macavei, Sergiu; Rada, Marius; Zagrai, Mioara;Balan, Radu et al., Spectroscopic Characterization of a Lead-Lead Dioxide Automobile Battery ANALYTICAL LETTERS Volume: 51 Issue: 17 Pages: 2671-2681 Published: 2018
6. Macavei, Sergiu; Toloman, Dana; Stefan, Maria; Balan Radu et al., Characterization of Cu2ZnSnS4 Thin Film Deposited by Pulse Laser Deposition 11TH INTERNATIONAL CONFERENCE OF PROCESSES IN ISOTOPES AND MOLECULES (PIM 2017) Book Series: AIP Conference Proceedings Volume: 1917 Article Number: UNSP 040010 Published: 2017
7. Rad, Ciprian-Radu; Hancu, Olimpiu, An improved nonlinear modelling and identification methodology of a servo-pneumatic actuating system with complex internal design for high-accuracy motion control applications SIMULATION MODELLING PRACTICE AND THEORY Volume: 75 Pages: 29-47 Published: JUN 2017
8. Lapusan, Ciprian; Balan, Radu; Hancu, Olimpiu; et al., Development of a Multi-Room Building Thermodynamic Model Using Simscape Library Conference on Sustainable Solutions for Energy and Environment (EENVIRO - YRC) Location: Bucharest, ROMANIA Date: NOV 18-20, 2015 EENVIRO-YRC 2015 - BUCHAREST Book Series: Energy Procedia Volume: 85 Pages: 320-328 Published: 2016
9. Lapusan, Ciprian; Hancu, Olimpiu; Rad, Ciprian; et al., Integrated learning platform based on Lego NXT and Matlab for teaching mechatronics 8th International Conference on Electronics, Computers and Artificial Intelligence (ECAI) Location: Ploiesti, ROMANIA Date: JUN 30-JUL 02, 2016 Book Series: International Conference on Electronics Computers and Artificial Intelligence Published: 2016

Significant solutions:
The development of the Matlab-dSpace research platforms with HIL-Hardware in the Loop, SIL-Software in The Loop, RCP-Rapid Control Prototyping applications
The implementation, testing and optimization of the modern/innovative control technics (state feedback control, optimal control, predictive control);
The optimization of the motion laws (elimination of shocks)-Cartesian robot with pneumatic action, industrial control technology (SPC201, FPC101)
Research on modelling and control of the energy consumption in buildings
Patents: 2

The offer addressed to the economic environment

Research & development	Fundamental research in mechatronics, energy, renewable energy, integronics, trans-disciplinary as well as related fields Team members have great knowledge in mechatronics, energy, renewable energy and related fields. Thus the research base in process control, electronic parts and components design, software design (microcontrollers, DSP, FPGA, PLC etc.), embedded systems, mechanical design, energy efficiency, energy audit, energetic management, sensor network, management and control of industrial processes etc. is assured.
Consulting	Consulting in any of the fields above mentioned may be done Due to a close collaboration with the productive sector, the research team is capable of collaboration with various industrial partners in order to subcontract any applied engineering services and products.
Training	The members of the team are accredited trainers and have a vast experience in the educational field (academics). Also, the team has experience in the development of the professional formation and reorientation trainings for adults.

TESTING, RESEARCH CERTIFICATION OF INTERNAL COMBUSTION ENGINES WORKING ON BIOFUELS LABORATORY

Contact details

Name	**Testing, Research and Certification of Internal Combustion Engines Laboratory**
Acronym	**TestEcoCel**
Logo	Departamentul de Autovehicule Rutiere și Transporturi – Laborator de Testare, Cercetare și Certificare a Motoarelor cu Ardere Internă – Universitatea Tehnică din Cluj-Napoca
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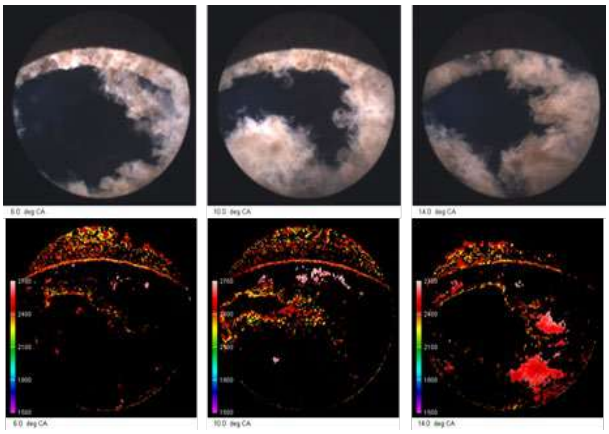
Fax	+40 264 415 486
Director	Prof. PhD. Eng. Nicolae Burnete
e-mail	nicolae.burnete@auto.utcluj.ro



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.

Team

Prof. PhD. Eng. Nicolae Burnete, Prof. PhD. Eng. Bogdan Varga, Prof. PhD. Eng. Florin Mariaşiu, Prof. PhD. Eng. Istvan Barabas, Prof. PhD. Eng. Adrian Todoruț, Assoc. Prof. PhD. Eng. Dan Moldovanu, Assoc. Prof. PhD. Eng. Calin Iclodean, Assoc. Prof. PhD. Eng.Nicolae Vlad Burnete, Lect. PhD. Eng. Andreia Molea, Lect. PhD. Eng. Levente Kocsis, PhD. Stud. Eng. Irina Duma.

Representative projects

"Cooperation with Porsche Engineering", Industry research, (2016-2023)
"**Cooperation with LUK Oil Romania"**, Industry research, (2019)
"**Endurance testing of various gasoline blends mixed with metallic additives**", Industry research, (2012-2013)
TestEcoCel, "Testing laboratory of internal combustion engines that run on biofuels", POS CCE, (2009-2011)
"The influence or the energetic contribution on functional parameters and emissions of internal combustion engines that work with blends of biofuels", (2007-2009)
EnergoEcoFarm,"**Studies regarding the usage of oil based fuels as a reliable energy source for agricultural farms**", PN II-21046, (2007-2009)
BIOBENZ, "New, modern, unconventional technologies of superior biomass capitalization from sugar beet –

obtaining gasoline", (2006-2008**)**
BIOGEF, "High energetic efficiency technology for producing an integrated biogas system and electrical energy from bio mass, for Romanian farms", (2006-2008)
ECOTRANS, "Possibilities and limits of greening urban transportation through vegetable oil fuels", CEEX Program, (2005-2008)

Significant results

The most representative publications of the past 5 years:

1. 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.
2. 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.
3. 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.
4. 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.
5. Burnete, N. V., Balint, R. J., Măgherusan, C. A., & Moldovanu, D. (2019, October). Performance, Combustion and Emissions Study of a DI Diesel Engine Running on Several Types of Diesel Fuels. In *SIAR International Congress of Automotive and Transport Engineering: Science and Management of Automotive and Transportation Engineering* (pp. 153-159). Springer, Cham.
6. 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
7. Varga, Bogdan Ovidiu; Mariasiu, Florin, INDIRECT ENVIRONMENT-RELATED EFFECTS OF ELECTRIC CAR VEHICLES USE ENVIRONMENTAL ENGINEERING AND MANAGEMENT JOURNAL Volume: 17 Issue: 7 Pages: 1591-1597 Published: JUL 2018
8. Moldovanu, D., Mariașiu, F., & Bagameri, N. (2018). Influence of swirl and tumble motion inside the combustion chamber of a compression ignited engine on vertices formation. In MATEC web of conferences (Vol. 184, p. 01022). EDP Sciences.
9. Burnete, N. V.; Burnete, N.; Jurchis, B.; et al., Influences of diesel pilot injection on ethanol autoignition - a numerical analysis NTERNATIONAL CONGRESS OF AUTOMOTIVE AND TRANSPORT ENGINEERING - MOBILITY ENGINEERING AND ENVIRONMENT (CAR2017) Book Series: IOP Conference Series-Materials Science and Engineering Volume: 252 Article Number: UNSP 012066 Published: 2017
10. Iclodean, C.; Varga, B.; Burnete, N.; et al., Comparison of Different Battery Types for Electric Vehicles INTERNATIONAL CONGRESS OF AUTOMOTIVE AND TRANSPORT ENGINEERING - MOBILITY ENGINEERING AND ENVIRONMENT (CAR2017) Book Series: IOP Conference Series-Materials Science and Engineering Volume: 252 Article Number: UNSP 012058 Published: 2017

Significant solutions:

Research regarding the use of rape seed oil based fuels with diesel, for the compression ignited engine, to reduce pollution; Studies regarding combustion modelling in a compression ignited engine fuelled with biodiesel for better performance; Studies and research regarding simulation of an internal combustion engine that works with biofuels; Studies and research regarding the possibilities of improving the internal combustion engine performance through supercharging;

Products and technologies:

Active Dynamometer – capable of functioning also as a motor, for starting the single cylinder engine, capable of working at 12000 rot/min, developing a power of 220kW and a torque of 540Nm; and capable of working as a controlled generator, for loading the engine; Single cylinder research engine – the engine has three interchangeable kits: Kit for gasoline engine, for direct injection and indirect injection (PFI); Kit for transparent engine, with a quartz liner in order to film inside the combustion chamber using cameras and a quartz cylinder head, for filming using the camera and a mirror system; Kit for Diesel engine, common rail, direct injection, with two orifices in the cylinder head for the endoscopic camera, to film the processes inside the combustion chamber; Open ECU – the Electronic Control Unit of the engine, Hardware in the Loop system

Patents:

Mariasiu E, Burnete N, Varga B., Cold start device for internal combustion engines supplied with biodiesel fuel, RO127032-A2

Mariasiu Florin Emil, Varga Bogdan Ovidiu, Deac Teodora Alexandra, Device For Reducing Lube Oil Viscosity Upon Start Of Internal Combustion Engines At Reduced Ambient Temperatures, 128768 / RO128768-A2 / a 2011 01383 - 2016

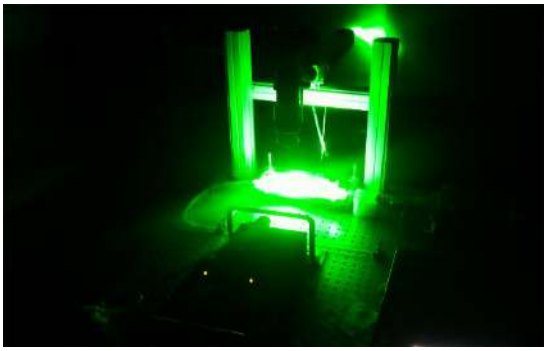
The offer addressed to the economic environment

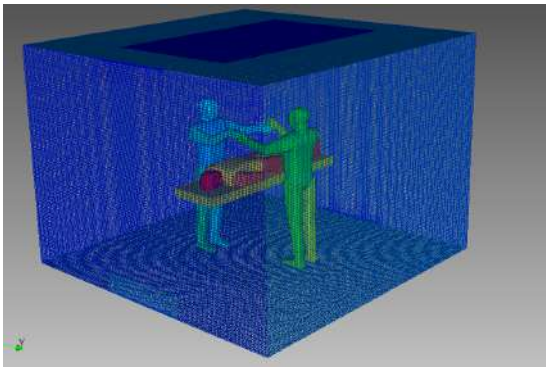
Research & development	In the applied engineering service domain, our research group offers technical expertise regarding the dynamic performance, chemical and nuisance while using different types of fuels for the internal combustion engines; Modeling and analysis of the combustion process of an internal combustion engine using different types of fuels; Analysis of biodiesel burn particularities in a compression ignited engine and study of bio-ethanol burn performance in a spark ignited engine.
Consulting & Training	In the consulting domain, our research group can provide data regarding fuel performance and internal combustion engine performance to internal combustion engine producers, to fuel producers and also for research centers. The internal combustion engine is tested as if it is mounted on the vehicle, due to the high performance of the dynamometer. The available trainings are in Engine testing, Engine certification, and Fuel testing domain.

ADVANCED FLOW AND HEAT TRANSFER INVESTIGATION GROUP

Contact details

Name	**Advanced Flow and Heat Transfer Investigation Group**
Acronym	**AtFLOW**
Logo	
Site	
Address	103-105 Muncii Blv., Rooms: B 303& D017, 400641, Cluj-Napoca, Romania
Faculty Department	**Faculty of Mechanical Engineering Mechanical Engineering Department**
Telephone	+40 752222732
Fax	
Director	Assist. Prof.Dr. Eng. Corina Giurgea
e-mail	Corina.Giurgea@termo.utcluj.ro





Areas of expertise

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 Personalized Ventilation; 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

Team

Assist. Prof. Dr. Eng. Corina Giurgea, Prof. Dr. Eng. Victor Hodor, Assoc. Prof. Dr. Eng. Florin Bode, Assist. Prof. Dr. Eng. Lucian Nascutiu, Assist. Dr. Eng. Daniel Banyai, Dr. Med. Octavian Ioan Budiu

Representative projects

INSIDE, "**Innovative strategies of HVAC systems for high indoor environmental quality in vehicles",** PN-II-PT-PCCA,http://cambi.ro/inside/ (2014-2017)
EQUATOR, **"Advanced strategies for high performance indoor Environmental QUAliTy in Operating Rooms"**, PN-II-PT-PCCA, http://cambi.ro/equator/index.html (2012-2016)
"Fluid dynamics analysis for innovative personalized ventilation diffusers for automotive and building applications", PN-II-RU-PD,http://www.cambi.ro/ventilare-personalizata-pd-bode/index.html (2011-2013)
MAACH, **"Advanced Methods of Analysis and Control in Hemodynamics, with applications in peripheral vascular surgery",** CNMP PN-II- (Complex Partnership Project), http://www.cnmp.ro:8083/pncdi2/program4/documente/2010/sedinta/rez/D8/82-086.pdf (2008-2011)
"The control and numerical analysis of combustion instability by using the acoustic analogy",CNCSIS PN II,http://www.termo.utcluj.ro/pncd2_2007_IDEI/ (2007-2010)
SHATEMP, **"Adaptive hydraulic systems for small-scale wind turbines",** CNMP PN-II(Complex Partnership Project), http://shatemp.tuiasi.ro/ (2007-2010)

Significant results

The most representative publications of the past 5 years:

1. CORINA MARIA GIURGEA, Carmen-Anca Safta, Ciprian Lupu, Mihaela Ordean[4]and Dan Opruţa, Water management issues in the context of music festivals, 2023 IOP Conf. Ser.: Earth Environ. Sci. 1136 012010 DOI 10.1088/1755-1315/1136/1/012010
2. Andrei – StelianBejan, CristianaCroitoru, FLORN BODE, CătălinTeodosiu, TiberiuCatalina, Experimental investigation of an enhanced transpired air solar collector with embodied phase changing materials, Journal of Cleaner Production Volume 336, 15 February 2022, 130398, https://doi.org/10.1016/j.jclepro.2022.130398

3. Florin BODE, Claudiu PATRASCU, Ilinca NASTASE, Heat and mass transfer enhancement strategies by impinging jets: A literature review, Thermal Science, 2021 Volume 25, Issue 4 Part A, Pages: 2637-2652, https://doi.org/10.2298/TSCI200713227B, ISSN 0354-9836, eISSN 2334-7163, 2021
4. Laurențiu TACUTU, Florin BODE, Ilinca NĂSTASE, Cristiana CROITORU, AngelDOGEANU, Experimental and numerical study on the thermal plumes of a standing and lying human in an operating room, Science and Technology for the Built Environment, DOI:10.1080/23744731.2021.1963133, ISSN: 2374-4731 print / 2374-474X online, Pag 1-19, 2021
5. Florin BODE, Amina MESLEM, Claudiu PATRASCU, Ilinca NASTASE, Flow and wall shear rate analysis for a cruciform jet impacting on a plate at short distance, Progress in Computational Fluid Dynamics, An Int. J., DOI: 10.1504/PCFD.2020.107276, Volume 20, No.3, p169-185, WOS:000551901900004, ISSN: 1468-4349, eISSN: 1741-5233, 2020
6. Ionut Voicu, Rania Rizk, Hasna Louahlia, Florin Bode, Hamid Gualous, "Experimental and numerical study of supercapacitors module with air-cooling", Applied Thermal Engineering, https://doi.org/10.1016/j.applthermaleng.2019.113903, IF.4.026, vol. 159, August 2019
7. Corina Giurgea, Florin Bode, Lucian Nascutiu, Cristian Dudescu, "Considerations Regarding the Optically Transparent Rigid Model for PIV Investigations. A Case Study. Part 2: Notes on the Failure of the Model", in *Energy Procedia* 85 (2016) 235 – 243, 2016
8. Lucian Nascutiu, Corina Giurgea, Mihai Damian, Florin Bode, Octavian Budiu, Octavian Andercou, "Considerations Regarding the Optically Transparent Rigid Model for PIV Investigations. A Case Study. Part1: Model Manufacturing", in *Energy Procedia 85* (2016) 358 – 365, 2016
9. Victor Hodor, Dan Birle, Lucian Nascutiu, Mircea Diudea, "CFD Prediction with LES for Psycho Acoustic Relevance in Ventilation", in *Energy Procedia* 85 (2016) 252 –259, 2016
10. Lucian Nascutiu, Olivier Reinertz, Christoph Siebert, Hubertus Murrenhoff, "High Performance Actuators for Fluid Power Drives", *The 9TH INTERNATIONAL FLUID POWER CONFERENCE IFK2014*, Vol. III, 242-253, Aachen, Germany, March 2014.

Significant solutions:

High accuracy mapping of the flow fields by using PIV and CFD investigations with possible future applications for: the graft geometry optimization (flow through a femoral artery bypass) respectively the nozzle design optimization (in Personalized Ventilation)

Products and technologies:

A technology for manufacturing optically transparent models suited to PIV investigations. The models consist of idealized bifurcations or axisymmetric channels machined in blocks of Plexiglass with a high degree of transparency and refractive index that could be matched with that of certain working fluids (Technology developed in cooperation with colleagues from the Department of Machine Building of the UTCN).

An experimental setup integrating a flow circuit reproducing the flow through a femoral artery bypass and a 2D PIV system that would allow the investigation by the PIV method of pulsating flows similar to those in a segment of the human circulatory system

Others:

Creation of a laboratory that provides appropriate conditions (darkroom, flat surfaces, optical table and devices, 2D PIV system, experimental setups) for flow investigations through optical methods

The offer addressed to the economic environment

Research & development	Providing support (expertise and facilities) for research in connected fields like: hemodynamics, biomedical flows, thermo-gas-dynamics/combustion by the complementary use of CFD techniques and optical PIV methods. Developing/upgrading the experimental setup used to investigate the pulsed flows similar to that through a bypass (currently in the experimental model stage) with a view toward potential use in testing vascular prostheses Designing and machining customized optically transparent models of axisymmetric channels and bifurcations appropriate for PIV investigations Developing solutions for PV (Personalized Ventilation) and HVAC (Heating Ventilation and Air Conditioning) based on CFD numerical simulations Measuring viscosities for a wide range of fluids, including non-Newtonian fluids, and low viscosity fluids (e.g. possible beneficiaries in cosmetics or pharma industries) Measuring parameters for monitoring the indoor air quality (temperature, humidity, air velocity, CO2 concentrations)
Consulting	Consulting and technical support for designing, building and evaluation of thermo-energy and combustion equipment. Technical and judicial expertise in the area of: using thermal equipment and combustion
Training	Courses for providing surgeons with a new approach to reconstructive bypass surgery from the engineering perspective. Introductory course in numerical simulation of fluid flow and heat transfer for undergraduate students and students at the MSc doctoral and postdoc level (2018-2021: 12 Undergraduate St. + 3MSc.St. + 2 PhD St +1 postdoc.) Initial training in in PIV optical measurement techniques for students at the M.Sc. and doctoral level.

INTELLIGENT RECONFIGURABLE SYSTEMS LABORATORY

Contact details

Name	**Intelligent Reconfigurable Systems Research Laboratory**
Acronym	**SIR**
Logo	SIR
Site	http://mdm.utcluj.ro/Cercetare/Lab_SIR/index.html
Address	103-105, Muncii Blv., 400641, Cluj-Napoca, Romania
Faculty Department	**Faculty of Automotive, Mechatronics and Mechanical Engineering - Technical University of Cluj-Napoca** **Department of Mechatronics and Machine Dynamics**
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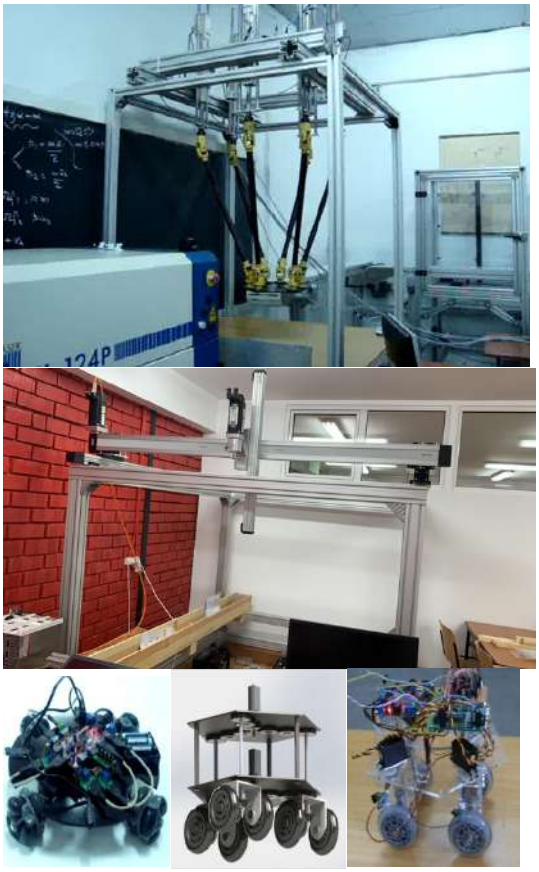
Fax	+40 264 594491
Director	Prof. Dr.-Ing. Cornel Brisan
e-mail	cornel.brisan@mdm.utcluj.ro



Areas of expertise

Advanced Technologies for Industrial Process Control
Identifying and modeling highly complex processes
New paradigms of manufacturing systems
Technologies and High Precision Mechanical Products and Mechatronic Systems
Applied mechatronics; Intelligent mechatronic products and systems
Techniques, metrologies and precise and highly precise measuring instruments
Conventional and unconventional automatic drive systems and equipment, with accurate and highly accurate linear or angular positioning
Robotics and high precision microrobotics with or without autonomous motions
High accuracy conventional and unconventional production techniques
Assembly technologies, microassembly, rapid assembly and high accuracy automatic disassembly
Innovative Products and Technologies for Transport and Automotive Industry
Products and technologies for automotive industry
Development of New Types of Mechanical Transmissions
Cylindrical and frontal ball transmissions
Processional variable speed
Diagnosis and maintenance of Industrial Equipment
Technologies for vibration reduction in dynamic systems
Predictive maintenance systems

Team

Prof. Dr.-Ing. Cornel Brisan, Prof. Dr. Eng. Mircea Bara, Prof. Dr. Eng. Mihai Olimpiu, Assist. Prof. Dr. Eng. Calin Rusu, Conf.dr.ing. Olimpiu Hancu, Sl.dr.ing. Lapusan Ciprian, Asist.dr.ing. Rad Ciprian, Ddr. Trif Mihaela

Representative projects

SIRAMAD – "Autonomous robotic systems for waste management in the context of the intelligent city", PNIII-P1-1.2 PCCDI 2018, (2018-2020)
"Research concerning theoretical development and experimental validation of Reconfigurable Haptic Interfaces for Virtual Reality", Alexander von Humboldt Foundation (2012-2015)
"Reconfigurable haptic interfaces used in dynamic contact reproduction - Theory Developmentsethical and

experimental”, PNII-PT-PCCA-2011-3.1-0190, (2012-2016)
“Research concerning develpment of machine tools with reconfigurable topology”, Grant ANCS Idei (2007-2010)
“Research and development of the high accuracy positioning robotic systems with extended mobility”, Grant ANCS, (2007-2010)
“Modeling, simulation and realization of mobile minirobots with adaptable structure”, Grant type A CNCSIS, (2006-2007)
“Modelling, simulation and development of robotic system families used for inspection and exploration”, Grant PN-II-Idei, (2007-2010)
“Mathematical Modeling and Experimental Research on Anthropomorphic Parallel Robots”, Alexander von Humboldt Foundation, (2004-2008)

Significant results

The most representative publications of the past 5 years:

1. Brisan C., Introduction in optimisation of Industrial Robotics. Theory and Applications. Ed Academiei Romanne, 2019.
2. C Lapusan, M Lapusan, C Brisan, V Chiroiu , Aspects relating to development of modular design in mass customization production, PROCEEDINGS OF THE ROMANIAN ACADEMYOF THE ROMANIAN ACADEMY , Series A, Volume 20, Number 4/2, 2019, pp. 377–382.
3. C Boanta, C Brisan Optimization of a Robot Used for a Solid Waste Selection System, International Journal of Modeling and Optimization 9 (6), 2019.
4. 1. Tatar M.O., Pecie R. - Modular omnidirectional mobile robot with four driving and steering wheels, IOP Conference Series: Materials Science and Engineering, vol. 514, 2019, p 012019, doi:10.1088/1757-899X/514/1/012019.
5. Gyarmati, M., Tătar M.O., - Locomotion systems for search and rescue robots, Revista Robotica & Management, ISSN 1453-2069, Vol. 24, nr. 1, 2019, pp. 8-13.
6. Tătar, M.O., Barbu, P., - Studies regarding mobile robots that are adaptable to rough terrain, Revista Robotica & Management, ISSN 1453-2069, Vol. 24, nr. 1, 2019, pp. 24-29.
7. Chiroiu, Veturia; Brisan, Cornel; Dumitriu, Dan; et al., A sonification algorithm for developing the off-roads models for driving simulators MECHANICAL SYSTEMS AND SIGNAL PROCESSING Volume: 98 Pages: 310-323 Published: JAN 1 2018
8. Munteanu, Ligia; Brisan, Cornel; Chiroiu, Veturia; et al., STRAIN AMPLITUDE DEPENDENT INTERNAL FRICTION AND THE YOUNG'S MODULUS DEFECT IN DAMAGED SOLIDS ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING Volume: 60 Issue: 4 Pages: 485-490 Published: NOV 2017
9. Chiroiu, Veturia; Munteanu, Ligia; Dumitriu, Dan; et al., ON THE SONIC FILMS WITH DEFECTS PROCEEDINGS OF THE ROMANIAN ACADEMY SERIES A-MATHEMATICS PHYSICS TECHNICAL SCIENCES INFORMATION SCIENCE Volume: 18 Issue: 4 Pages: 378-385 Published: OCT-DEC 2017
10. Fodor, Ferenc; Brisan, Cornel; Chiroiu, Veturia, The Development of a Pneumatically Actuated Driving Simulator IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR) Location: Cluj Napoca, ROMANIA Date: MAY 19-21, 2016 Book Series: IEEE International Conference on Automation Quality and Testing Robotics Pages: 185-190 Published: 2016
11. L. Munteanu, V. Chiroiu, C. Brisan, D. Dumitriu, T. Sireteanu, and S. Petre, "On the 3D normal tire/off-road vibro-contact problem with friction", *Mechanical Systems and Signal Processing*, vol. 54-55, pp. 377-393, Mar 2015.
12. L. Munteanu, C. Brisan, V. Chiroiu, D. Dumitriu, and R. Ioan, "Chaos-hyperchaos transition in a class of models governed by Sommerfeld effect", *Nonlinear Dynamics*, vol. 78, pp. 1877-1889, Nov 2014.
13. L. Munteanu, V. Chiroiu, S. Donescu, and C. Brisan, "A new class of sonic composites", *Journal of Applied Physics*, vol. 115, Mar 2014.
14. V. Chiroiu, C. Brisan, M. Popescu, I. Girip, L. Munteanu, “On the sonic composites without/with defects”, in *J. Apply Phys.*, vol. 114, 2013
15. C. Brişan, R.V. Vasiu, L. Munteanu, “A Road Auto-Generating Algorithm for Developing the Road Virtual Models Usable in Driving Simulators”, in *Transportation Research Part C: Emerging Technologies*, vol. 26, 2013, pp.160-179

The offer addressed to the economic environment

Research & development	Modeling complex intelligent systems. Developing robotic systems for manufacturing Development robotic inspection systems Development omnidirectional mobile robots Developing virtual models
Consulting	For automated manufacturing systems For precision mechanical systems Pipe inspection
Training	Computer aided design and development of mechatronic systems Development of manufacturing technologies Vibratory systems analysis Control algorithms for robots

INSTRUMENTAL ANALYSIS

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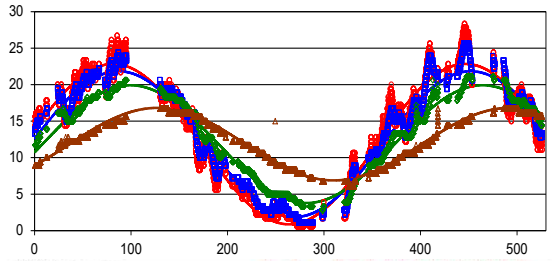

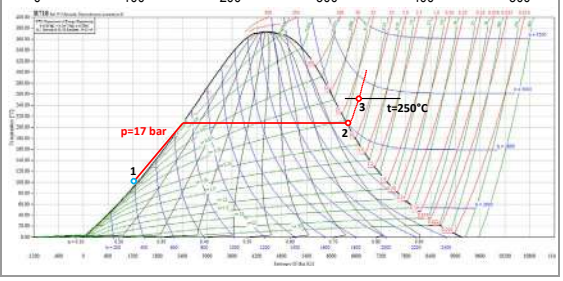

Areas of expertise

Fundamental research fields: Chemistry, Environment and materials science; Biology, Genetics and medicine; Physics and Technological physics; Fields at frontier
Applied research fields: Theoretic computer science; Advanced informatics systems; Sustainable energy systems; Energy security; Pollution reduction; Alimentary safety and security; Biotechnology

Team

Prof. Dr. Eng. Mugur Ciprian Balan, Prof. Dr. Lorentz Jantschi, Assoc. Prof. Dr. Eng. Paula Veronica Ungureșan, As. Dr. Eng. Ancuta Magurean

Representative projects

SUNHORIZON - Sun coupled innovative heat pumps (2022 - 2023)
https://sunhorizon-project.eu/
PN-III-P2-2.1-PED-2021-0544 (PED 706) Hybrid microgrid with renewable energy sources and optimized operating cost, which integrates energy management methods based on solar power prediction (2022-2024)
STRATEGY The local strategy of the thermal energy supply service for consumers in the municipality of Cluj-Napoca in the period 2021 – 2031 and the 2050 perspective (2021)
SIRCLES - Replicable large impact Symbiotic value chains for cross sectoral optimization of resource efficiency and circularity in Energy Intensive Industries (2020)
http://mugurbalan.eu/doc/SIRCLES.pdf
PVEFF - Increased energy efficiency in municipal buildings through the use of photovoltaic panels (2019)
http://www.mugurbalan.eu/doc/pv_utcn.pdf
REMSIS - Renewable energy management system for small isolated communities (2014-2017)
http://remsis.utcluj.ro/

Significant results

The most representative publications of the past 5 years:

1. Pop,O.G., Dobrovicescu, A., Serban, A., Ciocan, M., Zaaoumi, A., Hiris,P.D, Balan,M.C. - *Analytical modelling of food storage cooling with solar ammonia-water absorption system, powered by parabolic trough collectors. Method*, MethodsX 10C (2023) 102013, ISSN: 2215-0161 (JCI: 0.43 / 2021) https://doi.org/10.1016/j.mex.2023.102013
2. Hiris,P.D, Pop,O.G., Balan,M.C. - *Analytical modeling and validation of the thermal behavior of seasonal storage tanks for solar district heating*, Energy Reports 8 (2022) 741-755, ISSN: 2352-4847 (IF: 4.937 / 2021) https://doi.org/10.1016/j.egyr.2022.07.113
3. Hiris,P.D, Pop,O.G., Balan,M.C. - *Preliminary sizing of solar district heating systems with seasonal water thermal storage*, Heliyon 8 (2022) e08932, ISSN: 2405-8440 (IF: 3.776 / 2021) https://www.cell.com/action/showPdf?pii=S2405-8440%2822%2900220-1 https://doi.org/10.1016/j.heliyon.2022.e08932
4. Bucsa,S., Serban,A., Balan,M.C., Ionita,C., Nastase,G., Dobre,C., Dobrovicescu,A. - *Exergetic Analysis of a Cryogenic Air Separation Unit*, Entropy (2022), 24, 272, ISSN: 1099-4300 (IF: 2.524 / 2021) https://doi.org/10.3390/e24020272

5. Pop,O.G., Balan,M.C. - *A numerical analysis on the performance of DHW storage tanks with immersed PCM cylinders*, Applied Thermal Engineering, 197 (2021), 117386 ISSN: 1359-4311 (IF: 5.295 / 2020) https://doi.org/10.1016/j.applthermaleng.2021.117386
6. Zaaoumi,A., Bah,A., Ciocan,M., Sebastian,P., Balan,M.C., Mechaqrane,A., Alaoui,A. - *Estimation of the energy production of a parabolic trough solar thermal power plant using analytical and artificial neural networks models*, Renewable Energies, 170 (2021), pp. 620-638, ISSN: 0960-1481 (IF: 8.001 / 2020) https://doi.org/10.1016/j.renene.2021.01.129
7. Abrudan,A.C., Pop,O.G., Serban,A., Balan,M.C. - *New Perspective on Performances and Limits of Solar Fresh Air Cooling in Different Climatic Conditions*, Energies, 12(11) (2019), pp. 1-21, ISSN: 1996-1073 (IF: 2.707 / 2018) https://www.mdpi.com/1996-1073/12/11/2113
8. Pop,O.G., Fechete Tutunaru,L., Bode,F., Abrudan,A.C., Balan,M.C. - *Energy efficiency of PCM integrated in fresh air cooling systems in different climatic conditions*, Applied Energy, 212 (2018) pp. 976-996, ISSN: 0306-2619 (IF: 7.900 / 2017) https://doi.org/10.1016/j.apenergy.2017.12.122

Patents:
M. C. Bălan, et al. : RO126148B1: Heat pump to provide heating temperature at two different levels. Owner: SC Convergo SRL

The offer addressed to the economic environment

Research & development	R&D in the fields of: Energy efficiency, Renewable energies, Chemistry; Computer science; Mathematics; Physics; Horticulture; Biotechnologies; Experimental design; Data acquisition, Computational fluid dynamics, Cogeneration
Consulting	Consulting in the fields of: Energy efficiency, Renewable energies, Chemistry; Computer science; Mathematics; Physics; Horticulture; Biotechnologies; Experimental design; Data acquisition, Computational fluid dynamics, Cogeneration
Training	Training in the fields of: Energy efficiency, Renewable energies, Chemistry; Computer science; Mathematics; Physics; Horticulture; Biotechnologies; Experimental design; Data acquisition, Computational fluid dynamics, Cogeneration

ADVANCED MECHATRONIC SYSTEMS LABORATORY

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Areas of expertise

Advanced Mechatronic Systems:
- **Virtual Reality:** design mechatronic systems with the assistance of virtual reality technology, which can benefit clearly from immersion and 3D. This virtual reality-based approach can be applied for the testing of intelligent mechatronic systems. Virtual reality facilitates the analysis of tests by the combination of virtual 3D models and visualization techniques.
- **Optimal design and control of parallel robots:** Parallel robots present better performances in comparison with serial robots. However, due to the strong dependence of geometric parameters and their performances, the corresponding design problems for the parallel robots are much more complex and the adequacy and effectiveness of the design method become more critical. In order to overcome this genetic algorithm optimization can be applied.
- **Haptic devices and Exoskeletons:** these mechatronic systems can be used for virtual reality and tele-presence applications. The development of even more capable devices that can accurately reproduce a large range of haptic information is an important component for the technologies of virtual reality and tele-presence. Exoskeletons can bring up a valuable contribution to the applications where the workspace is strategic.
- **Mechatronics research and training:** current research includes development of concepts, algorithms, theories, and methodologies for synergistic integration of precision mechanical engineering with advanced electronics and computer control in the design of mechatronic systems.
- **Advanced programming in MATLAB:** advanced topics like GUIs/APPs, Simulink/Simscape, interfaces with Arduino/Raspberry Pi & QUANSER control boards, ROS with MATLAB.

Team

Assoc. Prof. Dr. Eng. Sergiu-Dan Stan, Assoc. Prof. Dr. Eng. Emil Teuțan, Senior lecturer. Dr. Eng. Alin Plesa, Assoc. Prof. Dr. Eng. Ionut Muntean.

Representative projects

EXORAS. "**New Haptic Arm Exoskeletons for Robotics and Automation in Space**" (2012-2015). National project, the project seeks to develop in Romania capacity building at national level and to stimulate Romania's participation to international space missions and programs – in particular ESA, in the field of Robotic Exploration. The impact will be to develop new haptic arm exoskeleton to enable in-space force-feedback telemanipulation with redundant robotic arms, and so help enable new policies in Romania such as robotic exploration, as well as supporting Romania towards increased

participation to ESA programs.
GREENet. "**Globally Recoverable and Eco-friendly E-equipment Network with Distributed Information Service Management**" (2011-2014). European FP7 project, aimed to establish closer international cooperation and to share and develop research on globally sustainable Waste Electrical and Electronic Equipment (WEEE) management is timely and significant. This GREENet project is aimed at teaming up multi-disciplinary research teams from the EU and China to enhance the knowledge base and achieve research synergies as integrated technical solutions in the relevant areas.
SMART. "**Complex mechatronic systems for medical applications**" (2008-2011). National project, the project aimed of realization of integrated, innovative system regarding the complex mechatronic systems for medical applications.
CLEM. "**CLoud services for E-learning in Mechatronics technology**" (2012-2013). European project, Leonardo da Vinci Development of Innovation type, the CLEM project is the first step to fulfil the vision of establishing "a global Mechatronics technology in VET knowledge repository for exchange and sharing".
MIND. Development of mechatronics skills and innovative learning methods for Industry 4.0 (2019-2021).
XP2P. Crossing Borders: Peer-to-Peer Education in Mechatronics (2019-2022).
SMART2. "Advanced integrated obstacle and track intrusion detection system for smart automation of rail transport" (2019-2022). SMART2 research on-board long-range all-weather obstacle detection (OD) and track intrusion detection (TID) system. 2 new systems will be also researched, innovate and developed: advanced SMART2 trackside (TS) /airborne OD&TID systems. All 3 systems will be integrated into a holistic OD&TDI system via interfaces to central Decision Support System (DSS). **AMS laboratory** responsible for airborne OD&TID system.

Significant results

The most representative publications of the past 5 years:

1. Teutan, Emil; Rafa, Vasile, ANALYSIS AND FUZZY SIMULATION OF A PUMP WITH ECCENTRIC FOR NATURAL GASES ODORIZED ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING Volume: 61 Issue: 1 Pages: 55-60 Published: MAR 2018
2. Tatar, Mihai Olimpiu; Petre, Barbu; Teutan, Emil, Design and Development of the Hybrid Mobile Robots 21st IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR THETA) Location: Cluj-Napoca, ROMANIA Date: MAY 24-26, 2018 Book Series: IEEE International Conference on Automation Quality and Testing Robotics Published: 2018
3. Verba, Nandor; Chao, Kuo-Ming; James, Anne; et al., Platform as a service gateway for the Fog of Things ADVANCED ENGINEERING INFORMATICS Volume: 33 Pages: 243-257 Published: AUG 2017
4. Lovasz, Erwin-Christian; Margineanu, Dan Teodor; Ciupe, Valentin; et al., Design and control solutions for haptic elbow exoskeleton module used in space telerobotics MECHANISM AND MACHINE THEORY Volume: 107 Pages: 384-398 Published: JAN 2017
5. Chao, Kuo-Ming; James, Anne E.; Nanos, Antonios G.; et al., Cloud E-learning for Mechatronics: CLEM FUTURE GENERATION COMPUTER SYSTEMS-THE INTERNATIONAL JOURNAL OF ESCIENCE Volume: 48 Pages: 46-59 Published: JUL 2015
6. Ordean, M.-N.; Oarcea, A.; Stan, S.-D.; Dumitru, D.-M.; Cobîlean, V.; Bîrză, M.-C. Analysis of Available Solutions for the Improvement of Body Posture in Chairs. Appl. Sci. 2022, 12, 6489. https://doi.org/10.3390/app12136489.
7. Stan, S.-D.; Popişter, F.; Oarcea, A.; Ciudin, P. Comparative Study Using CAD Optimization Tools for the Workspace of a 6DOF Parallel Kinematics Machine. Appl. Sci. 2022, 12, 9258. https://doi.org/10.3390/app12189258.

Products and technologies

1. Real-time control of mechatronic systems
2. Optimal design of parallel robots using genetic algorithms
3. Control of industrial Fanuc robots; 4. Design and development of Soft Robotics systems

The offer addressed to the economic environment

Research & development	Development of solutions for modelling mechatronic systems. Development of original algorithms for optimization with genetic algorithms of mechatronic systems, Development of solutions for control of CNC machines/ robot systems; Development of airborne OD&TID systems; Design, control and development of Soft Robotics systems.
Consulting	Consulting, design, research and prototyping of mechatronic systems, control of industrial Fanuc robots
Applied engineering services	Custom solutions for specific issues regarding the implementation of mechatronic systems
Training	**MATLAB programming**: getting started with Matlab, m-files, Graphical User Interfaces, Virtual Reality, Simulink/Simscape Toolbox..etc. **Optimal design with Genetic Algorithms**: optimization, genetic algorithms, Pareto optimal front, multicriteria optimization. **Arduino**: hardware, breadboards and prototyping, simple electronic components, Introduction to important programming concepts, software interface with MATLAB. **Quanser:** teaching platform for controls and mechatronics with MATLAB/Simulink **Fanuc robots:** hands-on robotics learning for the future of mechatronics and automation, teaching experience of programming and operating cutting-edge industrial Fanuc robots.

Road Traffic and Traffic Security Research laboratory

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Fax	+40 264 415490
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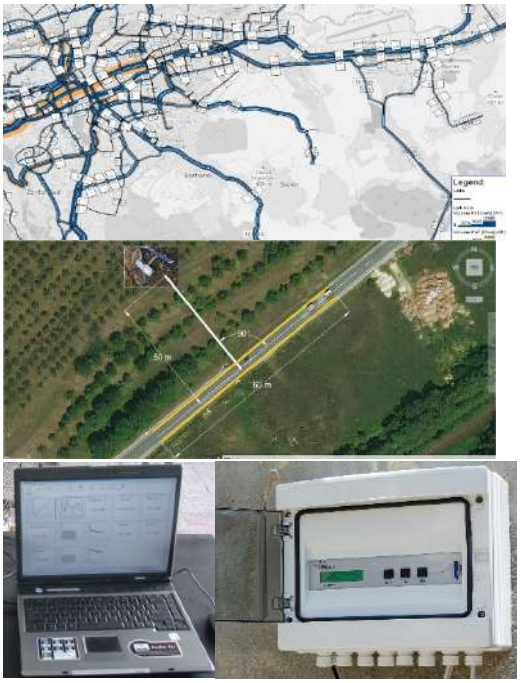
e-mail	Nicolae.Filip@auto.utcluj.ro



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

Team

Prof. Dr. Eng. Nicolae Filip; Assoc. Prof. Dr. Eng. Teodora Deac; Assoc. Prof. dr. Eng Lucian Fechete Tutunaru, Lecturer dr. Eng. George Popescu, assistant dr. arh. Ioana Craciun, lecturer Dr. Eng. Ferent Gaspar
PhD student Carmen Gheorghe, PhD student Georgiana Muresan.
Extern member PhD. Marius Deac. PhD. Claudiu Golgot

Representative projects

MOBURBIS CEEX project nr. X2-C34 (2007 – 2011)
Valorificarea potenţialului energetic din undele de presiune de la motoarele cu ardere interna, prin conversie termodinamica şi electrica „, cod CNCSIS 834 2009 - 2012
Identificarea arealului de acoperire al aeroportului international Cluj-Napoca, 2012
Plan de mobilitate urbana pentru municipiul Bistrita Nasaud 2015
Plan de mobilitate urbana pentru orasul Cugir 2016
IT solution for public transport Baia Mare cuty 2019-2021
Regional public transport optimization county Bistrita Nasaud
Bus line design for Est-Wet axes in Cluj Napoca city 2018-2019
ITS study for electric buses 2019
ITF solution for hydrogen buses 2021
Urban regeneration for Cluj Napoca city Nord area 2021-2022

Significant results

The most representative publications of the past 5 years:

1. 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.

2. Muresan GS., Gheorghe C., Filip N. Road Traffic Studies for Urban Development. 30TH SIAR INTERNATIONAL CONGRESS OF AUTOMOTIVE AND TRANSPORT ENGINEERING: SCIENCE AND MANAGEMENT OF AUTOMOTIVE AND TRANSPORTATION ENGINEERING. Page 304-311. DOI 10.1007/978-3-030-32564-0_36. Published 2020.
3. Gheorghe C., Deac TA., Filip N. IMAGE PROCESSING TECHNIQUES USED IN SOIL MOISTURE ANALYSIS. **INMATEH-AGRICULTURAL ENGINEERING. Volume 58 Issue 2 Page 147-154. DOI 10.35633/INMATEH-58-16. Published 2019.**
4. Gheorghe C.**, Filip N. Research Regarding on Choosing Optimal Traffic Organization Using Ranking Criteria. Book Series. Proceedings in Automotive Engineering. Page 775-783. DOI**
a. 10.1007/978-3-319-94409-8_90
5. Popescu V., Molea A., Moldovan M., Lopes P.M., Moldovan Mazilu A., Popescu G.L., „The Influence of Enzymatic Hydrolysis of Whey Proteins on the Properties of Gelatin-Whey Composite Hydrogels", Materials, Vol. 14, Nr. 13, 06.2021, p. 3507, https://doi.org/10.3390/ma14133507;
6. Popescu G.L., Filip N., Dudescu M.C., Popescu V., „BIODEGRADABLE AGAR-AGAR FOILS WITH POSSIBLE USES IN AGRICULTURE. OBTAINING AND CHARACTERIZATION", ISB-INMATEH AGRICULTURAL AND MECHANICAL ENGINEERING, Vol. 8, ISSN 2344 – 4126, 10.2019, p. 448-455; https://isbinmateh.inma.ro/pdf/Volume_Symposium_2019.pdf;
7. Popescu G.L., Filip N., Popescu V., "Research Aiming Simultaneously Recycling Of Waste Polyolefins By Pyrolisis, In Order To Obtain Some Fuels For Compression Ignition Engines", Applied Mechanics and Materials, Vol. 822, Online: 2016-01-12, ISSN: 1662-7482, p. 235-242, https://doi.org/10.4028/www.scientific.net/AMM.822.235;
8. POPESCU G.L., FILIP N., MOLEA A., POPESCU V., "THE EFFECT OF USING PYROLYSIS OILS FROM POLYETHYLENE AND DIESEL ON THE POLLUTANT EMISSIONS FROM A SINGLE CYLINDER DIESEL ENGINE", STUDIA UBB CHEMIA, Vol. 60(LX), Issue 4, December 2015, ISSN (print): 1224-7154, ISSN (online): 2065-9520, p. 273-288; http://chem.ubbcluj.ro/~studiachemia/issues/chemia2006_2015/Chemia2015_4.pdf;
9. Popescu G.L., Filip N., Popescu V., Molea A., "A comparison between the consumption of polyethylene pyrolysis oils and diesel to supply a generator powered by a single cylinder diesel engine", International Journal of Engineering and Applied Sciences (IJEAS), Volume-2, Nr.-8, August 2015, ISSN: 2394-3661, p. 7-10; https://www.ijeas.org/download_data/IJEAS0208003.pdf.
10. Deac, T., Fechete-Tutunaru, L., Gaspar, F., Environmental Impact of Sawdust Briquettes Use–Experimental Approach, Energy Procedia, Elsevier, 85 (2016) 178–183, ISSN 1876-6102; Indexată: ISI Web of Science, Scopus, Ebsco, etc.; Disponibilă la: http://www. sciencedirect.com/ science/article/pii/S1876610215029896.
11. Gaspar, F., Deac, T., Fechete-Tutunaru, L., Moldovanu, D., Experimental Study on the Sun Tracking Ability of a Spherical Solar Collector, Energy Procedia, Elsevier, 85 (2016) 220-227, ISSN 1876-6102; Indexată: ISI Web of Science, Scopus, Ebsco, etc.; Disponibilă la: http://www.sciencedirect.com/science/article/pii/S1876610215028921
12. Porumb, B, Unguresan, P, Tutunaru, LF, Serban, A, Balan, MEENVIRO-YRC 2015 – BUCHAREST Book Series Energy ProcediaVolume 85 Page 461-471 DOI 10.1016/j.egypro.2015.12.228 Published 2016.
13. Fechete T.L., Filip N., s.a. INFLUENCE OF INPUT FLOW OVER GRAIN MILL EFFICIENCY UTILISATION. Book Series Actual Tasks on Agricultural Engineering-Zagreb. Volume 46. Page 439-446. Published 2018
14. Crisan G.H., Filip N. BUSES FLEET MAINTENANCE OPTIMIZATION, USING COMPUTER SIMULATION METHODS ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING Volume 60 Issue 3 Page 417-426 Published 2017

Significant solutions:
Buses line design with lights adaptive phases;
Point to point vehicles speed determination;
Car shape laser scanning for vehicles classification;
Urban mobility plan for regional development;
Traffic counter device.

National Patents:
Filip N. Dispozitiv pentru conversia zgomotului in energie electrica. Brevet nr 128582. 2019

Filip, N., Chiriciuc, M. Contor electronic trafic. Patent nr. 019017. 2011

The offer addressed to the economic environment

Research & development	Development of original solutions for traffic. Development of original algorithms for image processing Development of original algorithms for vehicles scan GES evaluation algorithm
Consulting	Consulting, for urban mobility actions Consulting for buses fleet optimization Consulting in traffic safety Consulting in traffic studies development
Training	Traffic macroscopic parameters measurements; Vehicle speed detection. Noise conversion in electric energy GES evaluation in transportation field

EMARC - Electric Mobility Applied Research Center - Centrul de Cercetare Aplicată pentru Mobilitate Electrică

Contact details

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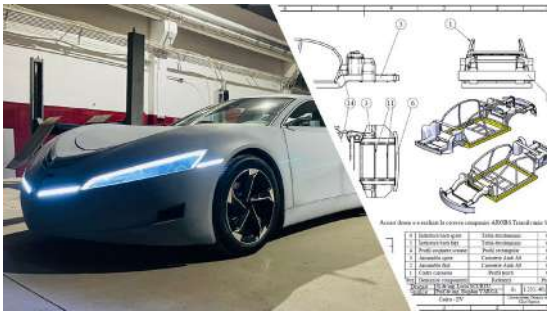

Areas of expertise

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;

Team

Prof. PhD. Habil. Eng. Bogdan VARGA, Prof. PhD. Habil. Eng. Florin MARIAȘIU, Asoc. Prof. PhD. Eng. Călin ICLODEAN, Asoc. Prof. PhD. Eng. Dan MOLDOVANU, Asoc. Prof. PhD. Eng. Nicolae Vlad BURNETE, Asoc. Prof. PhD. Eng. Nicolae CORDOȘ, PhD. Stud. Eng. Irina DUMA, PhD. Stud. Eng. Thomas BUIDIN, PhD. Stud. Eng. Ioan SZABO, PhD. Stud. Eng. Horațiu CĂRĂUȘAN, PhD. Stud. Eng. Andreea SÎRCA

Representative projects

- ✓ **OLGA**, Holistic Green Airport – an opportunity for innovation in smart and sustainable mobility (H2020) – ongoing;
- ✓ Elaboration of **opportunity study for the purchase of articulated electric buses** and buses with **fuel cells (Hydrogen)** in the Municipality of Cluj-Napoca;
- ✓ **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;
- ✓ The opportunity study for "Modernization of the local public transport system through the purchase of **ecological vehicles** in the Municipality of Bistrița"
- ✓ Consulting and Elaboration of specifications for 18m **electric buses** - ongoing
- ✓ **URBIVEL** - Advanced technologies for intelligent urban electric vehicles POC-A1-A1.2.3-G-2-15 Partnerships for knowledge transfer:
  - **together with Porsche Engineering Romania, a battery of accumulators was developed;**
  - **together with INOVO developed an electric car;**
- ✓ Consulting services in the development of specifications for **electric buses, trams and trolleybuses for 24 cities** in Romania, European Investment Bank – Luxembourg

- ✓ Technical assistance for the purchase of 41 electric buses in the Municipality of Cluj-Napoca (15,000 Euros);
- ✓ Technical assistance for the purchase of 50 trolleybuses in the Municipality of Cluj-Napoca (18,870 Euro);
- ✓ Technical assistance for the purchase of 21 trams in the Municipality of Cluj-Napoca (15,000 Euros);
- ✓ Modernization of the Laboratory for testing, research and certification of internal combustion engines operating with biofuels (2.1 Million Euro);
- ✓ Endurance tests for the analysis of fuels with MMT metal additives (LukOil) (32,000 Euros)
- ✓ Comparative analysis of the performances of 13 fuels from Cluj-Napoca (40,000 Euros)

Significant results

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

- ✓ Energy Consumption Prediction of Electric Vehicle Air Conditioning System Using Artificial Intelligence A Sagoian, BO Varga, S Solodushkin 2021 Ural Symposium on Biomedical Engineering, Radioelectronics
- ✓ Direct and indirect environmental aspects of an electric bus fleet under service, BO Varga, F Mariasiu, CD Miclea, I Szabo, AA Sirca, V Nicolae Energies 13 (2), 336,2020
- ✓ Prediction of electric vehicle range: A comprehensive review of current issues and challenges BO Varga, A Sagoian, F Mariasiu, Energies 12 (5), 946, 2019
- ✓ Varga, Bogdan Ovidiu. "Electric vehicles, primary energy sources and CO_2 emissions: Romanian case study." Energy 49 (2013): 61-70.
- ✓ Battery thermal management systems: Current status and design approach of cooling technologies., Buidin, Thomas Imre Cyrille, and Florin Mariasiu. Energies 14, no. 16 (2021): 4879.
- ✓ Modeling Approach of an Air-Based Battery Thermal Management System for an Electric Vehicle., Buidin, Thomas Imre Cyrille, and Florin Mariasiu. Applied Sciences 11, no. 15 (2021): 7089.
- ✓ Indirect environment-related effects of electric car vehicles use, BO Varga, F Mariasiu Environ. Eng. Manag. J 17 (7), 1591-1599, 2018
- ✓ Comparison of different battery types for electric vehicles, C Iclodean, B Varga, N Burnete, D Cimerdean, B Jurchiş, IOP conference series: materials science and engineering 252 (1), 012058,2017
- ✓ Significant solutions:

Products and technologies:

Tender books for electric buses
Tender books for trams
Tender books for trolleybuses
Opportunity studies regarding green transport and decarbonization if cities

Books:

- ✓ Varga, Bogdan Ovidiu, Florin Mariasiu, Dan Moldovanu, and Calin Iclodean. "Electric and Plug-In Hybrid Vehicles." Cham: Springer International Publishing, (2015).
- ✓ Varga, Bogdan Ovidiu, Calin Iclodean, and Florin Mariasiu. Electric and hybrid buses for urban transport: energy efficiency strategies. Cham, Switzerland: Springer International Publishing, (2016).

The offer addressed to the economic environment

Research & development	The team members also coordinate the ART TU Cluj-Napoca Association representing the Formula Student team of UTCN, currently being the only electric single-seater team in Romania (https://arttu-formulastudent.ro/). Research on electric buses, hydrogen buses, trams, trolleybuses (with papers and books to support this activity).
Consulting	The team members fully support the local Municipality and other Municipalities, and help with consulting on tender books, evaluation and reception of electric buses, trams and trolleybuses.
Training	The team members support the Postgraduate Training Program: Specialist in the diagnosis, evaluation and operation of electric and hybrid vehicles, taught in Romanian (Specialist în diagnosticarea, evaluarea și exploatarea autovehiculelor electrice și hibride), within UTCN, the Department for Continuing Education, Distance and Low-Frequency Education.

DEPENDABLE SYSTEMS - DeSy

Contact details

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Faculty Department	**Faculty of Automation and Computer Science Automation Department**
Telephone	+40 264 401427
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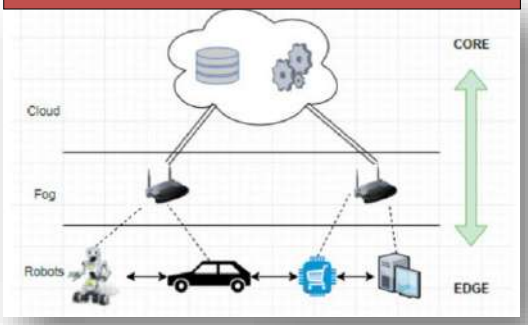
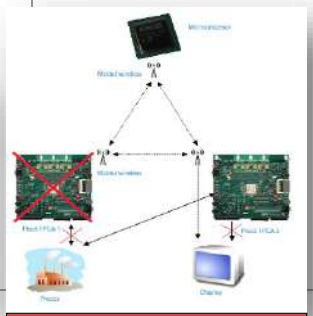
Director	Prof. Eng. Liviu Miclea, PhD
E-mail	Liviu.Miclea@aut.utcluj.ro

Block schemas elaborated by the DESY group, over time

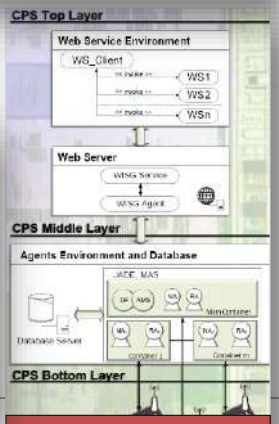
Overall Cloud-Fog-Edge Architecture



Blockchain application cases in the fight against COVID-19



Dependability Through Hardware Reconfiguration



CPS 3 Layers Based Architecture

Areas of expertise

Dependability. Security ►Development of intelligent techniques for dependability (availability, reliability, safety, security, integrity and maintainability), security (confidentially) 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 **a**bstractions, 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** ► Analyses, 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, etc.).

Team

Prof. Eng. Liviu MICLEA, PhD; Prof. Eng. Honoriu VĂLEAN, PhD; Prof. Eng. Silviu FOLEA, PhD; Assoc. Prof Eng. ENYEDI Szilard, PhD; Assoc. Prof. Eng. Ovidiu STAN, PhD; Lecturer Eng. Iulia ȘTEFAN, PhD; Lecturer Eng. Dan GOTA, PhD; Assist. Eng. Adela POP, PhD; Assist. Eng. Alexandra FANCA, PhD; Assist. Eng. Cosmina Corcheș, PhD; Assist. Eng. Marius MISAROȘ► **PhD students** Eng. Ionut Cătălin DONCA, Eng. Andrei-Mihai VĂDAN, Vlad BUCUR, Eng. Andrei SCURTU, Eng. Rareș COSTE, Tudor POP

Representative projects

The most representative projects in the last 10 years

► 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+) ►2018-2020 - **ROBIN – "Robots and Society: Cognitive Systems for Personal Robots and Autonomous Vehicles",** PCCDI2018 ►2014-2017 - **F2S, "SCADA Federation, Collaborative Instrument for Water Management – Somes River Pilot Application"**, National PN2-Partnerships project, http://193.226.5.107/f2s/pagina/, ►2013-2016 - "**Use of commercial drones for autonomous maintenance services in railways**", cooperation with Siemens company►2014-2015 **- "Cluj-Napoca: Next Generation Brained City - Software design for service monitoring at the level of the medical network, through innovative solution integration**", Sectoral Operational Programme "Increase of Economic Competitiveness" (POSCCE) project, http://clujit.ro/ro/#Next Generation Brained City, ►2013-2017 - **ProSEco, "Collaborative environment for design of AmI enhanced product-services integrating highly personalised innovative functions with minimal ecological footprint along life cycle and of their production processes based on collaborative environments"**, European FP7 project, http://cordis.europa.eu/projects/rcn/109191_en.html, ►2013-2014 - **CyCloSe, "Designing Cloud-based Self-healing Cyber-Physical Systems**", Ro–It Bilateral Cooperation with Politecnico di Torino.

Significant results

The most representative publications of the past 5 years

►A. Pop, A. Fanca, D. Gota, H. Valean, **Monitoring and Prediction of Indoor Air Quality for Enhanced Occupational Health**, Intelligent Automation & Soft Computing, Vol.35, No.1, pp. 925-940, 2023, DOI:10.32604/iasc.2023.025069, ISSN: 2326-005X, published june. 2022, **https://www.techscience. com/iasc/v35n1/48113** ►Donca, Ionut-Catalin, Ovidiu Petru Stan, Marius Misaros, Dan Gota, and Liviu Miclea. "**Method for Continuous Integration and Deployment Using a Pipeline Generator for Agile Software Projects**" Sensors 22, no. 12: 4637. https://doi.org/10.3390/s22124637 ►Alexandru G Berciu, Eva H Dulf, Iulia A Stefan, "**Flexible Augmented Reality-Based Health Solution for Medication Weight Establishment",** 2022, Processes, vol. 10, issue 2, page 219, Special Issue Empowering Pharma4.0: Continuous Monitoring and Optimization of Pharmaceutical Processes, ►A. Ciobotariu, D. Gota, A. Pop, O. Stan, A. Fanca, C. Domuta, H. Valean, L. Miclea. Demographic Attributes Classification via Convolutional Neural Networks: A Proposed Solution. Proc. of 2022 International Conference on Electrical, Computer and Energy Technologies (ICECET), 2022, Prague,pp. 1-6, Czech Republic, ISBN:978-1-6654-7087-2, DOI: 10.1109/ICECET55527.2022.9872818 ►Cosmina Corches, Mihai Daraban, Liviu Miclea, "**Availability of a RFID Object Identification System in IoT Environment**", Sensors, ISSN 1424-8220, special issue "Smart Sensors for Remotely Operated Robots", Vol 21, Issue 18, article number: 6226, DOI: 10.3390/s21186220, Published: SEP 2021, ►H. Patel, D.S. Rajput, O. P. Stan, L. C. Miclea, "**A New Fuzzy Adaptive Algorithm to Classify Imbalanced Data**", CMC-Computers, Materials & Continua, ISSN / eISSN: 1546-2218 / 1546-2226, Special Issue: Emerging Applications of Artificial Intelligence, Machine learning and Data Science, Vol.70, No.1, pp. 73-89, 2022, DOI:10.32604/cmc.2022. 017114, Accepted: APR 2021►Cristina Muresan, Isabela Birs *, Eva Dulf, Dana Copot, Liviu Miclea, "**A Review of Recent Advances in Fractional Order Sensing and Filtering Techniques**", Sensors, ISSN 1424-8220, special issue: "Fractional Sensor Fusion and its Applications", vol. 21, Issue 17, article number: 5920, doi: 10.3390/s21175920, published SEP 2021►Stan, O.P.; Enyedi, S.; Corches, C.; Flonta, S.; Stefan, I.; Gota, D.; Miclea, L. **Edge environment** Sensors 2021, 21, 4714. ►C. Corches, M. Daraban, O. Stan, Szilárd Enyedi, L. Miclea**, Interconnection of Systems with Cloud-Fog-Edge architectures: Concept and Challenges**, Control Engineering And Applied Informatics, vol 23, issue 1, pp.60-71, 2021►I. Ştefan, L. Miclea and H. Vălean, "**Towards Testing Considerations Of Experimental Decision Support System Design**," 2020 IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR), 2020, pp. 1-6, doi: 10.1109/ AQTR49680.2020.9129954, ►I. Muntean, G. D. Mois, S. C. Folea, "**Development and Analysis of a Low-Cost IoT Sensor for Urban Environmental Monitoring**", International Journal of Computers Communications & Control, Vol. 16, No. 5, doi:10.15837/ijccc.2021.5.4260, 2021.https://univagora.ro/jour/index.php/ijccc/article/view/4260►Gota, DI , Puscasiu, A, Fanca, A, Valean, H Miclea, L, **Human-Computer Interaction using hand gestures**, 2020 IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR), 2020,pp. 195-199, ►A. Scurtu, C. Dehelean, S. Enyedi and L. Miclea, "**Using Cognitive Services within CPS/SCADA Systems Federations - Concepts, Research Areas and Challenges**," 2020 IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR), Cluj-Napoca, Romania, 2020, pp. 1-4, doi: 10.1109/AQTR49680.2020.9129910►V. Bucur, O. Stan, L. Miclea, „**Data Loss Prevention and Data Protection in Cloud Environments based on Authentication Tokens**", 2019 22nd International Conference on Control Systems and Computer Science (CSCS), Bucharest, Romania May 28-30, 2019, pp. 720-725, DOI: 10.1109/CSCS. 2019.00128►O. Stan, L. Miclea, „**New Era for Technology in Healthcare Powered by GDPR and Blockchain**", 6th International Conference on Advancements of Medicine and Health Care through Technology (MediTech), Cluj Napoca, ROMANIA, OCT 17-20, 2018, Book Series: IFMBE Proceedings, Volume: 71, Pages: 311-317, ►Stefan, I.; Enyedi, Sz.; Scurtu, A.; et al., **Using the WaterML Standard Information Model, in a SCADA Federation Web Service**, Control Engineering And Applied Informatics Volume: 20, Issue: 1, Pages: 119-127, 2018►Bucur, V., Dehelean, C., Miclea, L., „**Object storage in the cloud and multi-cloud: State of the art and the research challenges**", 2018 IEEE International Conference on Automation, Quality and Testing, Robotics, AQTR 2018 - THETA 21st Edition, Proceedings, pp. 1-6 ► S. Enyedi, "**Electric cars — Challenges and trends,"** 2018 IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR), Cluj-Napoca, Romania, 2018, pp. 1-8, doi: 10.1109/AQTR. 2018.8402776. ►T. Sanislav, G. Mois, L. Miclea, "**An Approach to Model Dependability of Cyber-Physical Systems**", *Microprocessors and Microsystems*, vol. 41, pp. 67-76, March 2016, ISSN: 0141-9331, DOI: 10.1016/j.micpro.2015.11.021 ► S. Folea, G. Moiş, C. Muresan, L. Miclea, R. De Keyser, M. Cirstea, **A Portable Implementation on Industrial Devices of a Predictive Controller Using Graphical Programming**, IEEE Transactions on Industrial Informatics, April 2016, Q1 Automation & Control Systems)

Patents

► J. Figueras, L. Miclea, G. Moiş, "**Method for the dynamic voltage scaling in an arithmetic-logic unit based on on-line error detection**", no. OSIM: 130282/30.03.2018 ► L. Miclea, Szilard Enyedi, I. Stefan, O. Stan, I. Stoian, D. Capatina, O. Ghiran, M. Matreata, G. Bolos, R. Jucan, Z. Kope, A. Moldovan, "**Method of interoperability of data from SCADA-type systems through the constitution of a federated structure**", no. OSIM A/10061/2017.

The offer addressed to the economic environment

Research & development ►Abstractions definition, architectures design and tools implementation to achieve the development of highly dependable and secure CPSs; ►Expansion of artificial intelligence techniques in order to implement some modelling and control applications.
►Analysis, design, implementation and validation of dependable CPSs used in water resources management, electrical power generation and transport, cloud-fog-edge infrastructure; ►Analysis, design, implementation and validation of information systems applied in various fields; ►Application of artificial intelligence techniques in energy production, medicine, food quality control.

Consulting ►Consulting, research, design, development of dependable information systems and intelligent systems for industrial and scientific environment.

Applied engineering services ►Computer testing services ►Programming and software and hardware consultancy services ►Intelligent systems design and implementation services.

Training: Dependable basics: availability, reliability, safety, integrity and maintainability; ►**CPS basics:** hardware and software architecture, physical devices development and programming, decision support, historical databases design and management, historical data pre- and post-processing; ►**Software testing techniques**: functional testing, structural testing, use of software testing frameworks; ►**Artificial intelligence techniques:** intelligent agents, multi-agent systems, machine learning.

PROCESS AND ENERGY SYSTEMS ENGINEERING

Contact details

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Director	Prof. Dr. Eng. Vlad Mureșan
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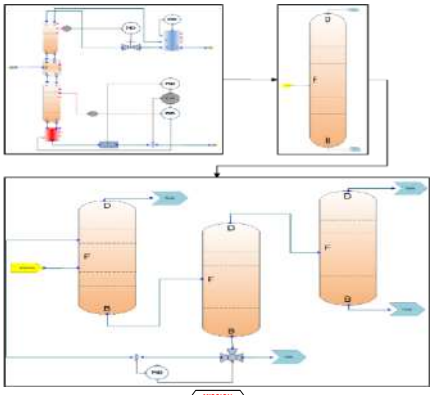
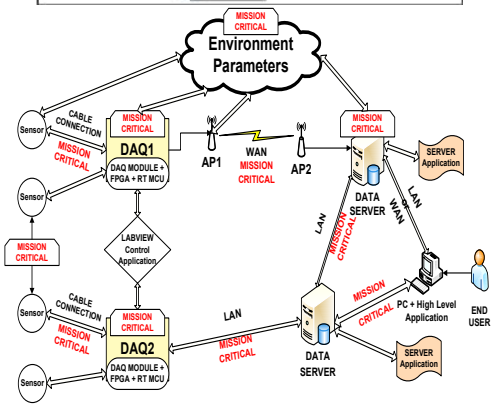




Areas of expertise

Process modelling and simulation: First principle modelling; Gray box modelling with partial derivative equations; Neural networks
Process control: Plantwide control, Control strategies for unconventional processes (e.g. cryogenic separation units, heavy water production); Development of control algorithms for processes with distributed parameters; System identification technologies, Dedicated control solutions for: rotary hearth furnaces, blunting systems, rolling mills, piercers and storage tanks, Intelligent control; Fractional-order control; Artificial intelligence applications
Energy systems: Renewable energy systems; Nuclear power plants; Laser, plasma and electron irradiation processes; Steam power plants
Medical systems: Pandemic dynamics; Respiratory system; Dental systems
Buildings automation: Energy efficiency and environmental parameters control (Certifications: SIEMENS: Synco 700 ACS Engineering; KNX; Security Systems)

Team

Prof. Dr. Eng. Mihail Abrudean, Prof. Dr. Eng. Tiberiu Coloși, Prof. Dr. Eng. Vlad Mureşan, Assoc. Prof. Dr. Eng. Ionuţ Muntean, Assoc. Prof. Dr. Eng. Iulia Clitan, Senior Lecturer Dr. Eng. Valentin Ioan Sita.

Representative projects

"Dynamics of SARS-CoV-2 virus transmission in Romania" - granted by UEFISCDI (no. 10Sol/2020). Project period: 2020 - 2021. The team structure: Coordinator: Technical University of Cluj-Napoca; P1 partner: "Alessandrescu-Rusescu" National Institute for Maternal and Child Health, Bucharest; P2 partner": Cluj-Napoca Infectious Diseases Clinical Hospital
"Embedded mode for advanced pressure control in protected spaces", PNIII-CI-2017
"Optimizing the length of steel bars according to the process of programming the production of tubular material and in relation to the production process in the steel works" internal project funded by TUCN (2016-2017)
"Stimulation of the return curve (metallographic process)", internal project funded by TUCN (2016-2017)
I3E, "Promoting Innovation in the Industrial Informatics and Embedded Systems Sectors through Networking", South East Europe Transnational Cooperation Programme (SEE), (2010-2012)
"Advanced metallurgical process control for the production of seamless steel tubes", BD-CNCSIS, (2008-2010)

Significant results

The most representative publications of the past 5 years:

1. Vlad Mureșan, Mihaela-Ligia Ungureșan, Mihail Abrudean, Honoriu Vălean, Iulia Clitan, Roxana Motorga, Emilian Ceuca, Marius Fișcă, "AI versus Classic Methods in Modelling Isotopic Separation Processes: Efficiency Comparison", Mathematics 2021, vol. 9, no. 23: 3088, pp. 1-31. https://doi.org/10.3390/math9233088.
2. Roxana Motorga, Vlad Mureșan, Mihaela-Ligia Ungureșan, Mihail Abrudean, Honoriu Vălean, Iulia Clitan. "Artificial Intelligence in Fractional-Order Systems Approximation with High Performances: Application in Modelling of an

Isotopic Separation Process", Mathematics 2022, 10, 1459, pp. 1-32. https://doi.org/10.3390/math10091459.
3. Tiberiu Coloşi, Mihail Abrudean, Mihaela Ungureşan, Vlad Mureşan, "Numerical simulation of distributed parameter processes", Editura SPRINGER, 2013, 363 pagini ISBN: 978-3-319-00013-8.
4. Mureşan V, Abrudean M, „Conducerea proceselor industriale , Editura Galaxia Gutenberg, Cluj-Napoca 2017, 181 pagini, ISBN 978-973-141-699-1.
5. Tiberiu Coloși, Iulia Clitan, Mihaela Ligia Ungureșan,Vlad Mureșan, Mihail Abrudean - Posibile extinderi ale matricei derivatelor partiale a vectorului de stare, asociate unor categorii de ecuatii cu derivate partiale, Editura Galaxia Gutenberg, 2020, 49 pag., ISBN 978-973-141-878-0.
6. Vlad Mureşan, Mihail Abrudean, Mihaela-Ligia Ungureşan, Iulia Clitan, Tiberiu Coloşi, "Inteligent temperature control in an industrial furnace", ICCAE conference, Sydney, Australia, 14-16 Februarue, 2020.
7. Vlad Mureşan, Iulia Clitan, Valentin Sita, Mihail Abrudean, Mihaela-Ligia Ungureşan, "^{18}O Isotope Separation Process Control", Lecture Notes in Electrical Engineering book series (LNEE, volume 613), 26 Octombrie 2019.
8. Vlad Mureşan, Mihail Abrudean, "Fault Tolerant Control System of the Rotary Hearth Furnace Servicing Machines", 2019 IEEE 22nd International Symposium on Design and Diagnostics of Electronic Circuits & Systems (DDECS), 24-26 Aprilie 2019, Cluj-Napoca, România.
9. Manescu Radu, Valentin Sita, "Heating efficiency with multiple boilers. Case study for single, two and three boiler operation", 20th International Conference on System Lista de lucrări – Sita Ioan Valentin 3 Theory, Control and Computing, 13 - 15 October 2016, Sinaia, Romania, pp. 79-83, ISBN 978-1-5090-2719-4.
10. Iulia Clitan, Vlad Mureșan, Mihail Abrudean, Zoltan Kovendi, Eugen Ioan Gergely, "Discrete Modeling and Control of an Industrial Robot used in a Metallurgical Process" 15th International Conference on Engineering of Modern Electric Systems (ICEMES 2019), 13-14 Iunie, 2019, Oradea, România.
11. Vlad Mureşan, Daniel Moga, Dorin Petreuş, Mihail Abrudean, Nicoleta Stroia, Rozica Moga "Fault Tolerant Control System for Photovoltaic Panels Application", 2019 IFAC Workshop on Control of Smart Grid and Renewable Energy Systems, 10-12 Iunie, 2019, Jeju, Coreea de Sud.
12. Iulia Clitan, Vlad Mureşan, Mihail Abrudean, Valentin Sita, "Discrete Model for the Movement of Industrial Manipulator Used in Hot Rolling Process", The 14-th edition of the Simulation, Modeling and Optimization in the Fields of Aerospace, Robotics, Manufacturing Systems, Mechanical Engineering, Power Energy, Materials Technology and Neurorehabilitation - SLS&OPTIROB 2019,27iunie-1 Iulie 2019, Jupiter, Constanța, România.
13. Iulia Clitan, Vlad Muresan, Mihail Abrudean, Andrei Florin Clitan, Honoriu Vălean, Mihaela Ligia Ungureşan, "Comparison of Continuous and Discrete PI Control on Clamp Positioning of an Industrial Robot", 2019 23rd International Conference on System Theory, Control and Computing (ICSTCC), 9-11 Oct. 2019, Sinaia, România.
14. Vlad Mureşan, Mihaela-Ligia Unguresan, Delia Gligor, Codruța Varodi, "Neural Modeling of Laviron Treatment for Coating of Electrodes with Mediator", COATINGS, Vol.: 9, Issue 7, 2019, Article: Number 429, ISSN: 2079-6412, DOI: 10.3390/coatings9070429, WOS:000478656200029.
15. Unguresan, Mihaela-Ligia; Muresan, Vlad; Gligor, Delia; et al., Adsorption process of phenothiazine solution in dimethyl sulfoxide on graphite electrodes Journal of Solid State Electrochemistry, Vol: 22, Issue: 8, Pages: 2305-2314.
16. Muresan, Vlad; Moga, Daniel; Petreus, Dorin; et al., Fault Detection and Fault Tolerance Mechanism for DC/DC Converters in Microgrids 10th IFAC Symposium on Control of Power and Energy Systems (CPES) Location: Meiji Univ, Tokyo, JAPAN Date: SEP 04-06, 2018 IFAC PAPERSONLINE, Volume: 51, Issue: 28, Pages: 666-671.

Significant solutions

First principle modelling library for distillation processes with non-ideal mixtures, Tuning algorithm for PID controllers for discrete-time systems with dead time, Gray box modelling platform, Control strategies for isotopic processes, Plantwide control strategies for distillation processes, Tuning algorithms for coupled PID controllers for performance improvement, Intelligent control solutions for industrial processes, Fractional-order control solutions for industrial processes, Methods for pandemic dynamics modelling, Control and implementation solutions for the buildings environmental parameters.

Products and technologies:

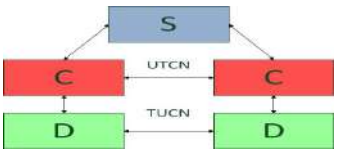
17. First principle modelling framework for distillation processes with non-ideal mixtures
18. General modelling and control framework using partial derivative equations
19. Robust PID tuning algorithm for discrete-time systems

The offer addressed to the economic environment

Research & development	Development of open- and closed-loop identification solutions. Development of tailored solutions for the modelling, simulation and control of chemical and energy systems. Development of general first principle modelling libraries/frameworks for chemical and energy systems. Development of general control strategies for the chemical and energy sector. Development of optimal control strategies for renewable energy systems. Development of models for biomedical applications. Development of buildings automation systems.
Consulting	System identification. Process modelling. Tuning of coupled controllers. Calculation of the economic potential of implementing advanced control strategies. Support for the implementation of our proposed technical solutions. Buildings autmation.
Training	**Systems theory:** identification methods, stability analysis, control loops, controllers. **Process control:** optimal control algorithms, plantwide control, PID tuning (discrete and continuous systems), control of unconventional processes, intelligent control, fractional-order control, buildings automation. **Electronics:** power and basic electronics.

DISTRIBUTED CONTROL SYSTEMS

Contact details

Name	**Distributed Control Systems**
Acronym	**DCS**
Logo	
Site	
Address	2, Observatorului St, room 310; 24, 26, Baritiu St., room G1, Cluj-Napoca, Romania
Faculty Department	**Faculty of Automation and Computer Science Automation Department**
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Fax	
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Areas of expertise

Distributed control systems, embedded systems, real-time application, intelligent control etc.

Team

Prof. Dr. Eng. Tiberiu S. Letia, Prof. Dr. Eng. Adina Aştilean, Assist. Prof. Dr. Eng. Camelia Avram, Assist. Prof. Dr. Eng. Mihai Hulea, Assist. Prof. Dr. Eng. Radu Miron, Assist. Dr. Eng. Dan Radu, Assist. Dr. Eng. Maria-Magdalena Santa, Assist. Dr. ing. Octavian Cuibus

Representative projects

"Intelligent control system of road traffic", research topic in the Postdoctoral project: Development and support of multidisciplinary postdoctoral programs in major technical areas of national strategy of Research - Development - Innovation" 4D-POSTDOC, contract no. POSDRU/89/1.5/S/52603, project co-funded by the European Social Fund through Sectorial Operational Program Human Resources Development 2007-2013, (2010-2013).
I3E, "Promoting Innovation in the Industrial Informatics and Embedded Systems Sectors through Networking", Contract EU: SEE/A/219/1.1/X, http://www.i3e.eu/ (2009-2012)
"Identification system based on digital fingerprint with mobile terminals", PNII-PDP (Joint Applied Research Project) 11038/2007, (2007-2010)
"Real-Time intelligent system for management, control and information of railway traffic", Grant Cod CNCSIS: 1537/2007, (2007-2009)

Significant results

The most representative publications of the past 5 years:

1. D. Al-Janabi, T.S. Letia. Analysis of Applications Conceived by Object Enhanced Time Petri Nets. IEEE Conf. ICSTCC, Sinaia, 2019
2. M. F. Enache, T.S. Letia. Approaching the Railway Traffic Resilience with Object Enhanced Time Petri Nets, . IEEE Conf. ICSTCC, Sinaia, 2019
3. Kilyen, Attila O.; Letia, Tiberiu S., Interactive development of cyber physical systems using UETPN model, Federated Conference on Computer Science and Information Systems (FedCSIS) Location: Poznan, POLAND Date: SEP 09-12, 2018, Book Series: Federated Conference on Computer Science and Information Systems Pages: 1035-1042 Published: 2018
4. Enache, Mihai F.; Al-Janabi, Dahlia; Letia, Tiberiu S., Railway Modeling with Object Enhanced Time Petri Nets

Conference: 21st IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR THETA) Location: Cluj Napoca, ROMANIA Date: MAY 24-26, 2018
5. Letia, T. S.; Kilyen, A. O., Using Unified Enhanced Time Petri Net Models for Cyber-Physical System Development Conference: 9th Vienna International Conference on Mathematical Modelling (MATHMOD) Location: Vienna, AUSTRIA IFAC PAPERSONLINE Volume: 51 Issue: 2 Pages: 248-253 Published: 2018
6. Radu, Dan; Cretu, Adrian; Parrein, Benoit; Avram Camelia, Astilean Adina et al., Flying Ad Hoc Network for Emergency Applications Connected to a Fog System ADVANCES IN INTERNET, DATA & WEB TECHNOLOGIES Book Series: Lecture Notes on Data Engineering and Communications Technologies Volume: 17 Pages: 675-686 Published: 2018
7. Avram, Camelia; Miron, Radu; Radu, Dan; et al., Two-phase authentication and encryption algorithm for mobile users 2018 IEEE INTERNATIONAL CONFERENCE ON AUTOMATION, QUALITY AND TESTING, ROBOTICS (AQTR) Book Series: IEEE International Conference on Automation Quality and Testing Robotics Published: 2018
8. Radu, Dan; Cretu, Adrian; Avram, Camelia; et al., Video Content Transmission in a Public Safety System Model based on Flying Ad-Hoc Networks 2018 IEEE INTERNATIONAL CONFERENCE ON AUTOMATION, QUALITY AND TESTING, ROBOTICS (AQTR) Book Series: IEEE International Conference on Automation Quality and Testing Robotics Published: 2018
9. Avram, Camelia; Astilean, Adina; Valente, Eduardo, Timed Cellular Automata-Based Tool for the Analysis of Urban Road Traffic Models MECHATRONICS FOR CULTURAL HERITAGE AND CIVIL ENGINEERING Book Series: Intelligent Systems Control and Automation Science and Engineering Volume: 92 Pages: 35-61 Published: 2018
10. Silva, Jose Reinaldo; Silva, Javier Martinez; Pereira, Celina; Avram Camelia et al., New Trends in Residential Automation MECHATRONICS FOR CULTURAL HERITAGE AND CIVIL ENGINEERING Book Series: Intelligent Systems Control and Automation Science and Engineering Volume: 92 Pages: 137-157 Published: 2018
11. Florian, Horatiu; Mocanu, Adrian; Vlasin, Cristian; Camelia Avram, Adina Astilean et al., Deaf people feeling music rhythm by using a sensing and actuating device SENSORS AND ACTUATORS A-PHYSICAL Volume: 267 Pages: 431-442 Published: NOV 1 2017
12. Letia, Tiberiu S.; Kilyen, Attila O., Unified Enhanced Time Petri Net Models for Development of the Reactive Applications Conference: 3rd International Conference on Event-Based Control, Communication and Signal Processing (EBCCSP) Location: Funchal, PORTUGAL Date: MAY 24-26, 2017

Significant solutions:
Control and monitoring system for urban vehicle traffic
Control and monitoring system for railway traffic
Control systems for Flexible Manufacturing Systems
Distributed control for hybrid processes.
Design, verification and implementation real-time (embedded) applications.
Person identification based on digital fingerprint.

The offer addressed to the economic environment

Research & development	Automatic synthesis of control and monitoring systems for discrete event or hybrid, concentrated or distributed processes. Verification of real-time applications.
Consulting	Embedded systems, real-time application design, implementation and verification. Distributed control systems for urban vehicle traffic or railway traffic.
Training	Design and implementation of real-time application, Design and implementation of distribute control application Distributed control of Transportation systems.

RAPID PROTOTYPING DESIGN IN CONTROL SYSTEMS

Contact details

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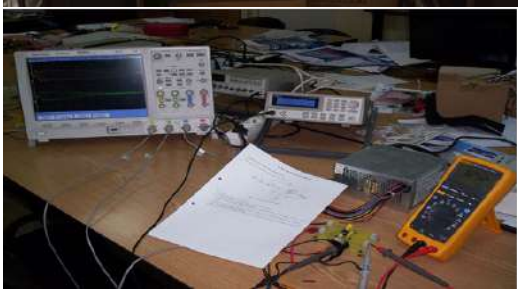

Areas of expertise

Digital Control of electrical drives for CNC machines.
Electrical drives for industrial robots.
Equipment Setup for building automation;
Embedded systems for intelligent environment.

Team

Prof. Dr. Eng. Petru Dobra, Assist. Drd. Eng. Mircea Şuşcă, Assist. Drd. Eng. Dora Laura Morar, Assist., Drd. Eng. Vlad Mihaly, Dr. Eng. Marius Costandin, Dr. Eng. Vasile Boancă

Representative projects

"The platform embedded for controlling a solar thermal cooling system suitable for small / medium scale cooling applications", 2014-2015, internal research project financed by TUCN
VISICOM, "Vision Bases Systems for Intelligent Control and Monitoring", CEEX NR.X2C21/18.07.2006
"Research on sensors technology and design algorithms for signal processing", Research Contract nr.22520/30.11.2005 UTC-N – MultiPRO Amsterdam, (2005-2006)
RADEPA, "Rapid development of prototyping for actuators systems", CNCSIS 1257/2005
"PLC equipment for fault detection and isolation in electrical drives and sensors systems", Research Grant CNCSIS tip E, nr. 108/2004
"H∞ techniques for fault detection and isolation in electrical drives and sensors systems", research grant CNCSIS AT 230/2001 & 48/2003

Significant results

The most representative publications of the past 5 years:

1. 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
2. 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
3. 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
4. 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

5. 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
6. 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
7. Mihaly, Vlad; Susca, Mircea; Morar, Dora; Dobra, Petru, Polytopic Robust Passivity Cascade Controller Design for Nonlinear Systems, 2022 EUROPEAN CONTROL CONFERENCE (ECC), European Control Conference (ECC), JUL 12-15, 2022, London, ENGLAND , 978-3-907144-07-7 2022 2105, 2110 WOS:000857432300292
8. Costandin, Marius, and Petru Dobra. "Polynomial trajectory generation and tracking for linear systems." International Journal of Control (2019): 1-10.
9. Mihaly, Vlad, Mircea Susca, and Petru Dobra. "Passivity-Based Controller for Nonideal DC-to-DC Boost Converter." 2019 22nd International Conference on Control Systems and Computer Science (CSCS). IEEE, 2019.
10. Fratean, Adrian; Dobra, Petru, Control strategies for decreasing energy costs and increasing self-consumption in nearly zero-energy buildings SUSTAINABLE CITIES AND SOCIETY Volume: 39 Pages: 459-475 Published: MAY 2018
11. Costandin, Marius; Costandin, Beniamin; Dobra, Petru, Nonlinear Model and Trajectory Control of A Novel VTOL Vehicle II Conference: INTERNATIONAL CONFERENCE ON UNMANNED AIRCRAFT SYSTEMS (ICUAS) Location: Dallas, TX Date: JUN 12-15, 2018 Book Series: International Conference on Unmanned Aircraft Systems Pages: 806-815 Published: 2018

Significant solutions:

Golden Medal, Innova, Brusselles, 2011, “Automatic system for the analysis of electrical energy quality”, Radu Munteanu, Petru Dobra, Daniel Moga, Radu Adrian, Munteanu,Mihai Stelian Munteanu,Mirela Truşcă, Dorin Petreuş,Valentin Sita

The offer addressed to the economic environment

Research & development	**Digital control system development for electrical drives with BLDC and PMSM motors** - implementation of EPLAN and Autocad Electrical projects; - ladder and C++ programming; - implementation of SCADA graphical interfaces; - control algorithms in Matlab, Labview; **Upgrade, replacement or retrofitting electrical drives for** - medium CNC machines - industrial robots with DC / Stepper / BLDC/ PMSM motors - configuring PLC’s (Siemens, Omron). **Equipment Setup for building automation;** - PLC based automation systems; - energy resources management; - using KNX and LOGO! Controllers.
Consulting	Microcontrollers/PLC/ FPGA programing environments, data acquisition procedures Programming in C, C++, PHP, Java, Matlab; Home Automation Configuring (KNX and LOGO! Controllers)
Training	Implementing Embedded Control Systems for: - electrical drives (DC motors, BLDC motors, PMSM motors) - inteligente sensors systems (temperature, humidity, pressure) - home automation (KNX and LOGO! Controllers)

INDUSTRIAL PROCESSES CONTROL SYSTEMS AND INSTRUMENTATION

Contact details

Name	**Industrial Processes Control Systems and Instrumentation**
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Telephone	+40-264-401 819
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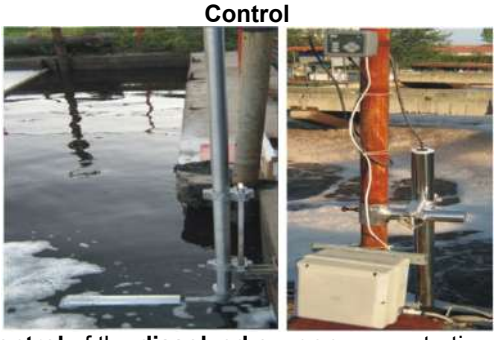
Director	Prof. Dr. Eng. Ioan Nascu
e-mail	ioan.nascu@aut.utcluj.ro

Wastewater Treatment Plant Monitoring and Control



Control of the **dissolved oxygen** concentration in a wastewater treatment plant

Areas of expertise

Industrial processes control systems.
Performance evaluation of industrial processes, design, implementation and analysis of automatic systems for the control of process parameters.
Advanced automatic control strategies: advanced control structures, advanced control algorithms.
Embeddedsystems-microcontrollers, data acquisition interfaces, industrial communications.

Team

Prof. Dr. Eng. Ioan Nascu, Sl.Dr. Eng. Ruben Crisan, Assist. Dr. Eng. Tudor Buzdugan, Sl. Dr. Eng. Gabriel Harja, Sl. Dr. Eng. Ioana Nascu, Assist. Dr. Eng.Isabela Birs, PhD students: Assist. Drd. Eng. Mihai Stanese, Drd. Eng. Bianca Toderean, Drd. Eng. Vasile Dan

Representative projects

ASCOS - Sistem avansat de supervizare si control pentru optimizarea functionarii statiilor de epurare ape uzate, PN-III-P2-2.1-PED-2021-1147**,** https://ascos.weebly.com/
SOMCEB - Development and validation of a multi-variable control system for the biological stage of wastewater treatment plants, PN-III-P2-2.1-CI-2018-1212, https://somceb.wixsite.com/proiect
SMEOPA -System for monitoring the efficiency and optimizing the aeration process for activated sludge wastewater treatment plants, PN-III-P2-2.1-CI-2017-0202, https://smeopa2.wixsite.com/proiect
CASEAU - "Strategii de conducere bazate pe tehnici de control avansat pentru optimizarea performantelor statiilor de epurare a apelor uzate si reducerea consumurilor energetice", PCCA 2013, Contract no. 274/2014, Caseau.wix.com/proiect
MULTIBAR, "Automatic modules for drinkable water using advanced oxidation processes and biofilter (multiple barriers)", PNII Innovation, 12DPST/20.08.2013, http://www.icpebn.ro/site_ro/cercetare/multibar/index.html (2013-2016)
TEHNOPUR, "Obtaining ultrapure water plant from primary sources", 2008-2010, INNOVATION Contract no. 177/2008, http://www.icpebn.ro/site_ro/cercetare/tehnopur/index.html (2008-2010)

Significant results

The most representative publications of the past 5 years:

1. Ioana Nașcu, D.Sebastia-Saez, Tao Chen, Ioan Nașcu, Wenli Du, Global sensitivity analysis for a perfusion bioreactor based on CFD modelling, Computers & Chemical Engineering, Vol. 163, July 2022, 107829, Impact Factor: 4.13
2. Isabela Birs, Cristina Muresan, Dana Copot, Ioan Nascu, Clara Ionescu, Event-based fractional order control, Journal of Advanced Research, Volume 25, September 2020, Pages 191-203, https://doi.org/10.1016/j.jare.2020.06.024
3. Isabela Birs, Cristina Muresan, Dana Copot, Ioan Nascu, Clara Ionescu, Identification For Control Of Suspended Objects In Non-Newtonian Fluids, Fractional Calculus and Applied Analysis, Volume 22, Number 5 (2020), ISSN(Print) 1311-0454, (Electronic)ISSN 1314-2224,

4. Isabela Roxana Birs, Cristina Muresan, Ioan Nascu, Clara Ionescu, A Survey of Recent Advances in Fractional Order Control for Time Delay Systems, IEEE Access PP(99):1-1, March 2019, DOI: 10.1109/ACCESS.2019.2902567
5. Dan V., Harja G., Nascu I., Advanced Rubik's Cube Algorithmic Solver, 2021 7th International Conference on Automation, Robotics and Applications (ICARA), 4-6 Feb. 2021 , Prague, DOI: 10.1109/ICARA51699.2021.9376564, Electronic ISBN:978-1-6654-0469-3
6. Covaci R., Harja G., Nascu I., Autonomous Maze Solving Robot, 2020 IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR), 21-23 May 2020, Cluj-Napoca, Romania, DOI: 10.1109/AQTR49680.2020.9129943
7. I Birs, CI Muresan, R Both, I Nascu, A real life implementation of fractional order event based PI control, 2020 IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR), 21-23 May 2020, Cluj-Napoca, Romania, DOI: 10.1109/AQTR49680.2020.9129933
8. Harja G., Nascu I., Advanced control for nitrogen removal of an intermittently operated ASWWTP, 2020 IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR), 21-23 May 2020, Cluj-Napoca, Romania, DOI: 10.1109/AQTR49680.2020.9129992
9. Mihai Stanese, Mircea Susca, Vlad Mihaly, Ioan Nascu, Design and Control of a Self-Balancing Robot, Automation, Quality and Testing, Robotics(AQTR), ISBN:978-1-7281-7166-1, IEEE,2020, https://ieeexplore.ieee.org/abstract/document/9129935
10. I Birs, CI Muresan, R Both, I Nascu, Fractional Order Internal Model Control Strategies for a Submerged Nanorobot, 2020 International SAUPEC/RobMech/PRASA Conference, DOI: 10.1109/SAUPEC/RobMech/PRASA 48453.2020.9040977
11. Birs, I; Muresan, C; Copot, D; Nascu, I; Ionescu, C: Design and Practical Implementation of a Fractional Order Proportional Integral Controller (FOPI) for a Poorly Damped Fractional Order Process with Time Delay, 2019 IEEE 7th International Conference On Control, Mechatronics And Automation (ICCMA 2019) Pages: 56-61 WOS:000543726100010
12. Ioana Nascu, Ioan Nascu, Wen-Li Du, Sai Gu, Predictive Control for Continuous Stirred Tank Reactors, 2019 International Conference on Informatics, Control and Robotics (ICICR 2019) ISBN:978-1-60595-633-6, DEStech Trans on Engineering and Technology Research, ISSN: 2475-885X, DOI 10.12783/dtetr/icicr2019/30554
13. Muresan C., Birs I., Prodan O., Nascu I., De Keyser R., Approximation Methods for FO-IMC Controllers for Time Delay Systems, 2nd International Conference on Electrical Engineering and Green Energy (CEEGE 2019), Rome, Italy, Edited by Bevrani, H.; E3S Web of Conferences, Volume 115, id.01003, DOI: 10.1051/e3sconf/201911501003
14. Harja G., Nascu I., Control of an Activated Sludge Wastewater Treatment Process based on a Calibrated and Modified BSM1 Model, 20th International Carpathian Control Conference, 26-29 May, 2019, Kraków - Wieliczka, Poland
15. Ioan Naşcu, Hierarchical predictive control of Wastewater Treatment Plants, MATEC Web of Conferences, Vol 210, art.no.02002 (2018)
16. Ioana Naşcu, Ioan Naşcu, Improving Activated Sludge Wastewater Treatment Process Efficiency Using Predictive Control, Advances in Technology Innovation(AITI), Vol.3 No.2 2018, pp 59-69, ISSN 2415-0436
17. Birs I., Muresan C., Nascu I., Folea S., Ionescu C., Experimental results of fractional order PI controller designed for second order plus dead time (SOPDT) processes, 2018 15th International Conference on Control, Automation, Robotics and Vision (ICARCV), IEEE, Electronic ISBN: 978-1-5386-9582-1
18. Ioana Naşcu, Ioan Naşcu, Multilevel predictive control system for an activated sludge wastewater treatment process, 5th Int.Conf. on Mathematics and Computers in Sciences and Industry- MCSI2018,Corfu Island, Greece, August 25-27, 2018
19. Crisan, Ruben; Harja, Gabriel; Nascu, Ioan; et al., Hierarchical Control System for Energy Savings in Wastewater Treatment Plant, 21st IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR THETA) Location: Cluj Napoca, ROMANIA Date: MAY 24-26, 2018 Book Series: IEEE International Conference on Automation Quality and Testing Robotics Published: 2018
20. Dragan, Paul; Stanese, Mihai; Nascu, Ioan, Camera-based liquid level measurement using the refractive properties of the medium, 21st IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR THETA) Location: Cluj Napoca, ROMANIA Date: MAY 24-26, 2018 Book Series: IEEE International Conference on Automation Quality and Testing Robotics Published: 2018

Patents:

"Parameters scheduling method for PID controllers", no. VI/112, September, 30, 2013

The offer addressed to the economic environment

Research & development	Modeling and simulation of processes with applications especially in chemical and biochemical processes. Advanced control strategies in biochemical processes. Advanced control strategies with applications in medicine.
Consulting	Evaluation and optimization of automatic control systems. Implementation of control systems using advanced control strategies
Training	Industrial process control systems. Complex industrial processes modeling and simulation. Sensors and instrumentation. PLC configuration and programming. Advanced control algorithms (model based predictive control, adaptive control).

ADVANCED SENSING TECHNOLOGIES GROUP

Contact details

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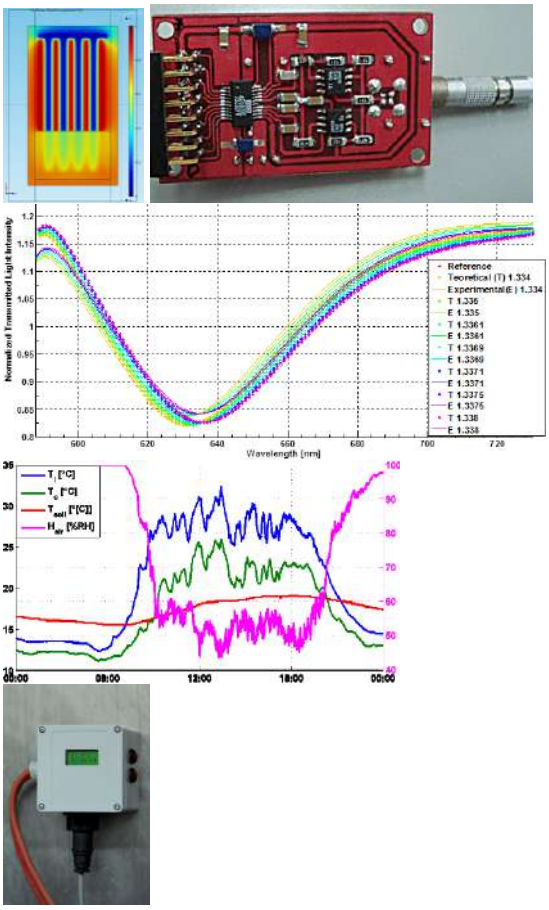
Director	Prof. Dr. Eng. Daniel Moga
e-mail	Daniel.Moga@aut.utcluj.ro



Areas of expertise

Smart sensors
-Simulation and design of optical sensors, MEMS based sensors, capacitive sensors, weather instruments
Wired and wireless sensor networks
-Ultra low power wireless sensors; Environmental monitoring with sensor networks; Multipoint wired networks
Hardware/software codesign for distributed control on embedded platforms
-Smart actuators; Fault tolerant control networks; Embedded servers and HMIs
Embedded hardware design for medical devices
- Innovative immunosensors; Monitoring in post-traumatic rehabilitation; Hyperthermic chemotherapy systems; Magnetic therapy equipment
Vision based monitoring and control
-Vision based automation systems for: quality control, automation in food industry, monitoring in agriculture

Team

Prof. Dr. Eng. Daniel Moga, Prof. Dr. Eng. Dorin Petreus, Prof. Dr. Mat. Mircea Ivan, Prof. Dr. Mat. Ion Gavrea, Prof.Dr. Ion Aurel Mironiuc, Dr. Corneliu Lungoci, Dr. Traian Oniu, Assoc. Prof. Dr. Eng. Mihai Stelian Munteanu, Assoc. Prof. Dr. Eng. Ramona Galatus, Assoc. Prof. Dr. Eng. Vlad Muresan, Assoc. Prof. Dr. Mat. Bogdan Gavrea, Assoc. Prof. Dr. Eng. Eugen Vitan, Dr. Mat. Rozica Moga, Dr. Eng. Iulia Clitan, Dr. Eng. Nicoleta Stroia, Phd. Student Eng. Zsolt Barabas

Representative projects

"Hypertermic Intra-Peritoneal Chemotherapy Equipment based on Cyber-Physical System Paradigm"
Project no. PN-II-RU-TE-357/01.10.2015, funded by the Romanian Ministry of Education and Research, UEFISCDI, (2015-2017), http://hiper-cps.hpm.ro/
HydroSens – "Integrated Smart Sensor System for Monitoring of Strategic Hydrotechnical Structures", PN-II-PT-PCCA-2011-nr.71, http://hydrosens.hpm.ro (2012-2016)
Algorithms and methods for optical signal processing (2011-2014)
Medical equipment for magnetic therapy with low frequency pulsed magnetic field - ATM41, PN2, 2012
Complex architecture for monitoring and transfer of medical data. CNCSIS 1019, (2008-2010)
Research on Test Compression and LBIST, Research contract UTCN-Philips Semiconductors, (2005-2008)
Vision based systems for monitoring and intelligent control, X2C21/ 18.07.06, (2006-2008)

Significant results

The most representative publications of the past 5 years:

1. Muresan, Vlad; Moga, Daniel; Petreus, Dorin; et al., Fault Detection and Fault Tolerance Mechanism for DC/DC Converters in Microgrids 10th IFAC Symposium on Control of Power and Energy Systems (CPES) Location: Meiji Univ, Nakano Campus, Tokyo, JAPAN Date: SEP 04-06, 2018 IFAC PAPERSONLINE Volume: 51 Issue: 28 Pages: 666-671 Published: 2018
2. Rusu, Cristian-Bogdan; Lungoci, Corneliu; Moga, Daniel; et al., Modelling a Temperature Calibration System for Medical Probes 21st International Conference on Control Systems and Computer Science (CSCS) Location: Univ Politehnica Bucharest, Bucharest, ROMANIA Date: MAY 29-31, 2017 Pages: 26-33 Published: 2017
3. D. Moga, D. Petreus, N. Stroia, „Web based solution for remote monitoring of an islanded microgrid", *The 42nd Annual Conference of IEEE Industrial Electronics Society (IEEE IECON 2016)*, Florence, Italy, pp. 125-130, 2016.
4. Moga, Daniel; Petreus, Dorin; Muresan, Vlad; et al., Optimal generation scheduling in islanded microgrids IFAC Workshop on Control of Transmission and Distribution Smart Grids (CTDSG) Location: Prague, CZECH REPUBLIC Date: OCT 11-13, 2016 Volume: 49 Issue: 27 Pages: 135-139 Published: 2016
5. Moga, Daniel; Petreus, Dorin; Stroia, Nicoleta, Web based solution for remote monitoring of an islanded microgrid PROCEEDINGS OF THE IECON 2016 - 42ND ANNUAL CONFERENCE OF THE IEEE INDUSTRIAL ELECTRONICS SOCIETY Book Series: IEEE Industrial Electronics Society Pages: 4258-4262 Published: 2016
6. C. Lungoci, D. Moga, V. Muresan, D. Petreus, N. Stroia, R. Moga, M. Munteanu, I. Raus, V. Muntean, A. I. Mironiuc."Hyperthermic Intraperitoneal Chemotherapy Approach Based on Cyber-Physical System Paradigm", *Journal of Control Engineering and Applied Informatics*, vol 17, no 3, pp. 50-59, 2015.
7. R. Etz, D. Petreus, T. Frentiu, T. Patarau, C. Orian, "An Indirect Method and Equipment for Temperature Monitoring and Control", *Advances in Electrical and Computer Engineering*, vol.15, no.4, pp.87-94, 2015, doi:10.4316/AECE.2015.04012
8. Juan A. Vallés and R. Gălătuş, "Requirements for gain/oscillation in Yb3+/Er3+-codoped microring resonators", *Proc. SPIE 9359, Optical Components and Materials XII, 93591R (March 16, 2015*); doi:10.1117/12.2078657; http://dx.doi.org/10.1117/12.2078657
9. C. Cristea, A. Florea, R. Galatus, E. Bodoki, R. Sandulescu, D. Moga, and D. Petreus, **"**Innovative immunosensors for early stage cancer diagnosis and therapy monitoring", in *The International Conference on Health Informatics (Y.-T. Zhang, ed.)*, vol. 42 of IFMBE Proceedings, pp. 47-50, 2014, *Springer International Publishing*.

Significant solutions:

Low cost hardware platforms for distributed sensing; Web based monitoring software for ARM platforms; Cross platform SCADA libraries; Ultra low power 8 bit embedded platform for wireless applications; Distributed control platform for building automation; Vision based mass and volume estimation for real time measurement of moving objects; CT medical image processing for computer assisted surgery

Products and technologies:

1.Distributed sensing and control platform (embedded and PC) with applications deployed in: industrial systems health monitoring, greenhouse automation, building automation
2. Smart communications hub for sensor networks, allowing data logging, processing, bridging, storing and streaming and html browser-based visualization for multiple wired/wireless sensing devices
4. Soil humidity sensors with wired/wireless interfaces
5. Weather sensors with Modbus interface
6. Condition monitoring systems for industrial machines and equipment
7. Internet based embedded platform for condition-based maintenance support
8. Vision-based equipment for high speed sorting in food industry
9. Integrated equipment for remote control and monitoring of greenhouse fields
10. Wireless system for monitoring and control of the progressive loading of lower limb in post-traumatic rehabilitation

Patents:

1. OSIM 123261 - **System for Monitoring the Progressive Loading of Lower Limb in Post-Traumatic Rehabilitation**, 2011
2. OSIM 122976 - **System and Process for Indirectly Measuring Mass of Objects in Motion**, 2010
3. OSIM 122986 - **Contactless Coupling Circuit**, 2010
4. OSIM 122380- **Method and Device for Measuring Rotational Speed in Highly Disturbing Media**, 2009
5. OSIM 123490 - **Wireless System for Remote Tilt Measurement**, 2012

The offer addressed to companies

Research & development	Development of analytical and numerical models for sensor devices. Identification and calibration of measurement system models. Development of algorithms for sensor fault identification and isolation in control networks. Optimization of advanced digital signal processing algorithms for embedded platforms. Development of real-time measurement systems for vision based inspection and sorting. Development of real-time medical signal processing libraries.
Consulting	Consulting, design, research and prototyping in advanced sensing systems for remote monitoring Custom integrated hardware and software solutions for specific distributed control application Simulation and design of smart sensor for medical applications

WIRELESS SENSOR APPLICATIONS

Contact details

Name	**Wireless Sensor Applications**
Acronym	**WS-App**
Logo	WS-App
Site	http://users.utcluj.ro/~sfolea/ https://eeris.eu/ERIF-2000-000W-0867
Address	Observator St., No. 2, 3rd Floor, Room 301, 400489
Faculty Department	**Faculty of Automation and Computer Science** **Department of Automation**
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Director	Prof. Dr. Eng. Silviu Folea
e-mail	silviu.folea@aut.utcluj.ro

Areas of expertise

Embedded systems design: The design and development of embedded systems based on microcontrollers, having sensor measurement and wireless transmission capabilities (Wi-Fi, BLE or LoRa).
Power harvesting: The evaluation of energy harvesting mechanisms which provide energy autonomy for prolonged periods of time and offer the advantage of miniaturization.
IoT applications implementation: The development of IoT software applications for environment monitoring (i.e., air quality) and power consumption evaluation.
Process monitoring and testing: The development of monitoring and testing systems on industrial real-time platforms including FPGA chips based on LabVIEW™ graphical programming.

Team

Prof. Dr. Eng. Silviu Folea, Asoc. Prof. Dr. Eng. George Moiș, Assist. Prof. Dr. Eng. Teodora Sanislav, PhD Student Eng. Ionuţ Dobra, PhD Student Eng. Vlăduţ Dobra, PhD Student Eng. Muscan Andreea.

Representative projects

"Thermal printer, Bluetooth low energy and microSD data logger", Contract no. 65CI/2017, PN III (2017).
"Evaluation of Power Harvesting Elements in Wireless Sensors", Contract no. 1998/12.07.2017, TUCN internal grant.
"Sub 1 GHz ISA100 technology for low cost and low power consumption embedded systems", TETRACOM – 3rd Call for TTP Proposals (FP7), Partial Funding for Academia-Industry Technology Transfer Projects in Computing Systems, Technology Transfer in Computing Systems, no. 609491/2016.
"Power Harvesting Ambient Beacon for the IoT", Accenture Industrial Software Solutions (AISS), Grant - Industrial Internet of Things (IIoT), no. 8678/2016.
"WAIST: Wireless Applications for Satellite Assembly Integration and Testing Applications", nr. 4000108133, Control Data Systems SRL (CDS) and Thales Alenia Space France (TAS-F), contract with European Space Agency (ESA) no. AO7169, (2015-2016).

Significant results

The most representative publications of the past 5 years:

1. T. V. Sântejudean, G. Dan Mois, T. Sanislav and S. C. Folea, "Edge Computing in Wireless Sensing Applications," *2022 11th Mediterranean Conference on Embedded Computing (MECO)*, 2022, pp. 1-4, doi: 10.1109/MECO55406.2022.9797161.
2. G. D. Mois, T. Sanislav and S. Folea, "An Internet of Things-Enabled Sound Level Meter Using Off-the-Shelf Components," *2022 IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR)*, 2022, pp. 1-4, doi: 10.1109/AQTR55203.2022.9802013.
3. I. Muntean; G.D. Mois; S.C. Folea, "Development and Analysis of a Low-Cost IoT Sensor for Urban Environmental Monitoring", *International Journal of Computers, Communications & Control*, Oct2021, Vol. 16 Issue 5, p1-14. 14p.

4. T. Sanislav, G. D. Mois, S. Zeadally and S. C. Folea, "Energy Harvesting Techniques for Internet of Things (IoT)," in *IEEE Access*, vol. 9, pp. 39530-39549, 2021, doi: 10.1109/ACCESS.2021.3064066.
5. G. Moiş, H. Hedeşiu, S. Folea (2020), "*Digital Design Laboratory using LabVIEW*", Mediamira, Cluj-Napoca, ISBN 978-973-713-353-3.
6. T. Santejudean, S. Folea and G. Mois, "Analysis of Low-Power Operation for an Environmental Monitoring Beacon," *2020 IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR)*, 2020, pp. 1-5, doi: 10.1109/AQTR49680.2020.9129917.
7. R. Miron, M. Hulea and S. Folea, "Food Allergens Monitoring System Backed-up by Blockchain Technology," *2020 IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR)*, 2020, pp. 1-4, doi: 10.1109/AQTR49680.2020.9130006.
8. S.C. Folea, G.D. Mois, "Lessons Learned from the Development of Wireless Environmental Sensors," in *IEEE Transactions on Instrumentation and Measurement*, vol. , pp. 1-1, DOI: 10.1109/TIM.2019.2938137, 28 Aug 2019.
9. T. Sanislav, S. Zeadally, G.D. Mois, S.C. Folea, "Wireless energy harvesting: Empirical results and practical considerations for Internet of Things," in *Journal of Network and Computer Applications*, vol. 121, pp. 149-158, ISSN 1084-8045, https://doi.org/10.1016/j.jnca.2018.08.002, 2018.
10. G.D. Mois, T. Sanislav, S.C. Folea, S. Zeadally, "Performance Evaluation of Energy-Autonomous Sensors Using Power-Harvesting Beacons for Environmental Monitoring in Internet of Things (IoT)," *Sensors*, Vol. 18, Issue: 6, Article Number: 1709, doi:10.3390/s18061709, http://www.mdpi.com/1424-8220/18/6/1709.
11. G. Mois, S. C. Folea and T. Sanislav, "Analysis of Three IoT-Based Wireless Sensors for Environmental Monitoring," in *IEEE Transactions on Instrumentation and Measurement*, vol. 66, Issue: 8, Pages: 2056-2064, Aug 2017.

Significant solutions:
IoT devices with energy harvesting capabilities for environment monitoring.
Wireless sensors based on Wi-Fi Low Power, BLE (Bluetooth Low Energy) or LoRA.

Products and technologies:
Electronic equipment design, dedicated solutions. Hardware and software implementation.

Patents:
1. A. Aştilean, T. Leţia, S. Folea, C. Avram, M. Hulea, R. Miron, E. Ciupan, „*Secured System and Method of Communication Between Fixed and Mobile Devices*", Brevet RO 127706 A2, nr. UTC-N 1000003415.
2. M. Ghercioiu, H. Hedesiu, S. Folea, G. Crisan, C. Ceteras, I. Monoses, "*Compact modular embedded device*", United States Patent 7860582B2, 12/28/2010
3. M. Ghercioiu, H. Hedesiu, S. Folea, G. Crisan, C. Ceteras, I. Monoses, "*Deployment and execution of a graphical program on an embedded device from a PDA*", United States Patent 7647562B2, 01/12/2010

The offer addressed to the economic environment

Research & development	The development of hardware equipment and of software products for new structures of data acquisition and communication. The testing of hardware equipment and of software products developed for data acquisition, wireless communication, and power harvesting. The development and testing of measurement systems and their implementation on industrial equipment for the evaluation of operating conditions and power consumption.
Consulting	Consulting activities for the development of IoT solutions.
Training	LabVIEW™ courses and introduction to digital design using LabVIEW™, Multisim, and VHDL. Electronic equipment design. Firmware development. IoT software applications implementation. Embedded systems testing and evaluation.

ADVANCED PROCESS CONTROL METHODS

Contact details

Name	**Advanced Process Control Methods**
Acronym	**ADAPTED**
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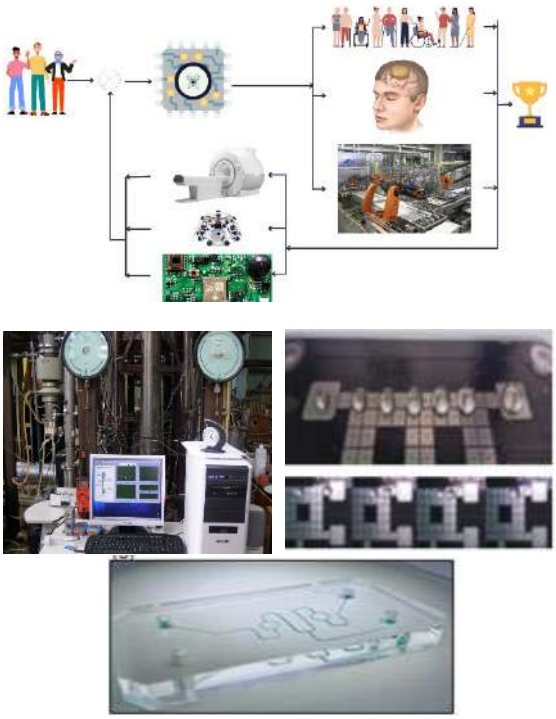
Director	Prof. Habil. Eng. Eva H. Dulf, PhD
e-mail	Eva.Dulf@aut.utcluj.ro



Areas of expertise

Complex process modelling and simulation
- Detailed models and simulations of various industrial, biotechnological and medical processes
- Modelling and simulation for personalized medicine

Tuning, design and testing of various control solutions including advanced control algorithms such as predictive, fractional, fault tolerant or robust control
- Conceptual design of various control loops from classical PID to advanced control algorithms
- Control strategy implementation
- Control optimization

Particular advanced monitoring, supervising and control methods for non-conventional processes and technologies
- Conceiving of new, efficient technologies in nonconventional processes
- Modelling, monitoring and control of biochemical and biomedical processes
- Improved efficiency based on optimization; process maintenance
- Engineering in diagnosis and personalized medicine

Team

Prof. Habil. Eng. Eva H. Dulf, PhD; Prof. Eng. Clement Festila, PhD; Assoc. Prof. Eng. Cristina I. Muresan, PhD; Assoc. Prof. Eng. Roxana Rusu-Both, PhD; Lect.Eng. Ioana Nascu, PhD; As. Eng. Izabela Birs, PhD
PhD students: MSc.Eng. Daniel D. Timis, MSc Eng. Ciprian Vogt, MSc Eng. Toader Seretan, MSc Eng. Alex Danku, Msc.Eng. Andrei Kovari, MSc Eng. Andrei Tulbure, MSc Eng. Karoly Lengyel, MSc Eng. Noemi Lorenzovici, MSc Eng. Elisabeta Kozma
Master students: Eng. Alexandru Berciu, Eng. Marcian Mihai, Eng. Erwin Hegedus, Eng. Dragos Craciun, Eng. Andreea Ceoca, Eng. Dan Bulgar; Eng. Oana Margin, Eng. Margareta Sangeorzan

Representative projects

Nanovaccinal Approaches for Colon Cancer, PN-III-P2-2.1-PED-2019-0844 (2020-2022), https://nanovacol.wixsite.com/home
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://tircitogen.wixsite.com/home
Solid-State Bioprocess Development and Optimization for the Sustainable Production of Powerful Antioxidants from Grape Pomace using Filamentous Fungi, PN-III-P2-2.1-PED-2019-1660 (2020-2022), https://bioantox2020.wixsite.com/home
Novel Fractional Order Autotuners for Poorly Damped Systems to Ensure Improved Safety and Comfort, PN-III-P1-1.1-TE-2019-0745 (2019-2021), http://cristina-muresan.com/research/te1432020

A sedation patient simulator for patient-individualised optimal drug dosing in general anaesthesia, PN-III-P2-2.1-PED-2019-0322 (2019-2021), http://cristina-muresan.com/research/552ped2019/
SWEETCONOMY - Functional collaboration model between public research organizations and the economic environment for the provision of high-level scientific and technological services in the field of bio-economy, PNIII-P1-1.2 PCCDI 2018, (2018-2020) https://sweetconomy.com
Robust fractional order event-based control for optimised resource allocation in complex cyber-physical closed loop systems, PN-III-P1-1.1-TE-2016-1396 (2018-2020), http://cristina-muresan.com/research/te652018/

Significant results

The most representative publications of the past 5 years:

1. 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
2. Stoleru CA, Dulf E.H.*, Ciobanu L. (2022) Automated detection of celiac disease using Machine Learning Algorithms, *Scientific Reports* 12 (1), 1-19
3. Tulbure, A. A., Tulbure, A. A., & Dulf, E. H.* (2022). A review on modern defect detection models using DCNNs–Deep convolutional neural networks. *Journal of Advanced Research, 35, 33-48*
4. Dulf, E. H., Bledea, M., Mocan, T., & Mocan, L. (2021). Automatic Detection of Colorectal Polyps Using Transfer Learning. *Sensors*, *21*(17), 5704.
5. Lorenzovici, N., Dulf, E. H*., Mocan, T., & Mocan, L. (2021). Artificial Intelligence in Colorectal Cancer Diagnosis Using Clinical Data: Non-Invasive Approach. *Diagnostics*, *11*(3), 514.
6. Dulf, E. H., Saila, M., Muresan, C. I., & Miclea, L. C. (2020). An Efficient Design and Implementation of a Quadrotor Unmanned Aerial Vehicle Using Quaternion-Based Estimator. *Mathematics*, *8*(10), 1829.
7. Muresan, C. I., Birs, I. R., & Dulf, E. H.* (2020). Event-Based Implementation of Fractional Order IMC Controllers for Simple FOPDT Processes. *Mathematics*, *8*(8), 1378.
8. Ionescu, C. M., Dulf, E. H., Ghita, M., & Muresan, C. I. (2020). Robust controller design: Recent emerging concepts for control of mechatronic systems. *Journal of the Franklin Institute*, *357*(12), 7818-7844.
9. Dulf, E. H., Vodnar, D. C., Danku, A., Muresan, C. I., & Crisan, O. (2020). Fractional-order models for biochemical processes. *Fractal and Fractional*, *4*(2), 12.
10. Dulf, E. H., & Festila, C. (2020). Sensors for Cryogenic Isotope-Separation Column. *Sensors*, *20*(14), 3890.

Significant solutions:
Monitoring, modelling and control of isotope separation processes and separation cascade
Fractional order control strategies for time delay and MIMO processes
Modelling and control of physiological systems

Products and technologies:

1. Mathematical models of complex chemical and biochemical processes
2. Special transducer for cryogenic liquid nitrogen level in the condenser of an isotope separation column
3. Special transducer for carbon monoxide level in the boiler of an isotope separation column
4. Monitoring system for ^{13}C cryogenic isotope separation column
5. Advanced control strategies for ^{13}C cryogenic isotope separation column and a separation cascade
6. Frequency analyzer based on a direct, simplified algorithm

Patents:

1. R.A. Munteanu, E.H. Dulf, C. Festila, R. Munteanu, G. Todoran, “Analogue electronic transducer for measuring power in direct current circuits, RO-128666/2018
2. Experimental unit for studying the fractional order characteristics of non-Newtonian fluids, Romanian patent proposal no. A00389/31.05.2018
3. Process for tuning fractional controllers for multivariable processes with deadtimes, , RO132450-A2/2016
4. Wind turbine, RO133354-A2/2017
5. Procedure for detection and diagnosis of intrathoracic pulmonary tumours based on ultrasound image analysis, Patent proposal A01040/04.12.2018

The offer addressed to the economic environment

Research & development	Identifying fundamental principles and methodologies that enable systems to exhibit intelligent, goal-oriented behaviour, and developing innovative instruments to monitor, manipulate, and control systems Tuning, design and testing of various control solutions using advanced control algorithms, such as predictive, fractional or robust control Modelling biochemical and biomedical processes
Consulting	Consulting in simulation, design, implementation and maintenance of control systems for multiple industrial field; Consulting in structural and nonlinear modelling of complex processes Consulting in process management using different simulation environment
Training	Complex process modelling and simulation Tuning, design and testing of various control solutions including advanced control algorithms such as predictive, fractional or robust control Biomedical engineering

ROBOTICS AND NONLINEAR CONTROL

Contact details

Name	**Robotics and Nonlinear Control**
Acronym	**ROCON**
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Site	http://rocon.utcluj.ro/
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Faculty Department	Faculty of Automation and Computer Science Department of Automation
Telephone	+40 264 20 2578
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Director	Prof. Dr. Eng. Lucian Busoniu
E-mail	Lucian.Busoniu@aut.utcluj.ro

Areas of expertise

Our group works on **Ro**botics and Nonlinear **Con**trol (ROCON) at the Department of Automation of the Technical University of Cluj-Napoca. Our research interests range from mobile robotics and robot modeling, to fundamental nonlinear control and estimation using methods from computational and artificial intelligence. These two major directions are connected via applications of nonlinear control to robotics.

Team

Professors: Lucian Busoniu, group lead; Zsofia Lendek; Gheorghe Lazea, honorary member
Associate Professors: Levente Tamas
Assistant Professors: Alexandru Codrean, Cosmin Marcu, Tassos Natsakis
PhD and long-term research students: Bilal Yousuf, Matthias Rosynski, Benjamin Kelenyi, Alexandru Pop, Ioana Lal, Florin Gogianu, Amalia Matyas, Zoltan Nagy, Molnar Szilard, Marian Pop, Mihalis Maer, Ioana Ulici, Bogdan Lazar, Tudor Santejudean, Stefan Ungur, Boglarka Suto
Technician: Adrian Lucaci

Representative projects (selection of 5 recent projects)

SeaClear2.0: Scalable Full-Cycle Marine Litter Remediation in the Mediterranean: Robotic and Participatory Solutions, Horizon Europe Innovation Action, 2023-2026, PI Lucian Busoniu. See also SeaClear1.0, at https://seaclear-project.eu/.

VinEye: cartografierea colaborativă a viilor cu roboți autonomi, PED grant, 2022-2024, PI Levente Tamas, http://rocon.utcluj.ro/~levente/?page_id=568

Control design for optimal estimation using heterogeneous sensors (HEROES), Young Teams grant, 2021-2022, PI Zsofia Lendek, http://lendek.net/TE185/

Targeted Robotic UppEr-arm REHABilitation (TRUE-REHAB). Young Teams Grant, 2020-2022, PI Tassos Natsakis, http://rocon.utcluj.ro/true-rehab

Significant results

Selection of 5 representative publications in the past 5 years

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

Z. Nagy, Zs. Lendek, L. Busoniu, *TS fuzzy observer-based controller design for a class of discrete-time nonlinear systems*. IEEE Transactions on Fuzzy Systems, 2022.

Frohlich R, Tamas L, Kato Z. 2019. *Absolute Pose Estimation of Central Cameras Using Planar Regions*. IEEE Transactions on Pattern Analysis and Machine Intelligence.

Boey H, Verfaillie S, Natsakis T, Sloten J Vander, Jonkers I. 2019. *Augmented Ligament Reconstruction Partially*

Restores Hindfoot and Midfoot Kinematics After Lateral Ligament Ruptures. Am J Sports Med.

Zs. Lendek, Z. Nagy, J. Lauber, *Local stabilization of discrete-time TS descriptor systems.* Engineering Applications of Artificial Intelligence, vol. 67, pages 409-418, 2018.

Patents:
Automatic Obstacle Detection and Breaking System for Cars, L. Tamas, Gh. Lazea, no A10006/16.02.2011.
Metodă De Vizualizare A Traseului Unui Vehicul Autonom Folosind Realitatea Augmentata, C. Militaru, L. Tamas, L. Tofalvi, request no. A/000368/2018, patent no. 133736.
System and method for mitigating errors occurring in data processing units implemented with digital circuits, O. Amaricai-Boncalo, A. Amaricai-Boncalo Zs. Lendek, request no. A/00838/2019.

What we offer to the economic environment

Research & development	Signal processing Control algorithms Monitoring and estimation Artificial intelligence and machine learning. Mobile robotics and robotic manipulation Advanced system control and monitoring Embedded software design
Consulting	Control system design and development Monitoring system design and development Robotic system design & engineering 2D and 3D mapping and surveys
Applied engineering services	Process and control engineering Robotics related services Process equipment related services
Training	Control and monitoring System identification Optimization and optimal control Computer integrated manufacturing Process equipment Industrial robotics Mobile vehicles

CENTER OF SCIENTIFIC RESEARCH OF ENVIRONMENT, FOOD AND HEALTH SAFETY- CCESMAS

PHYSICAL-CHEMICAL ANALYSIS

Contact details

Name	**Center of Scientific Research of Environment, Food and Health Safety- Physical-Chemical Analysis**
Acronym	**CCESMAS-Phys-Chem**
Logo	
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Telephone	+40 0262 276059
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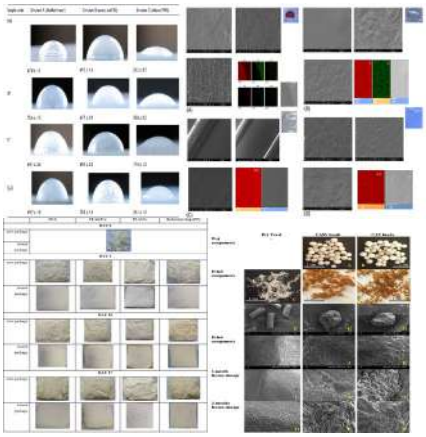
Director	Prof. Dr. Eng. Anca Mihaly Cozmuta
e-mail	ancamihalycozmuta@gmail.com



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 also the mining water wastes)
Science of material: • Nanomaterials based on titania, silica and noble metals: preparation, characterization and applications in depollution, recovery of metals, self cleaning, food preservation, etc...
Chemometry: • Statistically processing the experimental data; • Mathematical modelling of experimental data

Team

Prof. Dr. Eng. Anca Mihaly Cozmuta (coordinator), Associate Prof. Dr. Camelia Nicula, Associate Prof. Dr. Anca Peter, Associate Prof. Dr. Eng. Leonard Mihaly Cozmuta

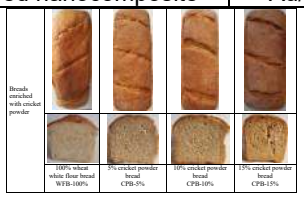
Representative projects

FOODCHAIN4EUROPE - HIGH QUALITY FOOD CHAIN 4 EUROPE – INTERREG IV (2017-2022)
GRAFOOD – "Active GRAphene based FOOD packaging systems for a modern society", PNIII-P3-3.2 COFUND-M-ERA.NET II-GRAFOOD, (2017-2020)
STRUCTural and PHOtochemical investigations of a nanosized composite as active component of paper based PACKage designed for food applications (STRUCT-PHO-PACK) – Romania-Russia bilateral projects; 2017-2018. 4517-3-16/18; 01-3-1115-2014/2018
SMARTPACK-"Smart functions of packages containing nano-structured materials in food preservation", (2012-2015)
DAC, **"Analysis and physically-chemically characterization of liquid and solid samples"**, (2012-2014)
RIVAM, **"Rehabilitation of tailings ponds by application ofd amendments and cultivation of vegetal species with high adaptability to the heavy metals"**, http://chimie-biologie.ubm.ro/RIVAM/ (2008-2011)
BIOMEG, **"Bioaccumulation of heavy metals in soil-vegetables-human chain"**, http://chimie-biologie.ubm.ro/biomeg/index.html (2008-2011)
SIG, **"Designing the hazards charts and environment assessment in mining areas of Maramures and Satu Mare counties using GIS"**, (2005-2008)
ZEMIP, **"Developing of a biophysical system based on zeolites-microorganisms-vegetal species for ecoremediation of tailing ponds coming from gold-silver preparation industry"**, http://chimie-biologie.ubm.ro/zemip/ (2009-2011)

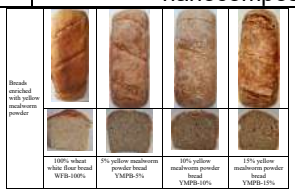
Significant results

Active packages for food industry

Polypropilene flask modified with Ag/TiO_2-based nanocomposite	Polypropylene flask modified with Au/TiO_2 – based nanocomposite	Paper sheet modified with Ag/TiO_2 nanocomposite



Bread fortified with cricket powder



Bread fortified with yellow mealworm powder

The most representative publications of the past 5 years

1. A. Mihaly Cozmuta, C. Nicula, A. Peter, L. Mihaly Cozmuta, A. Nartea, A. Kuhalskaya, D. Pacetti, S. Silvi, D. Fiorini, L. Pruteanu (2022). Cricket and yellow mealworm powders promote higher bioaccessible fractions of mineral elements in functional bread. Journal of Functional Foods 99 (2022) 105310
2. L. Mihaly Cozmuta, C. Nicula, A. Peter, R. Apjok, A. Jastrzębska, A. Mihaly Cozmuta (2022). Insights into the fermentation process of fresh and frozen dough bread made with alginate-immobilized *S. cerevisiae* yeast cells. Journal of Cereal Science 107 (2022) 103516
3. A. Peter, L. Mihaly Cozmuta, C. Nicula, A. Mihaly Cozmuta, G. Drazic, A. Peñas, F. Kamgang Nzekoue, X. Huang, G. Sagratini, S. Silvi (2022). Storage of chicken breast meat in paper coated with different types of hydrophobic agents. Packaging Technology and Science. https://do2i.org/10.1002/pts.2694
4. A. Peter, L. Mihaly Cozmuta, C. Nicula, A. Mihaly Cozmuta, R. Apjok, C. M Talasman, G. Drazic, A. Peñas, A.J Calahorro, F. Kamgang Nzekoue, X. Huang, G Sagratini, S. Silvi (2022). Barrier properties, migration into the food simulants and antimicrobial activity of paper-based materials with functionalized surface, Polymers and polymer composites, 30, 1-12.
5. A. Mihaly Cozmuta, A. Jastrzębska, R. Apjok, M. Petrus, L. Mihaly Cozmuta, A. Peter, C. Nicula. Immobilization of baker's yeast in the alginate-based hydrogels to impart sensorial characteristics to frozen dough bread. Food Bioscience 42 (2021) 101143
6. A Peter, L Mihaly Cozmuta, C Nicula, A Mihaly Cozmuta, R Apjok, CM Talasman, G Drazic, A Penas, AJ Calahorro, F Kamgang Nzekoue, X Huang, G Sagratini, S Silvi. Morpho-structural and chemical characterization of paper based materials with functionalized surface, Materials Chemistry and Physics 267 (2021) 124693
7.Anca Peter, Leonard Mihaly Cozmuta, Camelia Nicula, Anca Mihaly Cozmuta, Catalina Mihaela Talasman, Goran Drazic, Antonio Pe˜nas, Antonio Jesús Calahorro, Gianni Sagratini, Stefania Silvi. Chemical and organoleptic changes of curd cheese stored in new and reused active packaging systems made of Ag-graphene-TiO2-PLA. Food Chemistry 363 (2021) 130341.
8.Anca Peter, Leonard Mihaly Cozmuta, Camelia Nicula, Anca Mihaly Cozmuta, Catalina Mihaela Talasman, Goran Drazic, Marjan Bele, Alen Vizintin, Elena Tchernychova, Antonio Peñas, Antonio Jesús Calahorro, Gianni Sagratini, Stefania Silvi, Modifying the silver-titania nanocomposites with carbonaceous materials to remove the pollutants from domestic waste water, Journal of Nanoscience and Nanotechnology, 2021, doi:10.1166/jnn.2020.18960.
9.A. Mihaly Cozmuta , A. Peter, L. Mihaly Cozmuta, C. Nicula, R. Apjok, G. Drazic, F. Kamgang Nzekoue, X. Huang, S. Silvi, G. Sagratini, A. Peñas, A. J. Calahorro, M. Cano-Galey, O. Hodek - Impact of packaging properties on the physical-chemical-microbiological-sensory characteristics of Ricotta cheese during storage, Packaging Technology and Science, 33 (1), 27-37, 2020, doi: 10.1002/pts.2482

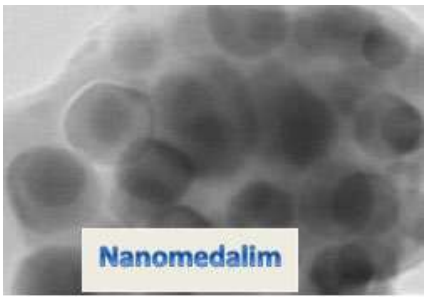
Patent:
Methods to obtain intelligent packages containing nano-structured materials used in fod preservation -European patent, filing No. 1023377/ 28.08.2015

The offer addressed to the economic environment

Research & development	Pollution monitoring; and rehabilitation of polluted areas; Physical-chemical control and expertise of food; Food packaging; Functional foods; Nanomaterials: preparation, characterization, application; Recovery of valuable metals (Au, Ag, Cu) from wastes; Waste waters treatment;
Consulting	Technologies for remediation of polluted soils; Technologies for recovery of valuable metals from wastes (Cu, Au, Ag); Food packaging; Food quality and safety;
Applied engineering services	Technologies for remediation of polluted soils and recovery of valuable metals from wastes (Cu, Au, Ag); Physical-chemical analysis of solid and liquid samples; Analysis of mineral elements in different matrices
Training	Operation of analysis equipment (FTIR, TOC, Analyst Perkin Elmer 800); Statistically processing of experimental data;

NANOMATERIALS AND APPLICATIONS IN ENVIRONMENTAL AND FOOD ANALYSIS

Contact details

Name	**Nanomaterials and application in environmental and food analysis**
Acronym	**Nanomedalim**
Logo	
Site	**http://research.utcluj.ro/index.php/chemistry-biology.html**
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Gas chromatograph G3950A INTUVO, Agilent 2019

Liquid chromatograph HPLC YL 9100, 2016

Areas of expertise

Synthesis and characterisation of nanoparticles embedded in silica, polyvinilalcool and PVA-SiO_2 matrix
- Synthesis of MFe_2O_4, $M^1_xM^2_{1-x}Fe_2O_4$ and $M^1_xM^2_{1-x-y}M^3_yFe_2O_4$ (M, M^1, M^2, M^3 = Ag^+, Na^+, Co^{2+}, Mn^{2+}, Zn^{2+}, Cu^{2+}, Ni^{2+}, Cd^{2+}, Ca^{2+}, La^{3+}) oxidic system nanoparticles nonembedded and embedded in silica, PVA and PVA-SiO_2
- Structural (TG-DTG-DTA-MS, XRD, FT-IR, Mossbauer, BET, porosity), morphological (TEM; SEM, AFM) and magnetic (VSM, M_s, M_r, H_c, K) characterization of ferrite-based nanocomposites.
- Photocatalytic and coloristic applications of ferritic nanomaterials embedded in silica matrices.

Environmental chemistry. Mathematical modelling of environmental data;
-Assessment of soil pollution due to microelements content; transfer of microelements from soil to plant, study of the influence of ionic exchange processes on microelements transfer in the soil-plant system; QSPR/QSAR studies
-Air quality analysis and monitoring; air pollutant and their spatial and temporal distribution; analysis of wet air deposition
- 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.

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, Composition, and Thermal Behaviour of solids foods;
- Chromatographic analysis of food components and environmental pollutants by HPLC and gas chromatography.

Team

Assoc. prof. dr. eng Thomas Dippong, Assoc. prof. dr. Cristina Mihali, Assoc. prof. dr. Zoita Marioara Berinde; Lecturer dr. eng. Claudia Butean, Lecturer dr. eng. Flavia Pop

Representative projects

CLAMROUA, "Clean Air Management in the Romania - Ukraine Transboundary Area", European Union, Hungary-Slovakia-Romania-Ukraine, ENPI- Cross-border Cooperation Program project, http://www.territorialcooperation.eu/frontpage/show/20419 (2013-2015)
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

Significant results

The most representative publications of the past 5 years:
1. **T Dippong**, E.A. Levei, O. Cadar, Correlation between structure, morphology and magnetic properties in $Zn_xCo_{0.8-x}Ni_{0.2}Fe_2O_4$@$SiO_2$ (0.1÷0.7) nanocomposites. Journal of Alloys and Compounds (24 2023) 330. FI=6.371 (Q1)

2. **T. Dippong**, E.A.Levei, I.G. Deac, I. Petean, O. Cadar, Dependence of Structural, Morphological and Magnetic Properties of Manganese Ferrite on Ni-Mn Substitution, *Int. J Mol Sci. 23* (2022) 3097. FI – 6.209 (Q1).
3. **T. Dippong**, E.A: Levei, O. Cadar, Investigation of Structural, Morphological and Magnetic Properties of MFe_2O_4 (M = Co, Ni, Zn, Cu, Mn) Obtained by Thermal Decomposition, *Int. J Mol Sci.* 23 (2022) 8483. FI – 6.209 (Q1).
4. **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).
5. **T.Dippong**, M.Dan, M.Kovacs, E.Kovacs, E.A.Levei, O.Cadar. Analysis of Volatile Compounds, Composition, and Thermal Behavior of Coffee Beans According to Variety and Roasting Intensity, *Foods* 11(2022) 3146.FI-5.561 (Q1).
6. **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).
7. A. Dumuta, Z. Vosgan, **C. Mihali**, L. Giurgiulescu, M. Kovacs, R. Sugar, L. Mihalescu, The influence of unconventional ultrasonic pasteurization on the characteristics of curds obtained from goat milk with the low cholesterol content, *Ultrasonics Sonochemistry*, 89 (2022), 106155, FI-7.491 (Q1)
8. S.M.Avramescu, I.Fierascu, R.C.Fierascu, R.I.Brazdis, A.V.Nica, **C.Butean**, Removal of Paracetamol from Aqueous Solutions by Photocatalytic Ozonation over TiO_2-MexOy Thin Films. *Nanomaterials*, 12 (2022) 613, FI – 5.719 (Q1)
9. **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 SiO_2 matrix. *Journal of Analytical and Applied Pyrolysis*. 158 (2021) 105281, FI – 6.437 (Q1)
10. **T. Dippong**, E.A. Levei, Cadar Oana, Recent Advances in Synthesis and Applications of MFe_2O_4 (M=Co, Cu, Mn, Ni, Zn) Nanoparticles. *Nanomaterials*, 11 (2021) 1560. FI – 5.719 (Q1)
11. **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).
12. **T. Dippong, C. Mihali**, Z. Vosgan, A. Daniel, A. Dumuta, Thermal behavior of different cocoa powder varieties and their physicochemical, phytochemical and microbiological characteristics, *Journal of Thermal Analysis and Calorimetry*, 143 (2021) 4217-4228, FI – 4.755 (Q1)
13. **T. Dippong**, E.A. Levei, F. Goga, O. Cadar, Influence of Mn^{2+} substitution with Co^{2+} on structural, morphological and coloristic properties of $MnFe_2O_4/SiO_2$ nanocomposites. *Mater Characterization*, 172 (2021) 110835, FI - 4.537 (Q1).
14. Z. Vosgan, **T. Dippong**, M.A. Hoaghia, **C. Mihali**, L. Mihalescu, Pedological characterization of soils in Gutai mountains near a mining area, Romania. *Environmental Earth Sciences*, 80 (2021) 164, FI – 3.119 (Q2).
15. **Z.M. Berinde**, QSPR Models for the Molar Refraction, Polarizability and Refractive Index of Aliphatic Carboxylic Acids Using the ZEP Topological Index. Simmetry, 13(12) (2021) 2359, FI-2.940 (Q1)
16. **T. Dippong**, M-A. Hoaghia, **C. Mihali**, E. Cical, M. Calugaru, Human health risk assessment of some bottled waters from Romania, *Environmental Pollution*, 267 (2020) 115409, FI – 10.366 (Q1).
17. O M Roșca, **T. Dippong**, M. Marian, **C. Mihali**, L. Mihalescu, M-A Hoaghia, M. Jelea, Impact of anthropogenic activities on water quality parameters of glacial lakes from Rodnei Mountains, Romania, *Environmental Research*, 182 (2020) 109136, FI – 8,431 (Q1).
18. S.M. Avramescu, **C. Butean**, C.V. Popa, A. Ortan, I.Moraru, G. Temocico. Edible and functionalized films/coatings—Performances and perspectives, *Coatings*, 10 (2020) 687. FI – 3.236 (Q2)
19. **T. Dippong, C. Mihali**, MA. Hoaghia E. Cical, A. Cosma, Chemical modeling of groundwater quality in the aquifer of Seini town - Somes Plain, Northwestern Romania, *Ecotox Environ Safety*,168 (2019) 88-101, FI – 7.129 (Q1)

Products and technologies:

1. Obtaining of MFe_2O_4, $M^1_xM^2_{1-x}Fe_2O_4$ and $M^1_xM^2_{1-x-y}M^3_yFe_2O_4$ (M, M^1, M^2, M^3 = Ag^+, Na^+, Co^{2+}, Mn^{2+}, Zn^{2+}, Cu^{2+}, Ni^{2+}, Cd^{2+}, Ca^{2+}, La^{3+}) oxidic system nanoparticles embdded in silica, PVA and PVA-SiO_2 matrix with structural, morphological, magnetic, coloristic and photocatalytic activities.
2. Studies on the impact of anthropogenic activities on water quality parameters, chemical modelling of groundwater quality in the aquifer, Modelling seasonal variation of physico-chemical parameters in the drinking water supply network.
3. Gas-chromatography method for analysis of wine and brandy components, HPLC method of analysis.
4. Analysis of caffeine and methylxanthine derivatives in food, beverages and pharmaceutical products.
5. Thermal behaviour, volatile aroma profile and metal composition of solid foods.
5. Method of determination of the microelements transfer factors from soil to plant

The offer addressed to the economic environment

Research & development	Depollution solution using nanotechnology Determination of soil characteristics related to the transfer process of the pollutant elements from soil to plants; Quantifying the impact of microelements in soil on the plants grown in areas with historical anthropogenic pollution and comparison with unpolluted reference areas; Studies on air pollution sources. Develop the" Action Plan for Good Air Quality Maintenance in Maramures County"
Consulting	Modelling the traceability of microelements on the food chain soil-plant-food-human. Human health risk assessment in areas polluted with microelements.
Training	Training on the nanoparticles synthesis and their application in environment and food analysis, Training on the negative effects of microelements on human health, measures of minimizing the risk to health. Training on liquid chromatography analysis

ENVIRONMENTAL PROTECTION THROUGH CONSERVATION AND REMEDIATION

Contact details

Name	**Environmental Protection through Conservation and Remediation**
Acronym	**ENVIRONMENTALIA**
Logo	
Site	
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Director	Assoc. Prof. Dr. Marian Jelea
e-mail	mjelea@yahoo.com

Areas of expertise

Assessment of biodiversity in natural and anthropogenic ecosystems, the conservation or remediation of degraded lands in perspective by promoting restoration of natural habitats.
Identifying, testing and application of combinations of species including microorganisms (bacteria, cianoficee), fungi and plants able to remedy degraded soils and stimulate the installation of natural habitats.
Recovery of copper through bio-technological procedures from the low-grade ores.
Applied research on tissue culture and plants multiply "in vitro".

Team

Assoc. Prof. Dr. Marian Jelea, Assoc. Prof. Dr. Monica Marian, Assist. Prof. Dr. Stela-Gabriela Jelea,
Assist. Prof. Dr. Oana Mare Roșca, Assist. Prof. Dr. Lucia Mihalescu

Representative projects

„Drawing proper assessment study in order to obtain the environmental permit", contract with industry, 2016-2017
"Monitoring action microbiota in order to use them in the soil remediation ponds", PNII, (2007-2010)
"We can refund flowers borrowed from our children?", Environment Fund Administration, (2008-2009)
"Conservation of biodiversity and ecological reconstruction of the lower basin of the River Tour - Adrian pond" AFM, (2007-2008)
„Evolution of installation of iron and sulphur oxidizing bacteria in the sulphidic mine wastes and their influence in generating acid mine drainage", GRANT CNCSIS,
http://194.102.64.7/GranturiFinalizate/faces/Projects/ProjectDetails.jsp (2007-2008)

Significant results

The most representative publications of the past 5 years:

1. **Oana Mare Roșca,** Thomas Dippong, **Monica Marian**, Cristina Mihali, **Lucia Mihalescu,** Maria-Alexandra Hoaghia, **Marian Jelea**. Impact of anthropogenic activities on water quality parameters of glacial lakes from Rodnei mountains, Romania. Environmental Research, Volume 182. Published: March 2020.
2. Damian F., **Jelea S.G.,** Lăcătuşu R., Mihali C. The treatment of soil polluted with heavy metals using the Sinapis alba l. and organo zeolitic amendment. Carpathian Journal of Earth and Environmental Sciences, Vol. 14, No. 2, p. 409 - 422. Published: 2019.
3. **Jelea S.G., Jelea M., Mihalescu L.,** Vosgan Z., Jelea O.C. Monitoring Food Additives and Nutritional Composition of Labels of Food Bases. Bulletin USAMV, series Agriculture 76(1): 40-45. Published: 2019.
4. **Mihalescu L., Marian M., Jelea S.**, Pop, F., Maxim A.., Voşgan Z. Research Concerning the Fighting of *Polystigma rubrum* Fungi under the Climate Conditions of Șomcuta Mare Area Bulletin UASVM series Agriculture 76(2): 73-77. Print ISSN 1843-5246; Electronic ISSN 1843-5386. Published: 2019.
5. Voşgan Z., **Jelea S., Marian M., Roşca-Mare O., Mihalescu L.** Assessment of Biomass Production on Pastoral Meadows in the Gutai Mountains. Bulletin UASVM series Agriculture 76(2): 109-110. Published: 2019.
6. **Monica Liliana Marian.** Possibilities of Sustainable Development in Protected Natural Areas. Case Study - Lazuri Village Overlaid with ROSCI 0214 Tur and ROSPA RIVER 0068 the Lower Meadow of the Tour. Proceeding of the

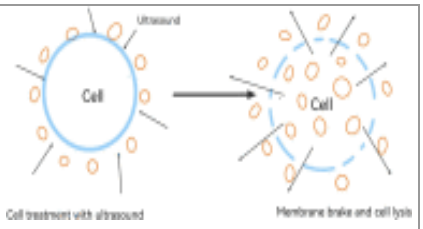
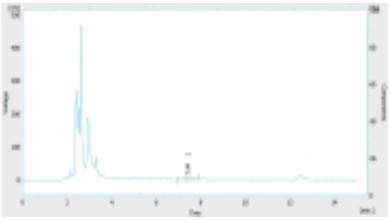
International Conference Communication, Context, Interdisciplinarity, ISBN: 8624 978 606 – 14-3, p. 57-63. Published: 2019.
7. **Monica Liliana Marian.** Local Community Support to Polluted Sites Management. Proceeding of the International Conference Communication, Context, Interdisciplinarity, ISBN: 8624 978 606 – 14-3: p. 64-69. Published: 2019.
8. **Mihalescu L.,** Voşgan Z., **Marian M., Jelea S., Mare Roşca O.,** Pop, F., Maxim A., Cordea M. Studies Regarding the Combat of the Braches Burns Produced by the *Phomopsis vaccinii* at Blueberry Bushes Cultivated in Maramures county. Bulletin USAMV, series Agriculture 75(2): 87–92. Published: 2018.
9. Z Voşgan**, L Mihalescu, S Jelea**, A Dumuța, F Pop, The Hygienic Quality of Raw Romanian Goat Milk Depending on the Milking Season Bulletin USAMV series Agriculture 75(1), 50-53. Published: 2018.
10. Z Voşgan, **L Mihalescu,** R Vidican, **M Marian, S Jelea, O Mare**. Monitoring the Vegetation Communities on the Southern Slope of the Gutai Mountains on the Basis of Ecological Indices Bulletin USAMV series Agriculture 75(1), 54-55. Published: 2018.
11. **Monica Marian, Oana Mare Roșca, Lucia Mihalescu,** Zorica Voșgan. Antifungal Effect of Spice Extracts - Possible Solutions for Biological Preservation of Food. Journal of Faculty of Food Engineering, Ştefan cel Mare University of Suceava, Romania, Volume XVII, Issue 2, 103 – 112. Published: 2018.
12. Alexandru Laposi, Aurel Ardelean, **Monica Marian**, Aspects of invasive plants dominated habitats use by marsh warnbler (Acrocephalus palustris) in Someș river floodplain. Carpathian Journal of Earth and Environmental Sciences, Volume: 13 Issue: 2, Pages: 515-521. Published: 2018.
13. **Mare Roșca Oana**, **Marian, M.** Alexandra Erica Pușcaș, Edita Agneta Pop, Claudia Marian and Daniel Năsui. Positive and Negative Impacts of Tourism in Breb Village. In Proceedings of the 32nd International Business Information Management Association Conference (IBIMA), 15-16 November 2018 Seville Spain. Vision 2020: Sustainable Economic Development and Application of Innovation Management from Regional expansion to Global Growth. 5216-5219 p.ISBN: 978-0-9998551-1-9. Published: 2018.
14. Claudia Marian, **Monica Marian, Mare Roșca Oana**, Daniel NASUI, **Lucia MIHALESCU**, Zorica Vosgan and Ighian Diana. Socio-Economic Assessment of Measures to Preserve the Quality of Water Indispensable to Ecological Tourism. Proceedings of the 32nd International Business Information Management Association Conference (IBIMA), 15-16 November 2018 Seville Spain. Vision 2020: Sustainable Economic Development and Application of Innovation Management from Regional expansion to Global Growth. 5205-5218 p. ISBN: 978-0-9998551-1-9. Published: 2018.
15. Voşgn, Z., **Mihalescu, L., Jelea, M., Marinan, M.,** Dumuţa A., Pop, F., **Mare Roşca O.,** Blidar, C.F. The incidence of coagulase-positive staphylococci (*Staphylococcus aureus* and other species) in raw goat milk collected during different seasons. Analele Universităţii din Oradea, Fascicula de Biologie, Tom XXIV, Issue 2, pp. 66-69. Print-ISSN: 1224-5119; CD-ISSN: 1842-6433; e-ISSN: 1844-7589. Published: 2017.
16. Viorica, Cosier; **Marian, Monica.** The advent of genomics and its potential contribution to the development of quantitative genetics Romanian Biotechnological Letters. Volume: 22 Issue: 5 Pages: 12847-12859 Published: SEP-OCT 2017.
17. **Mare Roşca Oana**, Pop, R., **Marian, M., Mihalescua, L.,** Voşgan, Z., Glodean, I. Water quality assessment of the Usturoi Valley assisted by the macrozoobentic bioindicators. Scientific Bulletin Series D: Mining, Mineral Processing, Non-Ferrous Metallurgy, Geology and Environmental Engineering, 31 (1): 83-89. Published: 2017.
18. **Jelea S.G., Jelea M.,** Vosgan Z., **Mihalescu L.,** Jelea O.C. Copper toxicity on *Triticum aestivum* L and *Lactuca sativa* L: effects on germination and growth. Bulletin of University of Agricultural Sciences and Veterinary Medicine, Cluj-Napoca, Agriculture, Vol. 73(2): 253-261. ISSN 1843-5246, e- ISSSN: 1843-5386. Published: 2016.
19. A. Dumuta, Z. Vosgan, **M. Jelea**, F. Pop, T. Dippong, **L. Mihalescu**, C. Mihali. Microbiological Aspects Considering the Production of Nutraceutical Curd Containing Onion, Animal Science and Biotechnologies, Vol.49, nr. 2, pp. 40-45. Published: 2016.

The offer addressed to the economic environment

Research & development	Evaluation of species of flora / fauna, microorganisms, fungi, from natural and anthropogenic habitats in order to protect themselves or to remedy environmental. Identifying biological methods based on the use of complex organisms able to reduce contamination of soil / water and facilitate the restoration of ecosystems; Identification of plant extracts alelopatic greenhouse (natural pesticides) in weed control and phytopathogenic; In vitro multiplication of species of plants for remediation and / or cultivation; The analysis, monitoring and diminishing of the effects produced by the polluting factors from industry; Evolution of installation of iron and sulphur oxidizing bacteria in the sulphidic mine wastes and their influence in generating acid mine drainage; Research studies for native vegetation installed in the acidic mine waste areas. Recovery of copper through biotechnological procedures from the low-grade ores.
Consulting	Structure and function in natural ecosystems and to restore contaminated their. Growing plants in different conditions of land polluted and / or contaminated. Evaluation of medical resources in the spontaneous flora, possible methods for obtaining the active principles of tissue culture.
Training	Structure and function in natural ecosystems and to restore contaminated their. Growing plants in different conditions of land polluted and / or contaminated. Evaluation of medical resources in the spontaneous flora, possible methods for obtaining the active principles of tissue culture.

FOOD INDUSTRY GROUP

Contact details

Name	**Food Industry Group**	
Acronym	**GCDIA**	
Logo	GCDIA FOOD INDUSTRY GROUP	
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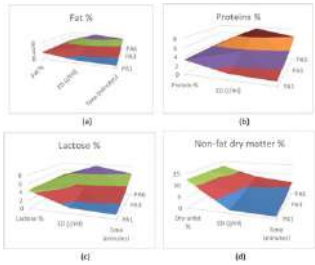
e-mail	giurgiulescu@gmail.com giurgiulescul@mail.utcluj.ro	

Areas of expertise

Ultrasound application to improve the food products quality
- Unconventional ultrasonic pasteurization
Food Engineering:
Fermentation technology, biotechnology, extractive technology.
Dairy industry:
- milk-processing in order to obtain consumption milk and other dairy products;
- laboratory tests to check the conformity of raw materials and finished products.
Food quality control:
- features that different foods must meet to fit existing standards,
- quality control of the process streams to obtain food,
- laboratory tests to verify compliance with various control parameters.

Team

Assoc. Prof. Dr. Liviu Giurgiulescu, **Assist. Prof. Dr. Anca Dumuţa, Assist. Zorica Voşgan Marcela**

Representative projects

- Molecular Assisted Breeding (MAB) techniques in routine screening of plant material. DRC project.
Participants: Hungarian University of Agriculture and Life Sciences, University of Ljubljana. University of Novi Sad, Technical University of Cluj-Napoca.
- "Research mobility within SEE Grants 2014-2021
Participants:Norvegian University of Science and Technology; Technical University of Cluj Napoca, Research domain "Development of Edible Films to Enchance Shelf-life of Muscle Foods, EEA-RO-NO-2018-0157"
- "Guidance in order to make the beneficiary aware about the scientific areas of interest to the services provider in the field of food processing technology" – contract with industry, 2017
- "**International consulting contract BAUHAUS Science Press" and IIETA Canada –** 2015-2016
- Science without borders - Bridge between Central Europe and Balkan CEEPUS Program.

Significant results

ISI papers in Red zone:
1.**Anca Dumuta, Zorica Vosgan**, Cristina Mihali, **Liviu Giurgiulescu**, Melinda Kovacs, Radu Sugar, Lucia Mihalescu,2022, The influence of unconventional ultrasonic pasteurization on the characteristics of curds obtained from goat milk with the low cholesterol content,Ultrasonics Sonochemistry,Volume 89,2022,106155, ISSN 1350-4177, https://doi.org/10.1016/j.ultsonch.2022.106155. **Factor Impact 9.336**
2. Yakiang He, Ruolan Wang, **Giurgiulescu Liviu**, Qian Lu, 2017, An integrated algal-bacterial system for the bio-

conversion of wheat bran treatment of rural domestic effluent, Journal of Cleaner Production Volume 165, 1 November 2017, Pages 458-467,https://doi.org/10.1016/j.jclepro.2017.07.119, ISSN: 0959-6526, **Factor Impact 11.072**

3. Oleg V. Ageev, Andrzej Dowgiałło, Monika Sterczyńska, Joanna Piepiórka-Stepuk, **Liviu Giurgiulescu**, Monika Janowicz, Marek Jakubowski 2021, Experimental characterization and theoretical modeling of fracture and friction resistance forces during tuna cutting, Volume 307,2021,110648,https://doi.org/10.1016/j.jfoodeng.2021.110648.**Impact Factor 6.2033**

Other publications in ISI journals

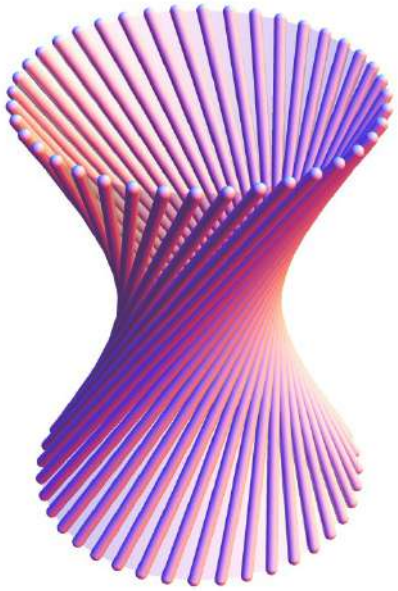
- Sabatino, Leo; Iapichino, Giovanni; Vetrano, Filippo; **Liviu Giurgiulescu** et al., EFFECTS OF POLYETHYLENE AND BIODEGRADABLE STARCH-BASED MULCHING FILMS ON EGGPLANT PRODUCTION IN A MEDITERRANEAN AREA CARPATHIAN JOURNAL OF FOOD SCIENCE AND TECHNOLOGY Volume: 10 Issue: 3 Pages: 81-89 Published: 2018
- **Dumuta, Anca; Vosgan, Zorica;** Pop, Flavia; et al., Study considering the microwave pasteurization of the raw milk used for yogurt production ROMANIAN BIOTECHNOLOGICAL LETTERS Volume: 23 Issue: 2 Pages: 13511-13518 Published: MAR-APR 2018
- Cimpenu, Baduca C.; Stoica, Felicia; Muntean, Camelia; **Giurgiulescu Liviu** et al., INFLUENCE OF CLONE ADND ROSTOCK ON TOTAL POLYPHENOLS, CATECHIN, EPICATECHIN AND RESVERATROL IN RED WINE CABERNET-SAUVIGNON FROM SIMBURESTI VINEYARD CARPATHIAN JOURNAL OF FOOD SCIENCE AND TECHNOLOGY Volume: 10 Issue: 2 Pages: 159-167 Published: 2018
- Gougoulias, Nikolaos; Vagelas, Ioannis; **Giurgiulescu, Liviu;** et al., COMPARATIVE STUDY ON POLYPHENOLS CONTENT AND ANTIOXIDANT EFFECT OF SOME GRAPE VARIETIES GROWN IN CENTRAL GREECE CARPATHIAN JOURNAL OF FOOD SCIENCE AND TECHNOLOGY Volume: 10 Issue: 1 Pages: 141-149 Published: 2018
- Gougoulias, Nikolaos; Vagelas, Ioannis; **Giurgiulescu, Liviu**; et al., THE COIR SUBSTRATE FOR SOILLESS CULTURES, REUSED AS SOIL AMENDMENT (STUDY IN VITRO AND IN VIVO) CARPATHIAN JOURNAL OF FOOD SCIENCE AND TECHNOLOGY Volume: 9 Issue: 4 Pages: 61-70 Published: 2017
- Gougoulias, Nikolaos; Giurgiulescu, Liviu; Vagelas, Ioannis; et al., CHANGES IN TOTAL PHENOL CONTENT AND ANTIOXIDANT ACTIVITY OF GREEK TABLE OLIVE CULTIVAR AMFISSIS DURING MATURATION STUDIA UNIVERSITATIS BABES-BOLYAI CHEMIA Volume: 62 Issue: 2 Pages: 387-396 Part: 2 Published: 2017
- **L. Giurgiulescu**, I. Vagelas, and N. Gougoulias, "Research regarding the influence of Penicillium chrysogenum, Penicillium expansum and Phanerochaete spp. on chemical composition of red wines", *Romanian Biotechnological Letters*, vol. 21, pp. 11290-11297, Mar-Apr 2016.
- Cical, Elena; Mihali, Cristina; Mecea, Mircea; **Dumuta Anca** et al., CONSIDERATIONS ON THE RELATIVE EFFICACY OF ALUMINUM SULPHATE VERSUS POLYALUMINUM CHLORIDE FOR IMPROVING DRINKING WATER QUALITY, STUDIA UNIVERSITATIS BABES-BOLYAI CHEMIA Volume: 61 Issue: 2 Pages: 225-238 Published: 2016
- N. Gougoulias, L. Giurgiulescu, D. Kalfountzos, A. Papachatzis, I. Vagelas, D. Ftakas, et al., "COIR EMPLOYED AS SOILLESS CULTIVATION SUBSTRATE AND ITS INTERFERENCE WITH NUTRIENT SOLUTION DURING TWO TOMATOES CROPPING PERIODES (CASE STUDY)", *Studia Universitatis Babes-Bolyai Chemia*, vol. 60, pp. 177-185, Jun 2015.
- **A. Dumuta, Z. Vosgan**, M. Jelea, F. Pop, T. Dippong, L. Mihalescu, C. Mihali, “Microbiological Aspects Considering the Production of Nutraceutical Curd Containing Onion”, *Animal Science and Biotechnologies*, Vol.49, nr.2, pp.40-45, 2016.
- Nikolaos Gougoulias, **Liviu Giurgiulescu**, Ioannis Vagelas, Eleni Wogiatzi, Maria Nektaria Ntalla,(2017) Phenol Content and Antioxidant Activity of Greek Table Olive Cultivar Amfissis During Maturation, Studia Universitatis Babes-Bolyai, Chemia, Tom2, pp. 387-396

The offer addressed to the economic environment

Consulting	Implementation of quality management systems in enterprises of food industry
Training	Education and training in the HACCP; VACCP and TACCP
Research & development	**Microbiology analyses:** ***Salmonella, E. coli, Campylobacter, Enterobacteriaceae, Listeria monocytogenes, NTG, NCS, Moulds and Yeasts detection, Bacillus cereus, Coliform bacteria, Staphylococcus aureus.*** **Ultrasound application to improve the quality of food products.** **Dairy industry:** - Researching the possibility of replacing the classical method of pasteurization with unconventional methods, like microwave technology, microfiltration technique or the use of high pressure. **Food biotechnology** - Wine biotechnology; Beer biotechnology; Dairy products biotechnology; - Enzymes application in new food products.

RESEARCH CENTER FOR APPLIED MATHEMATICS IN ENGINEERING SCIENCES

Contact details

Name	**Research Center for Applied Mathematics in Engineering Sciences**	
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Areas of expertise

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, system 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

Team

Prof. Dr. Math. Mircea Ivan; Prof. Dr. Math. Ioan Gavrea; Prof. Dr. Math. Ioan Raşa; Prof. Dr. Math. Alexandru Ioan Mitrea; Prof. Dr. Math. Dorian Popa; Prof. Dr. Math. Daniela Rosca; Prof. Dr. Math. Ioan Radu Peter; Assoc. Prof. Dr. Math. Daniela Inoan; Prof. Dr. Math Alina Sîntămărian; Assoc. Prof. Dr. Math. Dalia Cimpean; Prof. Dr. Math. Bogdan Ionuţ Gavrea; Assoc. Prof. Dr. Math. Adela Novac; Assoc. Prof. Dr. Math. Mircea Dan Rus; Assoc. Prof. Dr. Math. Ovidiu Furdui; Assoc. Prof. Dr. Math. Adrian Holhos; Assoc. Prof. Dr. Math. Adela Capătă; Assoc. Vicuta Neagos.

Representative projects

DynAPSNeur, "Dynamics Analysis of Parallel Simulations of Biological Neural Microcircuits", FP7 "Research Infrastructures" action (January 1 - December 30, 2013)
http://www.hp-see.eu/hp-see-pilot-call-awarded-applications
MoDef, "Modelling using advanced methods and techniques based on the theory of deformable surfaces with applications in computer assisted surgery and other modelling procedures of anatomic structures", PNII Partnership, http://dicomge.utcluj.ro/modef (2007-2010)
"Advanced Methods and Algorithms of Mathematics related to the Theory of Deformable Models, with applications in image processing and medicine", CNCSIS, (2006-2008)
"Denoising and compression of data on high-dimensional manifolds", Deutsche Forschung Gemeinschaft, Bilateral cooperation Germania – Romania PL 170/14-1, Georg Austin University, Göttingen, (January 1 - December 31, 2011)
"Denoising and compression of spherical data", *Deutsche Forschung Gemeinschaft* (2007 –2010),

DESPED, **"Stereo Based Object Tracking and Pedestrian Recognition in Traffic and Environments"**, *Wolkswagen AG*, Germania (2006-2007) , (coord. professor Sergiu Nedevschi).
CRIOLAPSIM, **"Laparoscopic Cryosurgical Treatment of the renal tumours individualized using simulations on 3D reconstructed model"**, *CEEX* (2006-2008) director TUCN prof. dr. eng. Sergiu Nedevschi (in cooperation with "Institutul Clinic de Urologie şi Transplant Renal" Cluj-Napoca

Significant results

The most representative publications of the last years

1. 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}
2. Holhoș, A., On the Approximation by Balázs–Szabados Operators. Mathematics (2021) 9 (14), 1588, 12 pp. doi: 10.3390/math9141588
3. Gupta, V., Holhoș, A., Approximation with Arbitrary Order by Baskakov-Type Operators Preserving Exponential Functions. Bulletin of the Malaysian Mathematical Sciences Society (2021) 44, 2567-2576. doi: 10.1007/s40840-020-01063-x
4. A. Holhoș, D. Roșca, Orhonormal 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
5. Ana Maria Acu, Ioan Raşa, Rekha Srivastava, Modified operators interpolating at endpoints, Mathematics 2021, 9(17), 2021; https://doi.org/10.3390/math9172051
6. Ana Maria Acu, Gülen Başcanbaz-Tunca, Ioan Rasa, Voronovskaja type quantitative results for differences of positive linear operators, Symmetry 2021, 13(8), 1392; https://doi.org/10.3390/sym13081392
7. Ulrich Abel, Dany Leviatan and Ioan Rasa, On the q-monotonicity preservation of Durrmeyer-Type operators, Mediterranean Journal of Mathematics volume 18, Article number: 173 (2021) , https://doi.org/10.1007/s00009-021-01823-4
8. Capătă, A, Existence of solutions of bilevel strong vector equilibrium problems and their applications, J Nonlinear Var Anal (2021), 5 (3), 371-389, doi: 10.23952/jnva.5.2021.3.03
9. Novac, A., Otrocol, D. & Popa, D. Ulam Stability of a Linear Difference Equation in Locally Convex Spaces. Results Math 76, 33 (2021). https://doi.org/10.1007/s00025-021-01344-2
10. Veronica Ilea, Adela Novac, Diana Otrocol, Radu Precup, Solutions with a prescribed interval of positivity for differential systems with nonlocal conditions, Applied Mathematics and Computation 375, 125092, https://doi.org/10.1016/j.amc.2020.125092.
11. Cimpean, D.S., Sheremet, M.A., Pop, I., Mixed convection of hybrid nanofluid in a porous trapezoidal chamber, International Communications in Heat and Mass Transfer, ISSN: 0735-1933, 116 (2020) 104627, https://doi.org/10.1016/j.icheatmasstransfer.2020.104627
12. Sheremet, M.A., Cimpean, D.S., Pop, I., Thermogravitational Convection of Hybrid Nanofluid in a Porous Chamber with a Central Heat-Conducting Body, Symmetry, ISSN: 2073-8994, 12, 593 (2020); doi: 10.3390/sym12040593
13. Cimpean, D.S., Pop, I., Entropy generation of a nanofluid in a porous cavity with sinusoidal temperature at the walls and a heat source bellow, International Journal of Numerical Methods for Heat & Fluid Flow, (2021)Vol. ahead-of-print No. ahead-of-print. https://doi.org/10.1108/HFF-10-2020-0654.
14. AR Baias, F Blaga, D Popa, Best Ulam constant for a linear difference equation, Carpathian J Math., 35 (2019), No. 1, 13 – 22.
15. 13.Baias, A.R., Popa, D.: On Ulam stability of a linear difference equation in Banach spaces. Bull. Malays. Math. Sci. Soc. (2019). https://doi.org/10.1007/s40840-019-00744-6, 16
16. Capata, A. Optimality conditions for ϵ -quasi solutions of optimization problems via ϵ -upper convexificators with applications. Optim. Lett. 13, 857-873 (2019) doi: 10.1007/s11590-018-1287-117
17. Capata, A. Optimality for weakly ϵ -efficient solutions of vector optimization problems with applications. Numer.Funct. Anal. Optim.. 40, 726-741 (2019) doi:10.1080/01630563.2019.1571510
18 Cimpean D. S, Revnic C., Pop I., Natural Convection in a Square Inclined Cavity Filled with a Porous Medium with Sinusoidal Temperature Distribution on Both Side Walls, Transport in porous media, Volume: 130 Issue: 2 Pages: 391-404, DOI: 10.1007/s11242-019-01315-w, Published: NOV 2019
19 Cimpean Dalia Sabina, Pop Ioan, Free convection in an inclined cavity filled with a nanofluid and with sinusoidal temperature on the walls: Buongiorno's mathematical model, International journal of numerical methods for heat & fluid flow, Volume: 29 Issue: 12 Pages: 4549-4568, DOI: 10.1108/HFF-04-2019-0317, Published: DEC 2 2019
20 B. Gavrea, On a convexity problem in connection with some linear operators, Journal of Mathematical Analysis and Applications, Volume 461, Issue 1, 319-332, 2018. doi:10.1016/j.jmaa.2018.01.010

The offer addressed to the economic environment

Research & development	Development of original solutions for modelling dynamic 3D environments; Development of real-time perception systems for structured or unstructured 3D environments, applied to drive assistance systems, autonomous robots, space observation, or computer-assisted medical diagnosis.
Consulting	Consulting, designing, and researching pattern recognition, and machine learning for industrial and scientific fields.
Training	Image processing basics: Image processing algorithms and techniques, pattern recognition, machine learning, kernel methods with applications in different fields (computer vision, neuroscience, medical, speech recognition); Numerical optimization algorithms, time stepping schemes for rigid body systems with applications to robotics, autonomous navigation, and granular materials.

APPROXIMATION METHODS AND CALCULUS OF VARIATIONS IN DEFFORMABLE MODELS APPLIED IN IMAGE PROCESSING AND COMPUTER ASSISTED MEDICINE - RESEARCH LABORATORY

Contact details

Name	**Approximation methods and Calculus of Variations in Deformable Models applied in Image Processing and Computer Assisted Medicine – Research Laboratory**
Acronym	**LC MoDef**
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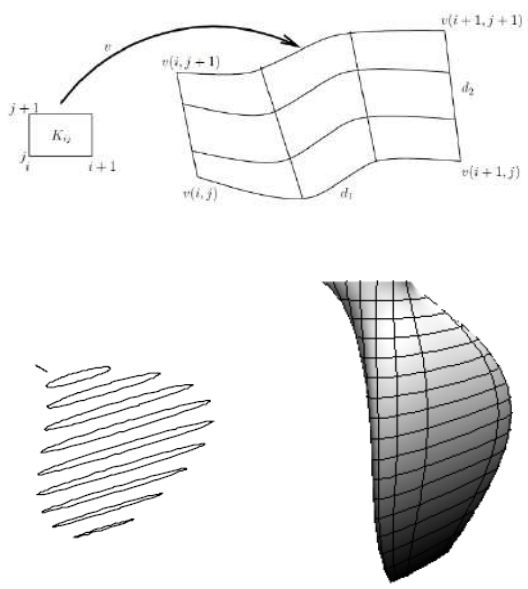

Areas of expertise

LC MoDef research laboratory is devoted to the development of the mathematical basis of the theory of deformable models and to the applications of this theory in image processing and medical imaging, involving the following areas of expertise:
- Differential Equations
- Calculus of Variations
- Geometry
- Numerical Analysis
- Probabilities
- Modelling & Simulation
- Medical Imaging (Ultrasonography, CT, MRI)
- Digitization based on mathematical models applied in the medical field

Team

Prof. Dr. Math. Alexandru I. Mitrea; Prof. Dr. Math. Dumitru Mircea Ivan; Assoc. Prof. Dr. Math. Daniela Inoan; Assoc. Prof. Dr. Math. Radu Peter, Senior Lect. Dr. Mircia Gurzau

Representative projects

MoDef, "Modelling using advanced methods and techniques based on the theory of deformable surfaces with applications in computer assisted surgery and other modelling procedures of anatomic structures", PN II 11018-Partenership, http://dicomge.utcluj.ro/modef (2007-2010)
Advanced Methods and Algorithms of Mathematics related to the Theory of Deformable Models, with applications in image processing and medicine, Grant CNCSIS 1255, 2006-2008

Significant results

The most representative publications of the past 5 years:

1. 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}
2. Inoan, D.; Marian, D. Semi-Hyers–Ulam–Rassias Stability via Laplace Transform, for an Integro-Differential Equation of the Second Order. Mathematics 2022, 10, 1893. https://doi.org/10.3390/math10111893
3. Inoan, D., Kolumbán, J. Calmness of the Solution Mapping of Navier-Stokes Problems Modeled by Hemivariational Inequalities. Set-Valued Var. Anal 30, 1089–1104 (2022). https://doi.org/10.1007/s11228-022-00636-1

4. D. Inoan, Calmness of the Solution Mapping of Parametric Variational Relation Problems, Filomat, Vol. 35 (2021), No. 10, 3541–3548, https://doi.org/10.2298/FIL2110541I
D. Inoan and D. Marian, Semi-Hyers–Ulam–Rassias Stability of a Volterra Integro-Differential Equation of Order I with a Convolution Type Kernel via Laplace Transform, Symmetry, Vol 13, Issue 11, 2181. https://doi.org/10.3390/sym13112181, 2021
A. Aral, D. Inoan and I. Raşa, Approximation properties of Szász–Mirakyan operators preserving exponential functions, Positivity, 2019, Volume 23, Issue 1, pp 233–246, doi.org/10.1007/s11117-018-0604-3
5. Mitrea Alexandru Ioan, Remarks on using some Finite Difference Schemes to provide energy minimizing snakes, The 16-th International Conference on Applied Mathematics and Computer Science, July 3-6, 2019
6. Mitrea, Alexandru I., On the dense unbounded divergence of interpolatory product integration on Jacobi nodes CALCOLO Volume: 55 Issue: 1 Article Number: UNSP 10 Published: MAR 2018
7. Peter, Ioan Radu, A Bound of the Finslerian Ricci Scalar MEDITERRANEAN JOURNAL OF MATHEMATICS Volume: 15 Issue: 3 Article Number: 143 Published: JUN 2018
8. Inoan, Daniela Ioana; Kolumban, Jzsef, Existence Theorems for Inequality Systems BULLETIN OF THE IRANIAN MATHEMATICAL SOCIETY Volume: 44 Issue: 5 Pages: 1329-1336 Published: OCT 2018
9. Inoan, D.; Kolumban, J., Existence theorems via duality for equilibrium problems with trifunctions OPTIMIZATION Volume: 67 Issue: 5 Pages: 537-547 Published: 2018
10. Inoan, D.; Kolumban, J., On Quasi-Equilibrium Problems with Trifunctions MINIMAX THEORY AND ITS APPLICATIONS Volume: 3 Issue: 1 Pages: 161-172 Published: 2018

Significant solutions:
Considering until now parametric (variational) deformable models, we developed an iterative method based on finite difference schemes in order to solve numerically the ELP equation of Calculus of Variations, which provides the energy minimizing snake; we derived estimates concerning the approximation error related to the corresponding ELP algorithm and we established conditions for its convergence and stability; as future targets, we intend to consider probabilistic models which offer an alternative approach by using the Bayes technique, as well as geometric deformable models which provide an efficient alternative to address some limitation of parametric deformable models.

Products and technologies:
1. Mathematical study concerning the deformable model theory: energy functional, evolution equation, discretization methods
2. Stochastic Modelling and Simulation Platform/Implemented in Java/
3. 3D Deformable Surfaces Modelling Software Environment

The offer addressed to the economic environment

Research & development	Generating performing mathematical algorithms in order to obtain the minimizing-energy curves and surfaces. Finding approximation error, convergence rate and giving consistency and stability conditions concerning these algorithms **.**
Consulting	Consulting in finding suitable algorithms to obtain minimizing-energy curves and surfaces, which assist activities in medicine, industrial environments, modern traffic infrastructure, physics
Training	**Deformable models theory:** reveal of the interdisciplinary value of the domain**,** connections with practical problems of medicine, image processing, and physics**;** knowledge confluence from functional analysis, approximation theory, differential equations, differential geometry, calculus of variations, numerical analysis, linear algebra, and probability theory**.** **Model-based approach:** integrating computer-assisted medical image analysis, their applications at this level including image segmentation, shape representation and motion tracking.

INTELLIGENT METHODS FOR SOLVING OPTIMIZATION PROBLEMS

Contact details

Name	**Intelligent Methods for Solving Optimization Problems**
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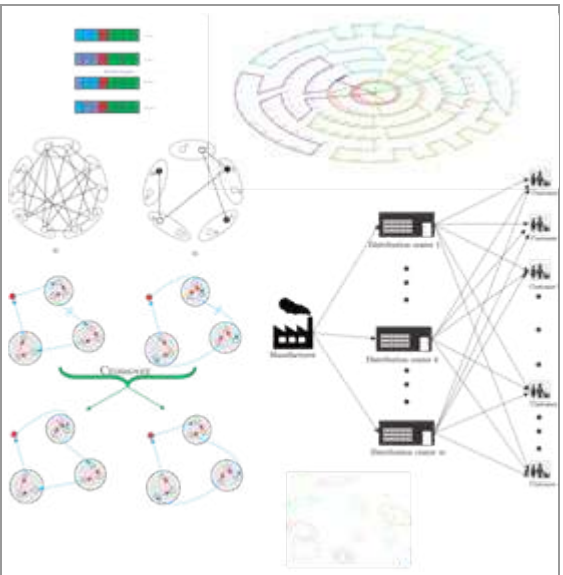

Areas of expertise

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

Team

Prof. Dr. Petrica Pop Sitar, Prof. Dr. Oliviu Matei, Assoc. Prof. Dr. Corina Pop Sitar, Assoc. Prof. Dr. Andrei Horvat Marc, Assoc. Prof. Dr. Ovidiu Cosma, Assoc. Prof. Dr. Camelia Pintea, Assoc. Prof. Dr. Ioana Zelina, Assoc. Prof. Dr. Cosmin Sabo, Lecturer. Dr. Mara Hajdu- Macelaru, Lecturer Adrian Petrovan.

Representative projects

"Building Trust in Ecosystems and Ecosystem Components", EUROPEAN COMMISSION Horizon 2020 - Research and Innovation Framework Programme, https://www.bieco.org/ 2020-2023
"Collaborative Environment for Design of AmI enhanced Product-Services Integrating Highly Personalized Innovative Functions with Minimal Ecological Footprint along Life Cycle and of their Production ", ProSeCo, European FP7 project, http://proseco-project.eu/ (2013-2017)
"New hybrid metaheuristic methods for solving network design problems", PN-II-RU-TE-2011-3-0113, www.cunbm.utcluj.ro/meta-hibrid, 2011-2014.
"Hybrid Bi-level Optimization Approaches for Generalized Network Design Problems", bilateral project Romania – Austria, 2014-2015
"Selective graph coloring problem", grant PHC Bosphore 26284RB, EGIDE, 2012-2013.
"Research, development and implementation of organizing the documents", ANCS, 2010-2013.
"Algorithmical methods for solving combinatorial optimization problems", project CEEX, ET34, 2006-2008, http://ceex-et34.ubm.ro

Significant results

The most representative publications of the past 5 years:

1. 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.

2. 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.
3. 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.
4. 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.
5. 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.
6. 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.
7. 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.
8. P.C. Pop, O. Matei, C. Sabo, A. Petrovan, A two-level solution approach for solving the generalized minimum spanning tree problem, *European Journal of Operational Research*, Vol. 265(2), pp. 478-487, 2018.
9. P.C. Pop, L. Fuksz, A. Horvat Marc and C. Sabo, A novel two-level optimization approach for clustered vehicle routing problem, *Computers & Industrial Engineering*, Vol. 115, pp. 304-318, 2018.
10. A. Horvat Marc, L. Fuksz, P.C. Pop and D. Danciulescu, A decomposition-based method for solving the Clustered Vehicle Routing Problem, *Logic Journal of IGPL*, Vol. 26(1), pp. 83-95, 2018.
11. P.C. Pop, C. Sabo, B. Biesinger, B. Hu and G. Raidl, Solving the Two-Stage Fixed-Charge Transportation Problem with a Hybrid Genetic Algorithm, *Carpathian Journal of Mathematics*, Vol. 33, No. 3, pp. 365-371, 2017.
12. J. Suto, S. Oniga and P.C. Pop, Feature analysis to human activity recognition, *International Journal of Computers, Communications & Control*, Vol. 12, No. 1, pp. 116-130, 2017.
13. O. Matei, D. Contras, P.C. Pop and H. Valean, Design and Comparison of Two Evolutionary Approaches for Automated Product Design, *Soft Computing*, Vol. 20, Issue 11, pp 4257-4269, 2016.
14. P. Pop, O. Matei, C. P. Sitar, and I. Zelina, A hybrid based genetic algorithm for solving a capacitated fixed-charge transportation problem, *Carpathian Journal of Mathematics*, vol. 32, pp. 225-232, 2016.
15. S. Fidanova and P.C. Pop, An improved hybrid ant-local search for the partition graph coloring problem, *Journal of Computational and Applied Mathematics*, Vol. 293, pp. 55-61, 2016.
16. P.C. Pop, C.M. Pintea, C. Pop Sitar and M. Hajdu-Macelaru, An efficient reverse ditribution system for solving a supply chain network design problem, *Journal of Applied Logic*, Vol. 13(2), Part A, pp. 105-113, 2015.
17. C.M. Pintea, P.C. Pop and I. Zelina, Denial jamming attacks on wireless sensor network using sensitive agents, *Logic Journal of IJPL*, Vol. 24(1), pp. 92-103, 2016.
18. C.M. Pintea and P.C. Pop, An improved hybrid algorithm for capacitated fixed-charge transportation problem, *Logic Journal of IJPL*, Vol. 23(3), pp. 369-378, 2015.
19. O. Matei, P.C. Pop, I. Sas and C. Chira, An improved immigration memetic algorithm for solving the heterogeneous fixed fleet vehicle routing problem", *Neurocomputing,* Vol. 150, Part A, pp. 58-66, 2015.
20. P.C. Pop, O. Matei and C.-A. Comes, Reducing the bandwidth of sparse matrix with a genetic algorithm, *Optimization*, Taylor & Francis, Vol. 63(4), pp. 1851-1876, 2014.
21. M. Demange, J. Monnot, P.C. Pop and B. Ries, On the complexity of the selective graph coloring problem in some special classes of graphs, *Theoretical Computer Science*, Vol. 540-541, pp. 82-102, 2014.
22. P.C. Pop and O. Matei, A memetic algorithm for solving the multidimensional multi-way number partitioning problem, *Applied Mathematical Modelling*, Vol. 37, Issue 22, pp. 9191-9202, 2013.
23. P.C. Pop, O. Matei and C. Pop Sitar, An improved hybrid algorithm for solving the generalized vehicle routing problem, *Neurocomputing*, Vol. 109, pp. 76-83, 2013.
24. O. Matei, P.C. Pop and H. Valean, Optical Character Recognition in Real Environments using Neural Networks and k-Nearest Neighbor, *Applied Intelligence*, Vol. 39(4), pp. 739-748, 2013.

The offer addressed to the economic environment

Research & development in core areas	Elaboration of new intelligent methods for solving complex optimization problems. Development of new nature inspired algorithms based on group intelligence, extension and improving the existent methods and hybridizing the metaheuristic algorithms with exact methods based on integer programming.
Research & development in applied fields	Proposal of new intelligent methods for solving complex optimization problems such as network design problems, facility and location problems, transportation problems, scheduling problems, etc. Document and information flows, indexing of documents, knowledge organization, real time applications.
Consulting	The research team has the necessary abilities for providing the necessary consulting activities to the beneficiaries for implementing the research results in the proposed field of research. These abilities are confirmed by the previously obtained results.

CENTER OF SUPERCONDUCTIVITY, SPINTRONICS AND SURFACE SCIENCE

Contact details

Name	**Center of Superconductivity, Spintronics and Surface Science**
Acronym	**C4S**
Logo	
Site	http://www.c4s.utcluj.ro/
Address	26-28 G. Baritiu Str., 400027, Cluj-Napoca, Romania
Faculty Department	**Faculty of material and environment engineering Physics and Chemistry Department**
Telephone	+40 264 401475, +40 733 274 834
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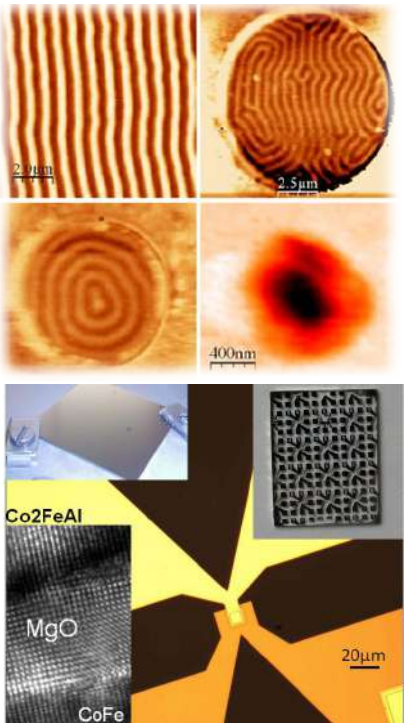
Director	Prof. Dr. Phys. Traian Petrisor
e-mail	traian.petrisor@phys.utcluj.ro



Areas of expertise

SUPERCONDUCTIVITY: new materials and technologies for coated conductors based on YBa2Cu3O7-y (YBCO) fabrication using the Rolling-Assisted-Biaxially-Textured-Substrates approach. Applied research and development efforts include Ni-based biaxially textured tapes processing, deposition of both oxide buffer layers and YBCO films by chemical solution deposition (CSD). **Responsible/contact: traian.petrisor@phys.utcluj.ro**

SPINTRONICS: manipulation of the electron spin in electronic devices. Elaboration and study of new materials, magnetic and nonmagnetic thin film systems, the design and the patterning of individual spintronic devices for applications in the field of sensors, data storage and logic element, fundamental physics, theoretical modeling. **Responsible/contact: coriolan.tiusan@phys.utcluj.ro**

SURFACE SCIENCE. The molecular dynamics at the interface or under confinement conditions inside porous media is investigated using the noninvasive Nuclear Magnetic Resonance (NMR) technique based on diffusometry and relaxometry. The studied samples are: polymeric nano and micro-capsules used as drug carriers, ultra strong concrete, liquids confined inside porous ceramics with controlled amount of magnetic impurities, polymers, liquid crystals, binary mixtures of fluids, ionic liquids, etc. **Responsible/contact: ioan.ardelean@phys.utcluj.ro**

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: La0.66Sr0.33MnO3, La2Zr2O7, YBa2Cu3O7, BaZrO3. Resent research axis concerns nano-lithography using self-assembled polymer templates. **Responsible/contact: lelia.ciontea@chem.utcluj.ro**

Team

Prof. Dr. Phys. Traian Petrisor, Prof. Dr. Lelia Ciontea, Tiusan, Prof. Dr. Ioan Ardelean, Assoc. Prof. Dr. Gavril Negrea, Assoc. Prof. Dr. Tania Ristoiu, Assist. Prof. Dr. Amalia Mesaros, Assist. Prof. Dr. Phys. Traian Petrisor Jr, Assist. Mihai Gabor, Tech. Razvan Miclea, Res. Assist. Bianca Mos, Res. Assist. Mircea Nasui.

Representative projects

ExNanoMat Supporting excellence in nanotechnology and advanced materials research, PNIII-P1-1.2- 1.2.2 PFE, (2018-2020)
EMERSPIN – "Emerging sensors and data storage spintronic devices based on magnetic tunnel junctions with enhanced efficiency magnetization manipulation" PN-III-P4-ID-PCE-2016-0143, (2017-2019), https://c4s.utcluj.ro/Current%20projects%20-PNIII-ID22-2017.html
EUROTAPES - "European development of Superconducting Tapes: integrating novel materials and architectures into cost effective processes for power applications and magnets", FP6, (2012-2016)
"Unexplored magnetic vortex regimes relevant for fusion applications of superconductors." FP7 - EUROFUSION

Eneabling Project
SPINCOD- "Advanced spintronic devices for communication and data storage technologies based on Heusler compounds" PN-II-RU-TE-2014-4-1820 – SPINCOD (2015-2017)
MAGPIN-"Nano-engineered Magnetic Pinning Centers in High Temperature Superconducting Epitaxial Thin Films", PN-II-RU-TE-2014-4-2848 MAGPIN (2015-2017)
SPINTAIL-"Dispozitive spintronice mezoscopice cu proprietati magnetice si de transport controlate", PN-II-ID-PCE, IDEI (2013-2016)
SPINTRONIC- "Cercetarea si dezvoltarea de dispozitive spintronice la scara mezoscopica", POS-CCE, (2010-2013)
"Efectele dopajului si ale dimensionalitatii asupra proprietatilor magnetice, structurale si morfologice si dinamicii de spin in micro si nanostructuri oxidice feromagnetice", PNI-ID, (2010-2013)
"Nuclear magnetic resonance studies of surface effects on dynamics of molecules confined inside porous media with magnetic impurities", PNII PCE-IDEI, (2011-2016)

Significant results

The most representative publications of the past 5 years:

1. Belmeguenai, M.; Roussigne, Y.; Cherif, S. M.; et al., Influence of the capping layer material on the interfacial Dzyaloshinskii-Moriya interaction in Pt/Co/capping layer structures probed by Brillouin light scattering JOURNAL OF PHYSICS D-APPLIED PHYSICS Volume: 52 Issue: 12 Article Number: 125002 Published: MAR 20 2019
2. M Bersweiler, K Dumesnil, Y Fagot-Revurat, P Le Fèvre, C Tiusan, D Lacour and M Hehn, Spin-polarized resonant surface state in (111) Sm1−xGdxAl2, a zero-magnetization ferromagnet JOURNAL OF PHYSICS-CONDENSED MATTER Volume: 30 Issue: 43 Article Number: 435501 Published: OCT 31 2018
3. M Belmeguenai, K Aitoukaci, F Zighem, MS Gabor, T Petrisor Jr, RB Mos, C Tiusan, Investigation of the annealing temperature dependence of the spin pumping in Co20Fe60B20/Pt systems, Journal of Applied Physics 123 (11), 113905 (2018), DOI: https://doi.org/10.1063/1.5011111
4. M. Belmeguenai, M. S. Gabor, F. Zighem, D. Berling, Y. Roussigne, T. Petrisor, et al., "Static and dynamic magnetic properties of Co2FeAl-based stripe arrays", *Journal of Magnetism and Magnetic Materials*, vol. 399, pp. 199-206, Feb 2016.
5. M. S. Gabor, T. Petrisor, R. B. Mos, A. Mesaros, M. Nasui, M. Belmeguenai, et al., "Spin-orbit torques and magnetization switching in W/Co2FeAl/MgO structures", *Journal of Physics D-Applied Physics*, vol. 49, Sep 2016.
6. MS Gabor, M Belmeguenai, T Petrisor Jr, C Ulhaq-Bouillet, S Colis, C Tiusan,"Correlations between structural, electronic transport, and magnetic properties of Co 2 FeAl 0.5 Si 0.5 Heusler alloy epitaxial thin films", *Physical Review B* 92 (5), 054433, 2015;
7. R. B. Mos, M. Nasui, T. Petrisor Jr., M. S. Gabor, R. A. Varga, L. Ciontea, "Synthesis, crystal structure and thermal decomposition of Zr6O4(OH)4(CH3CH2COO)12", in *J of Analytical and Appl. Pyrolysis*, vol. 97, 2012, pp. 137-142;
8. M. Nasui, T. Petrisor. Jr, R.B. Mos, M.S. Gabor, A. Mesaros, F. Goga, L. Ciontea, T. Petrisor, "Fluorine-free propionate route for the chemical solution deposition of YBa2Cu3O7−*x* superconducting films", *Ceramic International* 41, 2015, pp. 4416–4421;

The offer addressed to the economic environment

Research & development	**Superconductivity and materials chemistry** The C4S is developing new materials and technologies for coated conductors using the Rolling-Assisted-Biaxially-Textured-Substrates (RABiTS) approach. Applied research and development efforts include Ni-based biaxially textured tapes processing, deposition of both oxide buffer layers and YBCO films by chemical solution deposition (CSD). **Spintronics,** dealing with the development of sensors and data storage devices based on giant - and tunnelling magneto-resistance systems. We are dealing with the design and the patterning of individual spintronic devices for applications in the field of sensors, data storage, logic elements, high frequency oscillators. Future research axes concern the superconducting spintronics which combines classical spintronics and superconductivity, the spin-orbitronics and the spintronics with graphene. **Surface Science** The NMR laboratory is designed to study molecular dynamics at the interface or under confinement conditions inside porous media; The systems under study are: polymeric nano and micro-capsules used as drug carriers, ultra strong concrete samples, liquids confined inside porous ceramics with controlled amount of magnetic impurities, polymers, liquid crystals, binary mixtures of fluids, ionic liquids, etc.
Consulting	Available for consulting within the following areas: materials science, low temperature systems, thin film elaboration and characterization tools (structural, morphological, magnetic properties), pattering using UV lithography techniques and ion beam/chemical etching, clean room facilities, high vacuum and Ultra High Vacuum deposition tools, chemical elaboration strategies for thin films and nanoparticles, molecular dynamics at the interface or under confinement conditions inside porous media via the non-invasive Nuclear Magnetic Resonance (NMR) technique.
Training	- Participating to high level teachning modules (e.g. master degree): module of nanotechnology and advanced materials. - Participating of C4S members at teaching activities within the TUCN (elementary physics and chemistry classes).

RESEARCH CENTER FOR ADVANCED MATERIALS AND ENVIRONMENTAL PHYSICS AND CHEMISTRY

Contact details

Name	**Research Center for Advanced Materials and Environmental Physics and Chemistry**
Acronym	**CCFCMAM**
Logo	
Site	
Address	103-105 Muncii Blv., 400641 Cluj-Napoca, Romania
Faculty Department	**Faculty of Materials Engineering and Environmental Engineering** **Physics and Chemistry Department**
Telephone	+40 264 401262, +40 741111149, +40 741770595
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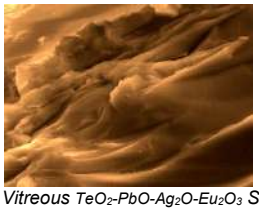
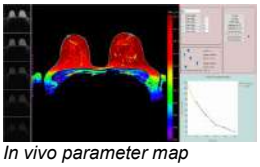
Honorary Director	Prof. Dr. Phys. Eugen Culea
e-mail	eugen.culea@phys.utcluj.ro
Executive Director	Prof. Dr. Habil. Phys. Radu Fechete
email	rfechete@phys.utcluj.ro

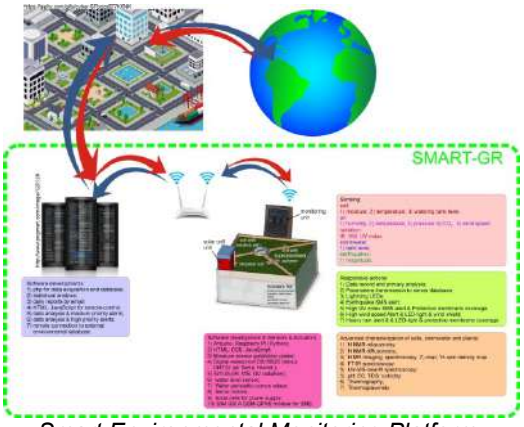


Vitreous TeO_2-PbO-Ag_2O-Eu_2O_3 SHIMADZU 6000 diffractometer



In vivo parameter map

Bruker NMR MQ 20 Minispec



Smart Environmental Monitoring Platform.

Areas of expertise

Laboratory of Nuclear Magnetic Resonance and Sensors' Physics (https://nmr4.utcluj.ro/**;** https://erris.gov.ro/Laboratory-of-Nuclear-Magnet**)**

- ***Structural and dynamic characterization of materials*** (elastomers, various polymers, bio-materials, micro-, nano-hydrogels, PEM membranes, cosmetic materials, construction materials, etc) by measurement of: 1) relaxation times (T_1, T_2, $T_{1\rho}$) and relaxation times distributions; 2) self-diffusion coefficient; 3) dipolar correlation function (MQ); 4) 2D T_1-T_2 , D-T_1, D-T_2 correlation maps and T_2- T_2 exchange maps;
- ***On-line and off line environmental monitoring:*** development of monitoring platforms; detection and measurement of some pollutants spectroscopic methods (IR, UV-Vis, EPR, NMR), sonometry, photometry, specific sensors;
- ***Medical Physics***: *In vivo* MRI, MRs and *f*MRI measurements and *in vitro* biological tissue characterization.
- ***Numeric Analysis and Numeric Modeling*:** Data processing (Image, spectroscopic), Data analysis and interpretation; Statistic analysis (PCA), Artificial Neural Network (ANN) applications in physical data acquisition and analysis, Molecular Modeling; Spectroscopic modeling (FT-IR, ^{1}H and ^{13}C NMR).

X-Ray Diffraction, TG/DTA and Spectroscopy Laboratory

- ***Structural characterization of materials:*** X-ray diffraction and spectroscopic methods (IR, UV-Vis, EPR) are used to realize the structural characterization of materials (glasses, ceramics, metals, etc.).
- ***Characterization of physico-chemical properties of materials****:* Spectroscopic (IR, UV-Vis, EPR), thermal (TG/DTA) and magnetic investigation methods are used to characterize the physico-chemical properties of materials.

Laboratory of Computational modelling of molecular structures of materials

- Based on spectroscopic experimental data obtained for different materials their molecular structure is achieved by using computational modelling.

Team

Prof. Dr. Phys. Culea Eugen, **Prof. Dr. Radu Fechete**, Prof. Dr. Petru Pășcuța, Assoc. Prof. Dr. Simona Rada, Prof. Dr. Phys. Dan E. Demco, Lecturer Dr. Pop Lidia Pop, Lecturer Dr. Liviu Bolunduț, Lecturer. Dr. Maria Boșca, Lecturer Dr. Ramona Chelcea, Lecturer Dr. Dumitrița Moldovan (Corpodean).
Phd students: Ing. Ramona Crainic, Ing. Lavinia Drăgan.

Representative projects

"**Structure-dynamics-properties relations and aging effects in nanocomposite elastomers and proton exchange membranes"**, (2011-2016):
PN-II-ID-PCE-2011-3-0544; http://www.phys.utcluj.ro/resurse/Cercetare/PNII_ID_307_2011.html;

"**New nanostructured vitreous systems with possible application in the immobilization of nuclear wastes"**, (2009-2011), PNII-Idei-183/2009: https://phys.utcluj.ro/resurse/Cercetare/PNII_ID_183_2009_Eng.htm
"Obtaining and characterization of physical and structural properties of some new glasses and glass ceramics doped with 3d and 4f ions with possible applications in electronics and telecommunication", (2009-2011) PNII-IDEI-532/ 2009, https://phys.utcluj.ro/resurse/Cercetare/PNII_ID_532_2009_En.html
"New tellurate and germanate vitreous systems with applications in telecommunications", (2007-2010): Parteneriate, https://phys.utcluj.ro/resurse/Cercetare/CNMP_71099_2007.html
MATNANTECH - "Clustering processes in oxide vitreous systems with 4f ions", (2006-2009) CEEX 47/2006, http://www.phys.utcluj.ro/resurse/Cercetare/CEEX_47_2006.html.
"Nanostructured phases in vitreous systems with 4f ions", CEEX POSTDOC 1546/2006, http://www.phys.utcluj.ro/resurse/Cercetare/CEEX_1546_2006.html (2006-2009).

Significant results

The most representative publications of the past 5 years:

1. R. Fechete, I.A. Morar, D. Moldovan, R.I. Chelcea, R. Crainic, S.C. Nicoara, Fourier and Laplace-like low-field NMR spectroscopy: The perspectives of multivariate and artificial neural networks analyses, Journal of Magnetic Resonance 324, 106915, (2021).
2. C.A. Taulescu, M. Taulescu, M. Suciu, L.C. Bolunduț, P. Pășcuța, C. Toma, A. Urda-Cîmpean, A. Dreanca, M. Șenilă, O. Cadar, R. Ștefan, A novel therapeutic phosphate-based glass improves full-thickness wound healing in a rat model, Biotechnology Journal 16 (2021) art. no. 2100031.
3. P. Păşcuţă, R. Stefan, L.E. Olar, L.C. Bolundut, E. Culea, Effects of Copper Metallic Nanoparticles on Structural and Optical Properties of Antimony Phosphate Glasses Co-Doped with Samarium Ions, Materials 13 (1), 5040, (2020)
4. Ramona Crainic, Radu Fechete, Advanced monitoring of a laboratory scale modular green roof model, AIP Conference Proceedings 2206 (1), 030004, (2020).
5. T. Fischer, D. E. Demco, R. Fechete, M. Möller, S. Singh, Poly (vinylamine-co-N-isopropylacrylamide) linear polymer and hydrogels with tuned thermoresponsivity, Soft Matter 16 (28), 6549-6562, (2020).
6. K. H. Tan, D. E. Demco, R. Fechete, A. Pich, Functional selenium modified microgels: temperature-induced phase transitions and network morphology, *Soft matter,* 15 (15), 3227-3240 (2019).
7. M. Rada, A. Popa, S. Rada, A. Bot, E.Culea, Recycled and vanadium-doped materials as negative electrode of the lead acid battery, *J. Sol.State Electrochem.*, 23(17) (2019).
8. R. E. David, R. Fechete, S. Sfrangeu, D. Moldovan, R. I. Chelcea, I. A. Morar, F. Stamatian, T. Kovacs, P. Popoi, *In Vivo* ^{1}H Nuclear Magnetic Resonance Spectroscopy and Relaxometry Maps of the Human Female Pelvis, *Analytical Letters*, 52 (1) 54-77 (2019);
9. P. Pășcuță, L. Pop, R. Stefan, L. Olar, G. Borodi, L. C. Bolundut, E. Culea, The impact of Ag and Cu nanoparticles on optical and magnetic properties of new Tb_2O_3-PbO-TeO_2 glass ceramic system, *Journal of Alloys and Compounds*, 799, 442 (2019).
10. L. Pop, L. Bolunduţ, P. Pășcuță, E. Culea, Influence of Er^{3+} ions addition on thermal and optical properties of phosphate–germanate system, *Journal of Thermal Analysis and Calorimetry*, 138, 1895 (2019).
11. R. Ștefan, L. C. Bolunduț, L. Pop, G. Borodi, E. Culea, P. Pășcuță, Copper nanoparticles enhanced luminescence of Eu^{3+} doped lead tellurite glass ceramics, *Journal of Non-Crystalline Solids*, 505, 9 (2019).
12. S. Rada, D. Cuibus, H. Vermesan, M.Rada, E. Culea, Structural and electrochemical properties of recycled active electrodes from spent lead acid battery and modified with different manganese dioxide contents, *Electrochem. Acta*, 332-339 (268) (2018).
13. S. Schweizerhof, D. E. Demco, A. Mourran, R. Fechete, M. Moeller, Diffusion of Gold Nanorods Functionalized with Thermoresponsive Polymer Brushes, *Langmuir*, 34, 8031−8041 (2018).
14. R. Fechete, I.A. Morar, D. Moldovan, R.I. Chelcea, R. Crainic, S.C. Nicoara, Fourier and Laplace-like low-field NMR spectroscopy: The perspectives of multivariate and artificial neural networks analyses, Journal of Magnetic Resonance 324, 106915, (2021).
15. R. Pintican, R. Fechete, B. Boca, M. Cambrea, T. Leonte, O. Camuescu, D. Gherman, I. Bene, L. D. Ciule, C. A. Ciortea, S. M. Dudea, A. I. Ciurea, Predicting the Early Response to Neoadjuvant Therapy with Breast MR Morphological, Functional and Relaxometry Features—A Pilot Study, Cancers, 14, 5866, (2022).

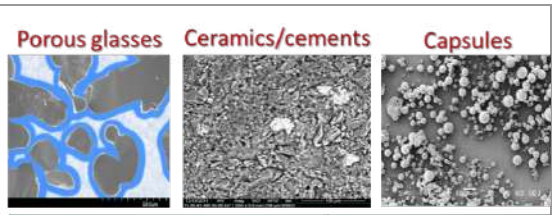
The offer addressed to the economic environment

Research & development	**Characterization of structural and behavioural properties of materials** by using spectrometric and magnetic analysis investigation methods. **Design of advanced models for materials structure** based on spectroscopic data and computational modeling.
Consulting	**Consulting in:** **-spectroscopic and spectrometric analysis methods** (1D and 2D ^{1}H NMR relaxometry and diffusiometry, X-ray diffraction, FT-IR, UV-Vis, EPR); **-environmental monitoring** (sensors/actuators, monitoring platforms, database, data processing, data analysis, sonometry and photometry)**;** **-thermography and thermogravimetry;** **-magnetic measurements.**
Training	Training in using different spectroscopic and spectrometric analysis methods (IR, UV-Vis, EPR, NMR, Thermography), magnetic measurements, sonometry and photometry.

NUCLEAR MAGNETIC RESONANCE DIFFUSOMETRY AND RELAXOMETRY LABORATORY

Contact details

Name	**Nuclear Magnetic Resonance Diffusometry and Relaxometry Laboratory**
Acronym	**NMRDR**
Logo	UTCluj NMR
Site	https://nmr.utcluj.ro/
Address	Bulevardul Muncii, nr.14, rooms 28 and 31 (et. III), Cluj-Napoca, Romania
Faculty Department	**Faculty of Materials and Environmental Engineering** **Physics and Chemistry Department**
Telephone	+40 264 401262
Fax	+40 264 595355
Director	Prof. Dr. Ioan Ardelean
e-mail	ioan.ardelean@phys.utcluj.ro



Areas of expertise

In our laboratory 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 porous media under study have nanometer or micrometer pore sizes and may be fully 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, 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 pores dimension 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).

Team

Prof. Dr. Ioan Ardelean, Lecturer Dr. Codruța Badea, Asist.Dr. Mihai Marius Rusu, Ioana Lacan, Alexandru Vijiila, Gabriel Grama, Alexandru Simedru

Representative projects

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/.
PN-III-P2-2.1-PED-2016-0719 (4.01. 2017-30.06.2018): Developing and testing of a new concrete, with higher flexural strength, obtained through the addition of nanoparticles and organosilane; https://ped125.weebly.com/.
PN-II-ID-PCE-2011-3-0238 (1.03. 2011-15.12.2016): Nuclear magnetic resonance studies of surface effects on dynamics of molecules confined inside porous media with magnetic impurities; https://idei305.weebly.com/.
CEEX MATNANTECH (1.03.2006-30.12.2008): NMR studies of molecular dynamics inside polymeric nanocapsules.
INSTITUTSPARTNERSCHAFT UTCN-Technical University Ilmenau, Germany (2011-2014): Molecular dynamics during the phase transition of liquids confined inside porous media (joint project financed by the Alexander von Humboldt foundation).

Significant results

The most representative publications of the past 5 years:

1. I. Ardelean, "Applications of Field-cycling NMR Relaxometry to Cement Materials", in "Field-Cycling NMR Relaxometry: Instrumentation, Model Theories and Applications", Edited by Royal Society of Chemistry 2018; pag. 462 – 489; http://dx.doi.org/10.1039/9781788012966
2. C. Cadar, C. Cotet, L. Baia, L. Barbu-Tudoran, I. Ardelean, Probing into the mesoporous structure of carbon xerogels via the low-field NMR relaxometry of water and cyclohexane molecules, Microporous Mesoporous Mater., 251, 19-25(2017), https://doi.org/10.1016/j.micromeso.2017.05.033
3. A. Cretu, C. Mattea, S. Stapf, I. Ardelean, The effect of silica nanoparticles on the pore structure of hydrating cement paste: a spatially resolved low-field NMR study, Molecular Physics 117, 1006-1014 (2019), https://doi.org/10.1080/00268976.2018.1513581
4. 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
5. C. Cadar, A. Cretu, M. Moldovan, C. Mattea, S. Stapf, I. Ardelean, NMR T1–T2 correlation analysis of molecular absorption inside a hardened cement paste containing silanized silica fume, Molecular Physics 117, 1000-1005 (2019), https://doi.org/10.1080/00268976.2018.1513582
6. C. Cadar, I. Ardelean, Surface influence on the rotational and translational dynamics of molecules confined inside a mesoporous carbon xerogel, Magnetic Resonance in Chemistry 57 (10), 829-835 (2019) https://doi.org/10.1002/mrc.4819
7. F Gallego-Gómez, C Cadar, C Lopez, I Ardelean, Microporosity Quantification via NMR Relaxometry, The Journal of Physical Chemistry C 123 (50), 30486-30491(2019), https://doi.org/10.1021/acs.jpcc.9b10398
8. 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
9. 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
10. 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
11. I. Ardelean, The Effect of an Accelerator on Cement Paste Capillary Pores: NMR Relaxometry Investigations, Molecules 26 (17), 5328 (2021), https://www.mdpi.com/1420-3049/26/17/5328
12. 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
13. 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 .
14. 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

The offer addressed to the economic environment

Research & development	The NMR diffusometry and relaxometry laboratory provides a variety of measurements for characterization of materials. Between these a list of possible investigations is given bellow: • Study the effects of various additives and admixtures on cement hydration; • Monitoring the alteration and ageing of rubber or polymers as well as the polymerization processes; • Determination of liquid content inside different porous materials (stone, wood, ceramics, catalysts, bricks, soil, etc.) and the pore size distribution; • Determining the degree of deterioration of lubricants; • Study the effectiveness of contrast agents used in MRI; • Determining the water content and its distribution in foods and seeds; • Determining the permeability of soils to certain pollutants; 2D optical images with resolution of up to 1μm of various non-transparent materials.
Consulting	We provide consultancy services on NMR techniques and their applications in medicine, oil industry, study of pollutants transport in soils, pore size characterization, study of cement-based materials, etc.
Training	Training of personal in the field of NMR diffusometry and relaxometry techniques and their applications

RESEARCH LABORATORY FOR COMPOSITE MATERIALS AND ENVIRONMENTAL CHEMISTRY

Contact details

Name	**Research Laboratory for Composite Materials and Environmental Chemistry**
Acronym	**CMEC**
Logo	
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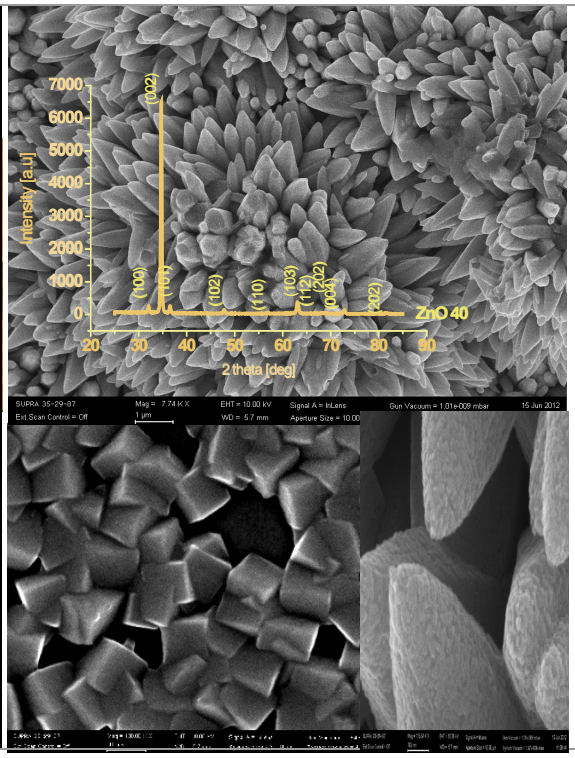
Telephone	+40 264 401 778 +40 743 174 195
Director	Prof. PhD. Eng. Violeta Popescu
e-mail	violeta.popescu@chem.utcluj.ro



Areas of expertise

Materials science and engineering: oxides, sulphides, polymeric materials, biomaterials, polymers recycling, nanomaterials;
Environment science and engineering: pollutants separation and degradation trough adsorption or photodegradation;

Team

Prof. PhD. eng. Violeta POPESCU, Lecturer Ph.D. eng. George Liviu POPESCU, Ph.D. Amalia MAZILU, Ph.D. Eng. Pompilia LOPES, PhD. Liviu MARE, PhD.eng. Felicia MINTEUAN

Representative projects

DISDENT – "Noi materiale pentru tratamentul minim invaziv al cariei dentare incipiente şi al petelor albe" PN-III-P2-2.1-PED2019-2953/13.08.2020 (2020 – 2022)
ENZIPLAST – "The Optimization of the Obtaining Process of the Amino-Acids Chelates for Obtaining of New Materials with New Applications", PNIII-P2-2.1 BG-2016-0204, (2016-2018), https://sites.google.com/site/112bg2016enziplast/
COMBREG, "Research related to the obtaining of fuels and raw materials from renewable sources. The project aims to develop methods for organic waste materials recycling"

Significant results

The most representative publications of the past 5 years:

1. Lopes, P.M.P.; Moldovan, D.; Fechete, R.; Prodan, D.; Pop, C.R.; Rotar, A.M.; Popescu, V. Swelling and Antimicrobial Activity Characterization of a GO-Reinforced Gelatin—Whey Hydrogel. Gels 2022, 9, 18.
2. Turza, A.; Popescu, V.; Mare, L.; Borodi, G. Structural Aspects and Intermolecular Energy for Some Short Testosterone Esters. Materials 2022, 15, 7245.
3. Purcea Lopes, P.M.; Moldovan, D.; Moldovan, M.; Carpa, R.; Saroşi, C.; Păşcuţă, P.; Mazilu Moldovan, A.; Fechete, R.; Popescu, V. New Composite Hydrogel Based on Whey and Gelatin Crosslinked with Copper Sulphate. Materials 2022, 15, 2611.
4. Mazilu Moldovan, A.; Popescu, V.; Ionescu, C.V.; Cuc, S.; Craciun, A.; Moldovan, M.; Dudea, D.; Mesaros, A.S. Various Aspects Involved in the Study of Tooth Bleaching Procedure: A Questionnaire–Based Study. International journal of environmental research and public health 2022, 19, 3977.
5. Popescu, V.; Sarosi, C.; Dumitrescu, R.S.; Chisnoiu, A.M.; Moldovan, M.; Dumitrescu, L.S.; Prodan, D.; Carpa, R.; Gheorghe, G.F.; Chisnoiu, R.M. Preparation and In Vitro Characterization of Gels Based on Bromelain, Whey and Quince Extract. Gels 2021, 7, 191.
6. Popescu, V.; Molea, A.; Moldovan, M.; Lopes, P.M.; Mazilu Moldovan, A.; Popescu, G.L. The Influence of Enzymatic Hydrolysis of Whey Proteins on the Properties of Gelatin-Whey Composite Hydrogels. Materials 2021, 14, 3507.

7. Dascalu (Rusu), L.M.; Moldovan, M.; Prodan, D.; Ciotlaus, I.; Popescu, V.; Baldea, I.; Carpa, R.; Sava, S.; Chifor, R.; Badea, M.E. Assessment and Characterization of Some New Photosensitizers for Antimicrobial Photodynamic Therapy (APDT). Materials 2020, 13, doi:10.3390/ma13133012.
8. Voina, C.; Delean, A.; Muresan, A.; Valeanu, M.; Moldovan, A.M.; Popescu, V.; Petean, I.; Ene, R.; Moldovan, M.; Pandrea, S. Antimicrobial Activity and the Effect of Green Tea Experimental Gels on Teeth Surfaces. Coatings 2020, 10, doi:10.3390/COATINGS10060537.
9. Voina, C.; Muresan, A.; Delean, A.; Moldovan, A.I.; Popescu, V.; Prodan, D.; Petean, I.; Voina-Tonea, A.; Valeanu, M. The Effects of an Experimental Green Tea Extract Gel on the Surface Roughness of Bleached Teeth with Carbamide Peroxide Gels. Revista de Chimie 2020, 71, 312–320, doi:10.37358/RC.20.6.8197.
10. George Liviu Popescu, N.F., Mircea Cristian Dudescu, Violeta Popescu BIODEGRADABLE AGAR-AGAR FOILS WITH POSSIBLE USES IN AGRICULTURE. OBTAINING AND CHARACTERIZATION. ISB-INMATEH AGRICULTURAL AND MECHANICAL ENGINEERING 2019, 8, 448–455.
11. Gheorghe, M.; Popescu, G.L.; Prodan, D.; Cojocaru, I.; Groza, M. Study of Some Soil Properties and Evaluation of the Level of Contamination with Lead in Baia Mare, Aghires and Copsa-Mica, Romania. REVISTA DE CHIMIE 2019, 70, 801–804.
12. Mazilu, A.; Sarosi, C.; Moldovan, M.; Miuta, F.; Prodan, D.; Antoniac, A.; Prejmerean, C.; Dumitrescu, L.S.; Popescu, V.; Raiciu, A.D.; et al. Preparation and Characterization of Natural Bleaching Gels Used in Cosmetic Dentistry. Materials 2019, 12, doi:10.3390/ma12132106.
13. Violeta Popescu, M.M., Codruta Sarosi, Mihaela Vlassa, George Liviu Popescu, Elena David, Diana, Cojocaru Ileana, Doina Prodan The Identification of Branched-Chain Amino Acids and the Testing of the Antibacterial Effect of Whey and Soy Protein Powders.; 2019; Vol. 21, p. 150.
14. Marioara Moldovan, D.P., Codruta Sarosi, George Popescu, Amalia-Ionela Mazilu (Moldovan), Violeta Popescu Evaluation of Colour Modifications and Surface Morphology of Dental Composite.; 2019; Vol. 21, p. 148.
15. Prică, C.-V.; Marinca, T.F.; Neamţu, B.-V.; Popa, F.; Popescu, V.; Chicinaş, I. Structural and Thermal Investigation of Ta–25 Mass% Cu Alloy Prepared by Mechanosynthesis Route. Journal of Thermal Analysis and Calorimetry 2019, 136, 995–1001, doi:10.1007/s10973-018-7816-4.
16. CEBOTARI, V.; POPA, F.; MARINCA, T.F.; POPESCU, V.; CHICINAŞ, I. Caracterisation of High Manganese Silicides Prepared by Mechanical Milling. Powder Metallurgy and Advanced Materials: RoPM&AM 2017 2018, 8, 80.
17. Gherman, T.; Popescu, V.; Carpa, R.; Rapa, M.; Gavril, G.L.; Dudescu, M.C.; Bombos, D. Potential Use of Galium Verum Essential Oil for Antibacterial Properties in Gelatin Based Hydrogels Prepared by Microwave Irradiation Technique. Revista de Chimie 2018, 69, 575–580, doi:10.37358/rc.18.3.6152.
18. Gherman, T.; Popescu, V.; Carpa, R.; Gavril, G.L.; Rapa, M.; Oprescu, E.E. Salvia Officinalis Essential Oil Loaded Gelatin Hydrogel as Potential Antibacterial Wound Dressing Materials. Revista de Chimie 2018, 69, 410–414, doi:10.37358/rc.18.2.6118.

Activity with undergraduate students: More than 24 graduation thesis or dissertation.

Activity with pHD students. Research activity with 14 pHD students: 8 with finalized thesis and 4 in progress.

Activity with postdoctoral students. Research activity of 2 postdoctoral students.

Patent no. RO 127718/2015. M. Moldovan, L. Silaghi-Dumitrescu, G. Furtoş, H. Iovu, C. Petrea, V. Popescu, C. Saroşi, S. Boboia, M. Filip, A.L. Colceriu Burtea, R.L. Silaghi-Dumitrescu. Compoziție endodontică pentru obturarea şi sigilarea canalelor radiculare.

Patent no. RO128800-A2; RO128800/2017. Prejmerean C, Moldovan M, Prodan D, Silaghi D L, Furtos G, Iovu H, Petrea C, Popescu V, Pascalau V, Sarosi C, Boboia S, Filip M, Colceriu B A L, Silaghi D R L, Damian C M, Sarosi L C, Matrice organică şi compozit de restaurare indirectă pentru utilizare în stomatologie.

Products
1. IR photosensitive PbS films; semiconducting PbS, CuS, CdS, TiO_2, ZnO, Fe_2O_3 films and powders.
2. Fuels from plastic waste.
3. Biodegradable plastic materials.
4. Diverse natural extracts.

The offer addressed to the economic environment

Research & development	The correlation between optical, structural and morphological properties of semiconductors. The obtaining of materials with photocatalytic properties. Chemical recycling of plastic materials. Fuels obtaining, characterization and testing.
Consulting	FT-IR and UV-VIS spectroscopy. Plastic materials characterization and recycling.
Training	Rapid identification of organic compounds by IR spectroscopy using ATR-FTIR. Elaboration of UV-VIS spectroscopic quantitative analysis methods. Polymers recycling.

LABORATORY OF ELECTROCHEMISTRY IN ADVANCED MATERIALS

Contact details

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Director	Prof. Lorentz Jäntschi
Honorary Director	Prof. Em. Dr. Chem. Elena Maria Pică
e-mail	Lorentz.JANTSCHI@chem.utcluj.ro Elena.PICA@chem.utcluj.ro

Areas of expertise

Achievement of electrochemical sensors
Study of some advanced materials for membrane sensors
Modelling and simulation of processes

Team

Prof. Lorentz Jäntschi, Prof. Dr. Chem. Elena-Maria Pică, Assoc. Prof. Dr. Chem. Mihaela-Ligia Ungureşan, Assoc. Prof. Dr. Eng. Dana-Adriana Ilețiu-Varvara, Assoc. Prof. Dr. Liviu-Călin Bolunduț, Prof. Dr. Phys. Eugen Culea, Dr. Eng. Ec. Luminița Cristina Pirău, Dr. Mioara Zagrai, Dr. Eng. Marius Roman, Drd. Phd. students: Cornel Sava, Dragoș Teodor Lup

Representative projects

Pică E.M.: Studies and research on replacing the cathode material in oxygen sensors with other materials such as different varieties of coal, 85/1988, 1988-1989.
Pică E.M.: Selective electrochemical nitrite sensor for the control of nitrites in agro-food products. Nitritsenz", INDAL_90/MCT/PNCDI/AGRAL/269/2004, 2004-2006, 44 k$.
Pică E.M.: Synthetic porphyrinic macrocycles, nanostructures with involvement in the configuration of sensors, photovoltaic cells, in anti-corrosion protection and in medicine - NANOMATPORFIRINE. PC-D04-PT4-181/CEEX/MCT/1332/29.06.2005, 300 k$.
Ungureșan M.L.: Kinetics of fast Cu(II) redox reactions with thiocombinations, AT_143/CNCSIS/33532/2003, 2003-2004.
Ilețiu-Varvara D.A.: Development of an efficient recovery method of oily tunder by testing the material and evaluating combustion emissions, CI-1.1-UTCN 2016, 2016-2017, 10k$.
Jäntschi L.: From mathematical chemistry to quantum chemistry, and to medicinal chemistry, ID_1051/UEFISCSU/202/1.10.2007, "IDEAS" 2007-2010, 377 k$.

Significant results

The most representative publications of the past 5 years:

1. Culea, E. Nicula Al.; Erat I. An Infrared Study of $xV_2O_5 \cdot (1-x)B_2O_3$ Glasses. Physica status solidi A 2022, 83, 435-438.
2. Jäntschi, L. Energetics of $C_8B_8N_8$, $N_{12}B_{12}$, and C_{24} Macrocycles and Two [4]Catenanes. Foundations 2022, 2, 781-797.
3. Jäntschi, L. Introducing structural symmetry and asymmetry implications in development of recent pharmacy and medicine. Symmetry 2022, 14, 1674.
4. Jäntschi, L. Modelling of acids and bases revisited. Studia UBB Chemia 2022, 66, 73-92.
5. Pascuta, P.; Stefan, R.; Olar, L.E.; Bolundut, L.C.; Culea, E. Effects of copper metallic nanoparticles on structural and optical properties of antimony phosphate glasses co-doped with samarium ions. Materials 2020, 13, 5040.
6. Pirău, L.C.; Pică, E.M. Maintenance of the equipment used in the medical optics office (in Romanian), Cluj-Napoca, Cluj, Romania: AcademicDirect, 2022. [Online]. Available: http://ph.academicdirect.org

7. Piscoiu, D.N.; Rada, S.; Macavei, S.; Vermeșan, H.; Culea, E. Characterization of calcium oxide treated lead–lead dioxide vitroceramics from recycled automobile batteries by x-ray diffraction, infrared and ultraviolet–visible spectroscopy, and voltammetry. Anal. Lett. 2022, 55, 2347-2358.
8. Pruteanu, L.-L.; Braicu, C.; Módos, D.; Jurj, M.-A.; Raduly, L.-Z.; Zănoagă, O.; Magdo, L.; Cojocneanu, R.; Paşca, S.; Moldovan, C.; Moldovan, A.I.; Ţigu, A.B.; Gurzău, E.; Jäntschi, L.; Bender, A.; Berindan-Neagoe, I. Targeting cell death mechanism specifically in triple negative breast cancer cell lines. Int. J. Mol. Sci. 2022, 23, 4784.
9. Rada, S.; Unguresan, M.; Zagrai, M.; Popa, A. Structural, optical, and magnetic studies of the metallic lead effect on MnO_2-Pb-PbO_2 Vitroceramics. Materials 2022, 15, 8061.
10. Rada, S.; Unguresan, M.; Zhang, J. Structure, XAS analysis, and voltammetric study of copper–manganese-doped electrode materials obtained by recycling of a lead–acid battery. J. Solid State Electrochem. 2022, 26, 2673–2683.
11. Roman, M.-D.; Sava, C.; Iluțiu-Varvara, D.-A.; Mare, R.; Pruteanu, L.-L.; Pică, E.M.; 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.
12. Sas-Boca, I.-M.; Iluțiu-Varvara, D.-A.; Tintelecan, M.; Aciu, C.; Frunză, D.I.; Popa, F. Studies on hot-rolling bonding of the Al-Cu bimetallic composite. Materials 2022, 15, 8807.
13. Sava C.; Pică E. M. Drying and Energy Recovery of Sludge, Studia UBB Chemia 2021, 55, 267-276.
14. Sava, C.; Pică, E.M.; Roman, M.D. Considerations regarding the use of sludge in agriculture. Res. J. Agric. Sci. 2019, 51, 57-63.
15. Taulescu C. A.; Taulescu M.; Suciu M.; Bolunduț L. C.; Pășcuța P.; Toma C.; Urda-Cîmpean A.; Dreanca A.; Șenilă M.; Cadar O.; Ștefan R. A novel therapeutic phosphate-based glass improves full-thickness wound healing in a rat model. Biotechnol. J. 2021, 16, e2100031.
16. Tintelecan, M.; Iluțiu-Varvara, D.-A.; Sas-Boca, I.M.; Aciu, C. The Behavior of a Zn-Al Anticorrosive Coating in the Wiredrawing Process. Materials 2022, 15, 6190.
17. Zagrai, M.; Unguresan, M.L.; Rada, S.; Zhang, J.; Pică, E.M.; Culea E. Local structure in gadolinium-lead-borate glasses and glass-ceramics. J. Non-Cryst. Solids 2020,546, 1-8.

Significant solutions:
Determination of various ions in different environmental samples
Analytical control of chemical and biochemical products/processes
Research-development studies performed, for environmental pollution
Validated models of some chemical processes

Products and technologies:
The development of ecologic products from biodegradable materials for some packs and protection equipment
Electrocatalysis of some transformation reaction for a major different pollutants in inorganic and organic mater
Nanomaterials with applications in mediated electrocatalysis using modified electrodes
Online interfaces for applied research and education: http://l.academicdirect.org

Patents:
Vlascici, D.; Pică, E.M.; Cosma - Făgădar E.; Bizerea O.; Costişor O., Cosma V. Senzor potenţiometric nitrit-selectiv, Patent 2010 No.122.790, in *B.O.P.I* Section:Patents, No.1, pp.72; http://www.osim.ro/publicatii/brevete/bopi_2010/bopi110.pdf
Fagadar-Cosma, E.; Vlascici, D.; Pică, E.M. Costişor, O.; Cosma, V.; Olenic, L. Bizerea, O. Procedure for Obtaining of A Highly Selective Potentiometric Sensor for Silver Ion Detection Based on Porphyrin Ionophore, Patent 2012, No.123.447, in *B.O.P.I* Section:Patents, No.5, pp.104; http://www.osim.ro/publicatii/brevete/bopi_2012/bopi_inv_05_2012.pdf
Bălan, M.C.; Jäntschi, L. Heating and cooling system for passive buildings based on heat and cold storage Patent 2015, No. GB2524551; https://www.ipo.gov.uk/p-ipsum/Case/ApplicationNumber/GB1405465.4

The offer addressed to the economic environment

Research & development	The development of some methods for achievement of electrochemical sensors and achievement of some new sensors used in different measurements (water and soil of environmental measurements) The development of advanced modeling procedures, identification, monitoring and control of processes occurring in electrochemical interface
Consulting	Consulting, design, research and prototyping of different sensors based on reduction of ions element
Training	Advanced materials electrochemistry and obtaining them Obtaining of the electrochemical sensors Modeling and simulation of the chemical processes Physical and chemical reference data

GROUP FOR RESEARCH AND DESIGN IN URBAN PLANNING

Contact details

Name	**Group for Research and Design in Urban Planning**
Acronym	**CPU**
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Director	Conf. Dr. Arh. Octav Silviu OLĂNESCU
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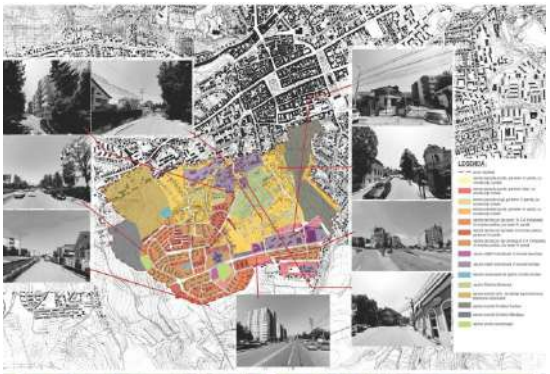

Areas of expertise

Research in urban design and urban planning. **Consulting** in urban design and urban planning
Developing planning documentations and projects: General urban plans and Regional urban plans, together with related local regulations, Urban Detail plans, Protection and development of the built heritage.
Design in architecture and building restoration. **Design** in urban design and urban planning.

Team

Conf. Dr. Arh. Octav Silviu OLĂNESCU
Prof. Dr. Arh. Mihaela Ioana AGACHI, Conf. Dr. Arh. Vlad Sebastian RUSU, Ş. L. Dr. Arh. Moldovan SILIVAN

Representative projects

"**International Architectural competition for the spatial planning of the Tamula lakeside area"**, Voru, Estonia, organized by the Town hall of Voru city ant the Estonian Union of Architects",http://www2.arhliit.ee/english/competitions/domestic/4538/ (2008)
"**International Architectural competition for reconstruction of Rakvere's St Paul's church"**, Rakvere, Estonia, organized by the City of Rakvere/ Estonia", http://www2.arhliit.ee/english/competitions/domestic/4550/ (2009)
"**International competition for the Memorial of Aeronautics, Bucharest**",http://www.oar.org.ro/concurs.php?id=10&st=1 (2009)
"**General Urban Plan with related local regulation (PUG and RLU) for Azuga Town, Prahova County**", (2009)
"**International competition for the theme of the Cultural Center of Transylvania in Cluj-Napoca, organised by the City of Cluj-Napoca**",http://www.archdaily.com/112383/transylvania-cultural-center-ioana-mihaela-agachi-octav-s-olanescu-anamaria-c-popa-vlad-s-rusu/ (2010)
"**Historical and urban study for P.U.G. of Cluj-Napoca**", (2010)

Significant results

The most representative publications of the past 5 years:

Studies:
1. 2019 - Urban Regeneration Guides for the Colective Housing Neighborhoods – Constanţa
2. 2020 – Urban Regeneration Guide – Integrated solutions for improving urban cmfort for the large collective housing complexes built during the stea socialism period

Books

1. Olănescu, Octav Silviu, *Aspecte ecologice în determinarea mediului construit*, Cluj-Napoca: U.T. Press, 2018

International competitions awards:

1. 2022 – 2nd Prize at the International competition for *Parc DN3C Constanţa*
2. 2022 – 3rd Prize at the International competition for *Piata Sfatului – Brasov Central Square*
3. 2020 – 2nd Prize at the International competition for *Transplant Integrated Center*, Cluj-Napoca
4. 2019 - 1st Prize at the International competition for *Sopor Masterplan*, Cluj-Napoca
5. 2019 – 2nd Prize at the International competition for *Cetăţuia Hill*, Cluj-Napoca
6. 2018 - 1st Prize at the International competition for *Parcul Feroviar*, Cluj-Napoca

The offer addressed to the economic environment

Research & development	Studies regarding urban design and urban planning and history of urbanism. Architectural design, building restoration design, urban design.
Consulting	Our group is open to cooperate in interdisciplinary teams for research in urban design and urban planning, at national and international level, with researchers, teachers from universities and with professional associations.
Training	The group is able to approach general urban plans, regional urban plans, urban detail plans, plans for territory improvement at different levels and also architectural projects.

PROJECTED SPACE | PRODUCED SPACE |PERCEIVED SPACE - RESEARCH GROUP

Contact details

Name	**Projected Space | Produced Space | Perceived Space** Research Group
Acronym	ppp SPACE
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Telephone	+40/0264/401843
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Director	Dr. Habil. Dana JULEAN, architect
e-mail	dana.julean@arch.utcluj.ro,spatiuproiectat.spatiuprodus.spatiuperceput@groups.facebook.com

Areas of expertise

- research in theory of architecture and architecture criticism
- interdisciplinary studies bordering on theory of architecture, culture theory, psychology, philosophy and sociology
- miscellaneous studies related to space, spatiality, and interpretations of space

Team

active members:
Senior Lecturer Dr. Hbil. Arch. Dana JULEAN; **Senior Lecturer Dr. Arch. Smaranda TODORAN**; **Senior Lecturer Dr. Arch. Adriana MĂGERUȘAN**; **Assist. Prof. Dr. Arch. Dan-Ionuț JULEAN**
external collaborators:
Senior Lecturer Dr. Kinga SZABO

Representative projects

„PARTNERSHIP for organising a series of master classes in architecture within the project «Universitatea Vârstei a 3-a (U3)» Cluj-Napoca [‘University for elderlies’ Cluj-Napoca]”
period: December 2018 - January 2019
partners: Platforma România 100 and the Technical University of Cluj-Napoca, through the research group „pppSpace” [Projected Space | Produced Space | Perceived Space]
team: CROITORU, Andra for Platforma România 100 and JULEAN, Dana for pppSPACE
„PARTNERSHIP for colaboration for the “Up STAIRS” project
period: June 2017 - June 2018
partners: Asociația pentru Teatru și Carte (PETEC) and the Technical University of Cluj-Napoca, through the research group „pppSpace” [Projected Space | Produced Space | Perceived Space]
team: MARINESCU, Irina and UȘURELU, Alina for PETEC and JULEAN, Dana for pppSPACE

Significant results

The most representative publications of the past 5 years:

- JULEAN Dana; JULEAN Dan-Ionuț. „Monumentul: de la abandon la comunitate. Un studiu de caz despre valorificarea patrimoniului industrial / The Monument: from Abandonment to Community. A Case Study on the Enhancement of Industrial Heritage", Transsylvania Nostra nr. 3 (2020): 13-21. Cluj-Napoca: SC. UTILITAS SRL. ISSN 1842-5631 (print), ISSN-L 1842-5631, ISSN 2344 – 5084 (on-line) http://transsylvanianostra.eu/tnjournal/ro
- JULEAN, Dana. „Eșecul arhitecturii". In: Psihoarhitectura: diseminări despre interferența arhitecturii cu psihologia, vol II, coordonator IANA Codruța (Iași: Pim, 2019): pp. 81-104 ISBN: 978-606-13-4800-8
- JULEAN, Dana. „Potențialul basmului în vindecarea spațiului". In: Psihoarhitectura: diseminări despre interferența arhitecturii cu psihologia, vol II, coordonator IANA Codruța (Iași: Pim, 2019): pp. 105 -121 ISBN: 978-606-13-4800-8
- POP, Dana; MATU, Silviu-Andrei; SZENTÁGOTAI, Aurora. "Experimental Assessment between Building Regulations and Claustrophobia", Urbanism. Arhitectură. Construcții vol. 9 nr. 3 (2018): 251-264. ISSN 2069-6469 http:///uac.incd.ro/

books

TODORAN, Smaranda Maria, ed. coord. OPINCARIU, Dana, ȚIGĂNAȘ, Șerban, ed. *Locuire 123. Caietul cu case*, UTPRESS, Cluj-Napoca: UT Press, 2020. ISBN: 978-606-737-xxx-x

The offer addressed to the economic environment

Research & development	1. theory of architecture, architecture criticism 2. interdisciplinary studies bordering on theory of architecture, culture theory, psychology, philosophy and sociology 3. architectural research methodology 4. culture theory 5. cultural sustainability 6. politics of heritage 7. socio-spatial practices 8. space psychology and perception 9. tactical urbanism
Consulting	1. studies in the fiels of: theory of architecture, architecture criticism, interdisciplinary research 2. research methods on architecture 3. evidence based design 4. spatial experiments - architecture, art, urban design 5. editorial projects
Training	1. interdisciplinary workshops 2. summer schools 3. courses 4. masterclasses

ARCHITECTURE. TIME. HABITUDES RESEARCH GROUP

Contact details

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Fax	-
Director	Dr. habil. Dan-Ionuţ JULEAN, architect Associate Professor
e-mail	ionut.julean@arch.utcluj.ro

Areas of expertise

History and theory of architecture
Art history – decorative and applied arts
Building restoration
Cultural heritage enhancement
Style and decoration – cultural environment and lifestyle
Cultural tourism

Team

Assoc. Prof. Dr.habil. Arch. Dan-Ionuţ JULEAN – Senior Lecturer Dr. Arch. Dragoş Ştefan Dascălu,. Senior Lecturer Dr. Arch. Dana Julean, Senior Lecturer Dr. Arch. Daniel Şerban, Ph.D. Arch. Horia Mihai-Coman, Ph.D. cand. Arch. Maria-Alexandra Sas, Ph.D. cand. Ileana-Ana Abos, Ph.D. cand. Alida-Ozana Crişan.
External collaborators:
Dr.Arch. Eugen-Cristian Rus, Dr. Dana Maria Mărcuş (licensed in history),
Dr. Arch. Endre Ványolos, Dr. Arch. Vlad Nicolae Cocheci;
Petru Dimoff, photographer.

Representative projects

Three research projects and five partnerships, within the past five years:

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 (Bucureşti) and the Technical University of Cluj-Napoca
Coordonator Parteneriat – Conf. dr. habil. arh. Dan-Ionuţ JULEAN
2 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
PARTNERSHIP for organising a series of master classes in architecture within the project «Universitatea Vârstei a 3-a (U3)» Cluj-Napoca ['University for elderlies' Cluj-Napoca]"
period: December 2018 - January 2019
partners: Platforma România 100 and the Technical University of Cluj-Napoca
PARTNERSHIP for professional activities within the project „Free Time Factory", Turda
period: March 2016 - December 2018
partners: Fundaţia Rațiu pentru Democrație and the Technical University of Cluj-Napoca
RESEARCH PROJECT for enhancing built heritage – „Free Time Factory" the former Brewery in Turda
period: May 2018 - June 2018
partners: Fundaţia Rațiu pentru Democrație and the Technical University of Cluj-Napoca

RESEARCH PROJECT for enhancing built heritage – the Central Cemetery in Cluj-Napoca
period: September 2017 - October 2017
partners: Ordinul Arhitecţilor din România – Filiala Teritorială Transilvania and the Technical University of Cluj-Napoca
RESEARCH PROJECT for enhancing built heritage – „Free Time Factory" the former Brewery in Turda
period: February 2017 - June 2017
partners: Fundaţia Rațiu pentru Democrație and the Technical University of Cluj-Napoca

Significant results

The most representative publications of the past 5 years:

1. Julean, Dan-Ionuț; Julean Dana, "Dr. György Versényi: Discovering the Story Behind Three of His Poems", *Philobiblon*, vol. XXVII, Nr. 2 (2022): pp. 235-260.
2. Julean, Dan-Ionuț, "Între naționalism și inventare a tradiției. Catedralele Unirii la vest de Carpații", *Psihoarhitectura: diseminări despre interferența arhitecturii cu psihologia,* vol II, coordonator Codruța Iana, Iași: Pim, 2019, pp. 151-166.
3. Julean, D.I., „«Spre Oradea» în căutarea memoriei unei comunităţi evreieşti", *Arhitectura* – revista Uniunii arhitecţilor din România fondata în 1906, No. 4 (682) (2019): pp. 42-49.
4. Julean, D.I., "The Architecture of a Photograph: Deconstructing La Castiglione's Scherzo di follia", *Philobiblon*, vol. XXII, Nr. 2 (2017), pp. 159-173.
5. Mihai-Coman, Horia. „«Identity» in the approach of architecture and urbanism during the socialist-communist period in Romania". *Journal of Urban and Landscape Planning – JULP*, nr. 5 (2020): pp. 1-11.
6. Mihai-Coman, Horia. „Intervenţii postbelice (1944-1989) în zonele centrale ale unor oraşe româneşti. Arhitectura reprezentativă. Arhitecţii" / „Post-War Interventions (1944-1989) in the Central Areas of Some Romanian Cities. Representative Architecture. The Architects". *Transsylvania Nostra*, nr. 2 (2019): pp. 47-57.
7. Sas, Maria Alexandra, "Reconsiderarea unei ruine. Studiu pentru valorificarea ansamblului Castelului Haller-Jósika din Garbou", *Transsylvania Nostra*, Year XIII, No. 50 (2019), pp. 20-31.
8. Paun-Constantinescu, Ilinca; Dascălu, Dragoș, Sucală, Cristina, "An Activist Perspective on Industrial Heritage in Petrila", *The Public Historian*, Vol. 39, No. 4 (2017), pp. 114–141;

Books:

1. Julean, Dan-Ionuț; Julean, Dana. *Recompunând fragmente: o (micro)istorie a familiei Korda de Borosjenő în context / Recomposing Fragments: a (micro)history of the Korda de Borosjenő family in context,* Cluj-Napoca: Presa Universitară Clujeană, 2022. 206 p. (e-book).
2. Julean, Dan-Ionuț; Julean, Dana. *Ascensiunea și decăderea domeniului Haller din Coplean. Destinul unei familii, destinul unui castel / The Rise and Fall of the Haller Estate in Coplean. The Destiny of a Family, the Destiny of a Castle*, Cluj-Napoca: Presa Universitară Clujeană, 2019. 182 p. (e-book).
3. Julean D.I.; Julean Dana, *Catedralele Unirii la vest de Carpați / The Cathedrals of the Great Union to the West of the Carpathians*, Cluj-Napoca: Presa Universitară Clujeană, 2018. (e-book).

The offer addressed to the economic environment

Research & development	specialized studies (architecture, history and theory of architecture / art history, genealogy) heritage studies & enhancement of the cultural and artistic heritage architectural restoration curating exhibitions cultural tourism scenography
Consulting	architectural and artistic heritage (history of architecture, art history) architectural restoration decorative and applied arts – valuation of antique furniture and decorative objects curating activities – co-curating exhibitions, , exhibit design and solutions from conception to realisation cultural and academic tourism scenography Transylvanian genealogy
Training	the possibility to co-organise workshops, summer schools, masterclasses, specialised courses, etc.

INVENTARIUM - Research Group for the [Re]Cognition of Built and Landscaped Heritage

Contact details

Name	**INVENTARIUM: research group for the [re]cognition of built and landscaped heritage**	
Acronym	**INVENTARIUM**	
Logo	• INVENTARIUM •	
Site		
Address	room 4, 34-36 Observatorului str., 400489 Cluj-Napoca	
Faculty Department	**Faculty of Architecture and Urban Planning**	
Telephone	-	
Fax	-	
Director	Prof. PhD habil. Arch. Virgil POP	
e-mail	virgil.pop@arch.utcluj.ro	

Areas of expertise

The documentation, evaluation, conservation, rehabilitation, and communication of architectural, urban and landscape-architectural heritage.

Team

Prof. PhD Habil. Arch. Virgil POP, director Assoc. Prof. PhD Arch. Andreea MILEA Assoc. Prof. PhD Arch. Cristina PURCAR Lecturer PhD Eng. Imola KIRIZSÁN Lecturer PhD Arch. Silivan MOLDOVAN Lecturer PhD Arch. Mihai RACU Teaching Assistant PhD Arch. Alexandru SABĂU Special academic staff PhD Arch. Silviu BORȘ	PhD student Arch. Verona MUSTEAȚĂ PhD student Arch. Marius PĂSCULESCU PhD student Arch. (Gergely) Csenge PATAKFALVI PhD student Arch. Cătălin POP

Representative projects

2013 - on-going: Transformation of medieval religious buildings during the Counter-Reformation. Coordinators: Prof. PhD Arch. Virgil Pop. researchers: PhD stud. Arch. Marius Păsculescu, Arch. Csenge Patakfalvi (Gergely).

2019 – on-going: Documentation and critical analysis of rural architectural and environmental heritage. 2019-20 Historical study for the village Coșbuc. 2022-23 Participation in an international collaboration with Université de Toulon. Coordinator: Prof. PhD Arch. Virgil Pop. Researchers: PhD student Arch. Verona Musteață, Assoc. Prof. PhD Arch. Cristina Purcar, Assoc. Prof. PhD Arch. Andreea Milea.

2022-2023: Urban renewal processes through heritage-sensitive regeneration of former industrial sites, 2022-2023. Organisation of itinerant exhibit around the urban regeneration projects of professor urbanist Marcel Smets (KU Leuven, Belgium), organised in a first edition at Cluj, during September-October 2023, in partnership with the Cluj contemporary art federation Centrul de Interes. Coordinators: Assoc. Prof. PhD Arch. Cristina Purcar, Assoc. Prof. PhD Arch. Andreea Milea.

2020: Historical study for the Post Office main building in Cluj. Consultancy for the designing office Scripcariu Birou

de Arhitectură. Prof. PhD Arch. Virgil Pop.

2015 – on-going: Railway architectural heritage in Transylvania: documentation and evaluation. Studies and recommendations for interventions, including in partnership with CFR (Romanian Railway Company, Cluj Regional). Coordinators: Prof. PhD Arch. Virgil Pop, Assoc. Prof. PhD Arch. Cristina Purcar, Assoc. Prof. PhD Arch. Andreea Milea. Researcher PhD stud. Arch. Adrian Niculaș.

2014 – on-going: Historical Parks of Transylvania: field research, sources and documents research, publishing studies, (including recommendations for interventions), Coordinator: Assoc. Prof. PhD Arch. Andreea Milea.

2022 – **on-going: Restoration and recording activities of Debreczeni László**, Lecturer PhD eng. Imola Kirizsan.

Significant results

1. Virgil POP, „Biserica de lemn din Calna," in *Calna 700* (coord. Iustin Marchiș), București, 2022, pp.182-202.
2. Virgil POP, Iosif-Andrei KISS, „Spațiul verde în centrul orașului transilvănean" / "Green Spaces in Transylvanian Town Centres," in *Transsylvania nostra* nr.60, 04/2021, pp. 2-18.
3. Virgil POP, „Istoria reprezentării șarpantelor" / "The History of Roof Structure Representation" at the International Conference on Built Heritage Theory and Practice – Tusnad, Cluj, pp. 17-19.11.2022.
4. Virgil POP, „Imaginarul arhitectural din Transilvania," in Liviu Malita (ed.), *Enciclopedia imaginariilor din Romania,* Vol.5: Imaginar si patrimoniu artistic, București: Polirom, 2020, pp.290-320.
5. Andreea MILEA, „Spații publice plantate bistrițene până la sfârșitul celui de-al Doilea Război Mondial" / "Planted Public Spaces in Bistrița until the End of World War II", *Transsylvania Nostra*, 03/2021, pp. 33-60.
6. Andreea MILEA, „Grădini publice băimărene până la sfârșitul celui de-al Doilea Război Mondial" / "Public Gardens in Baia Mare until the End of World War II", *Transsylvania Nostra*, 01/2021, pp. 27-39.
7. Andreea MILEA: „Promenada Aiudului" / "The Aiud Promenade", *Transsylvania Nostra,* 01/2020, pp. 14-24.
8. Cristina PURCAR, "Railways and History of Architecture: Research tracks to and from Transylvanian stations", invited lecture at the *Society of Architectural Historians – Great Britain*, July 6th, 2021.
9. Cristina PURCAR, Virgil POP, "A Taste for Modernity. An Architectural Semiotics of pre-WWI Railway Station Restaurants," in *Shaping Modernity. The Railway Journey Across Two Centuries*, Radu Marza ed. Cluj: Mega, 2022, pp.59-90.
10. Cristina PURCAR, "A Tale of Two Lines: "The Transylvanian" and "The Imperial": Mapping Territorial Integration through Railway Architecture, *Social Science History* 45(2), 2021, pp. 317-339.
11. Virgil POP, Cristina PURCAR, „Când fondul devine figură. Studiu arhitectural despre Hordou, satul lui Coșbuc", în *Istoria și scrisul istoric azi. Opțiuni metodologice. Paradigme. Agendă*, S. Andea, I.M. Balog, ș.a. eds., Cluj: Școala Ardeleană, 2020, pp.1007-1021.
12. Cristina PURCAR, Virgil POP, "Baia Mare Railway Station. A study for the (re)cognition of post-war architectural heritage," *Transsylvania Nostra* 3/2020, pp. 22-35.
13. Cristina PURCAR, Virgil POP, "Appropriations: Competing Modernisms in Transylvanian Railway Architecture, 1930s - 1940s," sITA – studies in History and Theory of Architecture, nr.7/2019, pp. 119-136.
14. Imola KIRIZSAN, "About interventions on historic buildings in Transylvania. Changes of approach, from local interventions to complex conservation Works", In. *Restoration in Romania, Theory and practice*, Carsa Edizione, Pescara, 2020, ISBN 978-88-501-0392-8, pp 138-149.
15. Imola KIRIZSAN, President of the Organising Committee – Practical and Theoretical Issues of Built Heirtage Conservation - Scientific Conference Series.
16. Imola KIRIZSAN, "About historic roof structures," Invited speaker at OAR meeting about Heritage, 2022.
17. Imola KIRIZSAN, "Minimal Intervention on historic wood," Special research topic at International ICOMOS Wooden Committee, 2022.
18. Imola KIRIZSAN. Open day at Greek Catholic Cancellary Blaj. Architectural students & young locals 02.09.2022.

The offer addressed to the economic environment

Research & development	Architectural and art historical studies, archival studies, photographic documentation of built and landscaped heritage. Surveying and diagnosis of built, urban, and landscaped heritage. Communication of built heritage to the public through publications, exhibits, conferences, tours.
Consulting	Historical studies, recommendations for interventions, architectural and urban heritage conservation.
Training	Training in surveying, studying and evaluating architectural and urban heritage.

ARTS • CULTURE • DESIGN • SUSTAINABILITY

Contact details

Name	**Arts - Culture - Design - Sustainability**
Acronym	**ACDS**
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Director	Assoc.Prof.PhD Arch. Dorina VLAD
e-mail	dorina.vlad@arch.utcluj.ro, dorinavlad@yahoo.com

Areas of expertise

Research and study in the field of : - architecture and decorative arts, contemporary design – architectural design / object design; - advances in architectural technology and design; - sustainability – part of contemporary society development; - research and study of rural and urban heritage and communities; - exhibition organization and participation, domain-specific communication; - education and improvement of the educational process.

Team

Assoc.Prof.PhD. Arch. Dorina VLAD, Assoc.Prof.PhD. Arch. Dana OPINCARIU, Assoc.Prof.PhD. Arch. Paul MUTICĂ, Lect.PhD.Arch. Andreea POP (MOȚU), Lect.PhD.Arch. Paul MOLDOVAN, Lect.PhD.Arch. Leonard VARTIC, T.assist.PhD.Arch.Ana-Maria GRAUR, T.Assist.PhD Arch.Alina VOINEA, PhD stud. Arch. Fabian LUCA.
External Collaborators: Lect.PhD.Arch. Adrian ARAMĂ, Arch. Raluca GRAPA-ROȘCA, PhD stud.Arch. Alexandra ZAHARIA

Representative projects

P.MOLDOVAN: **Student competition organization,** partnership with furniture manufacturer Vitra '#refreshVerner Panton's even', 2019/20
A.VOINEA: **Postdoc researcher InoHubDoc "The art of contemporary living in the Saxon rural house in Transylvania. Intelligent dialogue between inherited tradition and technological innovation"**

Significant results
Books (2018-2022):
A.VOINEA, „Valori identitare transmisibile în arhitectura rurală săsească din Transilvania", Presa Universitară Clujeană, ISBN 978-606-37-1410-8, 2022
D.VLAD, A.MOȚU, „Mobilier. Tehnica mobilei. Note de curs", ISBN 978-606-737-447-6, Cluj-Napoca: UTPRESS, 2020
L.VARTIC, „Limbajul cartografic" ISBN 978-606-737-448-3, Cluj-Napoca: UTPRESS, 2020
P.MOLDOVAN, „Transformations et mutations de l'enseignement de l'architecture à l'ère du numérique. Persistance ou obsolescence du modèle d'enseignement du projet de type Beaux-Arts", Cluj-Napoca: U.T. Press, 2019
Articles (2018-2022):
2022: D.VLAD, A.POP, F.LUCA, "One's personal exploration through design", 10th Edition. Questions International Conference, oct 2022
• D.OPINCARIU, A.POP,"Teaching Architecture: The 2020 Experience", ICERI2021 Proceedings ISBN: 978-84-09-34549-6, doi: 10.21125/iceri.2021.1152, pp.5029-5033
• D.OPINCARIU, A.POP, A.VOINEA, "Teaching Micro-Architecture", 14th annual International Conference on Education and New Learning Technologies, Palma de Mallorca (Spain), 4-6 July, 2022
• A.VOINEA, "Saxon Transylvania, an Identity Potpourri and a Cultural Catalysis in the Social Network Context of the Last Millennium",Philobiblon Transylvanian Journal of Multidisciplinary Research in Humanities, https://doi.org/10.26424/philobib.2022.27.2
• A.VOINEA, "Sustainable Dialog Between Traditional Revival and Contemporary models in the case of Saxon Settlements in Transylvania", Proceedings of 22nd SGEM International Multidisciplinary Scientific GeoConference Viena, 8-11 Dec. 2022
• L.VARTIC, L. PATACHI, A.VOINEA, "Experimenting with Form. Teaching Architecture Students Design Basics Through a Real Project"; A.VOINEA, "Architecture Education, a Place of Identity Transition and Professional Transformation", Proceedings of 14th annual International Conference on Education and New Learning Technologies, Palma de Mallorca (Spain), 4-6 July, 2022
2021: D.OPINCARIU, A.MOTU, L.VARTIC, A.VOINEA, "Mimetics and Originality in Architectural Design", "Evolution and

Sedimentation in Design Process - Retrospective of an Experience at Architecture Design Studio", "Back to the Future - The Role of Architectural Hand Drawing", "Learning in Perspective - Past, Present and Future of the Perspective Drawing", "Architecture Models. The Role of Three- Dimensional Imagery in the Process of Learning Architecture" De-Sign: Environment Landscape City 2021, Venice Biennale Resilient Communities.
• A.POP, „Sustainable Faces of Product Design", Cees 2021,12-15 October, Coimbra, Portugal
• A.VOINEA, L.PATACHI, "Paradigm Shifts in Architecture Education. An Assesment on Communication and Creativity On-line in Isolation", IATED Proceedings of ICERI 2021-14th International Conference of Education, Research and Innovation, 8-9 Nov.2021, Valencia, Spania, pp. 8641-8650, ISBN: 978-84-09-34549-6 / ISSN: 2340-1095,
2020: D.OPINCARIU, A.VOINEA, "Creative Power in Local Scenery and Academic Design Process, Framing Creative Typologies in Interior Design", SGEM International Scientific Conferences on Earth & Planetary Sciences, Viena, 2020
• D.OPINCARIU, A.MOTU, L.VARTIC, "A Sensorial Approach to Natural Landscape", "Decomposition and Recomposition of Natural Landscape","Features of Landscape, a Visual Interpretation", De_Sign Environment Landscape City (a cura di G. Pellegri), Intern.Conf.on Drawing, Genova University Press, pp.219-230, pp.413-422, pp.443-450, ISBN: 978-88-3618-042-4
• A.M.GRAUR, C.MARZA, G.CORSIUC, "Polyhedra in Architectural Design", moNGometrija 2020 7th International Scientific Conference on Geometry and Graphics 18-21 September 2020. Belgrade, Serbia
• C.MARZA,G.CORSIUC, A.M.GRAUR, "About the Geometry of some Fittings used in Ftat-Oval Ducts", moNGometrija 2020 7th International Scientific Conference on Geometry and Graphics 18-21 September 2020. Belgrade, Serbia
2019: D.VLAD, A.MOȚU, "A Sight towards the Design Museum. Thinking Big or Thinking Small?", 6th SWS International Scientific Conference on Arts and Humanities ISCAH 2019, Conference Proceedings, Vol 6, pp.329-336,
• A.MOȚU, D.VLAD, F.LUCA, "Learning to Design. A road-map of Specialized Design Project", Acta Technica Napocensis: Civil Engineering & Architecture, vol. 62 No. 1, 2019, pp.26-39, ISSN 1221-5848
• A.M.GRAUR,C.MARZA,G.CORSIUC, "Student Approaches on Warped Surface", Journal of Ind.Design and Eng.Graphics, 2019
• S.TIGĂNAȘ, P.MOLDOVAN, "Arh. Șerban Țigănaș recomandă ateliercetrei - Anamaria și Paul-Mihai Moldovan." Arhitectura 1906: BNA 2018 600 pentru viitor. 2-3/2019 (680-681):48-51, 2019
• L.VARTIC, "Cadrul architectural în pictura flamandă din prima jumătate a secolului al XV-lea", Studia Historia Artium, no. 1/ 2019 .vol 64 (LXIV) dec. UBB Cluj Napoca
Articles (2018): https://drive.google.com/drive/u/0/folders/1Ia11CQJPPSmhnhncm-M37zqgNmK8UGq8
Patents registration
P.MOLDOVAN, A.MOLDOVAN, OSIM: Certificat de înregistrare desen/model 'Masă', nr. 021763 din 30.01.2018
Participation in exhibitions (2018-2022):International exhibitions:
L.VARTIC • Project financed by The Romanian A.F.C.N., Cultural intervention section, Green Stage, Community Theatre for the Environment, Animaart, scenography author 2021 • „Reclusive", personal exhibition, painting, Cultural Palace Bistrița, „Casa cu Lei"Gallery, dec.2021 • "Multicultural Identities", (group exhibition), O.N.U. headquarters, New York, S.U.A., 2019
P.MOLDOVAN: • Exhibitor Maison&Objet Paris, 8-12 Sept.2022, Paris, France • Exhibitor International Contemporary Furniture Fair New-York, 15-17 May 2022, New-York, ICFF New-York & Wanted Design Manhattan • Exhibitor 5th Balkan Architectural Biennale, Belgrade, 8-15 Dec., Balkan Architectural Biennale, Belgrade, Serbia • Exhibitor BigSee Interior Design Awards, Ljubliana, 14-21 Oct. 2021, Zavod Big Center for creative economy of Southeast Europe Ljubljana, Slovenia • Exhibitor IMM Cologne 2020, 13-19 ian.2020, Cologne, Germania, Verband der Deutschen Möbelindustrie • Exhibitor–2ndprize,
National exhibitions/Exhibitions organization: https://drive.google.com/drive/u/0/folders/1Ia11CQJPPSmhnhncm-M37zqgNmK8UGq8
Projects: D.VLAD, F.LUCA, A.MOȚU, Interior design – the Entrance Pavilion of the National Ethnographic Park "Romulus Vuia". Project realized within the partnership between INVENTARIUM research group, A.C.D.S. and the Ethnographic Museum of Transylvania - no. registr. UTCN 7571 / 02.04.2018
Prizes, nominations and selections for national and international competitions:
• P.MOLDOVAN-Vila Cheia-Winner Rural revitalization section, BNA 2021; Winner Rural section, BATRA 2021 • cross. sideboard -Nomination Object design section, BATRA 2021 • CVG House - Winner Interior design section, BigSEE Design Awards Ljiubljana, Slovenia,
2021; Grand Prix nominee residential section, BigSEE Design Awards Ljiubljana, Slovenia, 2021 • L.VARTIC - The Romanian Pavilion at the Venice Architecture Biennale, 2020, *third prize (group member) • D.VLAD– Ascanio Damian Research Award, 2005 • A.ARAMĂ–The Romanian Pavilion at the Venice Architecture Biennale, 2016 (group member)

The offer addressed to the economic environment

Research & development	Studies and collaborations with economic, educational, cultural and administrative institutions and organizations regarding architecture and decorative arts, contemporary design, architectural technology; Studies - investigation and identification of sustainable development directions for local communities (in collaboration with other institutions, organizations, research groups); Rural and urban heritage and communities – identification and research of architectural, natural, social,
Consulting	•Assoc.Prof.PhD.Arch. D. VLAD: CNMC (Comisia Nationala a Muzeelor si Colectiilor – Museums and Collections National Committee) certified expert for meaningful artistic goods-furniture. •Assoc.Prof.PhD.Arch. P. MUTICĂ: BLETJ Cluj (Local Bureau for Technical and Judicial Expertise for Cluj) judicial expert with the Tribunal of Cluj County
Training	Competition organization, exhibitions, study visits – their aim is to create a link between the university (FAUP) and the economic or cultural environment (collaborations with museums, private cultural organizations)

CENTER OF ONOMASTICS

Contact details

Name	**Center of Onomastics**
Acronym	**CO**
Logo	
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Telephone	+40 743770876
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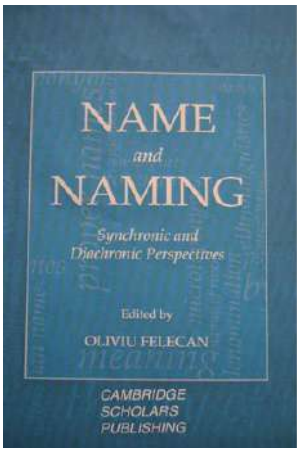

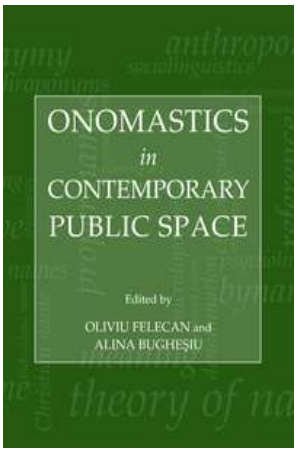

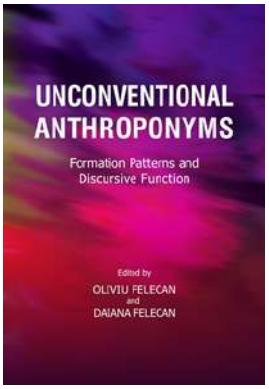

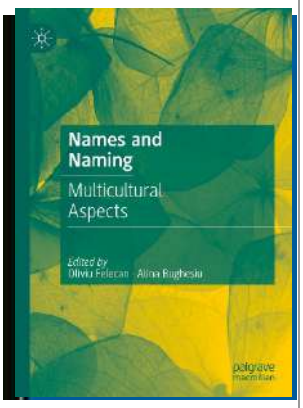

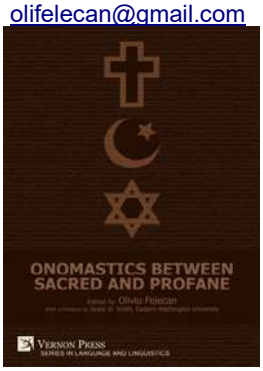

Areas of expertise

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.

Team

Prof. Dr. Hab. Oliviu Felecan, Prof. Dr. Hab. Daiana Felecan, Dr. Alina Bughesiu, Dr. Adelina Mihali

Representative projects

"**Multiethnic Connections in the Anthroponymy of Maramureş, a Central European Area**", IDEI, (2009)
"**Onomastics in Contemporary Romanian Public Space: Socio- and Psycholinguistic Research**", TE grant, (2012)
"**Unconventional Romanian Anthroponyms in European Context: Formation Patterns and Discursive Function**", TE grant, (2011)

Significant results

Books:

1. 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.
2. O. Felecan, A. Bugheșiu (eds.), *Names and Naming: Multicultural Aspects*, Palgrave Macmillan, 2021, 455 p., DOI: 10.1007/978-3-030-73186-1
3. O. Felecan, *Onomastics between sacred and profane*, Wilmington: Vernon Press, 2019, 434 p

4. D. Felecan, *Întâlnire cu semnele textului. 18 popasuri de lectură critică*, București: Editura Academiei Române, 2018.
5. O. Felecan, *Proceedings of the Fourth International Conference on Onomastics "Name and Naming". Sacred and Profane in Onomastics*, Cluj-Napoca: Editura Mega, Editura Argonaut, 2017, 1255 p.
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9. O. Felecan, *Transylvania - A Toponymic Perspective*, în „Onomastica Uralica", nr. 12/2018, p. 289-299.
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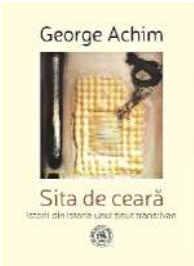
The offer addressed to the economic environment

Research & develop-ment	Research and development in the field of philology is mainly achieved with the help of humanities. Sociolinguistics, psycholinguistics, ethnolinguistics, and anthropological linguistics can help improve the economic environment theoretically. Through the interdisciplinary nature of the projects undergone within the Centre of Onomastics, our teamwork could be employed in other fields, such as sociology, psychology, economy, marketing, advertising etc.
Consulting	Consulting may regard the choice of an appropriate name for businesses, which should be tightly connected to the impact that such institutions perform in society, but also the correct usage of Romanian in the direct relationship with customers, or the one established (indirectly) by means of websites and advertisements. At the same time, we could offer consulting for the organization of international scientific events and for editing scientific journals.

CENTRE FOR IMAGOLOGICAL STUDIES AND FOR THE RESEARCH OF THE LITERARY AND SOCIAL IMAGINARIUM

Contact details

Name	Centre for Imagological Studies and for the Research of the Literary and Social Imaginarium	
Acronym	**CSI-CILS**	
Logo	CENTRUL DE STUDII IMAGOLOGICE ȘI DE CERCETARE A IMAGINARULUI LITERAR ȘI SOCIAL C S I C I L S	
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Areas of expertise

1. Identification of structures of the literary imaginary related to social, community and ethnical archetypes.

2. Researches of oral history regarding historical events reflected in the collective memory.

3. Identification and description of occupational models or human cohabitation that are lost or far away in time.

Team

Professor George Achim, PhD; Professor Cornel Munteanu, PhD; Associate Professor Delia Suiogan, PhD; Associate Professor Mircea Farcaș, PhD; Lecturer Claudiu Fărcaș, PhD; Alina Dorle, PhD, Adrian Oros, PhD. PhD Students: Felicia Mich, Ligia Bujor; Angelica Ionce, Florin-Vasile Pop.

Representative projects

Cercetare socio-antropologică și de istorie orală privind relația inter-etnică și multiculturală în arealul Ardud-Beltiug, județul Satu Mare; iulie 2017-martie 2018.

Significant results

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

1. George Achim**,** *Onomastica "imperiala" central-europeana si terminologia "K und K" în literatura română* proceedings of the International Conference on Onomastics "Name and Naming" - ICONN 3, ISI; http://onomasticafelecan.ro/iconn3/proceedings/5_1_Achim_George_ICONN_3.pdf

2. George Achim, *O zonă de sincretism cultural central-european (arealul sătmărean Ardud-Beltiug), privită prin lentilele istoriei orale I*, în Memoria Etnologica, nr. 70-71 An XIX/ ianuarie-iunie 2019, ISSN: 1582-8573 BDI EBSCO https://www.memoria-ethnologica.ro/articol/anarhia-formelor-pseudotraditie-si-alterare-in-satul-romanesc-contemporan/

3. George Achim, *Anarhia formelor. Pseudotraditie și alterare în satul romanesc contemporan*, Memoria Etnologica, nr.72-73, An XIX, 2019, ISSN: 1582-8573 BDI EBSCO

4. Delia Suiogan, *Dinamism și stabilitate în receptarea structurilor simbolice***,** Buletin Ştiinţific, Fascicula Filologie, Seria A, Vol. XXVIII, 2018, indexat BDI CEEOL, pp, CEEOL, Frankfurt, Germania, Copernicus, DOI: 10.37193/BSFF, 475-481

5. Delia Suiogan, *Means Of (Re)assuming Identity – Recovering Meaning, Memoria Ethnologica*, revistă de patrimoniu ethnologic şi memorie culturală, An XVIII nr. 68 - 69 , iulie – decembrie, 2018, Baia Mare, indexat EBSCO, pp. 122-131

6. Florin Pop, LE RECOURS AUX VALEURS TRADITIONNELLES. REPERES PAREMIOLOGIQUES, publicat in 2018 în Anuarul de Lingvistică și Istorie Literară – t. LVIII, 2018, Bucureşti, p. 159–168 (ALIL is indexed EBSCO); http://alil.academiaromana-is.ro/wp-content/uploads/2020/10/FLORIN-VASILE-POP-Le-recours-aux-valeurs-traditionnelles-Reperes-paremiologiques.pdf

Products and books:

George Achim, ***Sita de ceară –Istorii din istoria unui ținut transilvan,*** Editura Școala Ardeleană, Cluj-Napoca, 2017, ISBN 978-606-797-224-5, pp.498

The Wax Sieve – Histories from the History of a Transylvanian County, Scoala Ardeleana Publishing House, Cluj-Napoca, 2017, ISBN 978-606-797-224-5, pp.498

The offer addressed to the economic environment

Research & development	The projects can take the shape of a monographic research, which allows them to obtain a social and cultural impact in the communities where research has been conducted. In this respect, the results of the research regarding the multi-ethnic population in the Southern part of Satu Mare County had a deep impact and a concrete echo in the investigated and researched communities.

RESEARCH PUBLICATIONS

ISI PUBLICATIONS – 2022

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[2] S. Abbasi et al., "Evaluation of the dependence of methyl orange organic pollutant removal rate on the amount of titanium dioxide nanoparticles in MWCNTs-TiO2 photocatalyst using statistical methods and Duncan's multiple range test," International Journal of Environmental Analytical Chemistry, doi: 10.1080/03067319.2022.2060085.

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RESEARCH PATENTS

LIST OF PATENTS

1. **PATENT OSIM NR. RO134764- B1 / 30.12.2022**

   TITLE RO/EN: Procedeu de desulfatizare, optimizare si aplicare a placilor uzate provenite de la bateria auto / PROCESS FOR DESULPHURIZING, OPTIMIZING AND USING SCRAP PLATES FROM A CAR LEAD BATTERY

   INVENTOR(S): RADA SIMONA, OPRE RAZVAN TIBERIU, PINTEA ANDREI, CULEA EUGEN

   ABSTRACT: The invention relates to a process for desulphurising, optimizing and using scrap plates from the storage lead battery to make new applications such as battery electrodes. According to the invention, the process uses as raw material the anode electr
   ode, as a source of Pb, and the cathode electrode, as a source of PbO2, from a spent car battery which has a high degree of sulphurisation and a low content of Pb in plates and grids, and it consists in weighing on an analytical balance, the substances with the chemical formulas xNiO. (100-x) [4PbO2.Pb] where x = 8% moles of NiO and xCo3O4. [4PbO2.Pb], where x = 20% moles of Co3O4, expressed as percentages of moles in stoichiometric proportions, by using NiO powder and Co3O4, respectively, the mixture of substances is introduced into alumina crucibles and then placed in an oven, melted, and the melt is quickly overturned on a stainless steel plate.

2. **PATENT OSIM NR. RO134587- B1 / 30.12.2022**

   TITLE RO/EN: Procedeu de desulfatizare, optimizare si aplicare a placilor uzate provenite de la bateria auto / PROCESS FOR DESULPHURIZING, OPTIMIZING AND USING SCRAP PLATES FROM A CAR LEAD BATTERY

   INVENTOR(S): RADA SIMONA, OPRE RAZVAN TIBERIU, PINTEA ANDREI, CULEA EUGEN

   ABSTRACT: The invention relates to a process for desulphurizing, optimizing and using scrap plates from the storage lead battery to make new applications such as battery electrodes. According to the invention, the process uses as raw material the anode electrode, as a source of Pb, and the cathode electrode, as a source of PbO2, from a spent car battery which has a high degree of sulphurization and a low content of Pb in plates and grids, and it consists in weighing on an analytical balance, the substances with the chemical formulas xNiO. (100-x) [4PbO2.Pb] where x = 8% moles of NiO and xCo3O4. [4PbO2.Pb], where x = 20% moles of Co3O4, expressed as percentages of moles in stoichiometric proportions, by using NiO powder and Co3O4, respectively, the mixture of substances is introduced into alumina crucibles and then placed in an oven, melted, and the melt is quickly overturned on a stainless steel plate.

3. **PATENT OSIM NR. 130496 / 30.08.2022**

   TITLE RO/EN: Procedeu de obtinere a unui ambalaj alimentar din materiale nano-structurate / PROCESSES FOR OBTAINING INTELLIGENT FOOD PACKAGES

   INVENTOR(S): PETER ANCA, NICULA CAMELIA, MIHALY COZMUTA ANCA, MIHALY COZMUTA LEONARD, DANCIU VIRGINIA, BAIA GHEORGHE LUCIAN, KOVACS GABOR, BEGEA MIHAELA, CRACIUN LILIANA, CRACIUN GRIGORE, DUTUC GHEORGHE, FALUP ANCA, ZIEMKOWSKA WANDA, JASTRZEBSKA AGNIESZKA, KURTYCZ PATRYCJA, KARWOWSKA EWA, MIASKIEWICZ - PESKA EWA, ZALESKA RADZIWILL MONIKA, OLSZYNA ANDRZEJ, KUNICKI ANTONI, SITARZ KAROLINA, ROSLON MAGDALENA

   ABSTRACT: NOVELTY - The invention relates to a process for obtaining a food packaging which provides the preservation of the food characteristics and prolongs the validity term thereof. According to the invention, the process consists in preparing, in a first stage, a composite of titanium dioxide modified with 0.10...0.15% Au and, possibly, with nitrogen and 0.5...3% Ag or titanium dioxide-silicon dioxide mixture modified with 0.5...3% Ag, to be added to a polypropylene base and cellulose, respectively, after which, in a second stage, the mixture is processed in a manner known per se, to result in a package as a bottle or, possibly, a sheet of paper.

4. **PATENT OSIM NR. RO129401- B1 / 30.08.2022**

   TITLE RO/EN: Sistem de automatizare inteligent bazat pe o arhitectura distribuita, reconfigurabila si adaptiva / INTELLIGENT AUTOMATION SYSTEM BASED ON DISTRIBUTED RECONFIGURABLE ADAPTIVE ARCHITECTURE

   INVENTOR(S): MURAR MIRCEA, BRAD STELIAN

   ABSTRACT: NOVELTY - The invention relates to an automation system for the control, monitoring and configuration of equipments, intended for industrial processes of SMEs, having a quickly reconfigurable adaptive dynamic architecture, where the equipments are provided with a minimal level of distributed intelligence.

According to the invention, the system comprises a control unit (1), a high-priority output equipment (2), a high-priority input equipment (3), a low-priority output equipment (4) and a low-priority input equipment (5), together with some adapters (6, 7) specific to the high-priority output and input equipments (2, 3), respectively, and some adapters (8) characteristic to the low-priority equipments (4, 5); when an intelligent equipment is connected, it configures its internal modules, then it waits for a general interrogation, responds thereto and, further on, waits for it to be self-integrated into the process, to be configured by the operator and programmed by means of a human-machine interface and the control unit (1) according to the available options.

5. PATENT OSIM NR. RO134496- B1 / 30.06.2022

TITLE RO/EN: Masina electrica de propulsie cu actionare directa a rotii motoare pentru vehiculele de transport pe cale de rulare ghidata / ELECTRIC PROPULSION MACHINE WITH DIRECT ACTUATION OF DRIVING WHEEL FOR TRANSPORT VEHICLES ON GUIDED ROLLING TRACK, HAS ROTARY SLEEVE THAT IS PROVIDED WITH ROLE OF PREVENTING ELECTRIC MACHINE INTERIOR CONTAMINATION WITH DUST, AND WATER

INVENTOR(S): BREBAN STEFAN, DRANCA MARIUS ALEXANDRU, FARTAN MARIUS

ABSTRACT: NOVELTY - The electric propulsion machine has a stator that is comprised with a stator magnetic core made of circumferentially superposed sheets where notches are milled. A stator winding is mounted in the notches. A support is arranged for stator mounting on a fixed axle and securing against rotation with a parallel wedge, and a shaft end flange. A rotor is provided with permanent magnets and a clamping ring with ferromagnetic properties, for fixing an elastic element and for closing the magnetic flux lines between the rotor and the stator. A rotary sleeve is provided with the role of preventing the electric machine interior contamination with dust, and water. USE - Electric propulsion machine with direct actuation of driving wheel, for transport vehicles on guided rolling track.

6. PATENT OSIM NR. RO134330- B1 / 30.06.2022

TITLE RO/EN: Placa compozita din fibre naturale si procedeu de obtinere a acesteia / COMPOSITE BOARD USEFUL FOR BUILDINGS INSULATION CONTAINS SHEEP WOOL FIBERS, WHITE PORTLAND CEMENT OR NATURAL HYDRAULIC LIME, POLYVINYL ACETATE GLUE AND WATER

INVENTOR(S): FLOREA IACOB, MANEA DANIELA LUCIA

ABSTRACT: NOVELTY - Composite board comprises 26.6-27.1 mass% sheep wool fibers, 26.6-27.1 mass% white Portland cement or natural hydraulic lime 3.5, 5.75-6.25 mass% polyvinyl acetate glue and 40-40.5 mass% water. Before making composite board, the wool is hydrated with water. The composite board is produced by unbaling the sheep wool bales, loosening the sheep wool fibers with carder, hydrating the wool by spraying water, in mass ratio of 1:1, dosing the binder, adhesive and water to homogenize mixture, spraying the binder in wool fiber mass and stirring the composite simultaneously with its spraying, pouring resulting composition into mold, pressing the board, removing the board after 24 hours, compressing the boards to desired thickness using two perforated cellular PVC boards and keeping them under weight for another 48-72 hours, cutting the board at preset dimensions depending on intended use and finally packing and storing the cut boards as to protect them. USE - The composite board is useful for buildings insulation. ADVANTAGE - The composite boards have a thickness of 50 mm with a thermal conductivity of 0.0486 W/mK for the base boards based on hydraulic lime.

7. PATENT OSIM NR. RO134133- B1 / 29.04.2022

TITLE RO/EN: Procedeu de electrodepunere a aliajului de zinc-nichel pe substrat de otel inoxidabil / ELECTRODEPOSITION OF ZINC-NICKEL ALLOY ON STAINLESS STEEL PART SURFACE BY PREPARING PART SURFACE BY CHEMICAL PICKLING, PREPARING ELECTROLYTE FOR ELECTRODEPOSITION COMPRISING ZINC AND ENVIRALLOY NICKEL AND PERFORMING ELECTRODEPOSITION

INVENTOR(S): VERMESAN HORATIU, CHIRA MIHAI

ABSTRACT: NOVELTY - Method for electrodeposition of zinc-nickel alloy on surface of stainless steel parts involves (i) preparing the part surface by chemical pickling at 60 degrees C for 10 minutes, washing with water for 30 seconds, treating the surface with a solution of sodium hydroxide in a concentration of 350-450 g/l at 70-100 degrees C for 30-50 minutes and washing with water for 30 seconds, (ii) preparing an electrodeposition electrolyte which is a mixture of 4.9-7.5 g/l zinc, 130-145 g/l sodium hydroxide, 10 g/l Envirozin conditioner, 0.5 ml/l Enviralloy nickel 12-15 LCD, 50 ml/l NiSpeed complexor, 5-7 ml/l NiSpeed additive nickel, 0.2 ml/l NiSpeed leveler and 5 ml/l Enviralloy nickel 12-15 Part B and (iii) performing electrodeposition by subjecting the stainless steel part to the electrodeposition of a zinc-nickel alloy in an alkaline solution, where the density of electrodeposition current is 2-3 A/dm2, working temperature is 22-28 degrees C and the anodes employed are made of stainless steel or nickel. USE - The method is useful for electrodeposition of zinc-nickel alloy on surface of stainless steel parts and used in applications in which the stainless steel is intended to be connected with a less noble metal, preferably automotive industry. ADVANTAGE - The method provides product with excellent mechanical properties and high corrosion resistance.

8. **PATENT OSIM NR. RO133886- B1 / 29.04.2022**

TITLE RO/EN: Sistem eolian aeropurtat de producere a energiei electrice / AIRBORNE WIND-MOTOR SYSTEM FOR PRODUCING ELECTRIC ENERGY, HAS AERODYNAMIC-PROFILED WING WHICH CONFERS ADDITIONAL THRUST IN WIND HAS TWO VERTICAL PLATES AT ENDS, SO THAT IT IS PERMANENTLY ORIENTED ACCORDING TO WIND DIRECTION

INVENTOR(S): BREBAN STEFAN, DRANCA MARIUS ALEXANDRU, MALAEL ION

ABSTRACT: NOVELTY - The airborne wind-motor system has wind turbine having blades for driving one electric generator. Each wind turbine and each electric generator is mounted on a pole made of a light material which has circular cross section or aerodynamic profile. A wing with aerodynamic profile is asymmetrical in relation to the pole. A rotation equipment consists of an axial-radial bearing and a slide-contact element allows the rotation of the anchored assembly depending on the wind direction, and ensures the electrical connection with the electrical conductors within the anchoring cable. The orientation of the wind turbine in the wind is achieved by the drift fin made of a plate, if the turbine is with horizontal axis. The turbine orientation in the wind is not needed, if the turbine is with vertical axis. The aerodynamic-profiled wing conferring the additional thrust in the wind has two vertical plates at the ends, so that it is permanently oriented according to the wind direction. USE - Airborne wind-motor system for producing electric energy.

9. **PATENT OSIM NR. RO134350- B1 / 28.01.2022**

TITLE RO/EN: Convertor electronic intercalat ridicator/coborator de tensiune / INTERLEAVED VOLTAGE STEP-UP/STEP-DOWN ELECTRONIC CONVERTER HAS VOLTAGE STEP-DOWN CONVERTER THAT IS CONNECTED BY SERIAL CONNECTION AT INPUT OF TWO VOLTAGE STEP-DOWN ELECTRONIC CIRCUITS AND PARALLEL CONNECTION AT OUTPUT

INVENTOR(S): TEODOSESCU PETRE DOREL, SUCIU VASILE MIHAI, SZEKELY NORBERT CSABA, PACURARU ALEXANDRU MADALIN, BOJAN MIRCEA, MATHE ZSOLT

ABSTRACT: NOVELTY - The converter has two independently operating voltage step-up/step-down electronic circuits which take over the energy from a power supply and transfer to the consumer. The voltage step-up converter is connected by a parallel connection at the input of the two voltage step-down circuits and serial connection at the output, respectively. The amplification factor of the converter is increased, and the voltage step-down converter is connected by the serial connection at the input of the two voltage step-down electronic circuits and parallel connection at the output, respectively. The attenuation factor of the converter is increased. USE - Interleaved voltage step-up/step-down electronic converter.

10. **PATENT OSIM NR. RO133074 -B1 / 30.12.2021**

TITLE RO/EN: Compozitie de rasina de impregnare, material compozit si metoda de fabricatie a implanturilor cranio-faciale / MANUFACTURING GLASS FIBER-REINFORCED COMPOSITE USED AS BIOMATERIAL, BY MIXING ORGANIC MATRIX MADE OF METHACRYLIC MONOMERS WITH ZIRCONIUM OXIDE AND GENTAMICIN, IMPREGNATING RESIN WITH GLASS FIBER CLOTH, LAMINATING AND THERMALLY TREATING

INVENTOR(S): ROTAR ALEXANDRU-HORATIU, BACIUT GRIGORE, MOLDOVAN MADALINA-ANCA, PREJMEREAN CRISTINA, MOLDOVAN MARIOARA, PRODAN DOINA, BALC NICOLAE, BERE PAUL

ABSTRACT: NOVELTY - Process for manufacturing a glass fiber-reinforced composite, involves mixing an organic matrix made of methacrylic monomers with nano-filling of hydroxyapatite, zirconium oxide and gentamicin at room temperature for 2 hours to obtain a resin, impregnating a glass fiber cloth with the resin, laminating to obtain a glass fiber-reinforced composite, thermally treating the glass fiber-reinforced composite in an electric oven at 100 degrees C, and removing the residual monomer by extraction with solvent to obtain a biomaterial. USE - The process is useful for manufacturing glass fiber-reinforced composite used as biomaterial for manufacturing customized implants by three dimensional printing technique. ADVANTAGE - The process provides biomaterial, which has antimicrobial effects and favorable biological reactions.

11. **PATENT OSIM NR. RO133815 -B1 / 29.10.2021**

TITLE RO/EN: Robot paralel pentru recuperarea medicala a membrelor inferioare / PARALLEL ROBOT FOR MEDICAL RECOVERY OF LOWER LIMBS, HAS PRISMATIC COUPLINGS THAT PERFORMS TRANSLATION MOVEMENTS BY SOME SLIDING ELEMENTS, WHICH, ALLOWS FLEXION/DORSIFLEXION MOVEMENT OF PLANTAR SUPPORT

INVENTOR(S): PISLA DOINA LIANA, GHERMAN BOGDAN GEORGE, NADAS IULIU ADRIAN, POP NICOLETA MARIA, CRACIUN CRISTEA FLORIN, TUCAN PAUL GEORGE MIHAI, VAIDA LIVIU CALIN, CARBONE GIUSEPPE VENAFRO, BIRLESCU IOSIF, PLITEA NICOLAE

ABSTRACT: NOVELTY - The robot has a table on which a patient is placed in horizontal position, leg supports placed on an adjustable element which is attached onto a first module for hip and a knee medical recovery consisting of a frame on which two toothed belts are placed and driven by some motors. A counterweight is adjustably attached along an element fixed through a rotation coupling to the frame. The ankle rotation is achieved by a second module, where the rotation center of the ankle has to be placed at the intersection of the axes of some rotation couplings. The prismatic couplings performs translation movements by some sliding elements, which, allows the flexion/dorsiflexion movement of a plantar support, when simultaneously performed in the same direction and sense and with the same speed, and allows the eversion/inversion movements to be performed, when performed in opposite senses. USE - Parallel robot for medical recovery of lower limbs.

12. PATENT OSIM NR. RO133814 -B1 / 29.10.2021

TITLE RO/EN: Robot paralel pentru recuperarea mobilitatii membrului inferior / PARALLEL ROBOT FOR PATIENTS LOWER LIMB MOBILITY RECOVERY, HAS FIRST MODULE THAT IS PLACED ON FRAME AND THAT CONSISTS OF FOUR KINEMATIC CHAINS, AND SECOND MODULE THAT IS MOUNTED ON FIRST MODULE AND THAT IS DRIVEN BY TWO ROTARY MOTORS

INVENTOR(S): PISLA DOINA LIANA, BIRLESCU IOSIF, VAIDA LIVIU CALIN, GHERMAN BOGDAN GEORGE, TUCAN PAUL GEORGE MIHAI, CARBONE GIUSEPPE VENAFRO, PLITEA NICOLAE

ABSTRACT: NOVELTY - The parallel robot has two modules for the recovery of hip and knee joints and for the recovery of the ankle joint. The first module is placed on a frame and consists of four kinematic chains, and the second module is mounted on the first module and is driven by two rotary motors. USE - Parallel robot for patients lower limb mobility recovery.

13. PATENT OSIM NR. RO134151 -B1 / 30.09.2021

TITLE RO/EN: Motor sincron reactiv de 2 poli magnetici, cu rotor modular si tole axiale / REACTIVE SYNCHRONOUS MOTOR FOR VARIABLE SPEED ELECTRIC DRIVE SYSTEMS, HAS CONSECUTIVE MODULES THAT ARE INTERCONNECTED BY TRAPEZOIDAL RAILS, HAVING MALE CONNECTOR PROFILE THAT IS INSERTED IN GUIDE RECESSES PROVIDED AT REINFORCEMENT TUBE

INVENTOR(S): PISLA DOINA LIANA, BIRLESCU IOSIF, VAIDA LIVIU CALIN, GHERMAN BOGDAN GEORGE, TUCAN PAUL GEORGE MIHAI, CARBONE GIUSEPPE VENAFRO, PLITEA NICOLAE

ABSTRACT: NOVELTY - The motor has a modular rotor that is arranged with two magnetic poles and axially arranged sheets and stator. The rotor is inclined due to construction of five modules of axial sheets shifted from one another by 1/5 of the angle of the toothing pitch. The axial sheets are packed together to form a reinforcement tube that is made of non-magnetic material and composed of circular elements and two parallel straight. The module of the reinforcement tube has two air spaces that are used to prevent the increase of the motor inertia at the level of air spaces. The consecutive modules are interconnected by trapezoidal rails, having a male connector profile that is inserted in guide recesses provided at a lower portion of the reinforcement tube. A female connector profile and the transfer of torque from the motor to certain load is performed by two-diameter cylindrical portions, which are connected to the modular rotor by a system of guide rails and guide recess. USE - Reactive synchronous motor for variable speed electric drive systems.

14. PATENT OSIM NR. RO130517 -B1 / 30.07.2021

TITLE RO/EN: Actuator cu glisiere telescopic / TELESCOPIC ACTUATOR FITTED WITH SLIDES

INVENTOR(S): NASUI VASILE

ABSTRACT: NOVELTY - The invention relates to a telescopic actuator fitted with slides, with a mechanical transmission made of slides and roller cable used in linear drives in various industrial drives having a high working speed and long travel, in particular, extendable sliding gates and doors. According to the invention, the actuator comprises a gearmotor assembly (A) fixed on a support (1) and having on its output shaft (2) a roller (3) on which a cable (4) is wound, said cable being provided with means for adjusting the tension of the cable, fixed at both ends (a and b) by a support slide (5) in which another slide (6) glides, having at its ends some bolts (7) with rollers (8) on which there is wound another cable (9) or a flexible toothed belt, with the lower branch made integral with the fixed support (1) by means of a connection (10), said cable being guided in a channel (c) within the slide (6) and in a channel (d) within the slide (5), the upper branch of the cable (9) being made integral with the slide (5) by means of another connection (11) which is guided in the channel (e) of the slide (6), thereby resulting in a simultaneous forward motion of the two slides and, when the roller rotates to the left or to the right, the servomechanism fitted with slides being extended.

15. PATENT OSIM NR. RO133611 -B1 / 30.06.2021

TITLE RO/EN: Panou sandvis din puzderie si fibre de canepa si procedeu de realizare a acestuia / SANDWICH PANEL USED IN FIELD OF CIVIL CONSTRUCTIONS, HAS CORE THAT IS MADE OF SPECIFIC RANGE OF

HEMP FIBERS, SPECIFIC RANGE OF MINERAL BINDER AND SPECIFIC RANGE OF WATER SUCH THAT CORE IS EXTERNALLY CONFINED BY SPECIFIC THICK RIGID FACES

INVENTOR(S): ISTOAN RALUCA, TAMAS GAVREA DANIELA ROXANA, MANEA DANIELA LUCIA, VASILE OVIDIU

ABSTRACT: NOVELTY - The sandwich panel has a 40 mm-thick core made of 23-24% hemp fibers, 38-39% mineral binder and 38-39% water. The core is externally confined by two 5 mm-thick rigid faces and comprises 42-43% saturated chaff, 21-22% hydrated lime, 21-22% cement and 15-16% water. A composition is evenly poured into a wooden mold. The core of the sandwich panel is made by atomizing the hemp fibers with a cement-based solution obtained by mixing the mineral binder with water and placing in a shutter between the external rigid faces. USE - Sandwich panel used in field of civil constructions. ADVANTAGE - The acoustic performance is improved by perforating one of the external rigid faces. DETAILED DESCRIPTION - An INDEPENDENT CLAIM is included for a method for making sandwich panel.

16. PATENT OSIM NR. RO133833 -B1 / 29.04.2021

TITLE RO/EN: Beton eco-inovativ pe baza de ciment si deseuri reciclate din sticla si polietilen tereftalat pentru aplicatii in domeniul constructiilor / CONCRETE COMPOSITION FOR CONSTRUCTION, COMPRISES ARTIFICIAL AGGREGATE, CRUSHED GLASS, POLYETHYLENE TEREPHTHALATE FLAKES, PORTLAND CEMENT, WATER AND SUPERPLASTICIZER ADDITIVE

INVENTOR(S): CORBU OFELIA CORNELIA, SZILAGYI HENRIETTE, PIRGARIU GABRIEL

ABSTRACT: NOVELTY - A concrete composition comprises 64-70 wt.% artificial aggregate, 63-75 wt.% crushed glass having grain size of 0-4 mm, 19-23 wt.% crushed glass with grain size of 4-8 mm, 8-10 wt.% polyethylene terephthalate flakes, 21-24 wt.% Portland cement, water and superplasticizer additive, and has water-cement ratio of 0.4-0.45. USE - Concrete composition for constructions for forming alveolar blocks and arch bricks. ADVANTAGE - The concrete composition is environmentally-friendly.

17. **PATENT OSIM NR. RO133822 -B1 / 29.04.2021**

TITLE RO/EN: Instalatie si procedeu de depoluare prin spal;are a solurilor poluate cu metale grele / WASHING CONTAMINATED SOILS WITH HEAVY METALS, BY USING SOIL POLLUTED WITH WASHING SOLUTION CONTAINING POTASSIUM SALTS OF HUMIC ACID, STIRRING SOIL MIXTURE, EVACUATING SOIL WITH WASHING SOLUTION AND CARRYING OUT GRAVITATIONAL SEPARATION

INVENTOR(S): DAMIAN GIANINA ELENA, MICLE VALER

ABSTRACT: NOVELTY - Process for washing contaminated soils with heavy metals, involves (a) using potassium salts of humic acids and chitosan as washing agents and adopting a installation in which the soil polluted with the washing solution containing the potassium salts of the humic and chitosan acids, (b) introducing into a chamber through a feed hole, and preparing and storing the washing solution introduced into the chamber, (c) stirring the soil mixture with the washing solution using 12 mixing blades arranged on a rotary shaft, and operating the rotary shaft by a single-phase electric motor, and (d) evacuating the soil together with the washing solution from the chamber through a hole into a decanter with a volume of 3 l after depollution and carrying out gravitational separation of the soil with the washing liquid. USE - The process is useful for washing contaminated soils with heavy metals. ADVANTAGE - The method achieves depollution efficiency of 91.02-99.06% lead and 37.65-49.78% copper. DETAILED DESCRIPTION - Process for washing contaminated soils with heavy metals, involves (a) using potassium salts of humic acids and chitosan as washing agents and adopting a installation in which the soil polluted with the washing solution containing the potassium salts of the humic and chitosan acids, (b) introducing into a chamber inclined 1 degrees from horizontal plane through a feed hole provided with a threaded lid with a sealing gasket, and preparing and storing the washing solution introduced into the chamber in a 2 l pre-filled vessel by manually operating a tap, (c) stirring the soil mixture with the washing solution using 12 mixing blades arranged on a rotary shaft and inclined at 3 degrees to the rotary shaft, mounting the rotary shaft in the chamber by means of two ball bearings, protecting by two rotating cuffs at both ends of the rotary shaft, and operating the rotary shaft by a single-phase electric motor powered by a 220 V alternating current source with a single-phase on/off switch and an automatic 6 A fuse, and (d) evacuating the soil together with the washing solution from the chamber through a hole into a decanter with a volume of 3 l after depollution and carrying out gravitational separation of the soil with the washing liquid.

18. PATENT OSIM NR. RO131186 -B1 / 29.04.2021

TITLE RO/EN: Instrument laparoscopic pentru localizarea extralumenala precisa a unei tumori colorectale / METHOD AND LAPAROSCOPIC INSTRUMENT FOR ACCURATE COLON-RECTAL TUMOUR EXTRALUMINAL LOCALIZATION

INVENTOR(S): MOCAN BOGDAN, BINTINTAN VASILE

ABSTRACT: NOVELTY - The invention relates to a method and an instrument to be used in laparoscopic surgery, with possible applications in the classic surgery of colon and rectum and which enable the precise localization of endoluminal tumours, from the serous face of the gastrointestinal tract. The method and the instrument use may be extrapolated to the conventional thoracic surgery or thoracoscopic-approach surgery. According to the invention, the method consists of a previous marking of the poles, the upper one and the lower one, of a tumour, by means of one or more specific demarcation elements placed by endoluminal approach, followed by the precise identification of the localization thereof by scanning the wall of the colon or rectum on its external/serous face. The claimed instrument consists of a sensitive tip (1) which identifies the position of the tumour demarcation element in the colon/rectum, a metallic rod (2) in the distal extremity of which the sensitive tip (1) is integrated and which comprises an element (3) for visual signaling of the instrument operation and an element (4) for visual signaling of the detection of the tumour position in the colon, an instrument supply and control module (5) and a display device (6) for displaying various data relating to the instrument operation and to the identification of the tumour demarcation elements.

19. PATENT OSIM NR. RO132781 -B1 / 30.12.2020

TITLE RO/EN: Procedeu de detectie a defectelor senzorilor de curent ai unui convector electronic trifazat / METHOD FOR DETECTING FAULTS IN CURRENT SENSORS OF THREE-PHASED ELECTRONIC CONVERTER, INVOLVES CHANGING VALUES OF LOOP CONTROLLER COEFFICIENTS, AND LOCKING FAULT DETECTION MECHANISM OVER REMAINING OPERATIONAL PHASES FOR SET PERIOD OF TIME

INVENTOR(S): RUBA MIRCEA

ABSTRACT: The method involves detecting a fault by continuously monitoring the difference between the measured instantaneous values and the current reference values on each phase. The difference is compared with a threshold value, when the difference exceeds the threshold value. The fault occurred is compensated by replacing the measured value with an estimated current value on the phase. The values of the control loop controller coefficients are changed, and the fault detection mechanism is locked over the remaining operational phases for a set period of time.

20. PATENT OSIM NR. RO130936 -B1 / 30.12.2020

TITLE RO/EN: Stand pentru studiul tribocoroziunii / STAND FOR TRIBOCORROSION STUDY, HAS TABLE WITH SUPPORT SUSTAINING TWO LINEAR-DISPLACEMENT MODULES

INVENTOR(S): VERMESAN HORATIU, CHIRA MIHAIL

ABSTRACT: The invention relates to a stand used for carrying out experimental research necessary to determine the degradation of the surfaces of metallic materials subjected to friction, in the presence of corrosive media. According to the invention, the stand comprises a table (1) with a support (2) sustaining two linear-displacement modules (3 and 4), an electrochemical cell (5) with a work piece (6) on which a counter-piece (15) moves driven by a gearmotor (7) with a connecting rod - crank mechanism (8 and 9), the parameters of tribocorrosion being measured by means of a working electrode (22), by means of some electrodes (24 and 25) mounted in an adjustable support (27) and by means of some tensometric sensors (23) mounted on a blade spring (13).

21. PATENT OSIM NR. RO129751 -B1 / 30.12.2020

TITLE RO/EN: Metoda si sistem de criptare de tip OTP bazate pe secvente aleatoare determinate din structuri ADN / OTP ENCRYPTION SYSTEM AND METHOD BASED ON RANDOM SEQUENCES DETERMINED BY DNA STRUCTURES

INVENTOR(S): BORDA MONICA ELENA, TORNEA OLGA, TEREBES ROMULUS, MALUTAN EMIL RAUL

ABSTRACT: The invention relates to an encryption method and system of the OTP (One-Time-Pad) type based on random sequences determined by DNA structures. The claimed encryption method consists in transmitting from an emitting part to a receiving part a secret key together with an encrypted message, the secret key being formed of a header consisting of a two-bit code (k1) which represents the manner of forming the encryption key, of a three-bit code (k2) representing the number of IDs of DNA structures used to obtain the encryption key and of a sequence (k3) of IDs of the DNA structures used to obtain the encryption key (KADN). The claimed encryption system comprises two parts: a message emitting part and a receiving part, each of the two parts consisting of a DNA data base (BD ADN), either public or private, identical to both parts, an input data block (DI), a DNA key generator (Gen KADN), a convertor of the DNA key into binary key (Conv ADN-B), a modulo-2 summator (S), a block (Easterisk) for encrypting the input data which the secret key is generated with and a block (Dasterisk) for decrypting the secret key, the encrypted message and the secret key being transmitted from the emitter to the receiver, the receiver obtaining the input data by decrypting the secret key, and continuing with the generation of the DNA key which is used to decrypt the received message.

22. PATENT OSIM NR. RO132402 -B1 / 28.08.2020

TITLE RO/EN: Sistem adaptiv pentru asigurarea calitatii energiei in retelele de joasa tensiune / ADAPTIVE SYSTEM FOR ENSURING QUALITY OF ENERGY IN LOW-VOLTAGE NETWORKS CONSISTS OF A ACTIVE FILTER CONNECTED IN PARALLEL WITH THE ELECTRIC NETWORK

INVENTOR(S): SACERDOTIANU DUMITRU, NICOLA MARCEL, CIONTU MARIAN, IVANOV SERGIU, CHINDRIS MIRCEA DORIN, CZIKER ANDREI CRISTINEL, RADU ALEXANDRU, DUMITRESCU CAMIL-SORIN

ABSTRACT: The invention relates to an adaptive system for ensuring a certain quality of energy in low-voltage networks. According to the invention, the system consists of a first active filter (A) connected in parallel with the electric network and with a load (B) comprising a voltage inverter (101), three induction coils (108, 109 and 110) and three resistors (111, 112, 113) connected in the same point with the load (B), a measuring block (118) for the load currents, a measuring block (119) for the currents at the inverter output, a three-phased contactor (122) for connecting/disconnecting the system to/from the network and a second active filter (C) which comprises an inverter (102), a sinusoidal filter (104), three single-phase transformers (105, 106, 107) connected in series to the distribution network and a measuring block (115) for measuring the inverter output voltages.

23. PATENT OSIM NR. RO133200 -B1 / 28.08.2020

TITLE RO/EN: Sistem de fixare a sticlelor de plastic pentru aparate rotative de testare a etanseitatii / SYSTEM FOR FIXING PLASTIC BOTTLES IN ROTARY TIGHTNESS TESTING APPARATUS, HAS ONE BOTTLE FIXING DEVICE THAT IS LOCATED ABOVE CONVEYOR WHICH FEEDS ROTARY TABLE WITH BOTTLES AND OTHER BOTTLE FIXING DEVICE WHICH TAKES BOTTLES AWAY FROM TABLE

INVENTOR(S): UNGUREANU MIORITA, MARINA MARIAN GABRIEL, STOICOVICI DINU IOAN, UNGUREANU NICOLAE STELIAN

ABSTRACT: The system has a rotary bottle fixing device which consists of a metal drum on which a rubber bush is fixed by some fastening discs. The rubber bush has the profile and the grooves pitch identical with the belt of the linear fixing devices, in order to provide the bottle transfer to and from the rotary table. Two identical bottle fixing linear devices consists of two vertical drums on which a profiled rubber belt with textile insertion is mounted. The belt is provided on its external face with grooves sized depending on the bottle shapes. One bottle fixing device is located above the conveyor which feeds the rotary table with bottles and the other bottle fixing device is located above the conveyor which takes the bottles away from the rotary table.

24. PATENT OSIM NR. RO128582 -B1 / 30.07.2020

TITLE RO/EN: Analizor miniaturizat pentru determinarea simultana a elementelor din microprobe lichide prin spectrometrie de emisie optica / MINIATURIZED ANALYSER WITH RHODIUM-FILAMENT EVAPORATOR FOR SIMULTANEOUS DETERMINATION OF ELEMENTS FROM LIQUID MICRO SAMPLES BY OPTICAL EMISSION SPECTROMETRY

INVENTOR(S): FRENTIU TIBERIU, PONTA MIHAELA-LUCIA, DARVASI EIUGEN, BUTACIU SINZIANA, CADAR SERGIU IULIAN, SENILA MARIN, MATHE ALEXANDRU, FRENTIU MARIA, PETREUS DORIN-MARIUS, ETZ RADU, PUSKAS FERENC, SULEA DORIN

ABSTRACT: The invention relates to a miniaturized analyser with rhodium-filament evaporator for simultaneous determination of elements from liquid micro samples, by optical emission spectrometry, employed as analytical instrument. According to the invention, the analyser comprises: a plasma micro torch (1) which is capacitively coupled, with excitation-source function, an electro-thermal evaporator (2) with rhodium filament for the evaporation of the liquid micro sample, provided with a teflon support (3), having a piston (4) for extracting the liquid sample from its chamber, and a filament supply source (5), a radio-frequency generator (6), a micro spectrometer (7) with a detector, with coupled charge, for measuring the element emission signal, a computer unit (8) and an electronic flow-meter (9) meant to adjust the argon flow-rate coming from a gaseous-argon cylinder (10), as a plasma support.

25. PATENT OSIM NR. RO133261 -B1 / 30.04.2020

TITLE RO/EN: Panou compozit multistrat si procedeu de obtinere a acestuia / MULTILAYER COMPOSITE PANEL HAS TWO RIGID PLATE-TYPE LAYERS, MEDIAN LAYER WHICH CONSISTS OF SPECIFIC AMOUNT OF FLAX FIBERS AND, FOR REST, BINDER OF WHITE CEMENT AND WATER IN EQUAL RATIOS

INVENTOR(S): TAMAS-GAVREA DANIELA-ROXANA, ISTOAN RALUCA, TIUC ANCUTA ELENA

ABSTRACT: The multilayer composite panel has two rigid plate-type layers consisting of 14-14.5% perlite, 28.2-28.7% white cement, 14-14.5% lime and 42.4-42.9% water. The percentage is expressed by mass, reinforced with a net made of flax fibers. The median layer consists of 19-21% flax fibers and, for the rest, a binder of white cement and water in equal ratios. The panel has a thickness of 50 mm, a resistance to bending of 0.126 N/mm2, a resistance to compression of 0.013 N/mm2, a heat conductivity of 0.072 W/m and high sound-absorbing properties.

26. PATENT OSIM NR. RO132234 -B1 / 30.03.2020

TITLE RO/EN: Sistem robotic paralel pentru recuperarea medicala a membrului superior / ROBOT FAMILY FOR MEDICAL RECOVERY OF UPPER LIMB, HAS FRAMEWORK WITH ROTATIONAL COUPLINGS

INVENTOR(S): GHERMAN BOGDAN GEORGE, PISLA DOINA LIANA, PLITEA NICOLAE, VAIDA LIVIU CALIN, CARBONE GIUSEPPE, PISLA ADRIAN, BANICA ALEXANDRU VLAD

ABSTRACT: The invention relates to robots used for the medical recovery of the upper limb, namely for the recovery of the forearm flexion motion from the elbow, of pronation/supination, flexion/extension and abduction/adduction motion of the palm. According to the invention, the robots are located on a framework (1) which supports an active rotation coupling (2) and the fixed-coordinate system of the robot OXYZ, the coupling (2) having the rotation axis along the axis OY of the coordinate system, where the drive is achieved by means of a rotary motor (3), the motion q1 being performed by the rotation about the axis OY, thus the forearm flexion, a

connection element (4) is positioned and fixed along the forearm up to the active rotation coupling (5) placed in the distal third of the forearm, and driven by a rotary motor (6) thereby achieving the pronation/supination motion by the motion q2, namely rotation about the axis Ox1, and the same rotation coupling (5) driven by the motor (9) positions the connection element (7) which supports the active rotation coupling (8) with the role of performing the adduction/abduction motion of the palm by the motion q3, namely the rotation about the axis O2z2, and an element (10) supports the active rotation coupling (11) which, by means of the element (13) and socket (14) and driven by the rotary motor (12), leads to the flexion/extension motion of the hand, by the motion q4, namely by rotation about the axis O3z3.

27. PATENT OSIM NR. RO132233 -B1 / 30.03.2020

TITLE RO/EN: Robot sferic pentru recuperarea medicala a zonei proximale la nivelul membrului superior / SPHERICAL ROBOT FOR MEDICAL RECOVERY OF UPPER LIMB PROXIMAL AREA, HAS ACTIVE COUPLINGS AND SPHERICAL MECHANISM

INVENTOR(S): VAIDA LIVIU CALIN, PLITEA NICOLAE, PISLA DOINA LIANA, CARBONE GIUSEPPE, GHERMAN BOGDAN GEORGE, ULINICI IONUT-MIHAI, PISLA ADRIAN

ABSTRACT: The invention relates to spherical robot system for the medical recovery of the upper limb proximal area, having three active couplings with a view to reproducing the abduction and flexion of the shoulder in horizontal and vertical plane, respectively, and reproducing the pronation of the forearm in vertical plane. According to the invention, the robot is a mechanism with three degrees of mobility, in modular construction, consisting of a spherical mechanism with two degrees of mobility which reproduces the movements on the surface of a sphere in the vertical plane YOZ and horizontal plane XOY, the two movements achieving the mobilization of the shoulder joint, where the gearmotor (1) transmits the rotary motion, from the level of the active coupling q1, by means of the rod (2), towards the guiding profile (3) which, in its turn, transmits the motion to the guide slide (4), said slide performing a translation motion in the plane YOZ by sliding on the guide (5), reproducing the flexion/extension of the shoulder, and the gearmotor (6) also transmits a rotation motion, from the level of the active coupling q2, by means of the rod (7), towards the guiding profile (5) and the rod (2) as shoulder supporting element, such that the guide (5) makes guide slide (4) slide in the plane XOY, together with the support (8) of the arm, the support (9) of the forearm and the support (10) of the hand, consequently on the guide (3) there being reproduced the abduction/adduction of the shoulder, and a mechanism with one degree of freedom, which reproduces a rotational motion about the axis Y in the plane XOZ for which the gearmotor (11) transmits a rotation motion, from the level of the active coupling q3 to the toothed gear (12), which, by means of some rods (13), transmits the rotation about the axis Y to the atachment elements/ the support (9) of the forearm and the support (10) of the hand, thus reproducing the pronation/supination of the forearm.

28. PATENT OSIM NR. RO131721 -B1 / 30.03.2020

TITLE RO/EN: Masina sincrona cu reluctanta variabila in constructie modulara, pentru propulsia bicicletelor electrice / SYNCHRONOUS MACHINE WITH VARIABLE RELUCTANCE, IN MODULAR CONSTRUCTION, FOR ELECTRIC BICYCLE DRIVE

INVENTOR(S): JURCA FLORIN NICOLAE, INTE RAZVAN ALEXANDRU

ABSTRACT: The invention relates to an electric machine meant for electric bicycle drive. According to the invention, the electric machine, consisting of a stator and a modular rotor, comprises some exterior covers (1), some rotor modules (2) among which non-magnetic separation elements (6, 7, 8) are placed, and which are made of some magnetic elements (3, 4, 5) made of sheets, which close the magnetic field path within the electric machine rotor and ensure the assembling of the wheel spokes (10, 11, 12) fixed with a spring lock (13) and the stator consists of a magnetic core (14) and a three-phase winding (15), the rotor construction on axial and transverse direction allowing a variation of the machine reluctance as well as simple and fast maintenance operations.

29. PATENT OSIM NR. RO130186 -B1 / 28.02.2020

TITLE RO/EN: Analizor miniatural de mercur utilizand spectometria de emisie optica / MINIATURIZED MERCURY ANALYZER BASED ON OPTICAL EMISSION SPECTROMETRY IN CAPACITIVELY COUPLED PLASMA MICRO-TORCH AND GOLD FILAMENT MICRO-COLLECTOR

INVENTOR(S): FRENTIU TIBERIU, PONTA MIHAELA-LUCIA, DARVASI EIUGEN, MIHALTAN IRONIM-ALIN, MATHE ALEXANDRU, CADAR SERGIU IULIAN, SENILA MARIN, FRENTIU MARIA, PETREUS DORIN-MARIUS, ETZ RADU, PUSKAS FERENC, SULEA DORIN

ABSTRACT: The invention relates to a miniaturized mercury analyzer based on optical emission spectrometry in capacitively coupled plasma micro-torch and gold filament micro-collector used as analytical instrumentation. According to the invention, the analyzer consists of a capacitively coupled plasma micro-torch (1) with the role of excitation cell, a gold filament micro-collector (2) for concentrating the mercury vapours, a source (3) for supplying the micro-collector (2), a radiofrequency generator (4), a micro-spectrometer (5) with coupled load detector for measuring the mercury emission signal, a computing unit (6), a three-channel peristaltic pump (7), a cold vapour generator (8), some recipients (9, 10, 11 and 12) for the sample, for stannous chloride, for washing solution and for residue collecting and an electronic flowmeter (13) for argon.

30. PATENT OSIM NR. RO130512 -B1 / 30.01.2020

TITLE RO/EN: Dispozitiv de stergere a suprafetei sarmei de otel, dupa zincare / DEVICE FOR WIPING-OFF

STEEL WIRES SURFACE AFTER ZINC-COATING

INVENTOR(S): TINTELECAN MARIUS

ABSTRACT: The invention relates to a device for wiping-off the surface of steel wire after thermal zinc-coating thereof in order to remove the excess zinc and prevent the formation of dull iron-zinc phases, which insures a high gloss coated layer. According to the invention, the device is mounted at a distance of 10 mm, at the most, from the surface of the molten zinc bath (1) and consists of a cylindrical body (6) through which cooling water circulates, on said body there being mounted by screwing another system (4) through which the wire passes, inside which a set (5) of wiping-off pads is placed, the excess zinc being removed by ensuring a certain screwing degree between the body (6) and the said system.

31. PATENT EPO NR. EP3300462-B1 / 11.12.2019

TITLE RO/EN: Structura de condensatoare pentru circuit de curent continuu / CAPACITOR DIRECT CURRENT (DC)-LINK ARRANGEMENT FOR HIGH CURRENT RIPPLE APPLICATIONS, HAS CERAMIC CAPACITOR ELEMENTS THAT ARE ARRANGED AND CONNECTED IN SIMILAR CURRENT PATH AND IN PARTICULAR IN SAME RESISTANCE CURRENT PATH

INVENTOR(S): TEODOSESCU PETRE DOREL, VINTILOIU IOANA, POP ADRIAN CORNEL, RUSU TIBERIU, POP-PIGLESAN FLORIN-ADELIN, DARAMUS MIHAI-ALEXANDRU

ABSTRACT: The arrangement (1) has a first terminal (2) and a second terminal (3) that are arranged on a printed circuit board (PCB) based substrate (5) Several ceramic capacitor elements (4) are connected to the first terminal and the second terminal. The ceramic capacitor elements are arranged and connected in a similar current path and in particular in the same resistance current path. The first terminal and the second terminal are split into a first path (7,7') and a second path (8,8') to form a portion of a corresponding contact area (6,6'). USE - Capacitor direct current (DC)-link arrangement for high current ripple applications, power conversion systems and electronic converters. ADVANTAGE - The mechanical properties of the capacitor DC-link arrangement are significantly improved. The capacitor portion damages are prevented or significantly reduced due to application in high vibration environments. The load symmetry of the ceramic capacitor elements is achieved. The cracking vibration immunity of the capacitor bank is achieved by special arrangement of the ceramic capacitor elements together with placing of the strengthening bus bars on the positive and negative copper paths.

32. PATENT OSIM NR. RO128582 -B1 / 29.11.2019

TITLE RO/EN: Dispozitiv pentru conversia zgomotului in energie electrica / DEVICE FOR CONVERSION OF NOISE TO ELECTRIC ENERGY CONSISTS OF A SUPPORT WHICH SUPPORTS A COLLECTING MATRIX, WITH SOME ELECTROMAGNETIC AND PIEZOELECTRIC TRANSDUCERS

INVENTOR(S): FILIP NICOLAE

ABSTRACT: The invention relates to an acoustic-electric device meant to collect the environmental noise made by the road traffic or by various technological equipments and to convert the same into low-power electric energy. According to the invention, the said device consists of a support (1) which supports a collecting matrix (2), with some electromagnetic and piezoelectric transducers (3), which convert the acoustic energy into electric signals, which are collected by means of some connections (4) and a multichannel system (5) to an accumulator (6), or to a consumer; the collecting matrix (2) comprisimg 11 transducers (3), each being provided with a convergence element (7), geometrically differentiated depending on the central frequency.

33. PATENT OSIM NR. RO131458 -B1 / 30.10.2019

TITLE RO/EN: Sistem de amplificare pentru presiuni inalte / AMPLIFICATION SYSTEM FOR HIGH PRESSURES consists a sonic generator (1) comprising a shaft

INVENTOR(S): CIUPAN CORNEL, CIUPAN EMILIA, PETRUS RARES ADRIAN

ABSTRACT: The invention relates to an amplification system for high pressures, which can be used in the construction of water-jet cutting machines or in other industrial applications requiring high pressures. According to the invention, the system consists of the following components: a. a sonic generator (1) comprising a shaft (4) with a cam or an eccentric (5) which, by a rod (6), actuates a membrane (7) of a membrane chamber (8), the membrane (7) being fixed with some screws (11), between a lower casing (9) and an upper casing (10); b. a sonic amplifier (3) made of a membrane chamber (12) having the membrane (13) coupled, by a rod (14), to a membrane (15) of a membrane chamber (16), where the membrane (13) is fixed by screws (17) between an upper casing (18) and a lower casing (19), the membrane (15) is fixed between the lower casing (19) of the chamber (12) and the casing (20) of the membrane chamber (16), by some screws (21), generating pressure waves in a liquid-containing flexible pipe (2) made of insertion rubber, or a rigid pipe made of metal, the pressure waves generating a reciprocating motion of the membrane (13), the connecting rod (14) generating the reciprocating motion of the membrane (15), the membrane chamber (16) together with the supply valve (22) and a nozzle (23) mounted on an orifice (24), by means of a threaded bush (25), making up the high-pressure pump (26) which generates the pulsating jet whose frequency is equal with the frequency of the pressure waves within the pipe (2); the pressure amplification is achieved due to the fact that the membrane (13) has a diameter (D) larger than the diameter (d) of the membrane (15), the pressure amplifying ratio being given by the square of the ratio between the diameters (D/d)2.

34. PATENT OSIM NR. RO130017 -B1 / 30.09.2019

TITLE RO/EN: Dispozitiv optico-electric cu marcaje fiduciale pentru interfatarea cu sisteme tactile optice multi-punct / OPTO-ELECTRICAL DEVICE WITH FIDUCIAL MARKS FOR INTERFACING WITH MULTI-POINT TOUCH OPTICAL SYSTEM

INVENTOR(S): CRISAN SEPTIMIU

ABSTRACT: The invention relates to an opto-electrical device with fiducial marks meant for man-machine interfacing in multi-user multi-point touch systems carried out with optical methods and which have characteristics and behaviours similar to the real objects generally found on the frontal panel of an apparatus, such as press buttons, displays, control elements. According to the invention, the device comprises a mechanical support (1) adapted to the size of a human hand, which comprises a matrix (2) of visible or infrared punctiform sources, supplied from a mobile voltage source (3), a guiding grid (4) which together with the matrix (2) allows the manufacture of optical marks, a series of slots (5) for detecting the incident light radiation, a photoelectric transducer assembly (6) which detects the light radiation and controls the selective switching on of the sources forming a fiducial mark, a pressure sensor (7) which permits the decrease of the energy consumption and the detection of the interaction between the user and the device, a switch (8) for starting the device and a plate (9) for diminishing parasite reflections.

35. PATENT OSIM NR. RO129923 -B1 / 30.08.2019

TITLE RO/EN: Modul de orientare cu structura modulara cu mai multe curburi / MODULE OF ORIENTATION WITH MODULAR STRUCTURE, HAVING VARIOUS CURVATURES, INTERMEDIATE ELEMENT AND ELEMENT FOR CHANGING CURVATURE

INVENTOR(S): VAIDA LIVIU CALIN, PLITEA NICOLAE, PISLA DOINA LIANA, GHERMAN BOGDAN GEORGE, SUCIU MARIUS CRISTIAN

ABSTRACT: The invention relates to a module of orientation of the distal end of a surgical instrument. According to the invention, the module comprises a plurality of elements (1a, 1b and 1c), i.e. an end element, an intermediate element and an element for changing the curvature, which allow the carrying out of some structures of orientation having various curvatures that can have various inclination angles determined by the number of intermediate elements (1b) and by the value of an angle, with the possibility of obtaining several curvatures whose orientation in relation to one another is defined by the value of an angle and which can have various diameters (d) and lengths (L).

36. PATENT OSIM NR. RO128979 -B1 / 30.07.2019

TITLE RO/EN: Procedeu si instalatie de separare electrostatica a unui amestec de materiale granulare neconductoare / PROCESS AND INSTALLATION FOR ELECTROSTATICALLY SEPARATING A MIXTURE OF NON-CONDUCTIVE GRANULAR MATERIALS

INVENTOR(S): SAMUILA ADRIAN PAUN, BILICI MIHAI-ALEXANDRU, IUGA ALEXANDRU-IULIU, DASCALESCU LUCIAN DORUCALIN FLORENTIN LAUR

ABSTRACT: The invention relates to a process and an installation for electrostatically separating the components of a mixture of non-conductive granular materials, such as: wastes of plastic, mineral substances and others. According to the invention, the process consists in: introducing, with an adjustable supplying flow rate, a mixture comprising non-conductive granules of various types, into a triboelectrization region, electrically charging with contrary sign charge the two components the granular mixture consists of, by triboelectrization in fluidized bed, separating the non-conductive granules of the first type from those of the second type by displacing them in opposed directions, under the action of some forces exercised by an electrostatic field, fastening the granules of the first type on the surface of a non-conductive rotating cylinder and those of the second type on another non-conductive rotating cylinder, extracting, from the triboelectrization area, the electrically charged granules which are fastened on the two cylinders, by rotating the same in opposite directions, detaching the granules from the surface of the two cylinders, under the action of the weight force or by means of some cleaning brushes and collecting them as products of the separation process and discharging, from the triboelectrization area, the mixture of the granules which cannot be separated. As claimed by the invention, the installation comprises an air chamber (10) made of some identical modules (11) for dividing and configuring the fluidized bed, an area (1) for triboelectrization in fluidized bed common with an area of electrostatic field generated by two electrodes (3 and 4) each connected to a high voltage source (5 and 6) of positive and negative polarity, respectively, two non-conductive rotating cylinders (7 and 8) associated to the two electrodes (3 and 4), two brushes (9) providing the granule detachment from the rotating cylinders (7 and 8), two granule collectors (15) and a third collector (16) of insufficiently electrized granules.

37. PATENT OSIM NR. RO131169 -B1 / 28.06.2019

TITLE RO/EN: Dispozitiv electronic pentriu sisteme de iluminat cu LED / ELECTRONIC DEVICE FOR LED LIGHTING SYSTEMS

INVENTOR(S): TEODOSESCU PETRE DOREL, SABAU MADALINA SABINA, NORBERTY CSABA SZEKELY, BOJAN MIRCEA, MARSCHALKO RICHARD

ABSTRACT: The invention relates to an electronic device for controlling light emitting diodes - LED used in lighting systems. According to the invention, the device comprising a single electric energy conversion stage, without rectifier circuit on the input side, consists of an input filter (1), an alternating current converter (2), which consists of a capacitive divider (6) and a half-bridge electronic circuit (7) comprising two bidirectional electronic

devices (8), enabling the direct connection to an alternating voltage source and the generation, at the output, of high frequency alternating voltage signals, which supply a resonance circuit LC (3), a LED load (4) and a control circuit (5) generating control signals for the converter (2).

38. PATENT OSIM NR. RO128666-B1 / 29.11.2018

TITLE RO/EN: Traductor electronic analogic pentru masurarea puterii in curent continuu / ANALOGUE ELECTRONIC TRANSDUCER FOR MEASURING POWER IN DIRECT CURRENT CIRCUITS, HAS CIRCUIT FOR GENERATING FILLING FACTOR WHICH IS ASTABLE FLIP-FLOP CIRCUIT BASED ON AMPLIFIER

INVENTOR(S): MUNTEANU RADU ADRIAN, DULF EVA HENRIETTA, FESTILA CLEMENT, MUNTEANU RADU, TODORAN GHEORGHE-ION

ABSTRACT: The invention relates to an analogue electronic transducer used for measuring power in direct current circuits. According to the invention, the transducer consists of a circuit for generating the filling factor which is an astable flip-flop circuit based on an amplifier (A2) with positive reaction through two resistors (R1 and R2) but also with negative reaction through two diodes (d1 and d2), two equivalent controlled resistors (r1 and r2) and a capacitor (C), the equivalent resistors (r1 and r2) corresponding to some bipolar transistors from two oppositely-connected optocouplers, the output voltage of the differential amplifier (A2) controlling, in synchronism, two electronic switches (K1 and K2) connected with two low-pass filters (FTJ-1 and FTJ-2) which have the role of smoothing the rectangular waves generated by the switches (K1 and K2) and an amplifier (A1) which controls the current of the diodes (d1 and d2).

39. PATENT OSIM NR. RO131325-B1 / 30.10.2018

TITLE RO/EN: Metoda chimica de obtinere a filmelor epitaxiale de manganit de lantan dopat cu strontiu La0.66Sr0.33MnO3 (LSMO) / CHEMICAL METHOD FOR PREPARING EPITAXIAL FILMS OF STRONTIUM-DOPED LANTHANUM MANGANITE La0.66Sr0.33MnO3 (LSMO)

INVENTOR(S): NASUI MIRCEA, PETRISOR TRAIAN, MOS RAMONA BIANCA, MESAROS AMALIA, GABOR MIHAI SEBASTIAN, CIONTEA LELIA, PETRISOR TRAIAN

ABSTRACT: The invention relates to a chemical method for preparing epitaxial films of strontium-doped lanthanum manganite La0.66Sr0.33MnO3, meant to be used in magnetic field sensors. According to the invention, the method consists in preparing a precursor solution by mixing metal sources, such as lanthanum acetylacetonates, manganese and strontium acetate which are separately dissolved in propionic acid, the resulting precursor solution being then concentrated by vacuum distillation, up to a concentration of 1...2 M, after which it is deposited by centrifugation onto SrTiO3 monocrystalline substrates, at rotary speeds of 4000 rpm, for 60 s, the raw films being further subjected to a one-stage heat treatment, in air, at a heating rate of 5 degrees C/min, up to the temperature of 500 degrees C and a heating rate of 10 degrees C/min, up to the temperature of 1100 degrees C, they being maintained at this temperature for 2 h, after which they are cooled down to the ambient temperature at a rate of 10 degrees C/min, the resulting films exhibiting an advanced orientation degree.

40. PATENT OSIM NR. RO131110-B1 / 28.09.2018

TITLE RO/EN: Sistem janta cu motor electric incorporat pentru vehicule electrice / RIM WITH BUILT-IN ELECTRIC MOTOR SYSTEM FOR ELECTRIC VEHICLES

INVENTOR(S): JURCA FLORIN NICOLAE, RUBA MIRCEA

ABSTRACT: The invention relates to a system comprising a rim with built-in electric motor meant for electric vehicle propulsion. According to the invention, the system consists of two main elements: a rim and an electric motor, the rim consisting of an outer ring (1) made of non-magnetic materials, on which the tire is fixed, some outer covers (2), also made of non-magnetic materials, an inner disk (3) which has a double role: of fixing some modular rings (4 and 5), i.e. exterior and interior, respectively, and of fixing the system on the vehicle, the modular rings (4 and 5) providing, in their turn, the attachment of the motor magnetic cores made of modular elements (6 and 7), the electric motor being a motor with switched reluctance, in reversed construction, consisting of a rotor (8) made of electrotechnical-grade steel sheets in modular shape, and of a stator (10) made of modular magnetic poles also made of steel sheets, on which the electric circuit made of coils (12) wound about the salient poles is placed.

41. PATENT OSIM NR. RO131166-B1/ 30.08.2018

TITLE RO/EN: Actuator electromecanic cu dispozitiv electronic de comanda / ELECTRO MECHANICAL ACTUATOR WITH ELECTRONIC CONTROL DEVICE, MEANT FOR ROTARY ACTUATION OF ANY ELEMENT OR EQUIPMENT WHICH NEEDS MAXIMUM ANGULAR ROTATION

INVENTOR(S): BREBAN STEFAN, TEODOSESCU PETRE DOREL, NEAG ADRIANA VOICA, CHIRCA MIHAI

ABSTRACT: The invention relates to an electro-mechanical actuator with electronic control device meant for rotary actuation of any element or equipment which needs a maximum angular rotation of 180 degrees. According to the invention, the actuator consists of a rotor having one or more permanent magnets (9) with radial magnetization, mounted by means of a bush (18) clamping or adhered onto an axle (8) which is mounted on two bearings (7) each of them integrated into a plate (5, 6) of a material of high magnetic permeability, of windings (3) which are placed about some statoric poles (2), which are located on either side of the magnet/magnets (9)

on the rotor and are mounted on some supports (4) of a high permeability material, fixed on the ends of the plates (5, 6) to form together a rigid assembly, of a circular torsion spring (16) mounted about the axle (8) of the rotor, the spring (16) having one end fixed on one of the plates (5, 6) and the other end fixed, through a connection element (13) to the axle (8) of the rotor, and of an electronic device which provides the winding supply and, implicitly, the rotor movement between two standing positions.

42. PATENT OSIM NR. RO127032-B1 / 30.05.2018

TITLE RO/EN: Dispozitiv de pornire la rece a motoarelor cu ardere interna alimentate cu biodisel / COLD START DEVICE FOR INTERNAL COMBUSTION ENGINES SUPPLIED WITH BIODIESEL FUEL

INVENTOR(S): MARIASIU FLORIN EMIL, BURNETE NICOLAE, VARGA BOGDAN OVIDIU

ABSTRACT: The invention relates to a cold start device for an internal combustion engine supplied with biodiesel fuel. According to the invention, the device has a system (1) for emitting ultrasounds (2) that are transmitted by means of an emitter (3) directly into the biocombustible mass from a filtration battery, thereby producing an increase of the temperature thereof, the system (1) for emitting the ultrasounds (2) being controlled by means of a control module (4) depending on the temperature necessary to obtain the optimal physical parameters (viscosity, density) of the biofuel, the temperature being measured by a sensor (7) placed on the case (5) of the filtration battery.

43. PATENT OSIM NR. RO127277-B1 / 30.05.2018

TITLE RO/EN: Metoda de generare a structurilor cinematice pentru roboti paraleli, si structura reconfigurabila obtinuta / MODULES FOR RECONFIGURATION OF PARALLEL ROBOTS, HAVE PAIR OF COMBINATIONS OF LINKAGES, LINKAGE HAS SPHERICAL JOINT, PRISM-SHAPED JOINT AND UNIVERSAL JOINT

INVENTOR(S): BRISAN CORNEL

ABSTRACT: The invention relates to a method for obtaining, by reconfiguration, a system of parallel robots having various mobility degrees and to some modules necessary for such a reconfiguration, respectively. According to the invention, the method consists, in a first stage, in selecting the number of mobility degrees (M) of a robot, then selecting the number (b) of linkages of PSR type so that, finally, a number (a) of linkages of PSU type results based on the relation M=a+b, the reconfigurability of the structures being ensured by using the same mounting dimensions between the connection elements of some kinematic couples. The modules claimed by the invention have two combinations of linkages: a linkage (SPU) comprising three joints (1, 2 and 3), namely a spherical joint, a prism-shaped joint and a universal joint, and a linkage (SPR) comprising three joints (4, 5 and 6), namely a shperical joint, a prism-shaped joint and a rotation joint, where a reconfigurable joint can integrate only SPR linkages, only PSU linkages or combinations of PSR and PSU linkages, the linkages of the same type in a structure being identical.

44. PATENT OSIM NR. RO128489-B1 / 27.04.2018

TITLE RO/EN: Dispozitiv de sedimentare pentru obtinerea unor materiale poroase, sinterizate, graduale / PROCESS AND DEVICE FOR PREPARING SINTERED MATERIALS OF GRADUAL POROUS STRUCTURE BY GRAVITATIONAL SETTLING OF POWDERS

INVENTOR(S): VIDA-SIMITI IOAN, THALMAIER GYORGY, MOLDOVAN VALENTIN, SECHEL ARGENTINA NICULINA, NASCA OVIDIU

ABSTRACT: The invention relates to a process and a device for preparing sintered materials of gradual porosity by gravitational settling of powders, intended to be used as filtering elements or porous membranes for various industrial and medical applications. According to the invention, the process consists in previously dispersing the metallic powder mass into distilled water, after which it is poured into the settling enclosure (2) containing distilled water and a dispergation agent, the settling taking place inside a mould (6), then the settled material is dried in an oven, for 1 h, at a temperature of 110 degrees C, and sintered in sintering furnaces at technological parameters depending on the nature of the sintered material and the desired sintering degree. The device, as claimed by the invention, consists of four settling enclosures in the form of glass columns (2) which are fixed and sealed between the lower cap (3) and the upper cap (4), and four moulds (6) with water draining orifices.

45. PATENT OSIM NR. RO130282-B1 / 30.03.2018

TITLE RO/EN: Metoda pentru modificarea dinamica a frecventei intr-o unitate aritmetica bazata pe detectia on-line a erorilor / METHOD FOR DYNAMICALLY MODIFYING FREQUENCY IN AN ARITHMETIC UNIT BASED ON ONLINE ERROR DETECTION

INVENTOR(S): JOAN FIGUERAS PAMIES, MICLEA LIVIU CRISTIAN, MOIS GEORGE DAN

ABSTRACT: The invention relates to a method for dynamically modifying the frequency during the operation of an arithmetic unit within a digital signal processing unit which has adders or multipliers comprised in the critical path. According to the invention, the method consists in dynamically modifying the frequency by the dynamic modification of the clock signal period in an arithmetic circuit (1), based on the detection of the errors due to the delays occurred in the circuit, by a detection contention circuit, using a base 7 residual code.

46. PATENT OSIM NR. RO128900-B1 / 28.02.2018

TITLE RO/EN: Dispozitiv de atenuare a vibratiilor, atasat pe sistemul mana-brat al operatorului uman / DEVICE FOR DAMPING THE VIBRATIONS, ATTACHED TO THE HAND-ARM SYSTEM OF THE HUMAN OPERATOR

INVENTOR(S): POP AURORA FELICIA, ARGHIR MARIANA

ABSTRACT: The invention relates to a device for damping the vibrations, attached to the hand-arm system of the human operator. The device claimed by the invention consists of a support plate (3) which sustains a rubber sleeve (2) consisting of two parts secured at the ends with two screws (1), the plate (3) having the role of securing to the forearm, a vibration damper (6) secured between the plate (3) and another support plate (7) secured in another sleeve (9) by means of a screw (8), the vibration damper (6) being secured with an end to the plate (3) by means of a countersunk screw (4), and at the opposite end it is secured to the plate (7) by means of a support extender (5) which is welded to the plate (7).

47. PATENT OSIM NR. RO128681-B1 / 30.01.2018

TITLE RO/EN: Amplificator de impulsuri bipolare de curent in punte hibrida cu comanda simetrica / BIPOLAR CURRENT PULSE AMPLIFIER IN HYBRID BRIDGE WITH SYMMETRICAL CONTROL

INVENTOR(S): ARSINTE RADU, PETREUS DORIN- MARIUS

ABSTRACT: The invention relates to a bipolar current pulse amplifier in hybrid bridge with symmetrical control. According to the invention, the amplifier has a bridge structure consisting of four switch elements (Q1, Q2, Q5, Q6) and some circuits related thereto and it is meant to supply current pulses on an inductive load (L), two of the bridge sides, comprising switch elements (Q1 and Q5), are replaced with some linear current sources made by some high speed operational amplifiers (X1 and X2), some resistors (R5 and R12) being used for detecting the current of those sources and providing the current reaction, and some resistors (R6 and R13) providing the factor for amplifying in current, a voltage comparator made by some transistors (Q3 and Q4) and some additional elements (R15, R16 and R17) provide the control of the switch elements (Q2 and Q6) in the bridge, some elements (R3, R4, C2 and R11, R10, C4, respectively) are used for controlling the power switches (Q2 and Q6, respectively), in the bridge, and some diodes (D1, D2, D3 and D4) are used for suppressing the energy appearing during the switching process, the sense of the current in a load (L1) being set out by the transistors (Q3 and Q4) which are used for comparing the voltages at the output of the amplifiers (X1 and X2) and decide the activation of one of the two switches (Q2 or Q6).

48. PATENT OSIM NR. RO127341-B1 / 30.01.2018

TITLE RO/EN: Metoda si arhitectura hardware pentru adresarea automata a imaginilor microarray / METHOD AND HARDWARE ARCHITECTURE FOR AUTOMATIC MICROARRAY IMAGE ADDRESSING

INVENTOR(S): BELEAN IOAN BOGDAN, BORDA MONICA ELENA, TEREBES ROMULUS, MALUTAN RAUL EMIL

ABSTRACT: The invention relates to a method and hardware architecture for automatic microarray image addressing. The claimed method consists in determining a horizontal profile and a vertical profile of the image, applying a shock filter model and determining some points of inflection and tracing some pairs of horizontal and vertical lines allowing the selection and location of spots, eliminating the necessity of a workstation and a specialized software platform. The claimed hardware architecture consists in storing the horizontal and vertical profiles of the microarray image in a block RAM memory (8) using two information displacement registers (10 and 11) and a parallel processing block with two output registers (14 and 15) and dividing the profile data structure into blocks of size n, the same as the size of displacement registers (10 and 11), for uploading the data in the memory (8) into the displacement registers (10 and 11), passing and processing thereof by output registers (14 and 15) and storing the results in a RAM memory (9).

49. PATENT OSIM NR. RO 128372-B1 / 29.11.2017

TITLE RO/EN: Instalatie cu agitare pentru bioextractia metalelor grele din solurile poluate / INSTALLATION WITH STIRRING BY SWINGING FOR HEAVY METALS BIO-EXTRACTION FROM POLLUTED SOILS

INVENTOR(S): CIOCIORHAN CAMELIA SIMONA, MICLE VALER, ARDELEAN IOAN

ABSTRACT: The invention relates to an installation for extracting heavy metals from polluted soils. According to the invention, the installation consists of a cylindrical tank (7) supported on two rolling bearings and driven into a swinging-type oscillation movement, by means of a crank-equalizer-like quadrangle mechanism (2, 3, 4, 5, 6), a vat (8) with water, a gearmotor (1) and a system (10) for heating and temperature control, which, by means of a resistor of 1000 W connected in circuit with a microprocessor-plate, determines and maintains a temperature of 50 degrees C in the vat and of 35 degrees C in the cylinder.

50. PATENT OSIM NR. RO 129834-B1 / 30.10.2017

TITLE RO/EN: Procedeu de obtinere a unui material compozit de frictiune cu baza fier / METHOD FOR OBTAINING IRON-BASED FRICTION COMPOSITE, E.G. FOR BRAKE PADS, INVOLVES SCREENING IRON, COPPER AND TITANIUM DIOXIDE POWDERS WITH PARTICLE SIZE LESS THAN 10 MICROMETERS, HOMOGENIZING BY GRINDING, COMPRESSING IN MOLD AND SINTERING

INVENTOR(S): MERIE VIOLETA VALENTINA, CANDEA VIOREL CONSTANTIN, POPA CATALIN OVIDIU, POPA ANGELA ENUTA

ABSTRACT: The invention relates to a process for obtaining an iron-based friction composite material intended for car brake pads or other industrial friction applications. The process according to the invention starts by screening the iron, copper and titanium dioxide powders having a particle size of less than 10 microns, after which the powder mixture dosed according to the formula is homogenized by mechanical grinding for 15 minutes in a

planetary ball mill having a plate rotary speed of 1000 rpm and a container rotary speed of 500 rpm. The homogenized mixture is then compressed biaxially in a closed mold, using a compacting pressure of 600 MPa and in the final stage the raw pressed pieces are sintered under vacuum, at a pressure of 10-5 torr, at a sintering temperature of 1050 degrees C maintained for 30 minutes.

51. PATENT OSIM NR. RO129163-B1 / 30.10.2017

TITLE RO/EN: Material compozit de frictiune cu baza fier / IRON-BASED COMPOSITE FRICTION MATERIAL CONTAINS IRON, COPPER, GRAPHITE AND NICKEL

INVENTOR(S): CANDEA VIOREL CONSTANTIN, MERIE VIOLETA VALENTINA, POPA CATALIN OVIDIU, POPA ANGELA ENUTA

ABSTRACT: The invention relates to a composite material made of a Fe-based metal matrix reinforced with ceramic particles, the material being meant to be employed in manufacturing friction pads for cars or in industrial friction applications due to its increased wearing resistance, and average friction coefficient, while the mechanical and tribological properties are maintained constant at high temperatures specific to the operation of friction products. According to the invention, the material has the following composition: 63% Fe, 10% Cu, 7% graphite, 12% Ni, 6% TiO2 and 2 % alumina, the percentage being expressed by weight.

52. PATENT OSIM NR. RO127453-B1 / 30.08.2017

TITLE RO/EN: Sistem de control al traficului vehiculelor pe o banda, si metoda de exploatare / METHOD AND SYSTEM FOR CONTROLLING TRAFFIC OF ROAD VEHICLES ON ONE LANE BY LIMITING ADMISSIBLE MAXIMAL SPEED ON ONE LANE

INVENTOR(S): LETIA TIBERIU STEFAN, CIUPAN CORNEL

ABSTRACT: The invention relates to a method and a system for controlling the traffic of road vehicles on one lane. The claimed method consists in limiting the admissible maximal speed on one lane, when the speed of the vehicle entering the controlled section is higher than the admissible maximal speed by commanding to a mechanical system the application of an obstacle and the emission of some warning signals, and then the flow of cars on one lane is subjected to a control by limiting the number of vehicles passing through the control section by using the traffic lights in parallel with the obstacle and, in order to control the flows of vehicles on two adjacent lanes to be joined in a single lane, there are used two mechanical systems and two traffic lights, one for each lane, and there is permitted the access of vehicles in an equitable manner given by a ratio of the flows on each lane, said ratio being determined by means of a system which determines the time of passage between two cars for each lane. The claimed system comprises a control equipment (11) and a mechanical system which imposes an obstacle made either by means of an asymmetrical cylinder (6) mounted in a channel (5) which is cut in a control section crosswise on a lane (2), said cylinder (6) being rotated by a motor (8) and producing or cancelling a dislevelment (7), or by means of a hydraulic device (29) actuating an obstacle in the shape of a trap mounted on the lane in the control section.

53. PATENT OSIM NR. RO128055-B1 / 28.07.2017

TITLE RO/EN: Dispozitiv si metoda de testare a dintilor rotilor dintate asimetrice / DEVICE FOR TESTING TEETH OF ASYMMETRIC GEAR WHEELS, COMPRISES BASE PLATE, TEST SPECIMEN SUPPORT, FASTENING YOKE, TEST SPECIMEN, RACK SUPPORT AND RACK

INVENTOR(S): LOBONTIU MIRCEA, RAVAI NAGY SANDOR

ABSTRACT: The invention relates to a device and a method for testing the teeth of asymmetric gear wheels, intended to be employed in determining the maximal load force of a tooth of asymmetric gear wheel under static conditions in the stage of designing the gear wheel in the assembly of a reduction unit. According to the invention, the device is mounted on a materials testing machine (8) and comprises a base plate (1), a test specimen support (5), a fastening yoke (6), a test specimen (4), a rack support (2) and a rack (3). The teeth testing method, as claimed by the invention, has the following stages: manufacturing the test specimen (4), placing the device (7) into the materials testing machine (8), placing the test specimen (4) in the support (5), driving the device (7) for applying a stress on the tooth, measuring the variation of the tangential testing force Fta and of the tooth deformation up to the moment of the breaking thereof, removing the used test specimen (4) from the device (7), removing the device (7) from the materials testing machine (8) and processing the obtained data.

54. PATENT OSIM NR. RO130450-B1 / 30.03.2017

TITLE RO/EN: Reductor magnetic cu raport de transmisie in trepte / MAGNETIC REDUCTION GEAR WITH STEPPED TRANSMISSION RATIO USED FOR TRANSFERRING TORQUE AND ROTARY SPEED OF A ROTATING ELECTRICAL MACHINE

INVENTOR(S): FODOREAN DANIEL

ABSTRACT: The invention relates to a magnetic reduction gear with stepped transmission ratio used for transferring torque and rotary speed of a rotating three phase electrical machine towards a certain consummer. According to the invention, the reduction gear comprises an inner rotor, consisting of : ferromagnetic core (1) of electrotechnic-grade steel sheets and permanent magnets (2) made of rare earth, an inner air gap (3), a fixed part, consisting of some ferromagnetic teeth (4) of level L1 made of electrotechnic-grade steel, an air gap (5) being provided between the ferromagnetic teeth (4) and an envelope (6) of non-magnetic material whose length exceeds the length of the active part of the reduction gear and is used for guiding some supplemental teeth (4)

of level L2, L3 and L4 which will be inserted, upon necessities, into the air gap (5), an outer air gap (7) placed between the fixed part and the outer rotor of the magnetic reduction gear, an outer rotor consisting of : some permanent magnets (8) made of rare earth and ferromagnetic core (9) of electrotechnic-grade steel sheets and an outer mobile device of the reduction gear, consisting in its turn of the supplemental ferromagnetic teeth (4) of level L2, L3 and L4, the length of each level being different, the teeth being attached to some non-magnetic rings (10) which have different diameters, they are placed in different planes and are used for guiding the supplemental teeth (4) of level L2, L3 and L4 in the air gap (5) of the fixed part of the reduction gear.

55. PATENT OSIM NR. RO130062-B1 / 28.02.2017

TITLE RO/EN: Procedeu si material compozit pentru realizarea placilor sintetice ornamentale / PROCESS AND COMPOSITE MATERIAL FOR MANUFACTURING SYNTHETIC ORNAMENTAL PLATES

INVENTOR(S): SABAU EMILIA, BALC NICOLAE OCTAVIAN, BERE PETRU PAUL

ABSTRACT: The invention relates to a process for manufacturing synthetic ornamental plates to be used in constructions. According to the invention, the process consists in applying a usual stripping layer on a mould made of silicon rubber, after which a first mixture consisting of 60% polyester matrix and 40% calcium carbonate is poured so as to cover the height of the mould asperities and it is maintained until reaching the gel point at the room temperature, further on a reinforcing mixture comprising 30% sand, 30% minced wastes of glass fiber and 40% polyester matrix, mixed for 20 min. is poured and afterwards the mould, filled and leveled, is transferred into a polymerization oven where it is kept at the temperature of 60 degrees C for 2h, and, after the mould stripping, a compact composite material results.

56. PATENT OSIM NR. RO130354-B1 / 30.12.2016

TITLE RO/EN: Procedeu de obtinere a unei pulberi nanostructurate de tipul permalloy (supermalloy)/rhometal / NANOSTRUCTURED POWDER OF PERMALLOY (SUPERMALLOY) RHOMETAL TYPE AND PROCESS FOR PREPARING THE SAME

INVENTOR(S): CHICINAS IONEL, MARINCA TRAIAN FLORIN, POPA FLORIN, NEAMTU BOGDAN VIOREL

ABSTRACT: The invention relates to a composite nanocrystalline powder of pseudo "core-shell" type and to a process for preparing the same, the powder being meant to be used for manufacturing magnetic cores, with soft magnetic material properties and high electric resistivity, to operate in alternating current at medium frequencies. The claimed powder consists of composite particles which have a core of Permalloy type alloy - Ni3Fe or Supermalloy - 79Ni16Fe5Mo, as mass percentage, with nanocrystalline structure, and a quasi-continuous outer layer of fine Fe carbonyl particles bonded to the Permalloy particles by means of a specific thermal treatment, after which an interface 64Fe36Ni, as mass percentage, is formed between the core and the outer layer. The claimed process consists in preparing a mechanical mixture formed of nanocrystalline powder of Ni3Fe of large granulation and Fe carbonyl powder of small granulation, ranging between 6...9, with a mass ratio ranging between 92/8...60/40, the necessary amount of mixture being subjected to wet or dry homogenization, compacted at a pressure ranging between 300...600 MPa, followed by a thermal treatment in argon protected atmosphere, for one hour, at a temperature of 400...550 degrees C, and then the powder mixture is slightly ground in a mortar and screened through a sieve having a mesh size of 40.

57. PATENT EPO NR. EP2869433-B1 / 21.09.2016

TITLE RO/EN: Masina sincrona cu flux axial si magneti permanenti cu concentrare de flux magnetic / AXIAL FLUX PERMANENT MAGNET ELECTRICAL MACHINE FOR USE WITH E.G. WIND TURBINE, HAS STATOR OR ROTOR INCLUDING DISCRETE WINDINGS THAT ARE MOUNTED RADIALLY AT EQUAL DISTANCE, WITH HOLLOW SPACES AND ON INNER WINDINGS SUPPORT

INVENTOR(S): BREBAN STEFAN, MESTER VICTOR, OPREA CLAUDIU ALEXANDRU

ABSTRACT: The machine has a rotor arranged coaxial with a stator and mounted to allow rotation relative to the stator. One of the rotor and the stator includes permanent magnets (24) mounted radially with alternating NS-SN-NS circumferential magnetization and intercalated with magnetic poles (22). The stator or rotor includes discrete windings (10) that are mounted radially at equal distance, on a stator or rotor outer windings support, with hollow spaces and on an inner windings support. A mounting system comprises a retaining part and a clamping part.

58. PATENT OSIM NR. RO128768-B1 / 30.06.2016

TITLE RO/EN: Dispozitiv de reducere a vascozitatii uleiurilor de ungere, la pornirea, la temperaturi ambientale scazute, a motoarelor cu ardere interna / DEVICE FOR REDUCING LUBE OIL VISCOSITY UPON START OF INTERNAL COMBUSTION ENGINES AT REDUCED AMBIENT TEMPERATURES

INVENTOR(S): MARIASIU FLORIN EMIL, VARGA BOGDAN OVIDIU, DEAC TEODORA ALEXANDRA

ABSTRACT: The invention relates to a device for reducing the viscosity of lube oils upon the start of internal combustion engines at reduced ambient temperatures. According to the invention, the device uses a low-power ultrasound emitter (2) which reduces the lube oil viscosity upon the start of internal combustion engines at reduced ambient temperatures and a process automation module comprising an electronic control module (3) which receives information concerning the temperature of the lube oil by means of a thermostat (5).

59. PATENT OSIM NR. RO125211-B1 / 30.05.2016

TITLE RO/EN: Metoda de conducere a robotilor industriali / METHOD FOR CONTROLLING INDUSTRIAL ROBOTS BASED ON SIMULATION, TRAINING AND EXPLOITATION OF THREE-LAYERED NEURAL NETWORK WITH SIX NEURONS IN INPUT LAYER DETERMINED BY SIMULATION ON MATHEMATIC MODEL OR BY EXPERIMENTATION ON PHYSICAL MODEL

INVENTOR(S): CIUPAN EMILIA, MORAR LIVIU, CIUPAN CORNEL

ABSTRACT: The invention relates to a method for controlling industrial robots. According to the invention, the method is based on the simulation, training and exploitation of a three-layered neural network having six neurons in the input layer, corresponding to the coordinates of six engine torques qi, where i=1, ..., 6, six neurons in the output layer and a number of neurons ranging between 9 and 50 in the intermediary layer, the data for training the network being determined by the simulation on a mathematic model or by the experimentation on a physical model of a robot, by imposing some successive modifications of the engine torques qi, by a pace p, and then, by simultaneous modification of 2, 3, 4, 5 and 6 coordinates of the engine torques qi, resulting by actuating the kinematic axes related to the same, for each set of input data qi,j, i=1,..., m, there resulting a set of output data Xj,Yj, Zj, psij, tetaj, phij, which are used for training the network.

60. PATENT OSIM NR. RO125210-B1 / 30.05.2016

TITLE RO/EN: Metoda de instruire a robotilor pentru ocolirea obstacolelor / METHOD OF INSTRUCTING ROBOTS TO AVOID OBSTACLES IN A WORKING SPACE WHERE THE INSTRUCTION DATA IS DETERMINED BY SIMULATION USING THE MATHEMATICAL MODEL OR EXPERIMENTALLY USING A PHYSICAL MODEL OF THE ROBOT

INVENTOR(S): CIUPAN EMILIA, MORAR LIVIU, CIUPAN CORNEL

ABSTRACT: The invention relates to a method of instructing industrial robots to avoid obstacles in a working space. According to the invention, the method of instructing an industrial robot is based on modeling, instructing and exploiting a three-layered neural network having a number of k neurons in the input layer, corresponding to the number of degrees of freedom, a number of m neurons in the output layer, corresponding to the number of kinematic axes and a number n, ranging from 9 to 50 neurons in the intermediate layer, the instruction data being determined by simulation, using a mathematic model, or experimentally, using a physical model of the robot, by the convenient selection of a points cloud in a working space, an obstacle placed in the robot path being automatically avoided by an adequate network instruction with input data corresponding to some points in the direct robot path and output data corresponding to the by-pass path.

61. PATENT OSIM NR. RO127080-B1 / 30.03.2016

TITLE RO/EN: Instalatie de indepartare a dioxidului de carbon din gazele reziduale / PROCESS FOR RETAINING CARBON DIOXIDE FROM SPENT GASES BY CHEMICAL ABSORPTION

INVENTOR(S): VASILE HOTEA, GABRIEL BADESCU, JUHASZ JOZSEF

ABSTRACT: The invention relates to a process for retaining carbon dioxide from spent gases and to a plant for carrying out the process. According to the invention, the process consists in neutralizing the gases with a 2M solution of sodium and potassium carbonate with bicarbonate formation, followed by the thermal decomposition of the solution, at a temperature of 80...110 degrees C, with release of CO2 which is partially condensed and dried at a pressure of 2 bar, the carbon dioxide being released by pressure reduction and temperature increase up to 120 degrees C, after which it is compressed and stored. The plant claimed by the invention consists of a tank (2) in which the neutralizing solution is prepared, a pressure pump (3) which sends the 2M solution to a spent gas mixing zone (5) of a centrifugal scrubber (1) representing the absorption column, where the mixture is pulverized through a nozzle (7), the CO2-containing solution being discharged at the bottom of the scrubber, passed through a filter (9) and an exchanger (10) and entering the top part of a desorption column (11), wherefrom the resulting flow of CO2-rich vapour is passed through a condenser (12) and a drier (13) to the compression and storing zone.

62. PATENT OSIM NR. RO128077-B1 / 30.03.2016

TITLE RO/EN: Generator de plasma de putere mica la presiune atmosferica / LOW POWER PLASMA GENERATOR AT ATMOSPHERIC PRESSURE

INVENTOR(S): PETREUS DORIN-MARIUS, PLAIAN EMIL, GRAMA ALIN MARIUS, CORDOS EMIL, CADAR SERGIU IULIAN

ABSTRACT: The invention relates to a radiofrequency plasma generator at atmospheric pressure. According to the invention, the generator comprises an electronic commutator (1) consisting of a MOS-type transistor controlled by means of a grid (2) with a rectangular signal with variable pulse duty factor, between the supply terminal and the drain terminal of the commutator (1) there being placed a choke-coil (3) and in parallel with the commutator there being mounted a shunt capacitor (4) ensuring the load transfer during the commutations, while an RLC-type load network (5) plays the role of ensuring the commutation conditions for the MOS transistor, and a power amplifier consisting of a rectangular signal generator (6) with a role in generating the control signal which is transmitted to a block (7) controlling the grid (2) by means of which there is ensured a current amplification of the signal, said signal being necessary for controlling a power amplifier (8) at optimal parameters, at the output of the power amplifier (8) there being placed a magnetic-type voltage step-up amplifier (9) with a regulation loop (10), the output voltage of the amplifier (9) being applied to an electrode-block (11) on an active electrode (20), and by closing the field lines to a reference electrode there takes place the generation of the plasma at

atmospheric pressure.

63. PATENT OSIM NR. RO129217-B1 / 29.01.2016

TITLE RO/EN: Dispozitiv pentru laminarea longitudinala a rotilor dintate cu dantura dreapta, pe prese / DEVICE FOR LONGITUDINAL PRESS-ROLLING OF GEAR WHEELS WITH STRAIGHT TEETH, HAS INDIVIDUAL WHEEL OF DRIVING DEFORMATION ROLLER

INVENTOR(S): MARIAN IONUT, TINTELECAN MARIUS

ABSTRACT: The invention relates to a device for the longitudinal press-rolling of the gear wheels with straight teeth. According to the invention, the device consists of a body (11) whereon there is mounted a number of deformation rollers (9) individually driven by a gear wheel (8) which takes over the rotation movement by downwardly moving a rack (5), integral inside the cover of the upper part (1), the deformation roller (9) being actuated by a kinematic chain which comprises the deformation roller (9), the individual wheel (8) of driving the deformation roller (9) and the rack (5) with downward movement, the body (11) of the device exactly positioning both the deformation rollers (9) and the individual driving gear wheels (8), and the process of obtaining the gear wheels (8) is based on the direct contact of the deformation rollers (9) with a blank (7) which is deformed, these having an intended rotation movement induced by the downward movement of the racks (5) which determines the rotation of the driving gear wheels (8) and the reversed rotation of the deformation rollers (9).

64. PATENT OSIM NR. RO101011-B1 / 30.12.2015

: Procedeu de obtinere a unor concentrate de muscovit din pegmatite feldspatice / MUSCOVITE CONCENTRATE FROM FELDSPAR PEGMATITES PRODUCTION METHOD

INVENTOR(S): IUGA ALEXANDRU-IULIU, MORAR ROMAN, CUGLESAN IOAN, DASCALESCU LUCIAN-DORU, NEAMTU VASILE, POP DUMITRU-MITICA, VRANNAI STEFAN, SOOS MANEA CAROL, TIMBUS RADU, RANCA POMPILIU, BOLBA REMUS, MURESAN NICOLAE, KISS IOSIF, TOMESCU VALENTIN

ABSTRACT: A muscovite concentrate is obtd. from a granular material, a by prod. of processing feld-spathoid pegmatite. This material contains over 50% muscovite, spangles, quartz impurity feldspar and wood. A proposed technical soln. for the redn. of adhesive forces involves heating the material at 300-400 deg.C in an oven. Following classification in two stages and redn. of surface humidity at 150 deg.C sepn. is carried out in a three directional intensive electric field.

65. PATENT OSIM NR. RO127385-B1 / 30.10.2015

TITLE RO/EN: Minigriper compliant cu actuator piezoelectric / COMPLIANT MINIGRIPPER WITH PIEZOELECTRIC ACTUATOR MEANT FOR PRECISE MANIPULATION OF VARIOUS SIZE OBJECTS

INVENTOR(S): NOVEANU SIMONA, CSIBI IOSIF VENCEL, MANDRU DAN, NOVEANU DAN CRISTIAN, LUNGU ION

ABSTRACT: The invention relates to a compliant minigripper (1) with piezoelectric actuator (2) meant for the precise manipulation of various size objects, in applications specific to fine mechanics. According to the invention, the minigripper (1) is conceived as a monoblock structure, with some flexible couples (3) obtained by thinning the section of some symmetrically arranged kinematic elements (4) in the structure, the compliant minigripper body (1) containing ten flexible couples (3) which transmit the movement and the force, by the elastic deformation of the material they are made of, by means of the kinematic elements (4), at the outlet of the piezoelectric actuator (2), to some fastening elements (5) which carry out the manipulation, by modifying the geometric shape of the flexible couples (3) (elliptical, rectangular, parabolic, circular or rectangular with various transition radii), selecting the material that the compliant minigripper (1) is made of (steel, brass, polymethylmethacrylate, polytetrafluoroethylene etc.) as well as by the variation of the supply voltage of the piezoelectric actuator (2), there being ensured a wider range of dimensions of the objects to be manipulated as well as the use thereof in various media.

66. PATENT OSIM NR. RO129538-B1 / 30.09.2015

TITLE RO/EN: Dispozitiv de control si reglare a pozitiei sculelor cu suprafete elicoidale / DEVICE FOR SHARPENING TOOLS WITH HELICAL SURFACES, PLACED ON THE TABLE OF A SHARPENER WITH ABRASIVE DISCS

INVENTOR(S): VUSCAN GHEORGHE IOAN, MICACIU ALEXANDRU

ABSTRACT: The invention relates to a device used for sharpening tools with helical surfaces, placed on the table of a sharpener with abrasive discs. According to the invention, the device consists of a main shaft (2) whereon the tool (1) to be sharpened is fixed, the main shaft (2) passes through a ball bearing (4) inside which there is fixed, by hooping, a profiled ring (5) which is in contact with the main shaft (2), the ball bearing (4) being fastened in a box (6) which is integral with a shaft (7) of a worm gear (11), on the shaft (7) there being mounted a spring disk (8) and a pressure bearing (9) fixed in the bore hole of an upper plate (10), the worm gear (11) mounted with a wedge on the shaft (7) gears with a worm (12), at the end of a worm shaft (13) there being

placed a handle (15) for gearing the worm (12), by actuating the handle (15), the worm (12) gears with the worm gear (11) which by rotation inclines the box (6) together with the ball bearing (4) under an inclination angle which coincides with the inclination angle of the screw of the tool (1) thus defining the helical walk of the tool (1), the tool (1) being driven by actuating a hand wheel (3) in one sense or another, alternately, the tool (1) performing a rotary-translation movement under an abrasive disk (16) placed at the angle.

67. PATENT OSIM NR. RO128980-B1 / 30.09.2015

TITLE RO/EN: Dispozitiv de acoperire preventiva a interiorului pieselor tubulare de dimensiuni mari / DEVICE FOR PREVENTIVELY LINING THE INTERIOR OF HOLLOW PIECES OF LARGE SIZES

INVENTOR(S): VUSCAN GHEORGHE IOAN, CIGAN VLAD

ABSTRACT: The invention relates to a device used for painting or preventively lining the interior of some hollow pieces of large sizes. According to the invention, the device comprises a support plate (11) whereon there is fastened an electric motor (1) and a reducer (3), the movement being transmitted from the electric motor (1), through the reducer (3), to a case (8) provided with bevel gears, through a bevel gear (2), on the case (8) there being mounted three telescopic legs (9) having, at the ends, a inclinable friction wheel (6), the feeding movement being performed due to a propeller with three arms which come in contact with a hollow semi-finished product (12) by means of the friction wheels (6) which axially displace the entire assembly, the adjustment of the propeller inclination angle being carried out both manually, and by means of a step-by-step electric motor (7), some air, oxygen and acetylene sources being connected to a supplying sleeve (10), in a tank (4) there being stored paint or powders for the preventive lining, which are entrained by an air jet, on the interior surface of the hollow semi-finished product (12) through an atomizer (5) which performs a helical movement together with the case (8).

68. PATENT OSIM NR. RO129228-B1 / 28.08.2015

TITLE RO/EN: Procedeu de obtinere a unui material compozit fonoabsorbant / SOUNDPROOFING COMPOSITE MATERIAL COMPRISES FIR SAWDUST GRAINS AND POLYURETHANE FOAM

INVENTOR(S): TIUC ANCUTA ELENA, RUSU TIBERIU, NEMES OVIDIU

ABSTRACT: The invention relates to a soundproofing composite material and process for preparing the same. The claimed material comprises 70...80% fir sawdust grains having a humidity of 9.3...10.4% and a density of 0.035...0.039 g/cm3 and 20...30% polyurethane foam, the percentage being expressed by weight. The claimed process consists in vigorously mixing the polyol and isocyanate components in a ratio of 100:70 for 5...8 s, at the room temperature, afterwards adding fir or beech sawdust grains, the resulting mixture is poured into a mould and it is maintained for 30...45 min for the reaction completion, wherefrom there results a material having a density of 0.14...0.17 g/cm3, a compressive strength of 0.03...0.07 N/mm2, a thermal conductivity of 0.039...0.083 W/m.K and an acoustical absorption coefficient alpha within the range 0.55...0.95 in the frequency range of 1000...6300 Hz.

69. PATENT OSIM NR. RO128093-B1 / 29.05.2015

TITLE RO/EN: Procedeu de obtinere a placilor din materiale compozite polimerice armate cu fibre / PROCESS AND DEVICE FOR MAKING PLATES OF POLYMERIC COMPOSITE MATERIALS REINFORCED WITH FIBERS

INVENTOR(S): BERE PETRU PAUL, BERCE PETRU, NEMES OVIDIU, BALC NICOLAE

ABSTRACT: The invention relates to a process and a device for making plates of polymeric composite materials such as polyester, epoxy, phenolic, vinylester resins or other polymers, reinforced with fabrics made of glass fibers, carbon fibers, aramidic fibers and the like. According to the invention, the process consists in laying the composite material (3) in non-polymerized condition onto the surface of a plane mould (2), coating the same with a plastic foil (4), pressing the composite material (3) onto the mould (2) by means of a pressing device with cylinders (5) which removes the excess of composite material (3) towards the mould edges so that, by reducing the volume of composite material (3) under the plastic foil (4), there is formed a vacuum pressure which presses the composite material (3) during the entire polymerization process, and, in the end, the resulting plate of composite material is removed from the mould and the plastic foil (4) is eliminated. According to the invention, the device comprises a roller working table (1) whereon there moves the plane mould (2) with the composite material (3) covered with the plastic foil (4) and a pressing device with cylinders (5).

70. PATENT EPO NR. EP2444209-B1 / 22.04.2015

TITLE RO/EN: Metoda de generare a topologiei robotilor paraleli reconfigurabili cu actuatori verticali / METHOD FOR GENERATION OF KINEMATICAL STRUCTURES FOR RECONFIGURABLE PARALLEL ROBOTS WITH VERTICAL ACTUATORS, INVOLVES DETERMINING NUMBER OF PRISMATIC- SPHERICAL-UNIVERSAL KINEMATIC CHAINS BASED ON DESIRED NUMBER OF DEGREES OF FREEDOM

INVENTOR(S): BRISAN CORNEL, HILLER MANFRED

ABSTRACT: The method involves knowing the number of degrees of freedom of the robot. The number of prismatic- spherical-universal (PSU) kinematic chains is determined based on the desired number of degrees of freedom. The number of the prismatic - spherical - rotational (PSR) kinematic chains is determined. The conditional expression relating the robot and kinematic chains is satisfied. The reconfigurability of the structures is assured by the utilization of the mounting dimensions between the elements that form all the kinematic chains.

71. PATENT OSIM NR. RO127399-B1 / 30.03.2015

TITLE RO/EN: Beton cu agregate din deseuri de sticla / CONCRETE COMPOSITION USED FOR CONSTRUCTION, COMPRISES PORTLAND CEMENT, SUPERFINE SILICA, GLASS POWDER, RIVER AGGREGATES, CRUSHED AND SCREENED GLASS AGGREGATE, WATER, AND SUPERPLASTIFYING ADDITIVE

INVENTOR(S): MAGUREANU CORNELIA, CORBU OFELIA CORNELIA

ABSTRACT: The invention relates to a concrete composition for constructions. According to the invention, the composition consists of 15.91% Portland cement, 1.99% superfine silica, 3.97% fine glass powder, 32.55...36% river aggregates having sizes of up to 4 mm and 37...39.79% crushed and screened glass aggregate having a grain size of 4...16 mm, 5.39% mixing water and 0.40% superplastifying additive.

PATENT OSIM NR. RO127825-B1 / 27.02.2015

TITLE RO/EN: Procedeu de separare a feldspatului de cuart din minereurile pegmatitice / PROCESS FOR SEPARATING QUARTZ FELDSPAR FROM PEGMATITE ORES, INVOLVES CRUSHING AND WET GRINDING PEGMATITE ORE, REMOVING MICA BY GRAVITY SCREENING, DRAINING ORE IN FILTERING BED, CONDITIONING WITH HYDROFLUORIC ACID, AND SEPARATING

INVENTOR(S): VADAN DUMITRU, MORAR ROMAN, VADAN IOAN, SUARASAN ILIE, GOREA MARIA, VADAN MARIA

ABSTRACT: The invention relates to a process for separating quartz feldspar from pegmatite ores. According to the invention, the process consists in crushing and wet grinding a pegmatite ore until a grain size of 0.25 mm is reached, after which the mica is removed by gravity screening, the ore is drained in filtering bed until a humidity of 10% is reached, then is dried to a humidity of 0.2%, is conditioned with hydrofluoric acid, after which the product is subjected to separation in an induction magnetic field 1.4...1.6 T and finally is separated in electrostatic field to obtain quartz with a SiO_2 content of at least 98% and a Fe_2O_3 content of up to 0.08% and felspar with a Fe_2O_3 content of up to 0.55%.

72. PATENT OSIM NR. RO128500-B1 / 30.01.2015

TITLE RO/EN: Beton autocompactant fara adaosuri minerale / SELF-COMPACTING CONCRETE (C 50/60) WITHOUT MINERAL ADDITIONS, MEANT FOR PRECAST ELEMENT MANUFACTURING

INVENTOR(S): IOANI ADRIAN MIRCEA, SZILAGYI HENRIETTE, MIRCEA CALIN RADU GRIGORE

ABSTRACT: The invention relates to a concrete composition for the precast/precompressed elements manufacturing. According to the invention, the composition consists of 510 kg of cement, 920 kg of river sand with a particle size of up to 4 mm, 230 kg of coarse river aggregate, 492 kg of coarse river aggregate having the particle size of 8...16 mm, 5.61 kg of super-plastifier of polycarboxylic type and 199 kg of water.

73. PATENT OSIM NR. RO128581-B1 / 30.12.2014

TITLE RO/EN: Motor cu reluctanta comutata cu autoventilatie interna la rotor / MACHINE WITH COMMUTED RELUCTANCE MOTOR, WITH INTERNAL ROTOR SELF-VENTILATION CONSISTS OF A STATOR MADE OF ELECTROTECHNICAL STEEL SHEETS FORMING EIGHT STATOR POLES

INVENTOR(S): RUBA MIRCEA, FODOREAN DANIEL

ABSTRACT: The invention relates to a commuted reluctance motor, with internal rotor self-ventilation. According to the invention, the motor consists of a stator (1) made of electrotechnical steel sheets forming eight stator poles and an electric circuit (2) consisting of four phases, each phase comprising two coils wound around the salient poles located diametrically opposed, and a rotor (3) located inside the stator (1), also made of electrotechnical steel sheets, between every two consecutive salient poles of the rotor (3) there being located some elements (4) made of non-magnetic material, uniting the margins of the poles at the two extreme ends of the rotor (3), said elements (4) being arranged slantwise, being twisted in such a manner as to ensure a perfect

alignment with the margins of the rotor poles, at the extremities of rotor (3), said elements (4) acting as an internal fan which, together with the rotor (3) movement ventilates the stator windings, forcing the warm air around the windings to get out, being replaced with cold air from outside.

74. PATENT OSIM NR. RO127706-B1 / 30.09.2014

TITLE RO/EN: Metoda securizata de comunicatie intre dispozitive fixe si mobile / SECURED SYSTEM AND METHOD OF COMMUNICATION BETWEEN FIXED AND MOBILE DEVICES

INVENTOR(S): ASTILEAN ADINA, FOLEA SILVIU, AVRAM CAMELIA, HULEA MIHAI, MIRON RADU FLORIN, LETIA TIBERIU STEFAN, CIUPAN EMILIA

ABSTRACT: The invention relates to a secured system and method of communication between fixed and mobile devices based on fingerprints. The claimed system comprises one or more emitting subsystems (1) and a receiving subsystem (2) which consists of a distributed application server connected to the Internet, the secured information transmission between these subsystems (1 and 2) being based on the use of wireless or wired communication technology, each emitting subsystem (1) comprising: a fingerprint reader (FPS), provided with a storage and processing unit enabling the communication by Bluetooth, Wi-Fi or GPRS, a device (GPS) which communicates with the fingerprint reader (FPS) and a mobile terminal (MT), embeding GPRS technology or a computer (PC), the connection to the receiving subsystem (2) being carried out by means of the mobile terminal (MT) or the computer (PC). The claimed method provides the emission and the reception of an encrypted message by using an encrypting algorithm with a symmetrical key and limited duration, the symmetrical key being generated by the use of the information resulting by reading the fingerprint of participants in a communication session and the information concerning the position thereof, and the authentication is carried out according to a protocol also implying, besides the user's fingerprint and position, the identity codes of the entities involved in the communication system and the number of the communication session between the involved users.

75. PATENT OSIM NR. RO125433-B1 / 30.07.2014

TITLE RO/EN: Dispozitiv pentru ambutisare cu asistare hidraulica / HYDRAULICALLY ASSISTED METAL SHEET DRAWING DEVICE COMPRISES A BODY SUPPORTING A DIE HAVING AN ACTIVE PLATE AND A CENTERING RING, WHERE THE BODY IS PROVIDED IN THE CENTRAL PART WITH A CAVITY

INVENTOR(S): ACHIMAS GHEORGHE, COMSA DAN-SORIN, LAZARESCU LUCIAN, ACHIMAS SORIN, CECLAN VASILE ADRIAN

ABSTRACT: The invention relates to a metal sheet drawing device, meant to be used for reducing the thickness of walls by a combined mechanic and hydraulic process. According to the invention, the device comprises a body (1) supporting a die (2) having an active plate (3) and a centering ring (4), the body (1) being provided in the central part with a cavity (5) wherein oil is accumulated and the working pressure is reached, and with an orifice (6) wherethrough the oil intake is performed, the deformation of the blank (9) being achieved by using the punch (10) which presses on the blank through the active plate (3), the drawing thereof being thus achieved.

76. PATENT OSIM NR. RO127398-B1 / 30.04.2014

TITLE RO/EN: Procedeu de obtinere a betoanelor de ultra-inalta performanta / VERY HIGH PERFORMANCE CONCRETE COMPRISES CEMENT, VERY FINE SILICA POWDER, FINE QUARTZ SAND, SHORT STRAIGHT METAL FIBRES, METAL FIBRES WITH BENT ENDS, SUPERPLASTICIZING POLYCARBOXYLIC ADDITIVE AND WATER

INVENTOR(S): MAGUREANU CORNELIA, CORBU OFELIA CORNELIA, SOSA IOAN, SZILAGYI HENRIETTE, HEGHES BOGDAN HOREA

ABSTRACT: The invention relates to a concrete composition and to a process for preparing the same. According to the invention, the composition comprises 1 CEM I 62.5 R cement mass unit and the following components expressed as units from the cement amount: 0.25...0.27 units of very fine silica powder; 0.44...0.46 units of fine quartz sand having a grain size of 0...0.7 mm; 0.15...0.17 units of fine quartz sand having a grain size of 0.4...1.4 mm; 0.09...0.095 units of short straight metal fibres, 0.09...0.095 units of metal fibres with bent ends, 0.065 units of superplasticizing polycarboxylic additive of the IV-th generation, 0.15...0.17 units of water. The process claimed by the invention consists in mixing the materials in the dry state in a forced draft mixer for 2 min, after which the water is admixed together with the plasticizer and they are mixed for 8 min and at the end there are admixed the metal fibres while stirring, thereby resulting a concrete composition to be poured into formworks, dismantled and subjected to thermal treatment.

77. PATENT OSIM NR. RO88149-B1 / 28.02.2014

TITLE RO/EN: Mecanism de rotatie oscilant pentru roboti industriali / OSCILLATING ROTATOR FOR

INDUSTRIAL ROBOT - CONSISTS OF HELICOIDAL PLUNGER LOCATED IN PERFORATED SLEEVE ASSEMBLY AND COOPERATING WITH STEPPED ELECTRIC MOTOR

INVENTOR(S): POP I. IOAN, ISPAS VIRGIL, ISPAS VIOREL

78. PATENT OSIM NR. RO127480-B1 / 30.01.2014

TITLE RO/EN: Tija centromedulara autoblocanta / SELF-LOCKING INTRAMEDULLARY NAIL FOR OSTEOSYNTHESIS, HAS CENTRAL CORE WITH INTERNAL SHAFT AND MULTIPLE TUBULAR MODULES, INSERTED INTO OUTER ROD, WHERE ONE OF MODULES IS FIXED ON INTERNAL SHAFT

INVENTOR(S): COSTE CAMILIO VICTOR, GROZAV SORIN DUMITRU

ABSTRACT: The invention relates to an intramedullary nail used in the intramedullary osteosynthesis with closed focus. According to the invention, the nail comprises an outer rod (1) wherein there is inserted a central core (7) consisting of an internal shaft (8) and several tubular modules (9 and 10) provided with some indents (13), a module (9) being fixed on the internal shaft (8) and a module (10) being freely placed on the internal shaft (8), between the indents (13) being placed some screws (6) by means of which the fixation relative to the bone is carried out by a rotation motion of the internal shaft (8) of the central core (7). USE - Self-locking intramedullary nail for use in osteosynthesis. DESCRIPTION OF DRAWING(S) - The drawing shows a sectional view of a self-locking intramedullary nail.

79. PATENT OSIM NR. RO127534-B1 / 30.12.2013

TITLE RO/EN: Procedeu de obtinere a structurilor de sustinere celulara si materiale compozite destinate ingineriei tesuturilor / PROCESS FOR PREPARING CELL SUPPORTING STRUCTURES AND COMPOSITE MATERIALS MEANT FOR TISSUE ENGINEERING

INVENTOR(S): POPA CATALIN, CONT LIANA, DINDELEGAN GEORGE, SIMON VIORICA, BRIE IOANA, PAVEL CODRUTA, CANDEA VIOREL

ABSTRACT: The present invention relates to a process for directly preparing cell supporting structures by electrospinning, carried out with an installation comprising a square-shaped or an octagonal-shaped collector made of austenitic steel, having on the edges a lattice of slits whereon there is alternately placed, on both faces, a unidirectional or bidirectional arrangement of yarns of absorbable nature representing the matrix. The matrix and the yarns are made of different bioabsorbable polymers ensuring an optimal bioerosion duration and an optimal duration for maintaining the mechanical strength of the resulting membranes. From the thus resulting composite membranes there can be manufactured tubes for 3D tissue growth by bonding on template with the dissolved matrix polymer.

80. PATENT OSIM NR. RO125337-B1 / 30.10.2013

TITLE RO/EN: Metoda pentru determinerea modulului de elasticitate longitudinal al materialelor / METHOD FOR DETERMINING VALUE OF LONGITUDINAL ELASTIC MODULUS OF MATERIAL INVOLVES CREATING IMPULSE BY BODY OF MASS, DETERMINING TEST SAMPLE BY SOME HELICAL SPRINGS AND SUPPORTING RETURN PLATE

INVENTOR(S): ARGHIR MARIANA

ABSTRACT: The invention relates to a method for determining the value of the longitudinal elastic modulus of a material. According to the invention, the method consists in taking over 40...60% of the impulse created by a body (4) of a mass (M), launched from a height (h), determined above a test sample (1) by some helical springs (6) supporting a return plate (5) and mounted on a rest plate (8), the test sample (1) taking over 20...30% of the impulse value, while the rest of it is taken over by the helical springs (6) through the further compression thereof.

81. PATENT OSIM NR. RO126255-B1 / 30.09.2013

TITLE RO/EN: Motor electric trifazat cu reluctanta comutata tolerant la defecte / MODULAR FAULT-TOLERANT ELECTRIC MOTOR COMPRISING NINE MODULES ASSEMBLED OF STEEL SHEETS AND REINFORCED BY MEANS OF NON-MAGNETIC RODS, ON THE YOKES OF MODULES THERE ARE WOUND SOME COILS

INVENTOR(S): RUBA MIRCEA, SZABO LORAND

ABSTRACT: The invention relates to a modular fault-tolerant electric motor, operating on the principle of minimal magnetic reluctance, which consists of a stator (1) comprising nine modules (2) assembled of steel sheets and reinforced by means of non-magnetic rods (3), on the yokes of modules (2) there are wound some coils (4), the modules being magnetically insulated by some non-magnetic spacers (5) which also ensure the

required angular shift from one another, and by means of other frontal non-magnetic spacers (11), the modules are insulated with respect to some shields (9) which comprise some rolling bearings (10) wherein there rotate a shaft (7) of a rotor (6).

82. PATENT OSIM NR. RO125014-B1 / 28.06.2013

TITLE RO/EN: Compozitie pentru placi, panouri si tavane casetate usoare / COMPOSITION FOR LIGHT POROUS SOUND-ABSORBING AND HEAT INSULATING PANELS, PLATES AND COFFERED CEILINGS

INVENTOR(S): ARGHIR MARIANA, UNGUR PATRICIA, UNGUR PETRU, MIHAILA STEFAN, PAFUCAN TEODOR

ABSTRACT: The invention relates to a composition for sound absorbing and heat insulating building elements used in civil and industrial buildings. According to the invention, the composition comprises moulding alpha plaster, micronized calcite, dehydrated lime, white cement, expanded polystyrene or expanded pearlite beads, set retarders, oxide powders and dyestuffs.

83. PATENT OSIM NR. RO127090-B1 / 30.01.2013

TITLE RO/EN: Robot modular autopropulsat / MODULAR INSPECTING AND EXPLORING ROBOT COMPRISING PLURALITY OF MODULES FOR CHECKING OPERATION STATE OF INTERNAL WALL OF PIPES WITHIN GAS GRIDS, SEWAGE SYSTEMS OR PIPELINES FOR CIRCULATION OF OTHER GASEOUS OR LIQUID MEDIA

INVENTOR(S): TATAR MIHAI OLIMPIU, ALUTEI ADRIAN, CIREBEA CLAUDIU IOAN
ABSTRACT: The invention relates to a robot comprising a plurality of modules for checking the operation state of the internal wall of pipes within gas grids, sewage systems or pipelines for the circulation of other gaseous or liquid media. According to the invention, the robot comprises at least one passive module which consists of a cylinder (11) provided at its ends with two covers (10) in which there are cut some holes through which some supply cables pass, its motion being ensured by two groups of three wheels (8) mounted within some suspensions with adjustable travel on the radial direction, each of them consisting of some rods (6) supporting a wheel (8) movable inside a cylinder (3), a compression spring (5) being mounted between them and a fork of the rod (6), where the rods (6) are provided with through holes with the centres placed on a generatrix, wherethrough a bolt (4) can get in/out, the suspensions being fixed to some support elements (1) detachably assembled with the covers (10).

84. PATENT OSIM NR. RO126271-B1 / 28.12.2012

TITLE RO/EN: Robot chirurgical / SURGICAL ROBOT COMPRISES A POSITIONING MODULE WITH THREE DEGREES OF MOBILITY, A POSITIONING MODULE WITH FIVE DEGREES OF MOBILITY WHICH SUPPORTS A SURGICAL INSTRUMENT WITH THREE DEGREES OF MOBILITY AND ACTIVE MOTION

INVENTOR(S): PLITEA NICOLAE, PISLA DOINA LIANA, VAIDA LIVIU CALIN, GHERMAN BOGDAN GEORGE

ABSTRACT: The present invention relates to a surgical robot comprising a positioning module (1) with three degrees of mobility, a positioning module (31) with five degrees of mobility which supports a surgical instrument (32) with three degrees of mobility and active motion, by means of an active or passive cardan couple (2), there being also provided the embodiment that, for complex interventions, a system of surgical robots may be used, said system comprising a central robot (57) with an orientation module (1) with three degrees of mobility, and two robots (58) and (59), respectively, provided with orientation modules (31) with five degrees of mobility and a surgical instrument (32), in which the central robot (57) conducts a laparoscope or a video camera and robots (58) and (59) carry out functions specific to surgeon hands.

85. PATENT OSIM NR. RO126456-B1 / 29.11.2012

TITLE RO/EN: Metoda de germinare a semintelor cu radiatii infrarosii / SEED GERMINATION METHOD INCLUDES PLACING THE SELECTED SEEDS INTO BOXES AND EXPOSING THEM TO INFRARED RADIATION OF HIGH WAVELENGTH UNTIL THE SEEDS GERMINATE OR UNTIL THE FIRST LEAVES OR FLOWERS EMERGE

INVENTOR(S): COMAN MIRELA

ABSTRACT: The invention relates to a method for seed germination. According to the invention, the method includes placing the selected seeds into boxes and exposing them to infrared radiation of high wavelength until the seeds germinate or until the first leaves or flowers emerge, after which the seedlings may be transferred to the field.

86. PATENT OSIM NR. RO125756-B1 / 29.11.2012

TITLE RO/EN: Instalatie de retinere a dioxdului de carbon si a dioxidului de sulf din gazele reziduale / PROCESS FOR THE INTEGRATED RETENTION OF SULPHUR DIOXIDE AND CARBON DIOXIDE FROM RESIDUAL GASES

INVENTOR(S): HOTEA VASILE

ABSTRACT: The invention relates to a process for retaining sulphur dioxide and carbon dioxide from residual gases. According to the invention, the process consists, in a first stage, in treating the residual gases with a solution of sodium carbonate for SO2 absorption, followed, in a second stage, by CO2 adsorption on zeolite volcanic tuff, wherefrom there result residual gases having limit values of sulphur dioxide and carbon dioxide for being discharged into the atmosphere. The claimed installation consists of a reservoir (2) for preparing the sodium carbonate solution, a buffer reservoir (3) wherefrom a barrel exhausting pump (7) transfers the sodium carbonate solution to a centrifugal scrubber (1) with sprinkling nozzles, wherefrom the washing solution flows out into a reservoir (4), and a pump (8) carries out the recycling thereof into the scrubber (1), then the washing solution, containing sodium sulphite and bisulphite, in the stirrer reservoir (4) is heated in order to convert the sulphite into bisulphite and then transferred to a tilting crystallizer in order to separate the crystallized sodium bisulphite, the gases from which SO2 has been retained come out from the centrifugal scrubber (1) and are led to two CO2 adsorption columns (6) which are natural zeolite filters, and then are discharged into the atmosphere through some electrovalves (9), in a dispersion flue (10), the installation being also provided with a computerized operation system (11).

87. PATENT OSIM NR. RO123490-B1 / 29.11.2012

TITLE RO/EN: Sistem fara fir, pentru telemasurarea inclinatiei / WIRELESS SYSTEM FOR REMOTE MEASURING OF INCLINATION OF OBJECT IN VERTICAL PLANE OF PLACE

INVENTOR(S): MUNTEANU RADU , MOGA DANIEL, IVAN DUMITRU MIRCEA, DOBRA PETRU, MUNTEANU RADU ADRIAN, MOGA ROZICA GABRIELA, VELEA LUCIAN MARIUS

ABSTRACT: The invention relates to a wireless system for measuring the inclination of an object in respect of the vertical plane of the place, the system being carried out on a hardware platform which achieves the measurement of gravity acceleration on three orthogonal directions, using a 3D acceleration sensor (9), for the conversion of said acceleration values into angles relative to the direction and sense of the gravity acceleration vector g there being used an A/D controller (4), based on a computing algorithm implemented with a microcontroller processing unit (2), the measured values being then communicated via an RF transceiver interface (3), to a mobile acquisition unit (7) which displays/stores the measured values and communicates the same to some computing equipments (8), such as PC or PDA, the system being power supplied from an accumulator ACC (6), by means of a management block MA (5) having the function of charging control and monitoring of the charge state of the accumulator ACC (6), the so obtained data being then transmitted to the microcontroller processing unit (2) for being interpreted and then remotely communicated to the acquisition unit (7).

88. PATENT OSIM NR. RO123479-B1 / 28.09.2012

TITLE RO/EN: Aruncator pneumatic pentru matrite de injectat / PNEUMATIC EJECTOR FOR INJECTION MOLD, COMPRISES CYLINDER, PISTON WITH ROD FIXED BETWEEN COVER AND GUIDING BUSHING, CUSHIONING SPRING AND SOME SEALING RINGS

INVENTOR(S): HARAGAS SIMION, TUDOSE LUCIAN MIRCEA, POP DUMITRU OVIDIU

ABSTRACT: The invention relates to a pneumatic ejector employed in the construction of injection moulds for plastics with a view to automatically removing pieces from the moulds. According to the invention, the pneumatic ejector comprises a cylinder (1), a piston (2) with a rod (3) fixed between a cover (4) and a guiding bushing (5), a cushioning spring (6), some sealing rings (7, 8, 9, 10 and 11), where the pressurized air supply of the two cylinder chambers is made through a channel (a) cut into the cover (4) and through another channel (b) cut into the cylinder (1), the channel (a) being supplied with pressurized air for the ejection stroke through a channel (a1) and the channel (b) being supplied with pressurized air for the return stroke through a channel (b1).

89. PATENT OSIM NR. RO123447-B1 / 30.05.2012

TITLE RO/EN: Senzor potentiometric pe baza de ionofor porfirinic cu selectivitate inalta pentru argint / POTENTIOMETRIC SENSOR BASED ON PORPHYRIN IONOPHORE WITH HIGH SELECTIVITY TO SILVER

INVENTOR(S): FAGADAR-COSMA EUGENIA LENUTA, VLASICI DANA, PICA ELENA MARIA, COSTISOR OTILIA, COSMA VIORICA, OLENIC LILIANA, BIZEREA OTILIA

ABSTRACT: The invention relates to a potentiometric sensor for measuring the concentration of silver in liquid samples of various origins and to a process for carrying out the same. According to the invention, the sensor has a body (1) provided with a lid (2) and at the opposite end of the lid (2) there is a conductive copper support (3) which is attached to the body (1) with epoxy resin and on one face of the support (3) there is attached a central wire (6) of the connection cable, while on the other face of the support (3) there is formed a membrane (4), selective to Ag+, made of polyvinyl chloride (PVC), plastified with diethylhexyl sebacate (DOS), wherein there is included a composition which contains an ionophore, namely 5,10,15,20-tetrakis-(3-hydroxyphenyl) porphyrine and a lipophilic additive, tetrakis(4-chlorophenyl) potassium borate, the mass ratio PVC:porphyrine:DOS:additive being 33:2:66:1.

90. PATENT OSIM NR. RO123425-B1 / 30.04.2012

TITLE RO/EN: Procedeu de obtinere a pulberii de compusi intermetalici IrAl si IrAl3 si tinta de iradiere pentru gamagrafie industriala obtinuta din aceasta / PROCESS FOR PREPARING THE POWDER OF IrAl AND IrAl3 INTERMETALLIC COMPOUNDS AND IRRADIATION TARGET FOR INDUSTRIAL GAMMAGRAPHY OBTAINED THEREWITH

INVENTOR(S): CARLAN PAULA, CHICINAS IONEL

ABSTRACT: The invention relates to a process for preparing sinterable powders of IrAl and IrAl3 intermetallic compounds meant to be used for obtaining irradiation targets for sources. The process claimed by the invention is a process of mechanical alloying of Ir and Al granules by crushing the same in a stainless steel ball planetary mill, under a protective argon atmosphere. The ball volume : material volume ratio is 20 : 1 at an enclosure filling degree of 35%, the milling time for forming the IrAl compound is 8 h and the milling time for forming the IrAl3 compound is 28 h. The resulting irradiation target exhibits uniform dispersion of the activable element and reduced self-shielding factor.

91. PATENT OSIM NR. RO125006-B1 / 30.09.2011

TITLE RO/EN: Compozitie pentru pansamente si corsete ortopedice usoare si poroase / COMPOSITION FOR DRESSINGS AND LIGHT AND POROUS ORTHOPAEDIC CORSETS

INVENTOR(S): ARGHIR MARIANA, UNGUR PATRICIA, UNGUR PETRU, MIHAILA STEFAN, LEZEU IOAN

ABSTRACT: The invention relates to a composition for dressings and orthopaedic corsets used in orthopaedy, for fixing the limbs or other parts of the osseous system of human body in case of fractures and luxation. According to the invention, the composition consists of: pottery plaster, white cement, expanded polystyrene granules or expanded pearlite and tartaric acid, as setting retarder.

92. PATENT OSIM NR. RO123245-B8 / 29.04.2011

TITLE RO/EN: Procedeu de obtinere a tuburilor poroase prin rulare cu strat elastic a tablelor sinterizate / PROCESS FOR MAKING POROUS TUBES BY THE ROLLING WITH ELASTIC LAYER OF SINTERED SHEET METAL

INVENTOR(S): VIDA-SIMITI IOAN, CIUPAN CORNEL

ABSTRACT: The invention relates to a process for making a plain or profiled tube-shaped piece of sintered porous sheet metal, by rolling the sheet metal about a roller, using an element coated with an elastic layer. According to the invention, the process consists in using a rigid roller (1) having the diameter corresponding to a tube, and a satellite roller (2) having a larger diameter than the rigid roller (1), covered with an elastic element (3), which performs a planet motion about the rigid roller (1), the planet motion of the satellite roller (2) being composed of a rotation about an axis of the rigid roller (1) and a rotation about its own axis, the elastic element (3) being made of rubber, polyurethane or another elastic material, a support (4) ensuring the position adjustment between the two rollers (1 and 2) and the pressure adjustment relating to the pressing corresponding to the deformation of the porous material, the porous sheet metal (5) being deformed by its passing between the rigid roller (1) and the elastic element (3) of the satellite roller (2).

93. PATENT OSIM NR. RO123261-B8 / 29.04.2011

TITLE RO/EN: Sistem de monitorizare a incarcarii progresive a membrului inferior in recuperarea posttraumatica / SYSTEM FOR MONITORING THE PROGRESSIVE LOADING OF A LOWER LIMB IN POST-TRAUMATIC REHABILITATION

INVENTOR(S): MUNTEANU RADU, MOGA DANIEL, NEAGA FLORIAN CLAUDIU, PETREUS DORIN, DUMITREAN RADU MIHAI, MUNTEANU MIHAI, VLADAREANU LUIGE

ABSTRACT: The invention relates to a system for monitoring the progressive loading of a lower limb and

measuring the pressure force at the sole level within a post-traumatic rehabilitation process, said system comprising a network of elastic chambers (CE1, CE2, CE3) located at the level of the lower limb sole under three anatomic areas of maximal pressure of the patient's sole, said chambers communicating through a tubing (T) coupled to a pressure transducer (SP) which detects the current maximal pressure and transmits it to a control and measuring unit (BM) where it is converted into a digital value by a conversion circuit (A/D) then it is transformed into a force value by means of a calibration algorithm implemented on a processing unit (Microcontroller) of the measuring unit and compared with the threshold values stored in the memory of the measuring unit (BM), a warning device (AAL) generating acoustic and light signals when the maximal value of the force measured in a programmed period of time exceeds the pre-established threshold value, the values of various parameters (Tmas, Fs, FP, D) stored in the non volatile memory of the processing unit (Microcontroller) being read or modified by a wireless communication with the measuring unit (BM) by means of an interface (IR) implemented by a Transceiver unit (RF), the supply of the monitoring system being carried out by components belonging to the supply unit (A), an accumulator (ACC) and a charging device (I).

94. PATENT OSIM NR. RO122986-B1 / 28.05.2010

TITLE RO/EN: Circuit de cuplaj fara contact / CONTACTLESS COUPLING CIRCUIT FOR PROCESSING INFORMATION AND PERFORMING INFORMATION EXCHANGE BETWEEN THEM AND TRANSDUCERS SERVING

INVENTOR(S): MUNTEANU RADU IOAN, MOGA DANIEL, MUNTEANU RADU ADRIAN, MUNTEANU MIHAI STELIAN

ABSTRACT: The invention relates to a contactless coupling circuit, meant to supply the systems for processing information and performing the information exchange between them and the transducers serving them, according to the invention, the coupling circuit consisting of two sub-circuits, an independent information processing sub-circuit (S1), which provides the energy supply of the contactless coupling circuit and a dependent information processing sub-circuit (S2) connected to a transducer serving a certain application. The independent information processing sub-circuit (S1) consists of a central unit (UC1), a controlled oscillator with programmable frequency (OCFP), a current control stage (ECC), a unit (BA) for supplying the independent information processing sub-circuit (S1), being magnetically connected, by means of a first coil (B1) with the dependent information processing sub-circuit (S2), which comprises, for this purpose, a coil (B2), a voltage stabilizing and rectifying block (RST) as well as a central unit (UC2), which performs the information exchange with the mentioned transducer, the useful and control signals being passed through some modulator/demodulator and conversion blocks (M/DC1 and M/D C2) and then circulated, between the two information processing sub-circuits (S1 and S2) by means of two infrared emission/reception blocks (BERI1 and BERI2), one for each of the mentioned information processing sub-circuits (S1 and S2).

95. PATENT OSIM NR. RO122976-B1 / 28.05.2010

TITLE RO/EN: Sistem si procedeu pentru masurarea indirecta a masei obiectelor aflate in miscare / SYSTEM FOR INDIRECTLY MEASURING MASS OF OBJECTS IN MOTION COMPRISES CENTRAL PROCESSING UNIT WITH SET OF INTERFACES FOR CATCHING AND TAKING OVER IMAGES

INVENTOR(S): MUNTEANU RADU IOAN, MOGA DANIEL, MUNTEANU RADU ADRIAN, MUNTEANU MIHAI STELIAN

ABSTRACT: The invention relates to a system for indirectly measuring the mass of the objects in motion, by using software applications for the aquisition and processing of visual information, for control and for user interface, system comprising a central processing unit (UC), provided with a set of interfaces (I1...In) towards the devices (CA1, CA2...CAn) for catching and taking over images and an interface (IM) towards a system for monitoring (M1) the environment whereto there are coupled the sensors (S1...Sn) providing information on the environment wherein the objects are displaced, the processing unit (UC) having optionally an interface (IC) towards a control subsystem (C1) coupled to some execution elements (ACT1, ACT2...ACTn), from the analysis of the information received and the extraction of the values of the objects geometrical characteristics and the interpolation based on the built transfer surface, with the masses of the determined bodies, there being obtained the indirectly measured mass value (ml) of the visualized object.

96. PATENT OSIM NR. RO122932-B1 / 30.04.2010

TITLE RO/EN: Stand experimental termic cu comanda controlata a perturbatiilor / EXPERIMENTAL STAND WITH THERMAL ENCLOSURES COMPRISES ADJACENT ENCLOSURES, PRINCIPAL ENCLOSURE, ELEMENTARY ENCLOSURES, ELECTRICAL RESISTOR, SUPPLY UNIT AND TEMPERATURE TRANSDUCER

INVENTOR(S): ISOC DORIN, IGNAT AURELIAN DOREL

ABSTRACT: The invention relates to an experimental stand with thermal enclosures, meant for practical works and laboratory research studies on conducting technical processes of complex dynamic properties. According

to the invention, the experimental stand comprises some adjacent enclosures (I1, I2, I3 and I4) of which one is a principal enclosure (I1), and the others are elementary enclosures (I2, I3 and I4) formed by means of some removable walls (5, 6 and 7), each enclosure being separately heated by an electrical resistor (R1, R2, R3 and R4), by means of a supply unit (UCT1, UCT2, UCT3 and UCT4), the temperature of each enclosure being measured by a temperature transducer (TT1, TT2, TT3 and TT4), while the control of the supply units (UCT1, UCT2, UCT3 and UCT4)is achieved by a central control unit (UC) which also controls a resistor (R5) located inside a guide body (G), where a turbine (T) of a fan driven by an electric motor (M) blows air which enters the enclosures by some slot covers (C1, C2, C3 and C4) located at the top part of the enclosures.

97. PATENT OSIM NR. RO122822-B1 / 26.02.2010

TITLE RO/EN: Motocompresor / MOTOR-COMPRESSOR USED IN EG.MINING EQUIPMENTS COMPRISES BASE BODY WHERE MOTOR AND COMPRESSOR ENCLOSURES ARE SEPARATED INTO ENCLOSURES, DRIVING CYLINDER WITH JACKET, VALVES, INJECTOR, INTAKE AND COMPRESSION VALVE AND PISTON

INVENTOR(S): CARNARU STELIAN COSMIN

ABSTRACT: The invention relates to a motor-compressor meant to function as such or in batteries, in various applications, such as mining equipments, rock drills etc. According to the invention, the motor-compressor has a more simple construction by the fact that, inside the base body (1), the motor and compressor enclosures are separated into three enclosures (a, b, c) representing the very same volume, such that the first enclosure (a) which is the driving enclosure, has a driving cylinder provided with a jacket (2), a pair of valves (3 and 4), and an injector (5), the third extreme enclosure (c) is compressing and has a jacket (6) and a pair of valves, an intake valve (7) and a compression valve (8), a piston (9, 10) slide in each of the two extreme enclosures (a, c), the two pistons being coaxially rigidly connected with a common rod (11) provided in the middle enclosure (b).

98. PATENT OSIM NR. RO122790-B1 / 29.01.2010

TITLE RO/EN: Senzor potentiometric nitrit-selectiv / NITRITE-SELECTIVE POTENTIOMETRIC SENSOR FOR MEASURING NITRITE CONCENTRATION IN SAMPLES OF VARIOUS ORIGIN

INVENTOR(S): VLASICI DANA, PICA ELENA MARIA, FAGADAR-COSMA EUGENIA LENUTA, BIZEREA OTILIA, COSTISOR OTILIA, COSMA VIORICA

ABSTRACT: The invention relates to a nitrite-selective potentiometric sensor for measuring nitrite concentration in samples of various origin such as environmental pollution samples, food control samples, scientific research samples. According to the invention, the sensor has a body made of polyvinyl chloride bar, which is provided, at its lower part, with a nitrite-selective membrane, formed directly on a copper tablet, the membrane being based on plasticized polyvinyl chloride with o-nitrophenyl octyl ether (O-NPOE) which has embedded the Co(III)-tetraphenylporphyrin ionophore (CoTPPCl) and trioctylmethyl-ammonium chloride (TOMACl)as lipophilic additive.

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