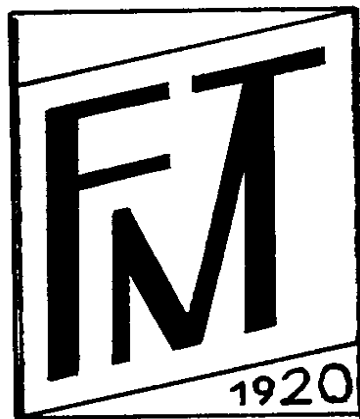


FACULTY OF MECHANICAL ENGINEERING



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MEDICAL ENGINEERING RESEARCH GROUP

CENTRE FOR MODELING THE PROSTHETIC APPLIANCES AND SURGICAL OPERATIONS ON THE HUMAN SKELETON – *CMPICSU*

GENERAL PRESENTATION

The *Centre for Modeling the Prosthetic Appliances and Surgical Operations on Human Skeleton* is structured as a Multiple User Research Centre (MURC). Its research team joins researchers, teachers and PhD students having different competences – mechanical engineering, electrical engineering, computer science and material science) from Politehnica University of Timisoara, University of Medicine and Pharmacy “Victor Babes” Timișoara, Hospital of Traumatology and Orthopedy No 1 Timișoara and Municipal Hospital of Oro-Maxillo-Facial Surgery.

The CMPICSU is strongly involved in the Bachelor - *Medical Engineering* specialization, Masters - *Implants, Intelligent Prostheses and Biomechanical Evaluation* and Doctoral Programmes in *Medical Engineering*, within the “Politehnica” University of Timișoara.

BRIEF HISTORY

- In 1999 was started the first pilot program financed by World Bank (2.000 USD) to set up the basic centre infrastructure;
- The main grant (430.000 USD) was finished in 2002, with the set up of the research infrastructure for two laboratories: Medical imaging and Modeling and Design;
- During 2002-2006 other funds were attracted in amount of 100.000 EUR and three new laboratories – LOPIFO Laboratory for implant manufacturing – authorized by the Health Ministry, CIDUCOS Laboratory for testing of medical devices CIDUCOS – accredited by RENAR and Motion analysis Laboratory were created;
- During September 2006 – December 2008 a new important project for the amount of 2.500.000 EUR *Platform of implantology, intelligent prosthetics and biomechanical rehabilitation* was accomplished, with the set up of new laboratories: Manufacturing Laboratory – Rapid Prototyping Fabrication, Manufacturing Laboratory – CNC Machining and EDM Fabrication, Medical Investigation Laboratory, and development of the existing laboratories.

MISSION

The Multiple User Research Centre *Centre for Modeling the Prosthetic Appliances and Surgical Operations on Human Skeleton* CMPICSU has been created in order to integrate the scientific research results from different universities and hospitals from our country in the field of Medical Engineering. Thus, the CMPICSU Research Centre represents a connecting factor, oriented towards interdisciplinary research and education.

The CMPICSU Research Centre is designed to be a union place for research – education –production – services both to interdisciplinary formation of specialists in Medical Engineering and to release integrated solutions of diagnosis, prosthetics, mobility rehabilitation and modern technologies for medical devices manufacturing.

The main aim of the CMPICSU research centre is to integrate its activities in the **European Research Area in the field of Medical Engineering.**

RESEARCH FIELDS

- Biomechanics;
- Implantology and prosthetics;
- Modern technologies for manufacturing;
- Testing of medical devices;
- Acquisition and processing of medical signals and images;
- Robotics.

KEYWORDS

Biomechanical modeling, Medical imaging, 3D reconstruction, Dental and orthopedic implants, Upper limb prosthesis, Mandible distractor, Motion analysis, Plantar pressure distribution, Biocompatible materials, Biological structure modeling, Rapid prototyping, Manufacturing of medical devices components.

ACTIVITIES

- *Fundamental and applied research in Biomechanics, biomechanical modeling of human locomotor apparatus;*

- *Motion analysis of patients having different deficiencies and animals in order to evaluate the disability or the rehabilitation process based on biomechanical principles;*
 - *Motion analysis of sportsmen in order to evaluate and improve their performances, and prevent injuries, based on biomechanical principles;*
 - *Static and dynamic study of plantar pressure distribution both for normal subjects and patients having different deficiencies;*
 - *Modeling and numerical analysis of stress and strain distributions in bone structures, implants, assembly of bone/implants and prosthetic components;*
 - *Design of dental and orthopedic implants both for human patients and animals and their certification;*
 - *Design and manufacturing of prosthetic devices;*
 - *Image acquisition and processing, 3D reconstruction of biological structures based on CT technique and specialized software, in order to develop a complex data base for different categories of skeleton deficiencies and to produce customized implants;*
 - *Development of appropriate technologies (including rapid prototyping, CNC machining, EDM technologies) to manufacture implants and prosthetic devices using biocompatible materials;*
 - *Development of new testing methods designed for various materials focused on implants and prosthetic devices.*
- order to evaluate the disability and its influence on the patient mobility;*
 - *Experimental kinematic analysis of a group of dogs, in order to obtain a pattern of the dog movement (healthy, having induced defects and recovered) and to use the results as reference data to evaluate the influence of the limb skeleton defects (natural or induced by humeral head OCD on the left front leg joints) on the kinematic parameters, and to evaluate the rehabilitation process after surgery;*
 - *Determination the mechanical properties of canine bones such as femur, tibia and humerus from adult dogs using compression, torsion and bending tests and developing of a data base of mechanical strength of canine bones;*
 - *Conception, modeling, design, and theoretical and experimental analysis of a low cost upper limb prosthesis;*
 - *Conception, modeling, design, and theoretical and experimental analysis of knee prosthesis and lumbar spine stabilization systems.*

CMPICSU LABORATORIES

1. *Medical Imaging Laboratory:* Computer Tomography system (SIEMENS SOMATOM Plus 4 Power Computer Tomograph), Orthopanic X-ray apparatus, Electrosomatograph DDFAO system (computer-assisted screening and functional diagnosis), Echocardiograph ACUSON CV70™ (cardiovascular ultrasound system).
2. *Medical Investigations Laboratory* is a useful tool that explores many practices and various situations that arise in the field of usual medical investigations: vascular Doppler, pulse oximeter, holter system, audiometer, electrocardiograph, kit for measuring of human physiological parameters.
3. *Motion Analysis Laboratory:* Zebris measuring system for gait analysis and plantar pressure distribution determination, ARIEL Performance Analysis System (APAS) for motion analysis, and different exercise equipments (body band massage device, upright bike, treadmill).
4. *Modeling and Design Laboratory* is equipped with professional hardware (20 Intel core workstations where is installed professional software for design and analysis of prosthetic devices and implants), projector with hookup to laptop, instructor's computer, and whiteboard.
5. *Manufacturing Laboratory – CNC Machining and EDM Fabrication:* is design to fabrication

AFFILIATION

The Centre for Modelling the Prosthetic Appliances and Surgical Operations on Human Skeleton (CMPICSU) - POLITEHNICA University of Timisoara, Romania was accepted as a seed group of International Society of Biomechanics in September 2009, Contact person Mirela Toth-Taşcău.

RESEARCH RESULTS

- *Biological structures reconstruction based on computed tomography, MIMICS software and CAD techniques – different bone structures of human and animal skeletons – allowing different mechanical properties;*
- *FE analysis of bone structures, implants, bone - implant assemblies and prosthetic components;*
- *Experimental motion analysis and dynamic plantar pressure distribution determination of patients submitted to total hip replacement in*

under precision and repeatability conditions of implants and medical devices. The conditions are provided by the computer numerical control of each machine.





6. *Manufacturing Laboratory – Rapid Prototyping Fabrication.* The prototyping machines serve both in model validation and rapid fabrication. Tools and ready to use parts are capable to build in both metals and plastics.
7. *Manufacturing Laboratory for implant devices, orthoses and prosthetic devices* LOPIFO: classical machining equipments used in prototype developing of prosthetic devices and medical instrumentation;
8. *Multimedia Room* contains a variety of equipments (projector with hookup to laptop, instructor's computer, DVD playback, video camera with tilt and zoom (tapes onto DVD), whiteboards, wireless network, video conference system) for audiovisual presentations, provides access to equipment

that supports the teaching process and allows students to practice their presentation skills.

9. *Testing Laboratory* CIDUCOS – associated laboratory: *corrosion test, hardness test, mass and density determination, metallographic analyses, mechanical tests, optical emission spectrometry test.*

RESEARCH CONTRACTS

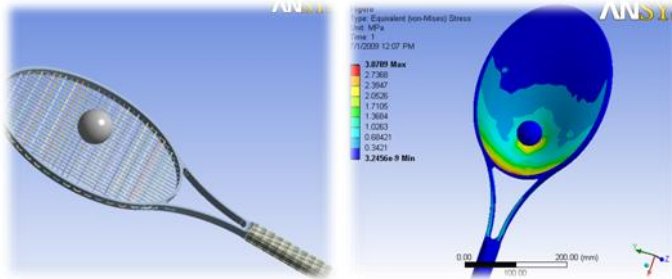
1. Contract 271/31.08.2010, *Diagnosing and recovering of Romanian language aphasic patients subsequent to ischemic stroke*, funded Timiș County Council. General Directorate of Social Assistance and Child Welfare.
2. Contract 17472/07.12.2010, Framework cooperation agreement between CMPICSU – “Politehnica” University of Timișoara and Hospital of Traumatology and Orthopedy No 1 Timișoara - University of Medicine and Pharmacy “Victor Babeș” Timișoara.

<p>Medical imaging Laboratory</p>		
		
	<p>Computer Tomography System Somatom Plus 4 Power - Stages of 3D hip joint reconstruction</p>	
		
<p>Electrosomatograph DDFAO system</p>	<p>Echocardiograph ACUSON CV70™</p>	

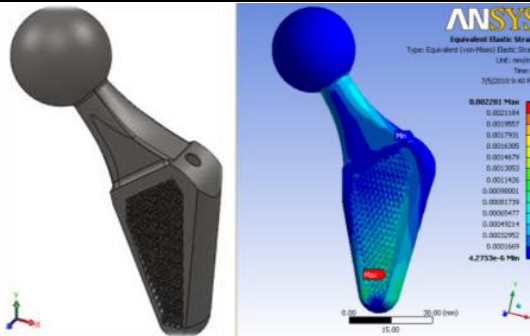
<p><i>Medical investigations Laboratory</i></p>		
	<p>Audiometric Equipments - MAICO MI 44 Diagnostic Middle Ear Analyzer and MAICO MA 33 PC Audiometer</p>	<p>ECG equipments – Holter EC-3H cardiospy and Electrocardiograph SE-6 EDAN</p>
		
	<p>ADInstruments laboratory system</p>	<p>Vascular Doppler and Pulseoximetry</p>
<p><i>Motion analysis Laboratory</i></p>		
	<p>Zebris measuring system for gait analysis and plantar force distribution</p>	
		
	<p>Zebris measuring system for cervical spine mobility analysis</p>	



APAS sequences from motion analysis of tennis serve



Numerical Analysis of a tennis racket



Design and Numerical analysis of hip endoprosthesis with integrated lattice structures

Modeling & Design Laboratory

Manufacturing Laboratory - CNC Machining and EDM Fabrication



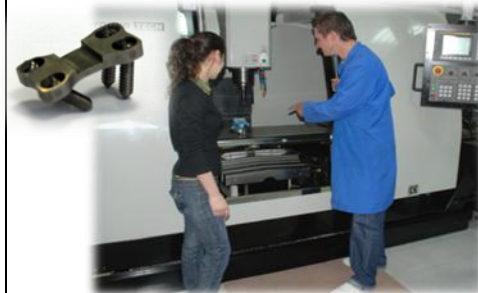
Dental implants fabrication on 5 axis CNC machining center






Orthopedic screws fabrication on Pinacho lathe machine



Maxillo-facial plate implant fabrication on wire EDM machine



Artificial disk fabrication on 3axis CNC milling machine

Manufacturing Laboratory – Rapid Prototyping Fabrication		
	Metal Powder Arcam S12 machine – metal substitution element fabrication	Plastic powder EOS Formiga P100 machine – plastic substitution element fabrication
Multimedia Room		
	Classes of Medical Engineering students	

PUBLICATIONS

BOOKS

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PAPERS IN BDI JOURNALS

1. M.O.Ghiba, M.Toth-Tașcău, R.Prejbeanu, D.Vermeșan, *Influence of the Lattice Structures on the Mechanical Behavior of Hip Endoprostheses*, Advanced technologies for Enhanced Quality of Life AT-EQUAL, Iași, 15th-18th July, 2010, pp. 6-11 ISBN 978-1-4244-8842-1.
2. M.Toth-Tașcău, M.Krepelka, *Biomechanical behavior analysis of a coxofemoral short implant*, Annals of the Oradea University, Fascicle of Management and Technological Engineering, Volume IX(XIX), Nr.3, 2010, pp. 2.90-2.97, ISSN 1583-0691.
3. M.Toth-Tașcău, D.I.Stoia, O.Pașca, *Motion analysis of a subject walking on a treadmill*, Annals of the Oradea University, Fascicle of Management and Technological Engineering, Volume IX(XIX), Nr.3, 2010, pp. 2.98-2.106, ISSN 1583-0691.
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6. M.Toth-Tașcău, D.Bugariu, L.Bereteu, *A comparison of two models of total knee prostheses*, Annals of the Oradea University, Fascicle of Management and Technological Engineering, Volume IX(XIX), Nr.2, 2010, pp. 2.95-2.100, ISSN 1583-0691.
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1. M.O.Ghiba, M.Toth-Tașcău, R.Prejbeanu, D.Vermeșan, *Method to improve the osseointegration of hip endoprostheses*, Journal of Orthopaedic Trauma, 2010, Vol. 20, Nr. 2, pp. 315-318, ISSN 1220-6466.
2. O.Suciu, D.V.Poenaru, D.Nemes, M.Toth-Tașcău, E.Amarincai, D.Popa, D.I.Stoia, *Gait rehabilitation in surgically treated ankle fractures*, Journal of Orthopedic Trauma of the Romanian – Italian - Spanish Orthopedic Association, Nr.2(18)/2010, pp. 73-80, ISSN 1454-6213.
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5. H.Vermeșan, R.Prejbeanu, M.O.Ghiba, S.Răducan, *Partial and total knee arthroplasty- indications and outcomes*, Journal of Orthopaedic Trauma, Vol. 20, Vol 20, Nr. 1, p. 133, ISSN 1220-6466.
6. H.Vermeșan, R.Prejbeanu, D.Nemeș, A.Boscu, M.O.Ghiba, *Failure causes in foot surgical treatment*, Journal of Orthopaedic Trauma, Vol. 20, Vol 20, Nr. 1, p. 126, ISSN 1220-6466.

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1. M.Toth-Tașcău, *Biomedical Engineering studies in Politehnica University of Timisoara*, 3rd International Conference Technics and Informatics in Education, Cacak, 7-9 May, ISBN 978-86-7776-105-9, 2010, pp. 13-19.
2. M.Toth-Tașcău, C.Vigaru, *Quality assurance of medical devices. Course of the study programme in Biomedical Engineering*, 3rd International Conference Technics and Informatics in Education, Cacak, 7-9 May, ISBN 978-86-7776-105-9, 2010, pp. 284-287.
3. D.Bugariu, M.Toth-Tașcău, L.Bereteu, *Doctoral studies in total knee arthroplasty*, 3rd International Conference Technics and Informatics in Education, Cacak, 7-9 May, ISBN 978-86-7776-105-9, 2010, pp. 288-292.
4. C.Săftescu-Jescu, M.Toth-Tașcău, L.Bereteu, *Doctoral studies in lumbar spine arthroplasty*, 3rd International Conference Technics and Informatics in Education, Cacak, 7-9 May, ISBN 978-86-7776-105-9, 2010, pp. 293-297.
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6. C.Vigaru, *Acoustic and hearing prostheses*, 3rd International Conference Technics and Informatics in Education, Cacak, 7-9 May, ISBN 978-86-7776-105-9, 2010, pp. 298-301.
7. D.Bugariu, *A comparison of two types of knee replacement*, International Conference Technical Student Days, Timișoara, 9-15 May, 2010, ISSN 2066-3617, pp. 386-388.
8. C.Saftescu-Jescu, *3D Reconstruction of a lumbar spine unit*, International Conference Technical Student Days, Timișoara, 9-15 May, 2010, ISSN 2066-3617, pp. 380-383.
9. M.Toth-Tașcău, L.Rusu, C.Decianu, O.Ghiba, *Kinematical analysis of the racket tip in tennis serve*, 1st International Conference Advances in Engineering & Management (ADEM 2010), Drobeta Turnu-Severin, 19-21 May, ISBN 978-606-510-899-8, pp. 135-136.
10. M.O.Ghiba, M.Dreucean, R.Prejbeanu, D.Vermeșan, *Elastic behavior of lattice structures for orthopedic implants*, 1st International conference Advances in Engineering and Management (ADEM 2010), Drobeta Turnu-Severin, 19-21 May, ISBN: 978-606-510-899-8, pp. 125-126.
11. M.Toth-Tașcău, L.Rusu, *Modeling and analysis of a testing device of a lumbar spine stabilization system*, 10th International

- Conference Research and Development in Mechanical Industry RaDMI 2010, 16 – 19 September 2010, Donji Milanovac, Serbia, ISBN 978-86-6075-016-9, p. 38-47.
12. D.Bugariu, M.Toth-Tașcău, L.Bereteu, *Modeling and finite element analysis of two types of total knee prostheses*, 10th International Conference Research and Development in Mechanical Industry RaDMI 2010, 16 – 19 September 2010, Donji Milanovac, Serbia, ISBN 978-86-6075-016-9, p. 747-752.
 13. C.Vigaru, L.Rusu, *Experimental Determination of Vibration at Weaving Machine in Order to Identify Sources of Vibration*, 10th International Conference Research and Development in Mechanical Industry RaDMI 2010, 16 – 19 September 2010, Donji Milanovac, Serbia, ISBN 978-86-6075-016-9, p. 454-459.
 14. M.Toth-Tașcău, K.Menyhardt, *Influence of the Denavit-Hartenberg parameters on robot positioning accuracy*, 10th International Conference Research and Development in Mechanical Industry RaDMI 2010, 16 – 19 September 2010, Donji Milanovac, Serbia, ISBN 978-86-6075-016-9, p. 965-970.
 15. C. Saftescu-Jescu, D.I. Stoia, L. Bereteu, *CAD Modeling and numerical analysis of two implanted lumbar spine units*, 10th International Conference Research and Development in Mechanical Industry RaDMI 2010, 16 – 19 September 2010, Donji Milanovac, Serbia, ISBN 978-86-6075-016-9, p. 1218-1223.
 16. D.I.Stoia, M.Toth-Tașcău, *Some biomedical applications of rapid prototyping*, 10th International Conference Research and Development in Mechanical Industry RaDMI 2010, 16 – 19 September 2010, Donji Milanovac, Serbia, ISBN 978-86-6075-016-9, p. 1241-1246.
 17. M.Toth-Tașcău, C.Vigaru, O.Pășca, *Methods for footprints and plantar arch index determination*, 10th International Conference Research and Development in Mechanical Industry RaDMI 2010, 16 – 19 September 2010, Donji Milanovac, Serbia, ISBN 978-86-6075-016-9, p. 1268-1273.
 18. M.O.Ghiba, M.Dreucean, R.Prejbeanu, D.Vermesan, *Rapid Prototyping in the Creation of Hip Implants with 3D Lattice Structures*, 10th International Conference Research and Development in Mechanical Industry RaDMI 2010, 16 – 19 September 2010, Donji Milanovac, Serbia, ISBN 978-86-6075-016-9, p. 259-262.
 19. A.Craciun, M.Dreucean, T.Ioanovici, *Quality Assurance for the Medical Act by Modular Remote Intensive Care Telemedicine System*, 10th International Conference Research and Development in Mechanical Industry RaDMI 2010, 16 – 19 September 2010, Donji Milanovac, Serbia, ISBN 978-86-6075-016-9, p. 1063-1069.
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 22. M.O.Ghiba, M.Dreucean, R. Prejbeanu, D.Vermesan, *The effects of lattice structures endoprosthesis over the growth of bone trabeculae*, 4th International Conference “Biomaterials, Tissue Engineering & Medical Devices” (BIOMED 2010), Sinaia, Romania, September 23-25th, 2010, ISBN 2069-0193, p. 112.
 23. C.Săftescu-Jescu, D.I.Stoia, L.Bereteu, M.Toth-Tașcău, *Design optimization Aspects of Total Lumbar Disc Replacement Devices*, 4th International Conference “Biomaterials, Tissue Engineering & Medical Devices” (BiomMedD'2010), Sinaia, Romania, September 23-25th, 2010, ISBN 2069-0193, p. 113.
 24. M.Toth-Tașcău, D.I.Stoia, *Influence of the Movement Frequency on the Quantifying of Cervical Spine Mobility*, 4th International Conference “Biomaterials, Tissue Engineering & Medical Devices” (BiomMedD'2010), Sinaia, Romania, September 23-25th, 2010, ISBN 2069-0193, p. 235.
 25. K.Menyhardt, L.Rusu, C.Vigaru, *Development of an Upper Limb Prosthesis*, 4th International Conference “Biomaterials, Tissue Engineering & Medical Devices” (BiomMedD'2010), Sinaia, Romania, September 23-25th, 2010, ISBN 2069-0193, p. 219.
 26. L.Rusu, K.Menyhardt, C.Vigaru, *Biomechanical Analysis of an External Mandibular Distractor*, 4th International Conference “Biomaterials, Tissue Engineering & Medical Devices” (BiomMedD'2010),

Sinaia, Romania, September 23-25th, 2010, ISBN 2069-0193, p. 21.

PhD STUDENTS

- Ovidiu Ghiba - *Contributions to conception and realization of hip endoprotheses*
- Delia Bugariu – *Research and contribution to improvement of knee prsotheses*
- Cristian Săftescu-Jescu - *Studies on the lumbar spine implants reintegration, using modern methods and techniques*
- Teodora Ioanovici – *Thermomechanical properties evaluation of the biocompatible materials used in implantology*
- Andrei Crăciun - *Techniques of telemedicine in primary care*
- Cristian Toader-Pasti - *Research on optimizing the orthopedic implant systems*
- Flavia Bălănean - *Theoretical and experimental studies of implants for elbow joint*
- Oana Maria Pașca - *Theoretical and applied research in the field of foot orthoses*

PERSPECTIVES

The CMPICSU Research Centre will continue to develop research in the field of Medical Engineering, especially in:

- *Fundamental and applied research in Biomechanics;*
- *Further research in the field of 3D reconstruction of human body anatomical segments;*
- *Study of the failed explanted prostheses in order to contribute to the development of novel materials and devices with improved performance;*
- *Motion analysis of patients having different deficiencies in order to evaluate the disability or the rehabilitation process;*
- *Manufacturing of new implant models and prosthetic devices.*

In addition, CMPICSU will enforce:

- *Development of the production capacity in the manufacturing laboratories;*

- *Developing the set of services offered to the social environment;*
- *Promoting the Medical Engineering Specialization including master degree studies in Politehnica University of Timișoara.*
- *Development of PhD programmes in the field of Medical Engineering, for engineers and other specialists in the medical area of tissue engineering, orthopedics, rehabilitation, etc.*
- *Promoting the collaboration in related fields with universities and research institutes.*

RESEARCH TEAM

- Prof.dr.eng. Mirela Toth-Tașcău – Director CMPICSU
- Prof.dr.eng. Mircea Dreucean
- Lecturer dr.eng. Lucian Rusu
- Lecturer dr. eng. Cosmina Vigaru
- Lecturer dr. eng. Antonius Stanciu
- Asist. dr. eng. Ioan Dan Stoia
- Asist. dr. eng. Karoly Menyhardt
- Eng. Ovidiu Ghiba, PhD student
- Eng. Delia Bugariu, PhD student
- Eng. Cristian Săftescu-Jescu, PhD student
- Eng. Teodora Ioanovici , PhD student
- Eng. Andrei Crăciun, PhD student
- Eng. Cristian Toader-Pasti, PhD student
- Eng. Flavia Bălănean, PhD student
- Eng. Oana Maria Pașca, PhD student
- Associated research groups, from The University of Medicine and Pharmacy “Victor Babeș” Timișoara, Hospital of Traumatology and Orthopedy No 1 Timișoara, and Municipal Hospital of Oro-Maxillo-Facial Surgery Timișoara.

CONTACT

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NATIONAL CENTER FOR ENGINEERING OF SYSTEMS WITH COMPLEX FLUIDS – NCESCF

GENERAL PRESENTATION

The *Hydraulic Machinery Division* within the Mechanical Engineering School of the Politehnica University of Timisoara, has been established in 1948, although courses on Hydraulics and Hydroelectric Power Plants have been taught since 1922. For the past half century, the Hydraulic Machinery Division has become an internationally recognized engineering school in turbomachinery hydrodynamics and cavitation, as well as in hydraulic and pneumatic power systems. Moreover, for the past three decades, a research group led by Acad.Prof.dr.doc.eng. Ioan Anton has developed new magnetic liquids and various technical applications.

The *National Center for Engineering of Systems with Complex Fluids (NCESCF)* is structured as a Multiple User Research Centre. Its research team joins professors and researchers from the “Politehnica” University of Timișoara, Hydraulic Machinery Division, and Romanian Academy – Timișoara Branch. NCESCF coordinates a nationwide research consortium including Politehnica University of Bucharest, Technical University of Civil Engineering From Bucharest, University “Dunarea de Jos” Galati, Technical University from Cluj-Napoca, University “Eftimie Murgu” Resita, and Technical University “Gh. Asachi” Iasi. At international level, NCESCF is actively engaged in academic and research agreements with Ecole Polytechnique Federale de Lausanne, Switzerland, University of Stuttgart, Germany, Luleå University of Technology, Sweden, Laval University, Canada, University of Porto, Portugal. The NCESCF also supports educational activities for master and PhD programs in mechanical engineering and computer science, as well as the Microsoft Academic Program within the “Politehnica” University of Timișoara.

BRIEF HISTORY

- In 1997 was started the first pilot program financed by WORLD BANK (25000 USD) to set up the basic centre infrastructure;
- The main grant (317000USD) was finished in 2002, with the set up of the research infrastructure for the three main laboratories: magnetometry, rheology, and numerical simulation;

- A partnership with Microsoft Company allowed the continuous development and upgrade of the software infrastructure



In January 2006 we have started the evaluation procedure for NCESCF, resulting in the formal recognition as a national research center by the National University Research Council (CNCSIS). The NCESCF joins now the staff from the Hydraulic Machinery Division and the research team from the Magnetic Liquids Laboratory, in a coordinated scientific research effort.

MISSION

The *National Center for Engineering of Systems with Complex Fluids (NCESCF)* main goal is to support high level research and education in the domain of complex fluids characterization, production, and application developments. Our three decades experience in producing magnetic liquids and developing engineering applications, as well as in cavitating flow theoretical and applicative studies, allows us to coordinate and support research programs in magnetometry, rheology and magnetorheology of multiphase fluids, nano-fluids, various polymers, as well as on complex hydrodynamic problems in hydraulic machines, hydromechanic equipments, biomedical applications. Our experimental and computational capabilities are able to support top level PhD research programs, as well as international scientific cooperations.

RESEARCH FIELDS

- Mathematical and numerical modelling of complex fluid hydrodynamics, including fluids with complex rheology, two-phase cavitating flows, turbulent 3D flows in complex geometries;

- Mathematical and numerical modelling of turbomachinery swirling flows as well as development and testing of novel flow control methodologies using magnetorheological devices;
- Development of research and professional software for parallel computing with applications in engineering hydrodynamics, turbomachineries, hydromechanical equipment;
- Analysis and optimization of hydraulic turbomachines, in order to improve both efficiency and cavitating behaviour;
- Flow properties of magnetic nanofluids and composites, magnetorheological fluids, polymeric melts, emulsions, gels;
- Magnetic and magnetorheological properties of magnetizable complex fluids;
- Specially tailored magnetic fluids as cooling agents: nucleate boiling heat transfer under the influence of a magnetic field;
- Magnetic and rheological characterization of bio-compatible/bioactive magnetizable fluids, ointments, composites for applications in plant biology and veterinary medicine;
- Magnetizable nanocomposite polymers with micrometric reinforcement elements;
- Engineering applications: rotating seals for high vacuum and moderate pressures, inductive sensors, MRF dampers;

KEYWORDS

Numerical hydrodynamics, cavitation, hydraulic turbines and pumps, hydraulic drives, parallel computing, complex fluids, magnetic nanofluids, magnetorheological fluids, magnetizable nanocomposites, magnetic properties, rheological properties.

ACTIVITIES

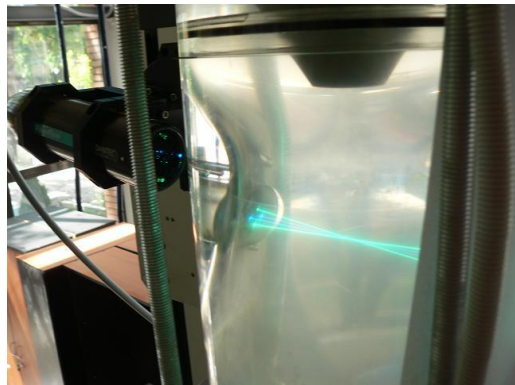
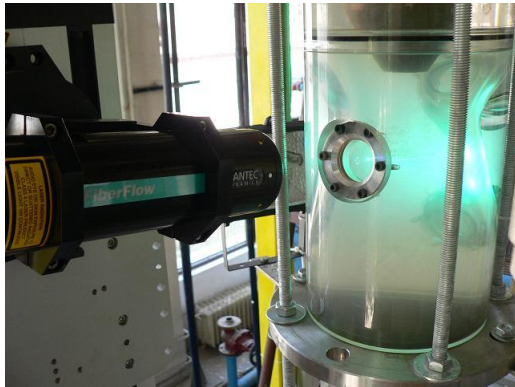
- *Numerical Simulation* in hydrodynamics of turbomachinery and hydraulic equipment and development of software bases for intelligent machines and installations
- *Development of numerical methods* to simulate the flow in turbomachines, cascades and development of complex models to determine the universal characteristics of cascades and turbomachines
- *Constructive solutions* for turbines and micro-turbines and research and design of turbomachines
- *Optimization of hydraulic machinery* using modern numerical methods
- *Cavitation* in turbomachinery with application to Francis and Kaplan turbines, cavitation erosion of materials used for hydraulic machines.
- *Design* of hydraulic drive systems for several industrial applications, modular optimization of the structures and elements of hydraulic drives systems
- *Experimental tests* on standard and proportional hydraulic equipment, using automated acquisition of experimental data
- *Complex characterization* of magnetic nanofluids and composites, magnetorheological fluids, polymeric melts, emulsions, gels: oscillatory and rotational rheometry, magnetometry;
- *Research and production* of new magnetic nano-fluids, magnetorheological fluids;
- *Application development* using magnetic fluids, in aerospace and bio-medical projects;
- *Numerical simulation* of flows with complex rheology and/or complex geometries, cavitating flows, applications for turbomachinery analysis and optimizations.
- *Software development* customized for special engineering applications;
- *Educational activities* in mechanical engineering and computer science, including master and PhD programs.

RESEARCH RESULTS

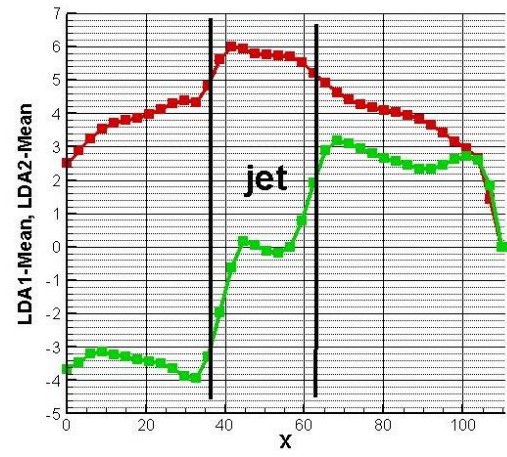
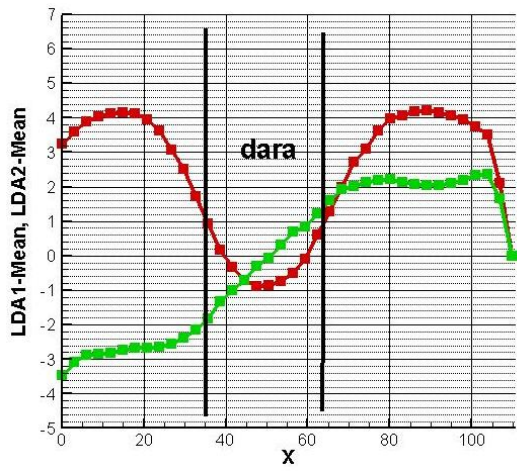
- Numerical analysis and stability analysis of decelerated swirling flows in hydraulic turbine draft tube; development of novel flow control techniques for Francis turbines operated at partial discharge.
- Full three-dimensional flow simulation and analysis in Kaplan and Francis hydraulic turbines;
- Parallel computing algorithms, development and implementation;
- Technical solutions for micro-hydro-turbines and development of design methods for hydraulic turbomachinery design;
- Static and dynamic identification and study of transients in pumps and turbines;
- Hydrodynamics of cavitation with applications to Kaplan and Francis turbines;
- Cavitation erosion studies for materials used in hydraulic turbines;
- Experimental investigations for hydraulic proportional equipment;
- Simulation and analytical modelling of flows in hydraulic poppet valves;
- Advanced characterization methods of the flow and magnetic behaviour of complex fluids and nanocomposites;
- High performance multifunctional materials for magnetically controlled heat transfer processes;
- Rotating seals, sensors, semiactive dampers;
- Biomedical applications.



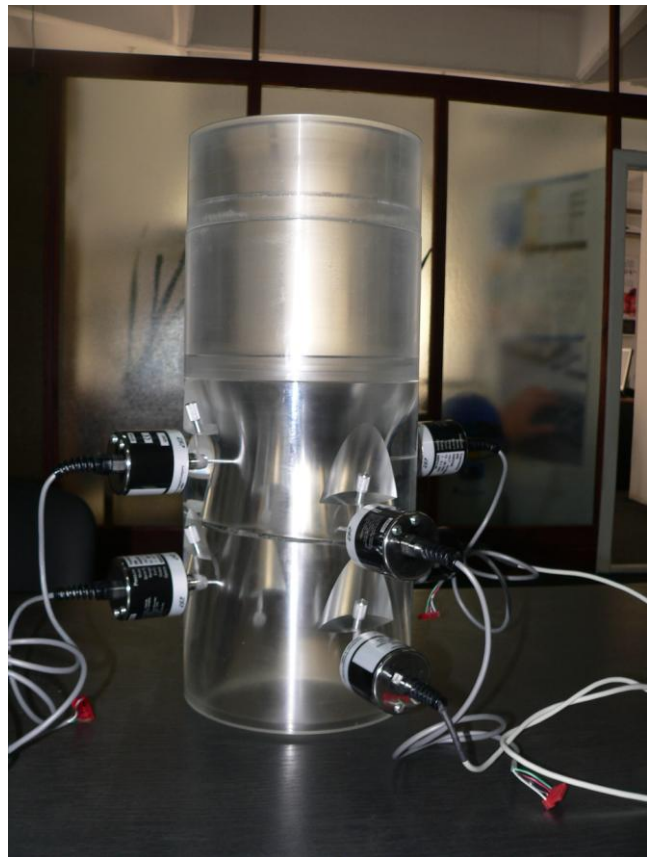
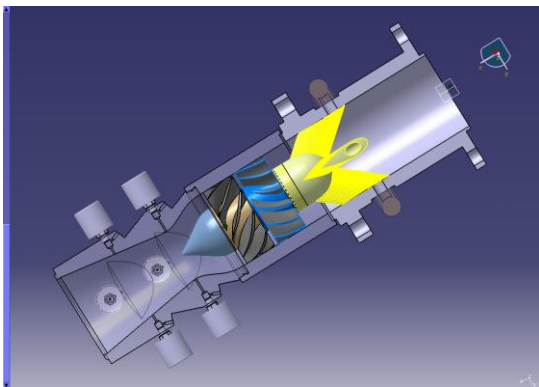
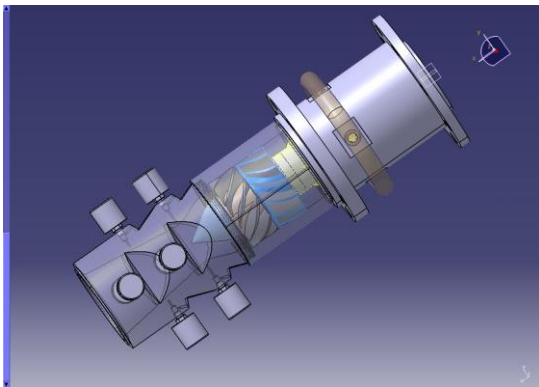
Vortex rope mitigation in the draft tube cone of a Francis turbine operating at partial discharge using the jet control technique.



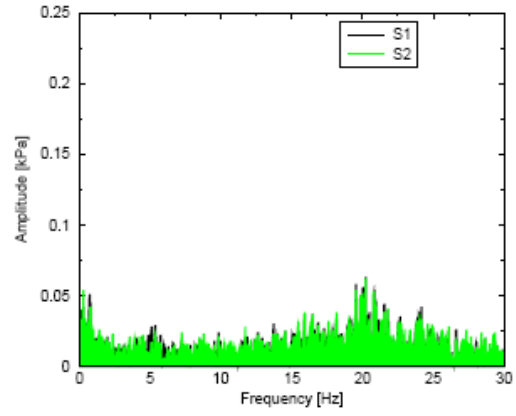
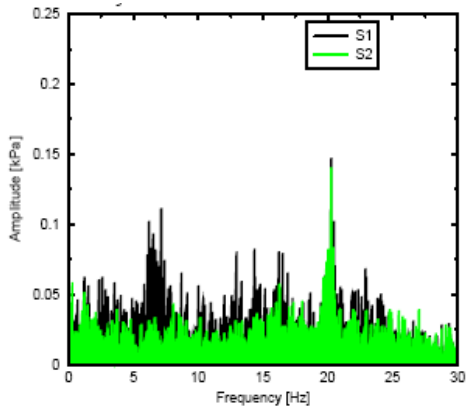
Closed loop test rig for experimental investigations of swirling flows and laser system to measure the velocity profiles



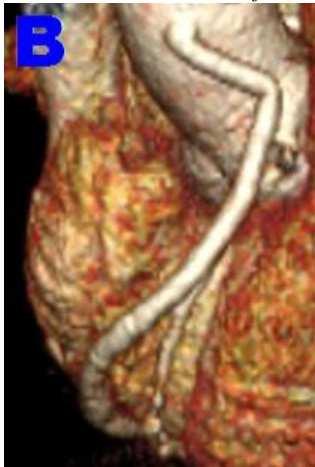
Velocity profiles without (left) and with (right) control jet.



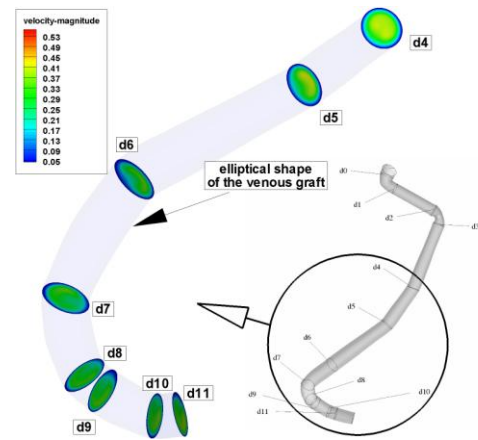
Test section for pressure measurements



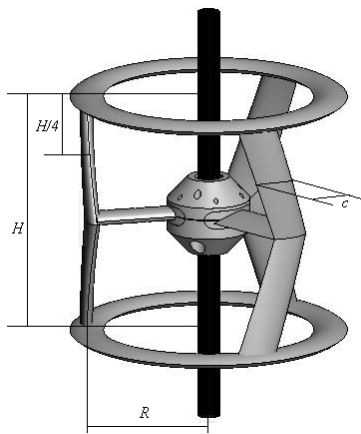
Fourier transform of pressure fluctuation without and with jet control



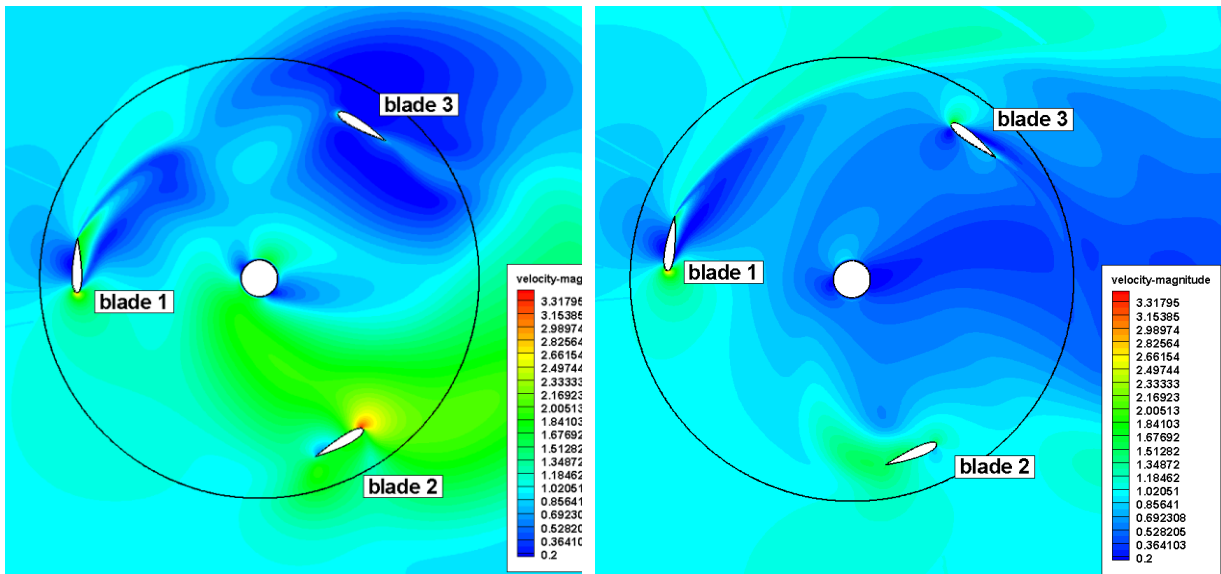
Venous bypass graft, 3D geometrical reconstruction.



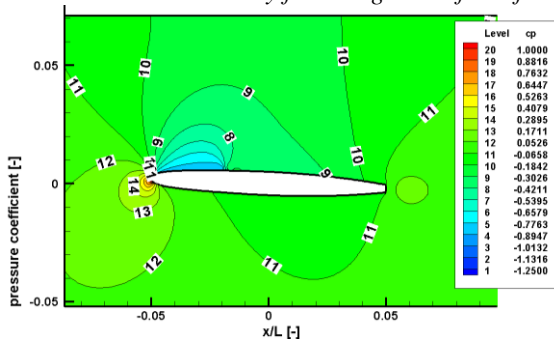
Velocity field computed in the venous bypass graft



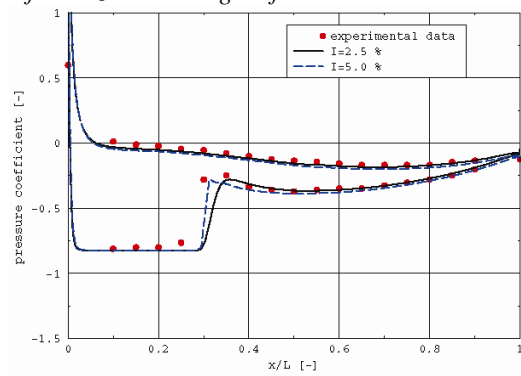
Achard turbine.



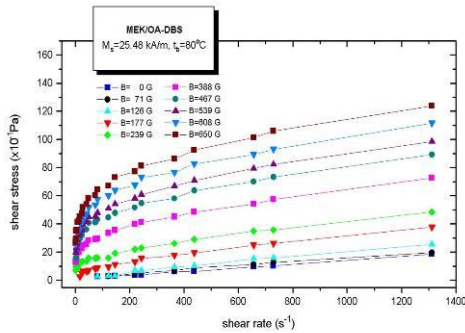
Velocity field magnitude for different value of the azimuthal angle of the blade



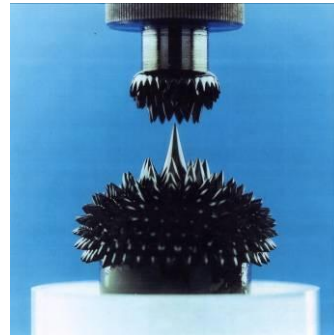
Pressure coefficient distribution on the NACA 0009 hydrofoil at 2,5 degree angle of attack and cavitation number 0.81



Pressure coefficient distribution of the different turbulence intensity for NACA 0009 hydrofoil at cavitation number =0.81.



Magnetic field induced non-Newtonian flow behaviour of a strongly polar magnetic nanofluid



Surface instabilities

Magnetometry Laboratory

- VSM 880 magnetometer
- the DMS Vibrating Sample Magnetometer (VSM) is a computer-controlled measurement system capable of characterizing a wide variety of magnetic samples
- The VSM supports all known magnetic measurements such as Hysteresis and Minor Loops, IRM and DCD Remanence Loops, SFD, Delta M and Henkel Plots, and Angular and AC Remanence Loops. Any series of measurements can be run without user intervention, using the flexible *EasyVSM* software.



Rheology Laboratory

The PHYSICA MCR 300 rheometer performs a wide range of steady and dynamic tests in both CSS and CSR mode. It covers a wide range of applications, from generating simple flow curves to the dynamic analysis of complex fluids, melts, and co-polymers:

Shear stress (CSS), Creep and recovery, Normal force, Stress relaxation, Linear tensile and compression, Amplitude sweep, Frequency sweep, Temperature sweep, Time sweep, Multiwave, Oscillation with superimposed rotation or any combination of the above. Our rheometer has additional magnetorheological capabilities, as well as a wide range of temperature settings (up to 300 Celsius).



Numerical Simulation and Parallel Computing Laboratory

Hardware infrastructure:

- 14 HP workstations computer cluster, PIV, 2,2 GHz, 1 GB RAM
- IBM X225 Windows server
- Dual PIII, 2GB RAM Linux server
- 5 workstations, DUAL INTEL XEON 3 GHz, 4 GB RAM.
- TYANPSC supercomputer with 10 processors on 64 bit and 40 GB RAM, data storage of 1.2 TB with fast access.

Software infrastructure

- FLUENT/FIDAP/POLYFLOW suite for a wide range of numerical flow simulations; available for parallel computing
- TECPLOT for advanced data post-processing
- Software for developing parallel computing applications.



RESEARCH CONTRACTS

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3. Ctr. nr. 688/2009, *O noua metoda de control al curgerii decelerate cu vartej prin injectie de apa si feedback hidrodinamic*, 175.000 RON/2010, Director proiect CSI Sebastian Muntean.
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5. Ctr. nr.7-018/2009, Program PN-II – ERA-NET(MAFINCO), *Nanofluid magnetic – un nou mediu izolator si de racire pentru transformatoarele electrice*, 83.000/2010, responsabil proiect, conf.dr.ing. Floriana Stoian.
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11. Ctr. 86EU/10CF/2009, Program PN-II, CAPACITATI- Modul III, PC 7, *Producere de nanoparticule magnetice avansate in procese si produse inteligente pentru viata (Advanced Magnetic Nanoparticles Deliver Smart Processes and Products for Life)*, 119.181 RON/2010, Director proiect, Dr. Fiz. Ladislau Vekas
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13. CNMP - PNCDI IV, Contract 3416/21-036/2007, *Deservirea energetica a unei comunitati locale utilizand curentii de aer, (Energy Service Of A Local Community Using the Currents of Air)*, Valoare 2010: 196034 RON, Valoare 2007-2010: 1395241 RON, Valoare decontată de UPT: 41628 RON. Coordonator Parteneriat: Universitatea "Politehnica" din Timișoara, responsabil contract: Conf. Dr. Ing. T. Milos, Director Proiect
14. RO 0018, *Improvement Of The Structures And Efficiency Of Small Horizontal Axis Wind Generators With Non-Regulated Blades* (Imbunătățirea construcției și a eficienței turbinelor eoliene de puteri mici cu ax orizontal și palete nereglabile). Contract cu finantare externa. Valoare totală contract: 1.210.000 EUR, din care in 2010 s-a realizat: 326.000 RON (echipa pentru partea mecanica). Functia detinută în cadrul contractului: coordonator pentru partea mecanica: conf.dr.ing. Teodor Milos.
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16. CNMP - PNCDI IV, 1467/21-047/2007, *Sisteme hidraulice adaptive pentru turbine eoliene de mica putere*, val 2010: 64000 RON, director proiect: Bordeășu Ilare
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3. S.I. Bernad, E.S. Bernad, T. Barbat, V. Albulescu, R. Susan-Resiga, *Effects of different types of input waveforms in patient-specific right coronary atherosclerosis hemodynamics analysis*, International Journal of Design and Nature & Ecodynamics, vol 5, no. 2, 2010, ISSN: 1224-6077, pp: 142-159.
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ORGANIZED CONFERENCE

- „25th IAHR Symposium on Hydraulic Machinery and Systems”, Timisoara, 20-24 Septembrie 2010, Organizatori: Universitatea “Politehnica” Timișoara-CNISFC, Academia Română-Filiala Timișoara.



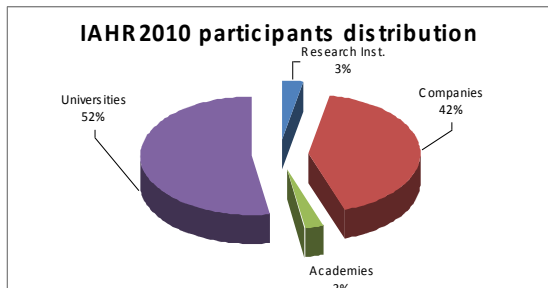
25th IAHR Symposium on Hydraulic Machinery and Systems

Timisoara, Sep. 20-24, 2010

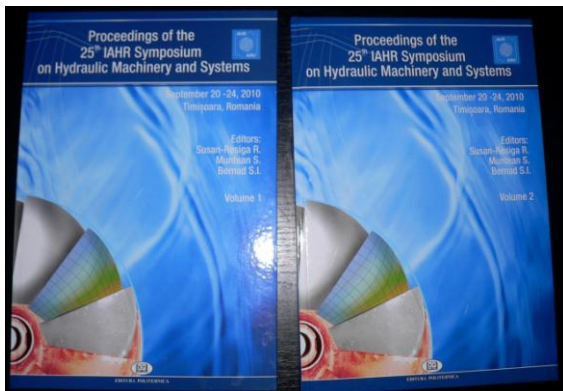
website: <http://acad-tim.tm.edu.ro/iahr2010>

proceedings: <http://iopscience.iop.org/1755-1315/12/1>

The 25th IAHR Symposium, affiliated with universities, technology centres and industry to debate topics related to advanced technologies for hydraulic machinery and systems, which will enhance the sustainable development of water resources and hydropower production. The Scientific Committee has selected 118 papers, out of 238 abstracts submitted, on the following topics: i) Hydraulic Turbines and Pumps, ii) Sustainable hydropower, iii) Hydraulic Systems, iv) Advances in Computational and Experimental Techniques, v) Innovative Technology, to be presented at the symposium and to be included in the proceedings.



The papers presented at the 25th IAHR Symposium on Hydraulic Machinery and Systems are also available in printed form as two-volume, hard-cover, full color A4, Volume 1 – 466 pages, Volume 2 – 480 pages.



During the symposium representatives from four European universities with education and research programs in hydrodynamics and hydraulic machines (EPFL – Lausanne, Univ. Stuttgart, UPC Barcelona, UPT - Timișoara) have established the academic consortium ACT-Hydro. This consortium will promote both academic cooperation (master and PhD programmes) as well as scientific research (joint research projects) on hydraulic machinery and systems.

PERSPECTIVES

- Development of new nano-fluid materials and magneto-rheological suspensions, with aerospace and bio-medical applications;
- Development of new numerical simulation techniques for complex 3D cavitating flows.
- Development of new numerical simulation techniques for complex 3D biomedical applications.

RESEARCH TEAM

- Prof.dr.eng. Romeo SUSAN-RESIGA, Director
- Dr.phys. Ladislau VEKAS, Scientific Director, head of the Rheology Laboratory

- Dr.eng. Sandor BERNAD, Executive Director
- Dr.eng. Sebastian MUNTEAN, head of the Numerical Simulation Laboratory
- Assoc.prof.dr.eng. Floriana STOIAN, head of the Magnetometry Laboratory
- Prof.dr.ing. Liviu ANTON
- Prof.dr.ing. Ilare BORDEAȘU
- Prof.dr.ing. Alexandru BAYA
- Prof.dr.ing. Mircea BĂRGLĂZAN
- Prof.dr.ing. Francisc GYULAI
- Prof.dr.ing. Mircea POPOVICIU
- Prof.dr.ing. Victor BĂLĂȘOIU
- Conf. dr.ing. Teodor MILOȘ
- Sl. dr.ing. Eugen DOBÂNDĂ
- Sl.dr.ing. Cornel VELESCU
- Sl.dr.ing. Ioan PĂDUREAN
- Sl.dr.ing. Adriana Sida MANEA
- Sl.dr.ing. Adrian BEJ
- Asist.dr.ing. Ionel BACIU
- Assist. dr.ing. Adrian STUPARU
- Asist.ing. Rodica BĂDĂRĂU
- Asist.dr.ing. Daniel Cătălin STROIȚĂ
- Fiz. Oana MARINICA, CS
- Phd. Stud. Alin BOSIOC
- Phd. Stud. Constantin TANASA
- Phd. Stud. Irina MOISA
- Phd. Stud. Alin JURCHELEA
- Phd. Stud. Adrian KARABENCIOV
- Phd.Stud. Nicolae BIRAU
- Phd.Stud. Elena DIMIAN
- Phd.Stud. Gheorghita GANGA
- Phd.Stud. Tiberiu CIOCAN
- Stud. Mariana TODIRUȚĂ
- Stud. Master ing. Laurențiu MIRCEA
- Stud. Master ing. Laurențiu Daniel CĂLIN
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RESEARCH CENTRE FOR VIBROIMPACTS AND MECHANICAL VIBRATIONS

GENERAL PRESENTATION

Because of the existing tradition and outstanding achievements in the scientific research, the premises appeared for funding a centre of scientific excellence focused on the field of vibroimpacts, mechanical vibrations and technical acoustics. As a consequence of the competitions organized by CNCISIS, concerning the identification and evaluation of research centers, the results obtained in these fields were specially appreciated, so the research centre was recognized as a type B research centre. Consequently, CNCISIS issued the certificate no. 15/CC-B from 11/05/2001, recognizing the **research centre VIBROIMPACTS AND MECHANICAL VIBRATIONS**. It has to be emphasized that the research in the field of the vibroimpacts is done, with priority, by the staff of this centre. As of 2009, the Laboratory of Acoustics and Vibration within this centre was accredited by RENAR (Romanian accreditation body for testing laboratories), in accordance with the standard SR EN ISO/CEI 17025, which means that test reports issued by this laboratory are accepted across Europe. The National Accreditation Body's mark on these reports guarantees their recognition, equivalence and reliability across Europe.

The members of this centre were involved in many national and international projects concerned with both theoretical and experimental problems related to vibration, vibro-impacts and acoustics.

MISSION

The main mission of the centre is to realize specific activities of continuous training, advanced research, technical assistance, documentation and technical expertise. In order to realize its mission, the centre has as objectives:

- promotion of works of fundamental and applied research in the field of vibroimpacts, vibrations, nonlinear dynamics and technical acoustics;
- expertise and consulting for the industrial environment;
- promotion of the research fields and realization of cooperation programs with other research institutes in these fields;

RESEARCH FIELDS

The main fields of the research are:

- vibroimpacting interactions and vibroimpacts
- mechanical vibrations, linear and nonlinear vibrations

- environmental acoustics, technical acoustics
- nonlinear dynamics in mechanical engineering
- vibration of nonlinear systems

KEYWORDS

Vibration, vibroimpact, noise, impact, spectrum, prediction, diagnosis, analytical solutions, homotopy methods, variational methods, iterative methods, stability, weakly and strongly nonlinearity

ACTIVITIES

The research activity of this centre spans the full spectrum of activities, from fundamental studies aimed at developing new analysis methods to experimental studies:

- Methods for the study of the vibrations of mechanical systems, with applications in engineering.
- Theoretical and experimental studies, concerning development of new methods and devices for decreasing the levels of vibrations and noise;
- Dynamics of vibroimpact systems. Theoretical and experimental methods for the study of stable vibroimpact motions;
- Modeling of working regimes of vibroimpact mechanisms, calculus and optimization algorithms;
- Fault diagnosis by vibrations at machines and equipment;
- Assessment of isolation capacity at air noise of building elements. Determination of noise levels at civil buildings;
- Assessment of noise levels in industrial and urban environment
- Evaluation of human exposure to hand-arm and whole-body vibration
- Test reports on acoustic and vibration real problems
- Application of homotopy methods and variational methods to the study of nonlinear phenomena
- Development of analytical approximate techniques for non-linear and strongly non-linear problems

RESEARCH CONTRACTS

1. *A study on decreasing the noise level in Timișoara City using rubberized asphalt, ctr.nr.108, Timișoara City Hall (Assoc.Prof. N.Herișanu)*

PUBLICATIONS

PAPERS IN ISI JOURNALS

1. V. Marinca, N. Herişanu - Determination of periodic solutions for the motion of a particle on a rotating parabola by means of the optimal homotopy asymptotic method, *Journal of Sound and Vibration*, 359 (2010) 1450–1459
2. V. Marinca, G. Drăgănescu - Construction of approximate periodic solutions to a modified van der Pol oscillator, *Nonlinear Analysis: Real World Applications*, 11(5) (2010) 4355-4362
3. G.E. Drăgănescu, L. Bereteu, A. Ercuța, G. Luca, Anharmonic vibrations of a nano-sized oscillator with fractional damping, *Commun. in Nonlinear Science and Numerical Simulation*, vol. 15(4) (2010) 922-926
4. V. Marinca, N. Herişanu - Comments on A one-step optimal homotopy analysis method for nonlinear differential equations, *Commun. in Nonlinear Science and Numerical Simulation*, vol.15 (2010) 3735–3739
5. N. Herişanu, V. Marinca - Explicit analytical approximation to large-amplitude non-linear oscillations of a uniform cantilever beam carrying an intermediate lumped mass and rotary inertia, *Meccanica*, 45 (2010) 847-855
6. N. Herişanu, V. Marinca - Accurate analytical solutions to oscillators with discontinuities and fractional-power restoring force by means of the optimal homotopy asymptotic method, *Computers and Mathematics with Applications*, 60 (2010) 1607-1615

PAPERS IN ISI PROCEEDINGS

1. L. Bereteu, G. E. Drăgănescu, D. V. Stănescu , Identification of Parameters of a System with Fractional Damping, WSEAS Proceedings: “Recent Adv. in Signal Proc., Robotics and Automation”, Cambridge, 2010, pp. 232-235 ISSN 1790-5117

PAPERS IN INDEXED JOURNALS

1. V. Bacria, N. Herisanu, Investigation of the effects of rubberized asphalt on decreasing the noise, *Fiability & Durability*, ISSN 1844-640x, 2(6) (2010) 5-10
2. V. Bacria, N. Herisanu, Considerations upon the Characteristic Frequency Spectra of some Road Transportation Means, *Analele Universității Eftimie Murgu Reșița. Fascicula de Inginerie*, ISSN 1453-7397, XVII (2010) 211-217

3. V. Bacria, N. Herisanu, Decreasing of noise level using rubberized asphalt, *Research Journal of Agricultural Science*, ISSN 2066-1843, 42 (2010) 382-388

PAPERS IN OTHER JOURNALS

4. D.V. Stănescu, L. Bereteu, Gh.E. Drăgănescu, Identification of Parameters of a System with Fractional Damping, *Scientific Bulletin of the „POLITEHNICA” University of Timisoara, Transactions on Mechanics*, Vol. 55 (69) ISSN 1224 - 6077 Iss. 1, 2010, pp 37-40
5. D. Rujan, D.V. Stănescu, Gh.E. Drăgănescu, Fractional Modelling of Diffusion Processes, *Scientific Bulletin of the „POLITEHNICA” University of Timisoara, Transactions on Mechanics*, Vol. 55 (69) ISSN 1224 - 6077 Iss. 2, 2010, pg 20-25
6. V. Marinca, N. Herişanu, Optimal homotopy perturbation method for strongly nonlinear differential equations, *Nonlinear Science Letters A*, ISSN 2076-2275, 1 (2010) 273-280
7. N. Herişanu, V. Marinca, A modified variational iteration method for strongly nonlinear problems, *Nonlinear Science Letters A*, ISSN 2076-2275, 1 (2010) 183-192

INTERNATIONAL CONFERENCES

1. N. Herişanu, V. Bacria, Considerations upon the acoustic field generated by sources within a disco-club, XXII Conference "Noise and Vibration", Nis, Serbia, 20-22.10.2010, ISBN 978-86-6093-019-6, pp.25-28
2. V. Bacria, N. Herişanu, Some acoustical arrangements in the urban environment, EAA EUREGIO, 1st European Congress on Sound and Vibration, Ljubljana, Slovenia, 15-18.09.2010, ISBN 978-961-269-283-4, pp.1-4
3. D. Simoiu, T.Gh. Cioara, Self excited vibration of a cylindrical body wind bidirectional flowmeter, IMAC-XXVIII, Jacksonville, Florida USA, February 1-4, 2010

BOOKS

1. V. Angheliescu, R.D. Angheliescu *Statistics*. Second edition, „Eurostampa” Publishing House, ISBN 978-606-569-165-0, 155 pages, 2010
2. N. Herişanu *Fundamentals of mechanical engineering. Statics*, “Politehnica” Publishing House, ISBN 978-606-554-231-0, 244 pages, 2010

PhD THESIS

1. Alexandru Boltosi, Vibration control by means of magnetorheological composite materials (16.07.2010)

PhD THEMES

PhD Advisor: Prof.dr.ing. Liviu Bereteu

1. Dan Viorel Stănescu, Identification of some nonlinear systems by the study of vibratory movements

PERSPECTIVES

Taking into account the research facilities, systems and equipments as well as the human resources of the centre, it is expected in the near future to significantly increase its presence in the scientific landscape at national and international level in the field of vibrations, vibroimpacts and technical acoustics. The results obtained by the centre's staff will be further developed in both fundamental and application directions. The research center will also promote continuous research activities in national

and international research projects as well as in some research projects requested by the industry.

RESEARCH TEAM

- Prof. dr. ing. Liviu BERETEU
- Prof. dr. ing. Adrian CHIRIAC
- Prof. dr. ing. Titus CIOARĂ
- Prof. dr. Vasile MARINCA
- Prof.dr. Gheorghe DRĂGĂNESCU
- Assoc. prof. dr. Pantele CHELU
- Assoc. prof. dr. ing. Nicolae HERIŞANU
- Lect. dr. Valeriu ANGHELESCU
- Lect. dr. ing. Gheorghe LUCA
- Asist. dr. ing. Ramona NAGY
- Dr. phys. Alexandru BOLTOSI
- Eng. Dan STANESCU, Ph.D Student

CONTACT

Prof. dr. ing. Gheorghe DRAGANESCU
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INTEGRATED ENGINEERING RESEARCH CENTRE

I. E. R. C.

GENERAL PRESENTATION AND MISSION

The *Integrated Engineering Research Centre (IERC)* is organized within the Department of Manufacturing Engineering (TCM). IERC is organized as a research unit and transfer of technology of the “Politehnica” University of Timișoara. IERC is accredited by the National Scientific Research Council for Higher Education (CNCSIS - Romania) with the certificate CNCSIS no. 103 / CC-C in May 11, 2001.

IERC mission is to coordinate teams of researchers, who are developing programs in the integrated engineering field of research.

RESEARCH FIELDS

The main fields of research are:

- Products, processes and manufacturing systems integrated collaborative design;
- Product lifecycle management;
- Integrated control of the manufacturing processes and systems;
- New products and manufacturing equipment;
- Equipments and technologies for non-conventional processes.

KEYWORDS

Integrated design, Collaborative distributed design, Manufacturing engineering, Product lifecycle management, Non-traditional machining processes, equipment and technologies, Quality assurance.

ACTIVITIES

- IERC assure the co-ordination and harmonization of the training programs through scientifically research (PhD. programs, post-graduated programs) for the researchers or research teams. The master program developed by IERC is: Integrated Engineering. The PhD. programs coordinated by IERC are in the field of Industrial Engineering.
- The research teams from IERC develop: fundamental and applicative research activities; products and technology design activities; technological development and technology transfer all attending the present industrial demands.
- IERC is involved in national and international research programs and organizes different scientific conferences.
- IERC members are part of the following professional bodies and associations:

EMIRAcle – European Manufacturing and Innovation Research Association, a cluster leading experience;

ETRIA - European TRIZ Association;

ECQA – European Certification & Qualification Association;

AGIR – The General Association of the Engineers in Romania

AUIF – Academic Association of Manufacturing Engineering in Romania

ARTN – Romanian Association of Nonconventional Technologies

RESEARCH CONTRACTS

1. LLP-LdV-TOI-2008-FR-117025, *Certified Integrated Design Engineer, iDesigner*, Director: Prof. George Drăghici, Value for 2010: 11559 €
2. Contract 05/08.01.2010, *Technical assistance in the field of materials, processing methods, coatings, plastic parts, plastic cold forming processes, measurements and statistical control of manufacturing processes*, Director: Assoc. Prof. Ion Grozav, Value for 2010: 13948 Lei
3. MNT 7-021/2010, *Ultrasonic assisted processes for machining of high precision components*, Director: Lect. Dr. Ing. Cristian-Gheorghe Turc, Value for 2010: 75600 Lei

Prospective:

- Participation to the **EC Seven Framework Program (FP7)**
- Participation to grant competitions through PN II, CNCSIS, POS-DRU, LLP etc.

PUBLICATIONS

BOOKS

1. Drăghici G., *Tehnologia fabricării produselor*, Editura Politehnica, Timișoara, 2010, ISBN: 978-606-554-219-8, CD-ROM

PUBLISHED PAPERS

1. Riel, A., Drăghici, A., Drăghici, G., Grajewski, D., Messnarz, R., *Process and product innovation needs integrated engineering collaboration skills*, Journal of Software Maintenance and Evolution: Research and Practice, 5 AUG 2010 DOI: 10.1002/smr.497, John Wiley & Sons, Ltd. (indexată: Wiley Online Library)

2. Drăghici, A., Drăghici, G., Izvercianu, M., Riel, A., Tichkiewitch, S. and Messnarz, R., *Qualification and Certification of Research-Entrepreneur Skills Using the ECQA Platform*, International Conference, CENTERIS 2010, Viana do Castelo, Portugal, October 20-22, 2010, Proceedings, Part II, ENTERprise Information Systems, Springer, ISSN 1865-0929, pp. 249-258 (Database: SprigerLink)
3. Oriță, A., Drăghici, G. - *Improvement of QFD with a Quality Plan*, Annals of DAAAM for 2010 & Proceedings of the 21th International DAAAM Symposium, Editor B. Katalinic, Published by DAAAM International, Vienna, Austria 2010, ISBN 978-3-901509-70-4, ISSN 1726-9679, pp. 1513-1514, (indexată ISI Web of Knowledge, Web of Science® – with Conference Proceedings, Database: Inspec)
4. Drăghici G., Drăghici A., Riel A., Tichkiewitch S., Grajewski D., Messnarz R., *Opportunities for the European Certification of the Integrated Designer Profession* (plenary session), Proceedings of the 14th International Conference ModTech 2010, 20-22 May 2010, Slănic Moldova, Romania, ISSN 2066-3919, pp. 259-262 (indexată ISI Web of Knowledge, Web of Science® – with Conference Proceedings)
5. Drăghici G., Drăghici A., Riel A., Messnarz R., Vajde-Horvath R., *Opportunities for the European Certification of the Integrated Designer and Entrepreneur Professions*, Proceedings of the Annual Session of Scientific Papers IMT Oradea 2010, Extended Abstracts, ISBN 978-606-10-0128-6, pp. 4.44, Annals of the Oradea University, Fascicle of Management and Technological Engineering, CD-ROM Edition, vol. IX (XIX), nr.1, ISSN 1583-0691, pp. 4.139-4.148 (CNCSIS B+, indexată Ulrich's Data base)
6. Pămîntaş, E., *Training for implementation of total productive maintenance in a SME*, Annals of the Oradea University, Fascicle of Management and Technological Engineering, CD-ROM Edition Volume IX (XIX), (CNCSIS ACCREDITATION 2002-2004, "CLASA B" 2005-2006, "CLASA B+" 2007-2009, Indexed by Ulrich`S Periodicals Directory, since 2008), ANNUAL SESSION OF SCIENTIFIC PAPERS IMT ORADEA – 2010, FELIX SPA, MAY 27-29th, 2010, Oradea, Romania, ISSN 1583 – 0691, Nr1/3.130-135, Extended abstracts ISBN 978-606-10-0128-6, pp 3.69
7. Pămîntaş, E., *Implementation results of total productive maintenance in a SME*, in Annals of the Oradea University, Fascicle of Management and Technological Engineering, CD-ROM Edition Volume IX (XIX), ISSN 1583 – 0691, Nr. 2/ 3.167-172, (CNCSIS ACCREDITATION 2002-2004, "CLASA B" 2005-2006, "CLASA B+" 2007-2009, Indexed by Ulrich`S Periodicals Directory, since 2008), ANNUAL SESSION OF SCIENTIFIC PAPERS IMT ORADEA – 2010, FELIX SPA, MAY 27-29th, 2010, Oradea, Romania, Extended abstracts ISBN 978-606-10-0128-6, pp. 3.70,
8. Pămîntaş, E., Banciu, F.V., *Experimental study about spreading of total machine available time* in Proceedings of the 14th International Conference Modern Technologies, Quality and Innovation, IASI-CHISINAU-BELGRAD ModTech 2010, New face of TMCR, 20-22th May 2010, Slănic Moldova, Romania, ISSN 2066-3919, pp. 443-446 (indexată ISI Web of Knowledge, Web of Science® – with Conference Proceedings)
9. Pămîntaş, E., *Effective vs. Designed shape accuracy at high speed cutting*, Annals of DAAAM for 2010 & Proceedings of The 21st International DAAAM Symposium "Intelligent Manufacturing & Automation: Focus on Interdisciplinary Solutions", 20-23 Oct. 2010, Zadar, Croatia, ISSN1726-9679, pp.719-720 , (indexată ISI Web of Knowledge, Web of Science® – with Conference Proceedings, Database: Inspec)
10. Pămîntaş, E., Belgiu, G., Turc, C., *Ten steps to build a guide for an expert system for metal cutting manufacturing* in Proceedings of the 14th International Conference Modern Technologies, Quality and Innovation, IASI-CHISINAU-BELGRAD ModTech 2010, New face of TMCR, 20-22th May 2010, Slănic Moldova, Romania, ISSN 2066-3919, pp 447-450 (indexată ISI Web of Knowledge, Web of Science® – with Conference Proceedings)
11. Turc, C. G., Tulcan, A., Banciu, F., Pămîntaş, E., *A fuzzy logic algorithm on products early design stage*, The 14th International Conference Modern Technologies, Quality and Innovation, ModTech 2010, New Face of TMCR, Iași & Chișinău, 20-22 of May, 2010, Iași, Romania, ISSN 2066 - 3919, pp. 651-654

- (indexată ISI Web of Knowledge, Web of Science® – with Conference Proceedings)
12. Belgiu, G., Banciu, F., Cărașu, C., Pămîntaș, E., Jeong, J., Turc, C., *Manufacturing process management using a CAD/CAM/CAE success operation prediction*, The 14th International Conference Modern Technologies, Quality and Innovation, ModTech 2010, New Face of TMCR, Iași & Chișinău, 20-22 of May, 2010, Iași, Romania, ISSN 2066 - 3919, pp. 115-118 (indexată ISI Web of Knowledge, Web of Science® – with Conference Proceedings)
 13. Tulcan, A., Stan, D, Turc, C., Cosma, C., Dume, A., *Design of linear drive systems to retrofit a coordinate measuring machine*, The 14th International Conference Modern Technologies, Quality and Innovation, ModTech 2010, New Face of TMCR, Iași & Chișinău, 20-22 of May, 2010, Iași, Romania, ISSN 2066 - 3919, pp.647-650 (indexată ISI Web of Knowledge, Web of Science® – with Conference Proceedings)
 14. Cărașu, C., Pruteanu, O., Rușeț, V.V., Turc, C.G., Pămîntaș, E., Belgiu, G., *Genetic algorithms application in machine tools design*, XVII International Science and Engineering Conference – Machine-Building and Techno Sphere of the XXI Century, Tom 4, September 13-18, 2010, Sevastopol-Donetsk, Ukraine, ISSN 2079-2670, pp. 44-47
 15. Turc, C.G., Cărașu, C., Pruteanu, O., Belgiu, G., Rușeț, V.V., *EDM ultrasonic assisting management*, XVII International Science and Engineering Conference – Machine-Building and Techno Sphere of the XXI Century, Tom 4, September 13-18, 2010, Sevastopol-Donetsk, Ukraine, ISSN 2079-2670, pp. 239-243
 16. Tulcan, L., Tulcan, A., Turc, C. G., Stan, D.V., *Analysis of surface roughness profile machining by ultrasonic lapping*, Annals of DAAAM for 2010 & Proceedings of the 21th International DAAAM Symposium, Editor B. Katalinic, Published by DAAAM International, Vienna, Austria 2010, ISSN 1726-9679, pp. 1497-1498 , (indexată ISI Web of Knowledge, Web of Science® – with Conference Proceedings, Database: Inspec)
 17. Stan, D., Șerban, I., Tulcan, L., Turc, C., Tulcan, A., *Thermoplastic extrusion die with ultrasonic thermo-pellicular effect*, 6th WSEAS International Conference on Energy, Environment, Ecosystems & Sustainable Development, Timișoara, Romania, 21-23 of October, 2010, ISSN 1792-5924, pp. 404-408
 18. Banciu, F., Grozav, I., Drăghici, G., *Supporting conceptual design phase using TRIZ*, in Annals of the Oradea University, Fascicle of Management and Technological Engineering, CD-ROM Edition Volume IX (XIX), ISSN 1583 – 0691, pp. Nr. 3/ pp. 1.5-1.12 , Extended abstracts ISBN 978-606-10-0128-6, pp. 1.6, (CNCSIS ACCREDITATION 2002-2004, "CLASA B" 2005-2006, "CLASA B+" 2007-2009, Indexed by Ulrich`S Periodicals Directory, since 2008), ANNUAL SESSION OF SCIENTIFIC PAPERS IMT ORADEA – 2010, FELIX SPA, MAY 27-29th, 2010, Oradea, Romania.
 19. Banciu F., Drăghici, G., *Holistic model for Collaborative Integrated Product design* in Annals of the Oradea University, Fascicle of Management and Technological Engineering, CD-ROM Edition Volume IX (XIX), ISSN 1583 – 0691, Nr. 1/ pp. 3.24-33, Extended abstracts ISBN 978-606-10-0128-6, pp. 3.11, (CNCSIS ACCREDITATION 2002-2004, "CLASA B" 2005-2006, "CLASA B+" 2007-2009, Indexed by Ulrich`S Periodicals Directory, since 2008), ANNUAL SESSION OF SCIENTIFIC PAPERS IMT ORADEA – 2010, FELIX SPA, MAY 27-29th, 2010, Oradea, Romania.
 20. Banciu, F. V., Draghici G., Grozav, I., *Using TRIZ Method for creativity in Conceptual Design* in Annals of DAAAM for 2010 & Proceedings of the 21th International DAAAM Symposium, “Intelligent manufacturing and automation: Focus on interdisciplinary solutions”, 20-23rd October 2010, Zadar, Croatia Volume 20, No1, Editor B. Katalinic, Published by DAAAM International, Vienna, Austria 2010, ISSN 1726-9679, ISBN 978-3-901509-73-5, pp. 443-444 , (indexată ISI Web of Knowledge, Web of Science® – with Conference Proceedings, Database: Inspec)
 21. Banciu, F., Drăghici, G., Pămîntaș, E., Turc, C., *Comparative Study Between Systematic and Axiomatic Design Models* in Proceedings of the 14th International Conference Modern Technologies, Quality and Innovation, IASI-CHISINAU-BELGRAD ModTech 2010, New face of TMCR , 20-22th May 2010, Slănic Moldova, Romania, ISSN 2066-3919, pp.87-91 (indexată ISI Web of Knowledge, Web of Science® – with Conference Proceedings)

PhD THESIS

1. Sorin George Lemac, *Geometrical Modeling, as a joint Technique of the CAD and CAM Systems for the Geometrical Entities Design and Manufacturing*, Thesis supervisor: Prof. George Drăghici

In course PhD THEMES

1. Felicia Veronica Banciu, *Developing of a innovative, collaborative product design platform*, Thesis supervisor: Prof. George Drăghici (2002)
2. Dinu Iacob Poiana, *Study of drilling process using a singular blade*, Thesis supervisor: Prof. George Drăghici (2003)
3. Ana-Andreea Mihărescu, *Integration of the customer requirements in the product design phases*, Thesis supervisor: Prof. George Drăghici (2003)
4. Adrian Oriță, *Integrated product design methodology in PLM context*, Thesis supervisor: Prof. George Drăghici (2005)
5. Ioana Dorian Stef, *Integrated product design and manufacturing platform*, Thesis supervisor: Prof. George Drăghici (2009)
6. Stelian Cornel Florică, *Collaborative product design in PDM/PLM platform*, Thesis supervisor: Prof. George Drăghici (2010)

RESEARCH TEAM

The human resources consist of researchers which are doctor degree graduates or which leads post-graduates programs. Also, in the team are working post-graduates and master students.

The IERC management is assured by the director and the Scientific Council, which is composed of professors or associate professors that have been recognized for their research activity and results.

The members of the research team are:

- Prof. Dr. Eng. George Drăghici – IERC director
- Assoc. Prof. Dr. Eng. Ion Grozav
- Assoc. Prof. Dr. Eng. Eugen Pămîntaş
- Assoc. Prof. Dr. Eng. Viorel Putz
- Assoc. Prof. Dr. Eng. Dănuț Șosdean
- Lect. Dr. Eng. Adrian But
- Lect. Dr. Eng. Cristian-Gheorghe Turc
- Assist. Eng. Felicia Banciu
- Eng. Ioan Dorian Stef, PhD student
- Eng. Stelian Cornel Florică, PhD student

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RESEARCH CENTRE FOR PROCESSING AND CHARACTERISATION OF ADVANCED MATERIALS

MAIN RESEARRCH FIELDS

Examinations and thermal analysis, design and elaboration of advanced materials and improvement of the processing technologies, thermo-mechanical processes for improving materials characteristics, training and consulting for specialists from the industry in the field of investigations, technology and designing of materials.

- Studies and investigations on metallic glasses Fe-Ni-P and Fe-Cr-P
Keywords: amorphous alloy, liquid quenching, ribbons, powders, thermo-stability, magnetic properties
- Studies and researches on behaviour of materials during welding and weldability of materials
Keywords: weldability, welding, microstructural investigations, mathematical modelling
- Manufacturing and characterization of advanced materials
Keywords: amorphous, metallic matrix composites, stainless steels, micro-alloyed steels
- Increasing fiability of machine parts by mean of surface treatments and use of advanced materials
Keywords: plasma nitriding, gas carbonising, surface inductive treatment
- Modern investigation of materials structure and properties, image acquisition and processing in optic and electronic microscopy
Keywords: digital photo camera, computer aided image processing, image archive

STUDIES AND INVESTIGATIONS ON THE METALLIC GLASSES Fe-Ni-P AND Fe-Cr-P

FIELD DESCRIPTION

Metallic glasses are a new class of materials used in applications that require high saturation magnetic induction and low magnetic loss, in high strength fibres and for magnetic shielding.

ACTIVITIES AND RESULTS

Researches on Fe-Ni-P and Fe-Cr-P amorphous alloys allowed designing of an elaboration technology and corresponding facilities for amorphous ribbons and powders. The properties of the obtained ribbons and powders

were studied by X-ray analysis, in order to observe the materials amorphous change. The researchers aim is to obtain magnetic materials with outstanding properties.

SHAPE MEMORY ALLOYS

FIELD DESCRIPTION

The shape memory alloys are materials with a large number of interesting properties as: shape memory effect, pseudoelastic behaviour and high dumping capacity.

ACTIVITIES AND RESULTS

Researches on Fe-Ni-P and Fe-Cr-P amorphous alloys allowed designing of an elaboration technology and corresponding facilities for amorphous ribbons and powders. The properties of the obtained ribbons and powders were studied by X-ray analysis, in order to observe the materials amorphous change. The researchers aim is to obtain magnetic materials with outstanding properties.

METAL MATRIX COMPOSITES

FIELD DESCRIPTION

Particle reinforced metal matrix composites are relatively new class of materials which combine high mechanical properties with cost that are significant lower in comparison with long fiber reinforced composites.

ACTIVITIES AND RESULTS

A new class of particle reinforced composites based on a hardenable Al-Cu-Si-Mg reinforced with SiC particles (10 μm average dimension) has been produced via a powder metallurgy technique.

Significant progresses have been made in technological optimisation, as well as the characterization of some important mechanical properties and the structural changes during heat treatment or thermo-mechanical processing of the materials.

TECHNOLOGY AND EQUIPMENT FOR INDUCTION HARDENING

FIELD DESCRIPTION

Surface treatments are important in order to improve exploitation characteristics of wear

stressed machine parts. Induction hardening is the proper treatment for cylindrical parts and plane surfaces, applied in serial manufacturing.

ACTIVITIES AND RESULTS

The research team developed and optimised surface hardening technologies by inductive treatment of different machine parts as: camshaft, guide conduit, inner cylindrical surfaces. A significant reduction of heating time and improve of exploitation characteristics of stud and railway switches was obtained.

INCREASE OF RELIABILITY ON DIFFERENT MACHINE PARTS BY SURFACE ENGINEERING

FIELD DESCRIPTION

Modern technology requires high quality machine parts with improved mechanical properties and reduced specific weight. Surface treatment as plasma nitriding and gas carburising on medium and high alloyed steels are meant to improve wear and fatigue strength, together with good behaviour in presence of dynamic stresses.

ACTIVITIES AND RESULTS

Advanced researches on plasma nitriding, gas carburising on medium and high alloyed steels, surface inductive treatment offer ready-to-use treatment technologies at industrial scale for high quality machine parts.

MODERN INVESTIGATION OF MATERIALS STRUCTURE AND PROPERTIES, IMAGE ACQUISITION AND PROCESSING IN OPTICAL AND ELECTRONIC MICROSCOPY

FIELD DESCRIPTION

Optical and electronic microscopy are investigation methods that provide complete information concerning the structure of materials. Computer aided acquisition and processing of images aloud the increase of the above methods' efficiency, for quantitative as well as qualitative measurements.

ACTIVITIES AND RESULTS

The improvement of the investigation equipment and the image acquisition and processing methods lead to the increase of the metallographic investigations results (image quality, measurements precision).

WELDING TECHNOLOGIES AND EQUIPMENTS (FUSION AND RESISTANCE)

FIELD DESCRIPTION

Electric arc welding of studs with ceramic ring, certification for welding technologies and welders training and authorization (for welding traditional materials as well as plastic materials), consulting and technical assistance for welding and weld control.

MAIN PUBLICATIONS

BOOKS

1. Mitelea Ion, *Materials Science II*, Politehnica Publishing House Timisoara, p.416, ISBN 978-973-625-826-8;
2. Mitelea Ion, Vlaicu Marius, *Selection of materials and fabrication processes*, Politehnica Publishing House Timisoara, p.454, ISBN 978-606-554-058-3;
3. Mitelea Ion, Roşu Radu, *Weldability of stainless steels*, Politehnica Publishing House Timisoara, p.158, ISBN 978-606-554-124-5;
4. Mihaela Popescu, *Basis of welding processes. Experimental themes*, Politehnica Publishing House Timisoara, p.188, ISBN 978-606-554-243-3;
5. Mihaela Popescu, *Joining of advanced materials*, Politehnica Publishing House Timisoara, p.667, ISBN 978-606-554-243-3;
6. Cucuruz L.R., Nicoară M., Radu B., Răduță A., *Non-ferrous alloys, vol. I Aluminium and its alloys*, Politehnica Publishing House Timisoara, p.147, ISBN 978-606-554-221-1.
7. Şerban V.-A., Răduță A., *Materials Science and Engineering, Second edition*, Politehnica Publishing House Timisoara, p. 526, ISBN 978-606-044-6
8. Răduță A., *Deformation and fracture of materials*, Politehnica Publishing House Timisoara, p. 322, ISBN 978-606-554-146-7

PUBLISHED PAPERS

1. Mitelea Ion, Craciunescu Corneliu, *Friction Welding Structures of Carburized Steels*, Materials Science Forum, Vol.638-642, pp.3781-3786,6p., ISSN 02558 – 5476, F. 0.399 (ISI);
2. Mitelea Ion, Craciunescu Corneliu, Gugu Radu, *Interfacial Behaviour of Dissimilar Friction Welded Nodular Cast Irons with Low Carbon Steels*, Materials Science Forum, Vol. 638-642, pp. 3757-3762, 6p., ISSN 02558 – 5476, F. 0.399 (ISI);
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PhD THESIS – presented –

1. *Contributions regarding the processing of cermet type layers by thermal spraying*, Author: Carmen Opriș. Scientific Coordinator: Prof.dr.eng. I.Cartiș.
2. *Studies and researches regarding the life time of electric resistors* - Author: Cosmin Locovei, Scientific Coordinator: Prof.dr.eng. M. Trușculescu.

RESEARCH CONTRACTS

1. Contract PN 41-091/2007, *Reconstruction of bone segmentary defects by bio mimetic matrix colonized with osteogenic cells*, (RECON-OS), Financer: M.Ed.C., Director: Cucuruz Roland, Value 2010 P3(UPT): 11000 lei;
2. Contract ID_18, No. 66/2007, *Bulk amorphous ferromagnetic and nanocrystalline alloys with applicability for making magnetic shields*, Financer M.Ed.C., Director: Viorel-Aurel Șerban, Value 2010 (UPT): 64800 lei;
3. Contract PN 71-050/2007, *Innovative technologies for obtaining by thermal spraying cermet composites microlayers, corrosion and wear resistant*, Financer: C.N.M.P., Director: Serban Viorel-Aurel, Value 2010 (UPT): 81708 lei;
4. Contract No. 72-174 / 2008 *Development of innovative methods and techniques for joining heterogenous materials using friction stir welding*, Financer: C.N.M.P., Director: Radu Bogdan, Value 2010 (UPT): 85000 lei;
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6. Contract PN 22-096/2008, *Integrated system for risk management at equipments from the energetic field*, Financer: C.N.M.P., Director: Serban Viorel-Aurel, Value 2010 (UPT): 167798 lei;
7. Contract 104/2010, *Research and investigation on the characteristics and properties of tools, equipment and products in current production*, Financer: SC KATHREIN Romania SRL, Director: Nicoară Mircea, Value 2010 (UPT): 670 lei;
8. Contract 66/2010, *Research and investigation on the characteristics and properties of tools, equipment and products in current production*, Financer: Hidroserv Hațeg SA, Director: Nicoară Mircea, Value 2010 (UPT): 857 lei;
9. Contract 66/2010, *Research and investigation on the characteristics and properties of tools, equipment and products in current production*, Financer: Hidroserv Hațeg SA, Director: Nicoară Mircea, Value 2010 (UPT): 857 lei;
10. Contract 96/2010, *Research and investigation on the characteristics of materials and processing technologies*, Financer: S.C. ZOPPAS Industries Romania SRL, Director: Aurel Răduță, Value 2010 (UPT): 2540 lei;
11. Contract 114/2010, *Studies and investigations on the quality of products from the automotive production*, Financer: Maschio Gaspardo, Director: Cosmin Locovei, Value 2010 (UPT): 947 lei;
12. Contract 17/2010, *Studies and investigations on the quality of products from the automotive production*, Financer: CRH Jimbolia, Director: Cosmin Locovei, Value 2010 (UPT): 8888 lei;
13. Contract 114/2010, *Studies and investigations on the quality of products from the automotive production*, Financer: Continental Automotive, Director: Cosmin Locovei, Value 2010 (UPT): 26137 lei;
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- Financer: Contitech Romania, Director: Nicoară Mircea, Value 2010 (UPT): 21263 lei;
15. Contract 11/2010, *Research and investigation on the characteristics of materials and processing technologies of automotive components*, Financer: DURA Automotive, Director: Nicoară Mircea, Value 2010 (UPT): 11669 lei;
 16. Contract 42/2010, *Research and investigation on the characteristics of materials and processing technologies*, Financer: ESSER ROMANIA, Director: Nicoară Mircea, Value 2010 (UPT): 2701 lei;
 17. Contract 143/2010, *Fixture design for processing car steering wheels*, Financer: S.C. TRW AUTOMOTIVE SAFETY SYSTEMS S.R.L., Director: Codrean Cosmin, Value 2010 (UPT): 4460 lei;
 18. Contract No. 9/2009, *Corrosion behaviour of aluminum alloys*, Financer: Alfred Kaercher AG, Director Radu Bogdan, Value 2010 (UPT): 20000 lei;
 19. Contract 140/2010, *Consulting in firms certification*, Financer: SC TUV AUSTRIA ROMANIA SRL, Director Mihaela Popescu, Value 2010 (UPT): 174 lei;
 20. Contract 108/2010, *Consulting in firms certification*, Financer: SC TUV AUSTRIA ROMANIA SRL, Director Mihaela Popescu, Value 2010 (UPT): 174 lei;
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 22. Contract 64/2010, *Consulting at welding*, Financer: SC SUDEXPERT SRL Timisoara, Director Mihaela Popescu, Value 2010 (UPT): 2975 lei;
 23. Contract 144/2010, *Technical assistance in the processing of copper rod*, Financer: SC Electric SYS SRL Timisoara, Director Mihaela Popescu, Value 2010 (UPT): 2728 lei.

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RESEARCH CENTRE FOR QUALITY IN MECHANICAL TRANSMISSION, PRECISION MECHANICS AND MECHATRONICS

GENERAL PRESENTATION

The research centre was founded in 11.05.2001 by the teaching staff of the Mechanisms and Machine Parts' Department. The research centre was recognized by CNC SIS as a C type centre with certificate number 71/CC-C/11.05.2001. From 2002, the research centre belongs to the Mechatronics' Department from „Politehnica” University of Timisoara.

The head of the research centre is **Prof. Dr. eng. Inocențiu Maniu**
E-mail: Inocentiu.Maniu@mec.upt.ro

The major research domains are:

- Mechanical Transmission;
- Precision Mechanics;
- Mechatronics and Robotics

The main research topics are:

- Mechanisms;
- Machine design and parts for precision mechanics and mechatronics;
- Tribology;
- Instrumentation and metrology;
- Optical and opto-electronical apparatus;
- Biomedical apparatus (medical robotics and medical investigation);
- Robotics;
- Mechatronics;
- Simulation and artificial intelligence;
- Finite element analysis;
- Internet teleoperation;
- Domestic robots;
- Prosthesis;
- Sensors and Actuating systems;
- Computer Aided Design;
- Virtual reality;
- Computer Aided Quality, Quality Assurance, Quality Management.

The research centre was founded in order to:

- coordinate the scientific fundamental studies;
- mechanisms and mechanical transmission;
- robotics, precision mechanics and mechatronics;
- biomedical techniques; instrumentation and control;
- develop applied studies in different research projects for economical societies.

The research team disseminates the results in various publications: books, papers presented at national and international symposia, congresses etc.

MAIN RESEARCH FIELDS

- Theoretical and experimental research of mechanisms and mechanical drives.

Keywords: gears, belts, linkages, cams, aviators, tribology, finite element method.

- Robotics

Keywords: robots, flexible fabrication systems, CIM systems, modelling/simulation and artificial intelligence.

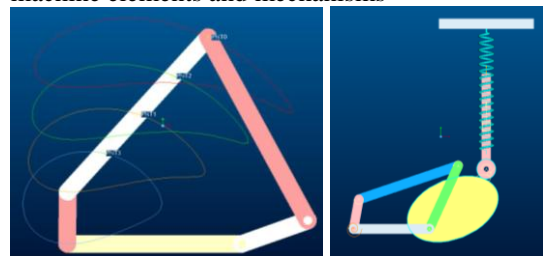


- Studies and researches in the precision mechanics field and mechatronics.
 - **Keywords:** measuring devices, transducers, metrology, quality assurance and optical systems.
 - CAD, artificial intelligence and virtual reality.
- Keywords:** 3D modeling, virtual reality, finite element method.

Researches in MECHANISMS AND MECHANICAL DRIVES

FIELD DESCRIPTION

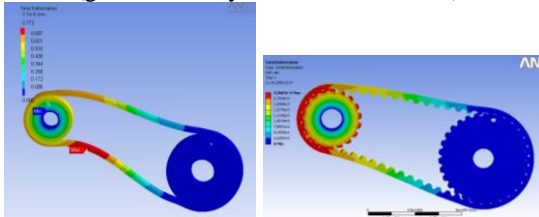
- theoretical study, design and tests of special purpose mechanisms and mechanical drives, cams and linkages, mechanical variators, behavior of machine elements and mechanisms



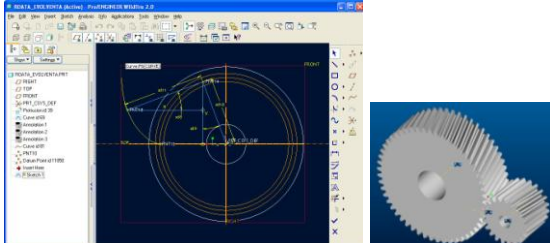
- tribological behavior of machine elements and mechanisms

ACTIVITIES AND RESULTS

- Collective competence used in computer aided design for general purpose or special mechanical drives (gears, belts, synchronic - belts etc.)



- Software for gears, cams and linkages design



- Improvement of mechanisms and machine elements standardization. Studies for service life increase and reducing of wear

RESEARCH TEAM

- Prof.dr.eng. Dan PERJU
- Prof.dr.eng. Octavian GLIGOR
- Prof.dr.eng. Lucian MĂDĂRAS
- Prof.dr.eng. Voicu MESAROȘ-ANGHEL
- Prof.dr.eng. Inocențiu MANIU
- Prof.dr.eng. Arjana DAVIDESCU
- Prof.dr.eng. Mircea DREUCEAN
- Assoc.prof.dr.eng. Francisc IOANOVICI
- Assoc.prof.dr.eng. Erwin-Christian LOVASZ
- Assoc.prof.dr.eng. Iosif CĂRĂBAȘ
- Assoc.prof.dr.eng. Veronica ARGEȘANU
- Assoc.prof.dr.eng. Carmen STICLARU
- Assist.eng. Ioan COȚA
- Lect. Dr.eng. Dan MĂRGINEANU
- Lect. Dr.eng. Andreea DOBRA
- Lect. Dr.eng. Rodica MILITARU,
- Lect. Dr.eng. Mihaela JULA,
- Assist.eng. Adriana TEODORESCU.

RESEARCH OFFERS

- Computer aided design of special purpose mechanisms and mechanical drives
- Automatic equipment, reducers and gears
- Design and testing of cam and linkages
- Studies with finite element method.

Researches in **ROBOTICS AND MECHATRONICS**

FIELD DESCRIPTION

Fundamental and applied research in the field of the automation of flexible manufacturing processes, of computer aided design, as well as related to the component equipment's and techniques of flexible manufacturing systems.

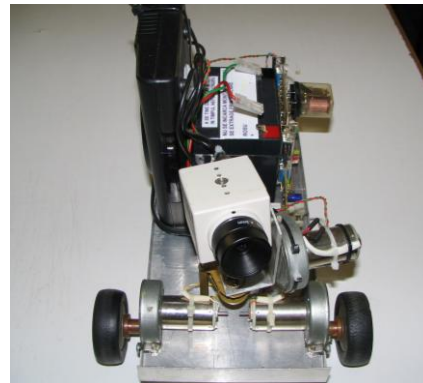


ACTIVITIES AND RESULTS

- Fundamental, oriented and applied research aiming realization and industrial implementation of computer integrated manufacturing systems.

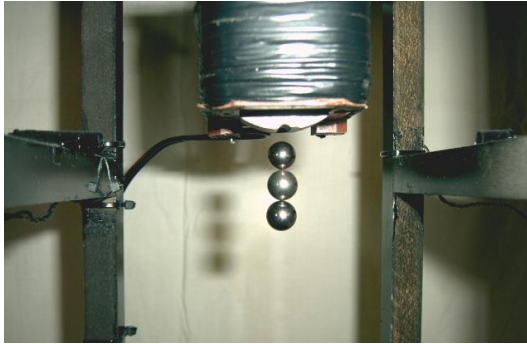


- Conception of flexible manufacturing modules, machining of medium – size parts (axles, bushings and prismatic parts).
- Flexible systems for manufacturing processes.



RESEARCH BENEFICIARIES

Ministry of Education, Ministry of Research and Technology, Fraunhofer Institute IPA Stuttgart, Germany, Technical University of Dresden



RESEARCH TEAM

- Prof.dr.eng. George SAVII
- Prof.dr.eng. Corneliu RĂDULESCU
- Prof.dr.eng. Valer DOLGA



- Prof.dr.eng. Valeria VĂCĂRESCU
- Prof.dr.eng. Voicu MESAROȘ-ANGHEL
- Prof. dr. eng. Inocențiu MANIU
- Prof.dr.eng. Mircea DREUCEAN
- Assoc.prof.dr.eng. Nicolae DEHELEAN
- Lect. Dr. eng. Sanda GRIGORESCU
- Lect. Dr. eng. Anca POPA
- Lect. Dr. eng. Aurel DIACONU
- Lect. Dr. eng. Milenco LUCHIN
- Lect. Dr. eng. Marius MATEAȘ
- Assist. eng. Adrian RADU

RESEARCH OFFERS

- On- and off-line diagnosis of flexible manufacturing systems components.
- Factory transports flexibility. Conception and industrial implementation of flexible manufacturing systems.
- Conception and different types of sensors. Modernizing methodologies of NC equipment's.
- Methodologies for integration of equipment purchased from heterogeneous manufacturer in unitary production systems.

Researches in *PRECISION MECHANICS*

FIELD DESCRIPTION

The research in the field of precision mechanics deals with the improvement of the measurement techniques, apparatus and precision mechanics equipment's, as well as quality assurance in mechatronics.

ACTIVITIES AND RESULTS

- The analysis, synthesis and testing of apparatus and precision mechanics equipment's
- modern laboratory techniques and quality assurance
- CAQ.

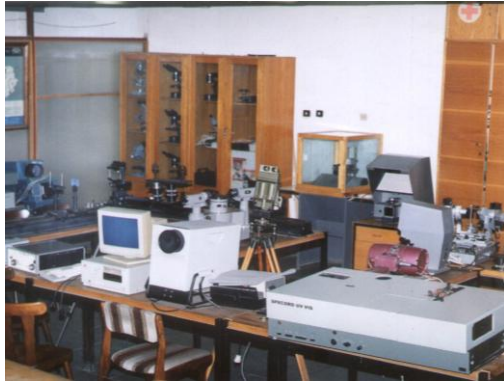
RESEARCH BENEFICIARIES

Direcția Sanitară Județeană Timiș, S.C. Optica Timișoara, INCDMF București, Ministry of National Education (CNCSIS), Siemens Automotive VDO.



RESEARCH TEAM

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- Prof.dr.eng. George SAVII
- Prof.dr.eng. Valeria VĂCĂRESCU
- Prof.dr.eng. Valer DOLGA
- Prof.dr.eng. Arjana DAVIDESCU
- Assoc.prof.dr.eng. Corina GRUESCU
- Assoc.prof.dr.eng. Erwin-Christian LOVASZ
- Assoc.prof.dr.eng. Nicolae DEHELEAN
- Lect. Dr.eng. Marius MATEAȘ
- Lect. Dr.eng. Liana DEHELEAN
- Lect. Dr.eng. Adrian George RADU
- Lect. Dr.eng. Andreea DOBRA
- Assist.eng. Adriana TEODORESCU.



RESEARCH OFFERS

- Modern techniques for metrological testing. Measuring instruments and equipment's for quality control.



- Optical and optoelectrical equipments. Bio-medical apparatus.

PUBLICATIONS

BOOKS

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58. Ianosi E., *Considerations about food safety management systems auditing*, International Conference on Science and Technique in the Agri-Food business - ICOSTAF 2010, Szeged, 3-4 November 2010 Review of Faculty of Engineering - Analecta Technica Szegedinesia 104, 6 pp., ISSN 1788-6392, www.icostaf2010.mustra.hu;
59. Mateas M., Ianosi E., *Flash flood warning system for small rural communities*, ISIRR 2010, CD, ISBN 978-963-508-600-9, www.isirr2010.hu;
60. Socoliuc V., Taculescu A., Dobra A., *Clustering in Water Based Magnetic Nanofluids: Investigations by Light Scattering Methods*, 8th International Conference on The Scientific and Clinical Applications of Magnetic Carriers; 10.1063/1.3530065, Volume 1311, pp. 89-95, 6pp., ISBN: 978-0-7354-0866-1, ISSN0094-243X, <http://scitation.aip.org/vsearch/servlet/VerityServlet?KEY=ALL&possible1=Dobra,+Andreea> &possible1zone=author&maxdisp=25&smode=stresults&aqs=true;
61. Ghiba M. O., Dreucean M., Prejbeanu R., Vermesan D., *Elastic Behavior of Lattice Structures for Orthopedic Implants*, ADEM 2010, 1st International Conference Advances in Management of Technological Systems, Drobeta Tr. Severin, May 19-21, 2010, Book of Abstracts, 1st International Conference Advances in Management, University of Craiova, 125, 2pp., 978-606-510-899-8, <http://trade-metal.com/adem-2010-p6914.html>;
62. N. M. Dehelean, L. M. Dehelean, E.-C. Lovasz and D. Perju, *A Theoretical Improvement of Stirling Engine PV Diagram*, New Trends in Mechanism Science 613, 11 978-90-481-9688-3, www.eucomes2010.utcluj.ro.

GRANTS / RESEARCH PROGRAMS

1. *ThinkMOTION, Digital Mechanism and Gear Library goes Europeana*, 250485/CIP-ICT-PSP-2009-3, FP7, European Commission Grant Agreement, 94443 Euro, Technische Universitaet Ilmenau -CO, Universidad del pais Vasco, Universitatea Politehnica din Timisoara, Rheinsch-Westfaelische Technische Hochschule, coord. Erwin-Christian Lovasz, Dan Perju, Inocentiu Maniu, George Savii, Iosif Carabas, Vacarescu Valeria, Gruescu Corina, Mesaros-Anghel Voicu, Argesanu Veronica, Dan Margineanu, Agneta Lovasz, Ivan Bogdanov, Dehelean Nicolae, Dehelean Liana, Sticlaru Carmen, Dobra Andreea, Zabava Eugen, Ciupe Valentin, Moldovan Cristian, Vatau Steliana, Ianosi Endre, Bereteu Liviu, Tucu Dumitru, Dolga Valer;
2. *Autonomous modular system for surveillance of atmospherical conditions*, 72-169/ 01.10.2008, PN_II, CNMP, 32630 lei, INCDMTM Bucuresti, Acad. De Stiinte din Romania, INC DIE ICPE-CA Bucuresti, IRECSO Bucuresti, coord. Dolga Valer, Dolga L., Maniu I., Carabas I., Ciupe V., Moldovan C., Dobra A., Teodorescu A., Filipescu H.;
3. *Complex mechatronics systems for medicine*, 72-197/01.10.2008, PN_II, CNMP, 54000 lei, U.Tehnica Cluj Napoca, Univ. Trans. Brasov, coord. Dolga Valer, Maniu I., Radulescu C., Vacarescu V., Dolga L., Toth Tascau M., Lovasz E., Dreucean M., Dobra A., Grigorescu S., Ciupe V., Moldovan C., Teodorescu A., Vatau S.;
4. *Ergoenginery – application in dental medicine*, 91-022/18.09.2007 – 2010, CNMP/PNC DI 2, CNMP, 310849 lei, Coord. Argesanu V. Coordonator : Universitatea Politehnica din Timisoara, Partener 1 - Universitatea de

- Medicina si Farmacie "Victor Babes" Timisoara Partener 2 – Asociatia Societatea Romana de Ergonomie Dentara Bucuresti Partener 3 - SC RA-OL SRL Timisoara Partener 4 – Universitatea "Ovidius" Constanta, Argesanu Veronica, Lovasz, Erwin-Christian, Davidescu Arjana, Carabas Iosif, Văcărescu Valeria, Dolga Valer, Gruescu Corina, Mateas Marius, Sticlaru Carmen, Maniu Inocentiu, Jula Mihaela, Popa Anca, Dobra Andreea, Madaras Lucian, Crastiu Ioan, Miclea Florian, Voinescu Mihai;
5. *International master on Robotics adaptive to labour market*, POSDRU 18/1.2/G/28382, 11999/26.05.2010, Universitatea Tehnica din Cluj-Napoca (coord.), HAMK University of Applied Science Finlanda, 167900 lei, coord. Maniu Inocentiu, Ciupe Valentin, Moldovan Cristian, Miclea Florian;
 6. *FLEXFORM – on mechatronic platforms*, POSDRU/87/1.3/S/64069, 11999/ 26.05.10, 726,446.36 lei, U.Tehnica Cluj Napoca (coord.), Univ. Trans. Brasov, Univ Politehnica Bucuresti, Univ. Craiova, Univ. "Dunarea de jos" Galati, Univ. Tehnica "Gh. Asachi" Iasi, FestoSRL, coord. Dolga Valer, Dolga Valer, Dolga L., Hudac D., Ruset D., Dreucean M., Savii G., Davidescu A., Carabas I., Ciupe V., Vatau S., Moldovan C., Dobra A., Teodorescu A.;
 7. *Flexicurity – adaptability to labour market*, POSDRU 59583, E 8808 / 15.11.2010, S.C. Terramold Iasi (coord.), UPT, Universitatea din Pitesti, Inspectia Muncii, Institutul de Politici Publice, AJOFM Iasi, Universitatea Tehnica din Creta, coord. Văcărescu Valeria, Izvercian Monica, Draghici Anca, Prostean Gabriela, Miclea Florian.
 6. Voinescu Mihai, *Contribution to improve the the inferior member prosthesis*, scientific supervisor: prof. dr. eng. Arjana Davidescu;
 7. Sofronia Raluca, *Modelling of rheological materials in virtual reality*, scientific supervisors: prof. dr. eng. Arjana Davidescu, prof. dr. eng. George Savii;
 8. Pop Cristian, *Artificial vision applied control of assembly robots*, scientific supervisor: prof. dr. eng. Arjana Davidescu;
 9. Bitea Alin, *Studies on behaviour of mobile robots in an environment with obstacles*, scientific supervisor: prof. dr. ing. Valer Dolga;
 10. Tilneac Mihaela, *Studies on agricultures robots*, scientific supervisor: prof. dr. ing. Valer Dolga;
 11. Ciontos Ovidiu, *Nonlinearities in mechatronics systems and applications of inverted pendulum*, scientific supervisor: prof. dr. ing. Valer Dolga;
 12. Moldovan Florentina, *Optimization of a walking mechanism*, scientific supervisor: prof. dr. ing. Valer Dolga;
 13. Gorie Nina, *Studies upon ultrasonic sensors used in mechatronics*, scientific supervisor: prof. dr. ing. Valer Dolga;
 14. Mondoc Alina, *Statistics models applied in studies on mobile robots working in environments with obstacles*, scientific supervisor: prof. dr. ing. Valer Dolga;
 15. Vancu Alexandru, *Optimization of a foot prosthesis*, scientific supervisor: prof. dr. ing. Valer Dolga;
 16. Crăciun Andrei, *E-medicine systems*, scientific supervisor: prof. dr. eng. Mircea Dreucean;
 17. Popescu Ionuț, *Logistic systems used in traffic analysis*, scientific supervisor: prof. dr. eng. Mircea Dreucean;
 18. Florea Cristina, *Investigation method of mechanical properties of materials*, scientific supervisor: prof. dr. eng. Mircea Dreucean;
 19. Pernevan Silvia, *Studies upon biocomposites using liberian plants*, scientific supervisor: prof. dr. eng. Mircea Dreucean;
 20. Pasca Ghorghie, *Modelarea si simularea sistemelor de fabricatie flexibile robotizate*, scientific supervisor: prof. dr. ing. Inocentiu Maniu;
 21. Voicu Mariana Claudia, *Active damping of the flexible rolls from paper fabrication*, scientific supervisor: prof. dr. ing. Inocentiu Maniu;

PhD STUDENTS

1. Moldovan Cristian, *Study of centroidal type mechanisms*, scientific supervisor: prof. dr. eng. Dan Perju;
2. Margineanu Eugenia, *Study of the influence of elasticity and hardness upon abrasive wear*, scientific supervisor: prof. dr. eng. Dan Perju;
3. Lovasz Agneta, *Electronic mechanism library*, scientific supervisor: prof. dr. eng. Dan Perju;
4. Teodorescu Adriana, *Contribution to modelling, simulation and testing of mechatronics systems*, scientific supervisor: prof. dr. eng. Dan Perju;
5. Nicolaie Costel, *Contribution to improve the orthopedic corsets*, scientific supervisor: prof. dr. eng. Arjana Davidescu;

22. Comşa Andrei, *Scanning automatization of an e-library*, scientific supervisor: prof. dr. ing. Inocentiu Maniu;
23. Borozan Ionuţ, *Optimization of automated gear boxes*, scientific supervisor: prof. dr. ing. Inocentiu Maniu;
24. Bistriian Diana Alina, *Numerical analyse of the stability of vortex flow*, scientific supervisor: prof. dr.eng. George Savii;
25. Chis Violeta, *Contributions to optimisation of energetical network connections*, scientific supervisor: prof. dr.eng. George Savii;
26. Neicu Marian, *Methods and algorithms used in bussiness management*, scientific supervisor: prof. dr.eng. George Savii.

CONTACT

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RESEARCH CENTRE FOR THERMAL MACHINES AND EQUIPMENT, TRANSPORTATION AND POLLUTION CONTROL

GENERAL PRESENTATION

This research centre was founded in 2001 (CNCSIS Certificate 70/CC/C/2001) and re-approved in 2006 (CNCSIS Certificate 14/12.IX.2006) by the National Council for University Research (CNCSIS), being recognized for the following main research fields:

- Thermal machines and equipment
- Environmental protection
- Transport vehicles

The research team includes the members of the founding chairs:

- ✓ Chair of Thermodynamics, Thermal Machines and Road Vehicles
- ✓ Chair of Transportation Engineering, as well as associated researchers and PhD & master students.

Category	Under 35 years		Between 35 and 45 years		Over 46 years	
	Fem	Male	Fem	Male	Fem	Male
Total	3	9	3	12	3	20
PhD title holders	0	3	2	8	3	19
PhD students	3	7	1	3	-	1
Teaching personnel (full-time)	0	2	1	1	2	10
Research personnel (part-time) from RO/ from abroad	2/-	8/-	1/-	1/-	-/-	1/-

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MISSION

- To promote its main expertise fields, by means of research projects & university curricula, by fundamental & applied, industrial, lab scaled &

numerical simulations research, by offering expertise & consultancy, by performing educational activities at undergraduate & graduate level, doctoral training, and post-university or expert training;

- To develop a self-financement budget by applying for research fundings, completion of basic equipment and additional activities (conferences, publications);
- To organize workshops, conferences, summer schools and other training modalities.
- To penetrate in the european research network and establish/apply/receive dissemination of high level curricula and R&D fields.
- To enlarge the thematic offer and activities.

Researches in COMBUSTION PROCESS & COMBUSTION FACILITIES FOR CLASSIC AND RENEWABLE FUEL SOURCES, TECHNOLOGIES FOR THE REDUCTION OF POLLUTING IMPACT OF THE THERMAL MACHINES AND VEHICLES ON THE ENVIRONMENT, AIR QUALITY MONITORING

Keywords: *classic and renewable fuels, waste, biomass, burners, boilers, combustion efficiency and control, pollutant emissions, air quality, thermal and environmental balances.*

ACTIVITIES

- Laborator Analiza combustibili, Investigatii ecologice si Dispersia noxelor, acreditat RENAR LI 787,
- Environmental on line measurements, with attested methods (emissions and air quality), in real time data acquisition for CO, SO₂, NO_x, C_mH_n, combustion quality, including meteorological data,
- Hg measurements,
- Waste management (combustion) and flue gas cleaning,
- Optical & classical methods for air quality investigation,
- Optimization of energy production & transmission (power plants), using fossil and renewable fuels,
- Numerical simulation of the pollutant dispersion, using various statistical methods, regarding the stationary combustion installations (boilers, furnaces etc.) and mobile

- combustion installations (vehicles equipped with ICEs: ISC3 View, Caline 3, Emisfac, Cal3qhcr,
- Numerical experiments regarding the optimization of combustion installations by modelling of the velocity, temperature and concentration fields in the furnaces of boiler using the FLUENT program package,
 - The ecological evaluation of the stationary and mobile combustion sources (burners, heaters, furnaces, ICEs) by experimental and theoretical researches, taking into consideration their toxicological effects;
 - Energetic and ecological optimization of low quality coal, heavy oils and alternative fuels (such as domestic waste, biomass etc.) combustion process by experiments;
 - Experimental researches regarding the performance indicators, safety and pollution level for small boilers (for individual heating systems);
 - Thermal balances for simple or complex thermal installations, with proposals for optimization,
 - Experimental researches regarding the Biogas production,
 - Experimental researches regarding the Biofuel production,
 - Experimental researches regarding the Biomass co-combustion, including numerical simulation,
 - Experimental researches regarding the Waste co-combustion,
 - Experimental researches regarding the CO₂ capture,
 - Research on Advanced laser remote sensing system (LIDAR),
3. *Measurements of ventilation in order to establish the concentration level of pollutants in the combustion gas duct, at 420 t/h boilers operating on lignite*, Financer: RAAN – Sucursala Romag Termo Value: 59316,26 RON, Director: Ioana Ionel
 4. *Research on emission levels of solids (dust) and gases (CO, NO_x, SO₂) in the exhaust stack of drying plant*, Financer: SC Tehnotab-Ro SRL, Value: 796 RON, Director: Ioana Ionel
 5. *Research on the concentrations of solid and gaseous pollutants emitted by CAF4 and CAF5*, Financer: SC Centrală Electrică de Termoficare Hidrocarburi SA, Value: 3123 RON, Director: Ioana Ionel
 6. *Research on emission levels of solids (dust) and gases (CO, NO_x, SO₂) in the exhaust stack of sand drying plant*, Contract no. 113/2010 Financer: SC Ital-Kol SRL, Value: 1044 RON, Director: Ioana Ionel
 7. *Researches on the evaluation of concentration levels of solid and gaseous levels at 2 boilers of the thermal plant*, Contract no. 83/2010, Financer: SC Bos-Automotive Products Romania SCS, Value: 1302 RON, Director: Ioana Ionel
 8. *Research on pollutant emissions from furnaces unit connected to a stack*, Contract no. 102/16.08.2010, Financer: SC ARGOMM RO SRL, Value: 2746,60 RON, Director: Ioana Ionel
 9. *Thermo-technical representative measurements of emissions at the hot water boiler*, Contract no. 78/01.06.2010, Financer: SC Carpat Stiks SRL, Value: 1503 RON, Director: Ioana Ionel
 10. *Thermo-technical representative measurements of emissions at the installation of asphalt mixtures - and toxic emissions inside the unit*, Contract no. 57/23.04.2010, Financer: SC Drumuri Municipale Timisoara SA, Value: 3006 RON, Director: Ioana Ionel
 11. *Researches on COV emissions concentrations and powders at 5 stacks with natural exhaust*, Contract no. 111/16.03.2010, Financer: SC Continental Automotive Products, Value: 5220 RON, Director: Ioana Ionel
 12. *Determination of COV concentration in the flexographic printing sector of polyethylene packaging factory*, Contract no 53/08.04.2010, Financer: SC Collini SRL, Value: 780,64 RON, Director: Ioana Ionel
 13. *Complex measurements regarding the emissions in the air*, Contract no. 36/16.03.2010, Financer: SC TRW Automotive

RESULTS

RESEARCH PROJECTS / CONTRACTS

1. *Sustainable development for Banat region by means of academic education and scientific research and development in transboundary air quality monitoring issues 84504/07.12.2010 CE*, IPA Cross-border Cooperation Romania-Serbia European Community, Value: 79788 RON Coordinator: UPT, Partner: Technical Faculty Zrenjanin, Serbia Director: Ionel Ioana
2. *Thermo-technical measurements for the determination of impact upon air and activity from the industrial unit*, Financer: SC Smitfield Prod SRL – Value: 22553,41 Director: Ioana Ionel

- Systems SRL, Value: 14601,3 RON, Director: Ioana Ionel
14. *Measurements on COV retention pilot station from the leather steering wheels and exhaust system for the retention of COV*, Contract no 3/05.01.2010, Financer: SC TRW Automotive Systems SRL, Value: 4998 RON, Director: Ioana Ionel
 15. *COT and PM 10 emissions measurements at the TMD Friction unit in Caransebes*, Contract no 19/24.02.2010, Financer: SC TMD Friction Romania SRL, Value: 2690 RON, Director: Ioana Ionel
 16. *Thermo technical measurements of the CR 1244 boiler combustion gas*, Contract no 20/24.02.2010, Financer: SC Centrala Electrica de Termoficare Arad SA, Value: 2059.18 RON, Director: Ioana Ionel
 17. *Quarterly thermo technical measurements to establish the level of pollution from waste gas stacks*, Contract no. 13/26.01.2010, Financer: SC Berg Banat SRL, Value: 3447 RON, Director: Ioana Ionel
 18. *Thermo technical measurements to determine the impact on the air of individual sources from the industrial unit Hella Electronics Romania from Timișoara*, Contract no. 8/15.01.2010, Financer: SC Hella Romania SRL, Value: 6997,2 RON, Director: Ioana Ionel,
 19. *Study on energy efficiency of light sources to determine the luminous efficiency*, Contract no. 62/03.05.2010, Financer: SC Coca-Cola HBC Romania SRL, Value: 5423,19 RON Director: Ioana Ionel
 20. *Calculation model and assessment of the concentration of nitrogen oxides NOx in combustion gases, depending on fuel composition*, Contract no 43/29.03.2010, Financer: S.C. CET Hidrocarburi S.A. Arad, Value: 4843,30 RON, Director: Ioana Ionel
1. Ioana Ionel, Popescu Francisc, Padure Gelu, Gruescu Claudiu, Trif-Tordai Gavrilă *Removal of mercury from municipal solid waste combustion gases*, Journal of Environmental Protection and Ecology Vol.11, Issue:1, 294 - 305, 12
 2. Ionel Ioana, Apostol G, Popescu F, Talianu C, Apascariței M, *Air quality monitoring in an international Romanian airport*, Journal of Environmental Protection and Ecology Vol.11, Issue:3, 815-821,7
 3. Cebrucean D, Ionel Ioana, Panait T, *Novel technology of coal biomass co-combustion with CO₂ capture*, Journal of Environmental Protection and Ecology Vol.11, Issue:1, 284-293,10
 4. Cioabla Adrian Eugen, Ioana Ionel, Francisc Popescu, *Study connected with wood residues behaviour during anaerobic fermentation process*, Environmental Engineering and Management Journal, Nr. 9, 1411-1416, 6
 5. Varga Lucia, Apascariței Maria, Ionel Ioana, Popescu Francisc, *Contribution to air quality monitoring in the eastern part of Timisoara city*, Metalurgia International Vol.14, nr.6, 40-45, 6
 6. Vetres I, Ionel Ioana, Popescu F, Nicolae D, Talianu C, Dungan L, *LIDAR system implementation and development for novel romanian systems*, Optoelectronics and Advanced Materials-Rapid Communications Vol. 4, Issue 8, 1074 -1077, 4
 7. Vetres I., Ionel Ioana, Popescu F, Lontis N. *Air pollution analysis in western Romania and the necessity of complementary vertical resolved LIDAR observation* Optoelectronics and Advanced Materials-Rapid Communications Vol. 4, Issue 8, 1256-1260, 5
 8. Balogh Ramon-Mihai, Ionel Ioana, Varga Lucia, Dungan Luisa Izabela, *Contribution regarding the impact generated by the Romanian national railway system on air quality*, Metalurgia International, Vol. 15 Issue 6, 46-55, 10
 9. Padurean Ioan, Ionel Ioana, *Influence of structural state on cavitation erosion of austenitic stainless steel solution treatment and nitriding*, Metalurgia International, Vol. 15 Issue 10, 55-59, 5
 10. Calinoiu D, Ionel Ioana, *Solar energy power systems as renewable energy technique of the future*, Journal of Optoelectronics and Advanced Materials Vol. 12 Issue 5, 1220-1225, 6

PUBLICATIONS

BOOKS

1. Ionel Ioana, Francisc Popescu, *Anthropogenic Air Pollution Sources*, ISBN 978-953-307-131-2
2. Ionel Ioana, Francisc Popescu, *Methods for Online Monitoring of Air Pollution Concentration* ISBN 978-953-307-131-2
3. Ioana Ionel, Sabin Ionel, *Statistical Tools and Optoelectronic Measuring Instruments* ISBN 978-953-307-511-2

PUBLISHED PAPERS

11. Gavrilă Trif-Tordai, Ionel Ioana, Popescu Francisc, Luisa Dungan, Lucia Varga, *Waste biomass & coal co-combustion in stationary fluidized bed as promising RES based technology*, 4th WSEAS International Conference on Energy Planning, Energy Saving, Environmental Education (EPESE'10), Kantatoui, Sousse, Tunisia, 3-6 mai 2010
12. Ionel Ioana, AE Cioabla, DC Badescu *Experimental study concerning waste agricultural biomass degradation during anaerobic fermentation*, 4th WSEAS International Conference on Energy Planning, Energy Saving, Environmental Education (EPESE'10), Kantatoui, Sousse, Tunisia, 3-6 mai 2010
13. AE Cioabla, Ionel Ioana, Constantin Carmencita, *Experimental results concerning biogas production through anaerobic fermentation, based on different waste biomass*, 4th WSEAS International Conference on Energy Planning, Energy Saving, Environmental Education (EPESE'10), Kantatoui, Sousse, Tunisia, 3-6 mai 2010
14. Popescu Francisc, Ionel Ioana, Lontis Nicolae, *Converting waste animal fats into energy sources Advances in Waste Management*, 4th WSEAS International Conference on Waste Management, Water Pollution, Air Pollution, Indoor Climate (WWAI'10), Kantatoui, Sousse, Tunisia, 3-6 mai 2010
15. Ionel Ioana *Clean technology from waste management*, Advances in Waste Management, 4th WSEAS International Conference on Waste Management, Water Pollution, Air Pollution, Indoor Climate (WWAI'10), Kantatoui, Sousse, Tunisia, 3-6 mai 2010
16. Ionel Ioana, Popescu Francisc, Luisa Izabel DUNGAN, Lucia Varga *Novel approach for district heating and cooling technology*, 8th WSEAS International Conference on Environment, ecosystems and development (EED'10), Vouliagmeni, Athens, Greece, 29-31 decembrie 2010
17. Luisa Izabel DUNGAN, Ioana Ionel, Mircea Dungan, Florin Iacobescu *Research concerning thermal stress of bandages on block braking in case of braking stop*, 8th WSEAS International Conference on Environment, ecosystems and development (EED'10), Vouliagmeni, Athens, Greece, 29-31 decembrie 2010
18. Gavrilă Trif-Tordai, Ionel Ioana, Popescu Francisc, Luisa Izabel Dungan, Lucia Varga *Waste biomass & coal co-combustion in stationary fluidized bed as promising RES based technology* 8th WSEAS International Conference on Environment, ecosystems and development (EED'10), Vouliagmeni, Athens, Greece, 29-31 decembrie 2010
19. Patricia Gherban Draut, Raul Ionel, Aurel-Stefan Gontean, Ioana Ionel *A New Approach for Carbon Monoxide Measurement using Virtual Instrumentation* The 6th WSEAS International Conference on ENERGY, ENVIRONMENT, ECOSYSTEMS and SUSTAINABLE DEVELOPMENT (EEESD'10), Timisoara, Romania, 21-23 octombrie, 2010
20. Gavrilă Trif-Tordai, Ioana Ionel, Francisc Popescu *Novel RES based Co-combustion Technology* WSEAS Transactions on Environment and Development Volume 7, Issue 6, 10
21. Cioabla Adrian Eugen, Ioana Ionel *Biogas Production through Anaerobic Fermentation, based on Different Waste Biomass* WSEAS Transactions on Heat and Mass Transfer Volume 5, Issue 3, 10
22. Ioana Ionel, Adrian Eugen Cioabla *Biogas Production based on Agricultural Residues. From History to Results and Perspectives* WSEAS Transactions on Environment and Development Volume 6, Issue 8, 13
23. Cioabla Adrian Eugen, Ionel Ioana, Popescu Francisc *Experimental study connected with the behaviour of the wood biomass residues during the anaerobic fermentation process* Buletinul Institutului Politehnic din Iasi, Sectia Constructii de Masini LVI (LX), FASC. 4, 8
24. Cebrucean Viorica, Ionel Ioana, Cebrucean Dumitru *Post-combustion CO₂ capture from coal-fired power plants*, Buletinul Institutului Politehnic din Iasi, sectia Constructii de Masini LVI (LX), FASC. 4, 10
25. F. Popescu, Ioana Ionel, C. Talianu, L. Belegante *Parallel monitoring campaigns in an international Romanian airport* 18th International Conference Transport and Air Pollution, Zurich/Dubendorf, Switzerland, 18-19 mai Proceedings of 18th International Conference Transport and Air Pollution 44-50
26. N. Lontis, Ioana Ionel, F. Popescu, I. Vetreș, Trif Tordai Gavrilă *Reduction of the CO₂ emission by fueling small scale cogeneration blocks with bio-butanol blends* 4th International Workshop on Optoelectronic Techniques for Environmental Monitoring - OTEM 2010, Cluj-Napoca, 19-21 octombrie 2010
27. Gavrilă Trif-Tordai, Ioana Ionel, Francisc Popescu *Reduction of CO₂ emission applying co-firing technology of biomass waste*

- resources* 4th International Workshop on Optoelectronic Techniques for Environmental Monitoring - OTEM 2010, Cluj-Napoca, 19-21 octombrie 2010
28. Francisc Popescu, Ioana Ionel, Livio Belegante, Doina Nicolae *Numerical simulation as a tool to evaluate air quality in airport areas* 4th International Workshop on Optoelectronic Techniques for Environmental Monitoring - OTEM 2010, Cluj-Napoca, 19-21 octombrie 2010
 29. Adrian Eugen Cioablă, Ioana Ionel, Luisa – Izabel Dungan *Reduction of CO₂ emissions by using biogas as a fuel for small spark ignition engines*, 4th International Workshop on Optoelectronic Techniques for Environmental Monitoring - OTEM 2010, Cluj-Napoca, 19-21 octombrie 2010 Proceedings of the 4th International Workshop on Optoelectronic Techniques for Environmental Monitoring - OTEM 2010, Cluj-Napoca
 30. Adrian Eugen Cioablă, Ioana Ionel *Research concerning biogas generation using municipal biodegradable waste*, Al 34-lea Congres ARA : Cercetare Științifică – Securitate – Dezvoltare Durabilă, Conexiuni, 18-23- mai Al 34-lea Congres ARA : Cercetare Științifică – Securitate – Dezvoltare Durabilă.
 31. Delia-Gabriela Calinoiu, Ioana Ionel, Francisc Popescu, Gavrila Trif-Tordai, *Sun photometer for aerosols investigation* International Workshop „Global and Regional Environmental Protection” G.L.O.R.E.P/ Timisoara, 26-28 noiembrie 2010
 32. Gheorghe Cătălin NISULESCU, Ioana Ionel *Air pollution issues highlighted with LIDAR systems* International Workshop „Global and Regional Environmental Protection” G.L.O.R.E.P/ Timisoara, 26-28 noiembrie 2010
 33. Cioabla Adrian Eugen, Ioana Ionel Gavrila Trif-Tordai, Irimescu A., Vetres I., *Experimental study connected with biogas quality obtained from agricultural biomass residues during the anaerobic fermentation process*, International Workshop „Global and Regional Environmental Protection” G.L.O.R.E.P/ Timisoara, 26-28 noiembrie 2010

PhD THESIS

PhD supervisor: Prof.dr.eng. habil Ioana Ionel

1. Eng. Apostol Gabriel, *Air quality monitoring in the airport area*

2. Eng. Cebrucean Dumitru, *Research on CO₂ capture*
3. Eng. Badescu Cicirone, *EU Directive on Climate changes.*

PhD STUDENTS

PhD supervisor: Prof.dr.eng. Corneliu Ungureanu

1. Eng. Alexandru Anghel C. Ghenea: *Contributions to the study of efficiency measures regarding the durable development of Ișalnița Power Plant*
2. Eng. Florica Tudor: *Contributions regarding the diminution of environmental pollution due to the ash produced at the lignite combustion at Turceni Power Plant*
3. Eng. Marius Marin: *Contributions regarding the diminution of environmental pollution due to gaseous pollutants produced due to the lignite combustion at Turceni Power Plant*
4. Eng. Vasile Gruescu: *Contributions regarding the ergo-technology of domestic and street waste*
5. Eng. Victor Ebetiuc: *Studies and researches regarding the efficient production and distribution of thermal energy in Turnu Severin city*
6. Marian Gabriel Mili: *Contributions regarding the modernization of existing energetic units using the combined cycle steam-gas with parallel disposition*
7. Eng. Marian Dobrin: *Contributions regarding the elaboration of a methodology of evaluation of technical and economic efficiency of energetic projects in the view of promoting the funding*

PhD supervisor: Prof.dr.eng. habil Ioana Ionel

1. Eng. Lucia Varga: *Studies and researches regarding the air quality in Bihor county*
2. Eng. Florin Iacobescu: *Theoretical and experimental studies regarding the reduction of pollutants concentration for internal combustion engines and the study of the effects on air by applying novel technologies*
3. Eng. Cebrucean Dumitru, *Theoretical and experimental studies of the CO₂ capture from the flue gases from the stationary facilities*
4. Eng. Balog Ramon, *NOX reduction applied to diesel engines with co-combustion from railway vehicles.*
5. Eng. Vetres Ioan, *Atmospherically investigations with Lidar systems.*

6. Eng. Rosca Ciprian, *Ecological aspect of the transportation and sustainable development.*
7. Eng. Tomescu Claudia, *Implementation of the pollution legislation upon the energy production of Romania.*
8. Eng. Calinoiu Delia, *Research regarding photovoltaic solar panels*
9. Eng. Nisulescu Catalin, *Contribution to improvement of the LIDAR systems in Timisoara*
10. Eng. Cebrucean Viorica, *Numerical simulation on CO₂ absorption process.*
11. Eng. Maria Apasartei, *Research in area of air quality*
12. Eng. Malan Bassim, *Study on air quality in desert storm*
13. Eng. Goanta Adrian, *Thermodynamics process in combustion facilities*
14. Eng. Magda Adrian, *Thermodynamics process in steam boilers*

Post-doc STUDENTS

- Dr.eng. Nicolae Lontis, *Research on co-generation facilities*
- Dr. Eng. Adrian Irimescu, *Research on air pollution from IC engines*
- Dr. Eng. Cioabla Eugen Adrian, *Research on biogas production management*

RESEARCH TEAM

- Prof.dr.eng. Corneliu UNGUREANU
- Prof.dr.eng.habil Ioana IONEL
- Assoc.prof.dr.eng. Oprisa Paul Dan Stanescu
- Assoc.prof.dr.eng. Dorin LELEA
- Lect. dr. eng. Francisc POPESCU
- Ass. Eng. Gavrilă TRIF-TORDAI
- Dr.eng. Nicolae LONTIS
- Eng. Lucia VARGA, PhD student
- Eng. Florin IACOBESCU, PhD student
- Eng. Rosca Ciprian, PhD student
- Eng. Marian Gabriel MILI, PhD Student
- Eng. Marian DOBRIN, PhD Student
- Eng. Carmencita CONSTANTIN, PhD Student
- Eng. Veters Ioan, PhD Student
- Eng. Cebrucean Viorica, PhD Student
- Eng. Maria Apasartei, PhD Student
- Dr. Eng. Laurentiu Calin
- Dr. Eng. Cioabla Eugen Adrian
- Dr. Eng. Adrian Irimescu
- Eng. Gavril Brateanu

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Researches in INTERNAL COMBUSTION ENGINES (ICEs) AND FUEL CELLS

Keywords: *spark-ignition engine, diesel engine, heat flow, carburetor hot spot, compression rate, heat exchanger, mixture formation, combustion process, numerical evaluation of pollutants, fuel cell, energy use reduction, emission reduction*

Activities:

- experimental researches regarding the operation, the level of pollution and energetic performance of ICEs using gaseous fuels
- experimental researches regarding the endurance and reliability qualities of ICEs
- experimental researches regarding the thermo-mechanical stresses in the ICEs sub-units
- numerical evaluation of the mixture formation and the combustion process, based on the fuel drops evolution (Diesel engines)
- numerical evaluation of pollutants
- calculation of the energetic and ecological performances for ICEs using gaseous fuels
- studies regarding the use of fuel cells to reduce energy use and emissions for transportation and stationary power applications

RESEARCH PROJECTS

1. *Thermo modeling of internal combustion engines to operate with unconventional fuels* 1003 PNII Idei CNCISIS grant, Value: 130000 RON – Director: Mihon L.

PUBLICATIONS

BOOKS

1. Pop Gh., Holotescu S. *Command and control systems for motor vehicles, handbook for students*, Editura Politehnica ISBN 978-973-625-937-1.

PUBLISHED PAPERS

1. Tokar Adriana, Negoitescu Arina Speranta, Mihon L. *Biodiesel used for a clean environment* International Congress Motor Vehicles & Motors 2010, Kragujevac 251-258 978-86-86663-57-3 2010.

2. Mihon Doina, Jădăneanț M. *Fighting noise pollution due to vehicles*, Buletinul AGIR, Anul XV, nr.2-3, apr-sept.2010, p.149, 4 pag, 2010.
3. Birlan A., Jădăneanț M., *Dynamical systems of influence in the railway traffic*, Buletinul AGIR, Anul XV, nr.2-3, apr-sept.2010, p.153, 4pag 2010.
4. Negoîtescu Arina Speranța, Tokar Adriana, Deac S. *Pollutant Emissions Reduction Methods for Internal Combustion Engines* Buletinul Științific al Universității Politehnica din Timișoara, seria Mecanică Tomul 55(69), Fascicola 2 B, 6 2010.
5. Mihon Doina, Jădăneanț M. *Metode de reducere a poluării sonore datorate autovehiculelor de transport A X-a Conferință națională "profesorul Dorin Pavel" Sebeș 2010 Știință și Inginerie, Vol. XVII, Ed. AGIR, 2010 577, 8 pag ISSN 2067-7138 2010.*

PERSPECTIVES

Development of the Laboratory for Processes in Internal Combustion Engines

Development of the Multifunctional Lab for Road Vehicles

PhD STUDENTS

PhD Supervisor: Prof.dr.eng. Daniel IORGA

1. Eng. Radu HORATIU: *Studies and researches regarding the conditions for mixture formation through injection in the valve port of a spark-ignition engine, related to the engine performances and the level of stresses*
2. Eng. Călin MOLDOVEANU: *Researches regarding the energetic performances and the pollution reduction for a direct injection diesel engine using a system of high pressure injection pressure*
3. Eng. Daniel PICIOREA: *Contributions to the adjustment of an injection system to use unconventional liquid fuels for a direct injection diesel engine*
4. Eng. Ludovic BAKOS: *Contributions to the analysis of the causes and effects of the road accidents from Arad county and methods of limiting it*

RESEARCH TEAM

- Prof.dr.eng. Daniel IORGA
- Prof.dr.eng. Traian RAICA
- Assoc.prof.dr.eng. Liviu MIHON
- Lect.dr.eng. Gelu PADURE
- Lect.dr.eng. Sorin HOLOTESCU
- Lect. Dr.eng. Gheorghe POP
- Lect. Dr. eng. Arina Speranța NEGOÎTESCU

- Lect. Dr. eng. Virgil STOICA,
- Lect.dr.eng. Daniel OSTOIA,
- Dr. Eng. Adriana TOKAR,
- Dr. Eng. Adrian IRIMESCU,

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Researches in ENHANCEMENT AND CONTROL OF HEAT AND MASS TRANSFER FOR THERMAL EQUIPMENTS AND ELECTRONIC COOLING, THERMAL NETWORKS

Keywords: *heat transfer enhancement, heat transfer control, magnetizable nanofluids, nanoscale systems, bubble dynamics, electronic equipment cooling, thermal network, heat exchangers, refrigerating machines, heat pumps, thermal phenomena, microchannel heat transfer*

ACTIVITIES

- researches regarding the optimization of heat exchangers
- theoretical studies concerning the heat transfer enhancement by means of numerical simulations
- researches regarding the mechanism of multi-phase heat transfer control by applying a magnetic field to a magnetizable nanofluid
- theoretical studies concerning the behaviour thermodynamic systems by molecular dynamics and Monte Carlo simulations
- electronic equipment cooling
- optimization of urban thermal networks
- Advance numerical modeling in heat transfer
- Micro- and nano-scale heat transfer and fluid flow

RESULTS

RESEARCH CONTRACTS

1. *Magnetic nanofluid – a new insulating and cooling environment for electric transformers*, MNT 7-018/2009 FP7, ERA-NET UEFISCDI 83000 RON, Romania: Director -UPT, partners: Academia Romana Filiala Timisoara and ROSEAL S.A. Odorheiu Secuiesc; SLOVACIA: international coordinator: Academy of Science of Slovacia, Director Stoian Floriana Daniela

2. *Fundamental research of thermal and dynamic phenomena in cooling micro devices*, Contract 670/2009 Financer: CNCIS 467279 Value: 175000 RON - Director: Lelea D.
3. Contract PN 22-096/2008, *Integrated system for risk management at equipments from the energetic field*, Financer: C.N.M.P., Director: Laza I., Value 2010 (UPT): 167798 lei;
4. *Integrated system for determining the laser weldability of polymeric materials, monitoring and real time control of the welding process*, (POLYWELDSYS) 71-088/2007 PN II Parteneriate CNMP, Value: 7300 RON, Director UPT: Stoica V.
5. *Analysis of the current national gas transmission system in terms of operating risk using the risk management method*, Contract 4/07.01.2010 Financer: SNTGN Transgaz SA Medias, Value: 217000 RON, Director: Laza I.
6. *Thermal calculation of boiler IP-01 upgraded to four operating modes*, Contract 2/05.01.2010 Financer: S.C. OVM ICCPET S.A. Bucuresti Value: 6200 RON, Director: Laza Ioan
7. *Studies and researches regarding the performances of the oil coolers* Contract: 10/19.01.2010 Financer: Raal sa Bistrita Value: 8680 RON, Director: Nagi M.
8. *Technical assistance for the increase of the flue gas recovery efficiency through automation and modernization of equipment from radiant heating tubes*, Contract 88/14.09.2009 Financer: SC DESIGN INTERNATIONAL Value: 24883 RON, Director: Negoïtescu Arina Speranța
5. Irimescu A., Lelea D. *Thermodynamic analysis of gas turbine powered cogeneration systems* Journal of Scientific & Industrial Research 69 2010.
6. Jadaneant M., Laurentiu C. *Constructive Solutions Regarding the Purification of Used Water Coming from the Beer Industry* Journal of Environmental Protection and Ecology Vol.11, Issue:1, pag.20, nr.pag:7 2010.
7. Marcu F., Jadaneant M. *Air pollution reduction using digital optimization of burning in combustion heaters* Journal of Environmental Protection and Ecology Vol.11, Issue:1, pag.1158, nr.pag:5 2010.
8. Lelea D., Cioabla A., Laza I. *The microtube heat transfer and fluid flow of dielectric fluids* Annals of DAAAM for 2010 & Proceedings of 21st DAAAM International Symposium, Vienna, Austria ISBN 978-3-901509-70-4 2010.
9. Nagi M., Carabas D., Ilies P., Ghita E. *Research regarding thermal and hydrodynamic performance levels of surfaces with sinuous fins for automotive heat exchangers*. Annals of DAAAM for 2010 & Proceedings of 21st DAAAM International Symposium, Vienna, Austria ISBN 978-3-901509-73-5 2010.
10. Ghita E., Nagi M. *The residual state of stress in old railroads* for Annals of DAAAM for 2010 & Proceedings of 21st DAAAM International Symposium, Vienna, Austria ISBN 978-3-901509-73-5 2010.
11. Timko M., Kopcansky P., Marton K., Tomko L., Holotescu S., Stoian Floriana Daniela, Vékás L. *Magnetic fluid as cooling and insulation medium for high power transformers* Proceedings of EEESD-10, Energy, Environment, Sustainable Development and Landscaping, Timisoara ISSN:1792-5924 2010.
12. Negoïtescu Arina Speranța, Tokar Adriana *Aspects Regarding the Performance Improvement of Heating Systems with Radiant Tubes* 5th IASME/WSEAS International Conference on Energy&Environment (EE'10) ISBN 6 978-960-474-159-5 2010.
13. Birlan A., Faur N., Jădăneanț M *Finit element modeling the temperature fields plastic injection* Acta Technica Napocensis, Applied Mathematics and Mechanics Nr.53, Vol.II, 2010,p.239, nr.pag:6 ISBN 1221-5872 2010.
14. Pășan M., Jădăneanț M. *Energy savings from using transport RO-LA* Journal of Sustainable Energy Vol.1, No.2, 2010, pag.44, nr.pag.2 ISBN 2067-5534

PUBLISHED PAPERS

1. Lelea, D. *Effects of temperature dependent thermal conductivity on Nu number behavior in micro-tubes* International Communications in Heat and Mass Transfer 37(3) 2010.
2. Lelea, D. *Effects of inlet geometry on heat transfer and fluid flow of tangential micro-heat sink* International Journal of Heat and Mass Transfer 53(17-18) 2010.
3. Lelea, D. *The viscous dissipation effect on heat transfer and fluid flow in micro-tubes* International Communications in Heat and Mass Transfer 37(9) 2010.
4. Ionel Ioana, Comsa Oana, Lelea, D. *Three-dimensional numerical simulation of the reciprocating flow in a branching tube network* Heat and Mass Transfer (Springer) 46(8-9) 2010.

15. Stoian Floriana Daniela, Holotescu S., Vekas L. *Bubbles generation mechanism in magnetic fluid and its control by an applied magnetic field* Journal Physics Procedia Vol.9, ISBN 1875-3892 2010.
16. Birlan A., Faur N., Jădăneanț M *Finit element modeling the temperature fields plastic injection* Acta Technica Napocensis, Applied Mathematics and Mechanics Nr.53, Vol.II, 2010,p.239, ISBN 1221-5872 2010.
17. Negoîtescu Arina Speranța, Tokar Adriana *Efficiency and Economy Solutions Regarding the Industrial Buildings Heating* WSEAS Transactions on Environment and Development Volume 6 (Issue 4), 10 ISBN 1790-5079 2010.
18. Argeșeanu Viorica, Farkas I., Laza I., Jula Mihaela *Sealing design in machine building* International Symposium on advanced engineering & applied management - 40 th anniversary in higher education, Hunedoara, România ISBN 978-973-0-093-40-7 2010.
19. Borozan S., Argeșeanu Viorica, Kulcsar M., Laza I. *About the tensioning of the belt drives* International Symposium on advanced engineering & applied management - 40 th anniversary in higher education, Hunedoara, România ISBN 978-973-0-093-40-7 2010.
20. Morega A.M., Morega Mihaela, Pislaru-Danescu L., Stoica V., Nouras Florica, Stoian Floriana Daniela *A novel ferrofluid-cooled transformer, electromagnetic field and heat transfer by numerical simulation* Optimization of Electrical and Electronic Equipment (OPTIM), 2010 12th International Conference, Brasov ISSN: 1842-0133 2010.
21. Băcală M., Jădăneanț M. *Improving ambient air quality using alternative fuels to internal combustion engines* Buletinul AGIR, Anul XV, nr.2-3, apr-sept.2010.
22. Călin L., Jădăneanț M., Popescu F. *Studiu privind influența amestecului aer-gaze de ardere asupra calității cerealelor în procesul de uscare* Buletinul AGIR, Anul XV, nr.2-3, apr-sept.2010.
23. Opris C., Codrean C., Laza I. *New standards in the field of risk management* Scientific Bulletin of the „Politehnica” University of Timisoara, , ISSN Tom 55(69),-Fasc.2, 2010.
24. Carabas D., Nagi M., Irimescu A., Moldoveanu C. *Fluid Dynamics Performance of Heat Exchangers as a Function of Fins Pitch Variation* Analele Universitatii “Constantin Brancusi” din Tirgu Jiu, editura “Academica Brancusi”, seria inginerie,nr. 3/2010, Seria inginerie, 2010.
25. Laza I., Cioabla A. *Study regarding the costs related with the construction of a biogas plant from using animal residues* Conferința Internațională ICOME 2010, Craiova, România, 27-30 aprilie ISBN 978-606-510-878-3 2010.
26. Laza I., Cioabla A. *Energy group of cogeneration working on internal combustion engine 526 biogas kWel using biogas* Proceedings of the international Workshop "Global and Regional Environmental Protection", Timisoara, România, 26-28 noiembrie ISBN 4 978-606-554-210-5 2010.
27. Nagi M., Stanciu T., Carabas I.D., Laza I. *Experimental researches upon tube in tube heat exchangers performances type* Conferința Internațională ICOME 2010, Craiova, România, 27-30 aprilie ISBN 5 978-606-510-878-3 2010.
28. Nagi M., Stanciu T., Carabas D., Laza I.I. *Experimental researches upon tube in tube heat exchangers performances type: International conference of mechanical engineering, Craiova Aprilie 2010* Editura Universitatea Craiova Tom 2 ISBN 978-606-510-878-3 2010.
29. Nagi M., Ilies P., Carabas D., *The influence of radiators width over thermal and fluid-dynamics performances* International conference of mechanical engineering, Craiova Aprilie 2010 Editura Universitatea Craiova Tom 2 ISBN 978-606-510-878-3 2010.
30. Nagi M.,Carabas D., Ilies P., *Wavy finspitch influence on water-air heat exchanger performance* Colocviul Francofon –Cofret 2010, Energie- Mediu- Economie-Termodinamica, Iasi, Romania, 5-7 Mai 2010. Buletinul Institutului Politehnic din Iasi, Tomul LVI(LX) FASC. 3b ISBN 1011-2855 2010.
31. Nagi M., Carabas D., Ilies P., Ghita E. *The Exploitation Feature and The Efficiency of the Radiators with Sinousoidal Fins* Balkan environmental association B.EN.A, Global and regional environmental protection Editura Politehnica, volumul 2, ISBN 978-606-554-210-5 2010.
32. Ghita E., Nagi M., Carabas D. *Aspects regarding the state of thermal stresses at wheel-rail contact in the railway transport* Balkan environmental association B.EN.A, Global and regional environmental protection Editura Politehnica, volumul 2, ISBN 978-606-554-210-5 2010.
33. Timko M. , Kopcansky P., Tomko L. , Marton K. , Koneracka Martina, Zavisova Vlada, Kubicar L. , Holotescu S., Stoian Floriana

- Daniela, Vekas L. *Magnetic Fluids for Transformer Technology* 5th International Conference on Nanosciences, Nanotechnologies, Nanomaterials, Nanomedicine and Technology Transfer, Bratislava (Slovakia), 16-19 mai 2010 Book of Abstracts ISBN 978-80-7399-949-0 2010.
34. Timko M. , Kopcansky P. , Marton K. , Tomko L. , Kudelcik J. , Holotescu S., Stoian Floriana Daniela, Kubicar L. *The thermal and dielectric properties of transformer oils based magnetic fluid* INDUCTICA 2010, Berlin (Germania), 22-24 iunie 2010 Conference Proceedings CD 2010.
35. Stoian Floriana Daniela, Holotescu S. *Experimental Study of Natural Convection Enhancement Using a Fe₃O₄ –Water Based Magnetic Nanofluid* 6th International Conference on Diffusion in Solids and Liquids, DSL 2010, Paris (Franta), 5-7 iulie CD 2010.
36. Holotescu S., Stoian Floriana Daniela *Prediction of particle size distribution effects on thermal conductivity of particulate composites* 4th International Conference on Computational Engineering and Experimenting, ACE-X 2010, Paris (Franta), 7-9 iulie 2010 CD Abstract Book ACE-X 2010.
37. Holotescu S., Stoian Floriana Daniela, Marinica Oana, Kubicar L., Kopcanski P., Timko M. *Utilization of the magnetogrulometric analysis to estimate the thermal conductivity of magnetic fluids* 12th International Conference on Magnetic Fluids, Sendai (Japonia), 1-5 august 2010 Book of Abstract OS2-1233, CD 2010.
38. Stoian Floriana Daniela, Holotescu Sorin, L. Vekas *Bubbles generation mechanism in magnetic fluid and its control by an applied magnetic field* 12th International Conference on Magnetic Fluids, Sendai (Japonia), 1-5 august 2010 Book of Abstract CD 2010.
39. Birlan A., Jădăneanț M. *Studiu de caz asupra deformării pieselor de tip disc din materiale termoplastice, injectate central* A X-a Conferință națională "profesorul Dorin Pavel" Sebeș 2010 Știință și Inginerie, Vol.XVII, Ed. AGIR, 2010 ISSN 2067-7138 2010.

PhD THESIS

PhD supervisor: Prof.dr.eng. Mihai JĂDĂNEANȚ

1. Eng. Marcu Florin, *Fuel combustion in independent heaters*

PhD supervisor: Prof.dr.eng. Mihai NAGI

1. Eng. Paul Ilies, *Research on compact heat exchangers*

PhD STUDENTS

PhD supervisor: Prof.dr.eng. Mihai NAGI

1. Eng. Catrina Mihai Cezar, *Energy reduction in electric locomotive*
2. Eng. Carabas Daniel, *Research on compact heat exchangers*
3. Eng. Ander Claudiu, *Pollution reduction on road vehicles*
4. Eng. Tiberius Stanciu: *Researches regarding the use of shell type of tubes for the construction of compact heat exchangers*
5. Eng. Buculei Mihaela, *Heat mass transfer*

PhD supervisor: Prof.dr.eng. Mihai JĂDĂNEANȚ

1. Eng. Petrico Remus Mihail: *Industrial engineering*
2. Eng. Patan Traian, *Transportation logistics and system Ro-La*
3. Eng. Bacala Miodrag, *Internal combustion engines and non-conventional fuels*
4. Eng. Birlan Adrian, *Industrial engineering*

RESEARCH TEAM

- Prof.dr.eng. Mihai NAGI
- Prof.dr.eng. Mihai JĂDĂNEANȚ
- Prof.dr.eng. Gavril CREȚA
- Assoc.prof.dr.eng. Floriana D. STOIAN
- Assoc.prof.dr.eng. Liviu MIHON
- Assoc.prof.dr.eng. Ioan LAZA
- Assoc.prof.dr.eng. Dorin LELEA
- Lect. Dr.eng. Gheorghe POP
- Lect. Dr.eng. Arina NEGOIȚESCU
- Lect.eng. Virgil STOICA
- Eng. Petrico Remus Mihail
- Eng. Patan Traian
- Eng. Bacala Miodrag
- Eng. Birlan Adrian
- Eng. Catrina Mihai Cezar
- Eng. Carabas Daniel
- Eng. Ander Claudiu
- Eng. Tiberius Sanciuc
- Eng. Buculei Mihaela

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**Researches in RAILWAY DESIGN,
ESTIMATION OF ENERGY CONSUMPTION
OF TRAINS, RAILWAY TRANSPORT
SYSTEMS**

Keywords: railway traction, traction estimation, combustible and electric energy consumption, energy saving, pollution, multimodal transport, freight terminals, RO – LA transport, FERRY – BOAT, containers special train, railway conveyance of material.

ACTIVITIES

- Estimation of combustible and electric energy consumption and the influences of parameters such as: profile of wheel and rail, constructive and functional characteristics of locomotives and wagons, train driving type and others
- Design of railway parts: bogies, wheelsets, dampers, rolling equipment
- Elaboration the solving methodology for train's movement equation by using Runge-Kutta integration method
- Elaboration of a computer code for traction calculation, combustible and energy consumption
- Multimodal transport: RO - LA transport, FERRY - BOAT and containers special train
- Analysis of the transport types with respect to conveyance of material, quantity, periods of time, transports relations

RESULTS

RESEARCH CONTRACTS

1. *Energy efficiency and environmental criteria in the awarding of regional rail transport vehicles and services* IEE/08/690 ECORails, Contract manager: G.E. Mocuta

BOOKS

1. Herman M. - *Elements of economical analysis in transports*, Mirton Publishing House, Timișoara, ISBN 978-973-52-0853-0, pp.116
2. Dungan L.I.-*Railway commercial operations*, POLITEHNICA Publishing House Timișoara, ISBN 978-606-554-094-1

PUBLISHED PAPERS

1. Ghita E., Nagi M., Carabas D., *Aspects Regarding the State of Thermal Stresses at Wheel-Rail Contact in the Railway Transport*,

Proceedings of the International Workshop "Global and Regional Environmental Protection", POLITEHNICA Publishing House ,Timisoara, 2010, pp.280 -284, ISBN 978-606-554-210-5 , Vol. 1- ISBN 978-606-554-211-2

2. Ghita E., Nagi M., Carabas I.D., *The Residual State of Stress in Old Railroads for Public Transport by Tram Vehicles*, Annals of DAAAM for 2010 & Proceedings of the 21st International DAAAM Symposium, Volume 21, No. 1, pp. 1109-1110, ISSN 1726-9679, ISBN 978-3-901509-73-5
3. Ghita E., Vilceanu Lucia, *An Analysis of the Railway Vehicle Suspensions*, Annals of Faculty Engineering Hunedoara, Tom VIII (2010), Fasc. 3, pp. 144-148, ISSN 1584-2673
4. Ghita E, *A Finite Element Analysis of a Driving Railway Vehicle Axle*, Scientific Bulletin of POLITEHNICA University of Timisoara., Vol.55(69), Iss.2, Transactions on Mechanics, 2010, pp. 26-29, ISSN 1224-6077
5. Ghita E., Matei M., Ursu-Neamt G., Stepan D, *An experimental analysis regarding the quality of the light-rail network for public transportation in the city of Timisoara*, Acta Technica Napocensis, Applied Mathematics and Mechanics, Nr.53, vol. II, 2010, pp. 149-152, ISSN 1221-5872
6. Mocuța G. E., Popescu M., *Fuel Consumption Calculus for Electrical Diesel Locomotives*, Scientific Bulletin of POLITEHNICA University of Timisoara, Transactions on Mechanics, Vol. 55(69), Iss. 1, 2010, pp. 87-90, ISSN 1224-6077
7. Mocuta G. E., Schipper M., Cosciotti E., Jonsson O., Pippert M., *Energy Efficiency and Environmental Criteria in the Awarding of Regional Rail Transport Vehicles and Services-Intelligent Energy Europe Project* , Proceedings of the EURO – Zel International Symposium 2010, Zilina, vol 2, pp.115-120, ISBN 978-80-554-0198-0
8. Mocuta G. E., *Promotion of Passenger Rail Transport as a Friendly Solution to Environment*, Proceedings of the International Symposium on Advanced Engineering & Applied Management– 40th Anniversary in Higher Education (1970-2010) Hunedoara, ISBN 978-973-0-09340-7
9. Dungan L. I., Ionel I., Dungan M., Iacobescu F., *Research concerning thermal stress of bandages on block braking in case of braking stop*, Proceedings of the WSEAS International Conference on Environment, Ecosystems and Development (EED'10), Athens, Greece, ISBN: 978-960-474-261-5 ISSN: 1792-7374

10. Dungan L.I. , Ionel I., Cioablă A.E., *Urban Transport in Timisoara and City Development*, Proceedings Belgrade, Serbia, 2010, ISSN 0352-678X (CD)
11. Dungan L.I. , Ionel I., Stepan D., Dungan M., *Research on noise reduction using different insulation materials in building passenger cars*, Proceedings of the International Workshop "Global and Regional Environmental Protection", POLITEHNICA Publishing House ,Timisoara, ISBN 978-606-554-210-5

PhD STUDENTS

PhD supervisor: Prof.dr.eng. habil Ioana Ionel:

Ph.D.student Ramon BALOGH

RESEARCH TEAM

10. Assoc. prof.dr. eng. Eugen GHITA
 11. Assoc. prof.dr. eng. Georgeta Emilia MOCUȚA
 12. Lect.dr.eng. Mihaela HERMAN
 13. Lect. dr.eng. Gabriel URSU-NEAMT
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Researches in URBAN TRANSPORTATION, ROAD TRAFFIC SAFETY, ROAD TRAFFIC CONTROL, INTELLIGENT TRANSPORT SYSTEMS AND ENVIRONMENTAL PROTECTION

Keywords: planning, design, ,road traffic, control, monitoring, simulation,

ACTIVITIES

- Road traffic management
- Planning, design, and optimization of road freight and passengers transport;
- Road safety an environment impact studies
- Usage and maintenance of supervision, control, monitoring, automation equipment and of road traffic directing, means
- Intelligent Transport Systems

RESULTS

RESEARCH CONTRACTS

1. *Energetically optimized electric systems for surface transportation, using batteries and supercapacitors* TRANS-SUPERCAP - D 21-018/2007 , PN II, phase 5 - 2010: Iancului D., Robu N., Gonczi A., Cipleu A., Ghita E. , Stefanescu W., Herman Mihaela., Dungan Luiza
2. *Consultancy for the planning of passenger transportation in Timis county*, 72/15.05.2010, Iancului D., Robu N., Gonczi A., Master students
3. *Planning of the development of the local and metropolitan passenger transportation network*, 71/15.05.2010, Iancului D, Robu N, Bogdanov I., Cipleu A., Master students
4. *Planning of the infrastructure development, organization and legislative regulation of public parking in Timisoara city*, 70/15.05.2010, Gonczi A., Iancului D., Robu N; . Bogdanov I., Cipleu A, Master students
5. *Traffic flow data acquisition and evaluation in the vicinity of Timisoara City*. 95/13.07.2010; Iancului D., Gonczi A., Vandici I., Paducel P.

PUBLISHED PAPERS

1. W. Ștefănescu, L Irimie, *Solutions for limitation of urban phonic pollution using the road traffic fluidization methods*, Journal of Environmental Protection and Ecology, Book 1, vol. 11 (2)

PERSPECTIVES

Development of the laboratory for telematics in transportation

Phd STUDENTS

Phd Supervisor Prof.dr.eng.Ion DANILA

1. Eng. Cristian MINCA: *Studies on tyre – road interaction in particular motion conditions;*
2. Eng. Lucian IRIMIE: *Contributions to the improvement of vehicle maneuverability;*
3. Eng. Alin PEIA: *Research on technical analysis of road accidents;*
4. Werner BIRCHAM: *Contribution to the improvement of the fodder plant harvesters*

5. Eng. Remus URSULESCU: *Contribution to the improvement of the constructive and functional parameters of the wheels tractors .*

RESEARCH TEAM

- Prof.dr.eng. Ion DANILA- cons.prof
- Assoc.prof.dr.eng. Dumitru IANCULUI
- Lect.dr.eng. Attila GONCZI
- Lect.dr.eng. Werner STEFANESCU
- Lect.dr.eng. Ionel VANDICI
- Lect. dr.eng. Adrian CIPLEU
- Assist. eng. Remus URSULESCU
- Ph. D. Student Lucian IRIMIE

CONTACT

Lect. dr. eng. Werner STEFANESCU
[_it@mec.upt.ro: wstefanescu@mpt.utt.ro](mailto:wstefanescu@mpt.utt.ro)

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PLASTICS MANUFACTURING RESEARCH CENTER

P.M.R.C.

GENERAL PRESENTATION AND MISSION

The *Plastics Manufacturing Research Center (P.M.R.C.)*, from the Department of Materials and Manufacturing Engineering (IMF), is a research unit and transfer of technology of the Faculty of Mechanical Engineering, "Politehnica" University of Timișoara.

P.M.R.C mission is to coordinate teams of researchers from the IMF Department, Manufacturing Engineering Chair (TCM), who are developing programs in the plastic injection, rapid prototyping, three-dimensional measurements, reverse engineering and ultrasonic activation of plastic parts manufacturing.

RESEARCH FIELDS

The main fields of research are:

- Computer aided design and manufacturing of plastic parts (CAD / CAM)
- Computer aided design and manufacturing of injection moulds for plastic materials
- Ultrasonic activation of plastic and composite materials processing
- Study of the manufacturing techniques, rapid prototyping and reverse engineering of the corresponding moulds
- Study of the flexible cells for plastics manufacturing
- Study of the quality systems and maintenance in plastics manufacturing

KEYWORDS

Plasturgy, Manufacturing engineering, Rapid prototyping and three-dimensional measurements, Reverse engineering, Cold forming, Non-traditional machining processes, Equipment and technologies for non-conventional technological processes, Piezoceramic transducers, Quality assurance.

ACTIVITIES

- P.M.R.C assure the co-ordination and development of scientifically research (PhD. programs, post-graduated programs) and the training programs in Industrial Engineering domain.
- The research teams from P.M.R.C. develop: fundamental and applicative research activities; products and technology design activities; technological development and technology transfer all attending the present industrial demands.

- P.M.R.C is involved in national and international research programs and organizes different scientific meetings (seminars, conferences etc.).
- Participation to grant competitions through CNCISIS, national and international programs
- Developing of fundamental and applicative research activities, technological development for the present industrial demands,
- P.M.R.C members are part of the following professional bodies and associations:
 - AGIR – The General Association of the Engineers in Romania
 - AUIF – Academic Association of Manufacturing Engineering in Romania
 - ESAFORM – European scientific Association for Materials forming
 - MODTECH – Professional Association in Modern Manufacturing Technologies

RESEARCH CONTRACTS

1. Contract PN-II ESOP 71-133/2007, *Expert systems for the optimisation of technological processes*, Director Professor Tudor Iclanzan.
2. European Network for Plastics and Composites Training, LLP-Parteneriate, Leonardo da Vinci, LdV/PAR/2009/RO/051, Director: Assoc. prof. Daniel Stan

PATENTS

1. Micro-injection mould, patent RO 122811 /26.02.2010, authors: Iclanzan T., Stan D., Seiculescu V., Tulcan A., Cosma C.

PUBLICATIONS

BOOKS

1. Iclanzan T., Stan D. - Valorificarea inventiei brevetate, Ed. POLITEHNICA, 2010, ISBN 978-606-554-237-2

PAPERS

1. Stan D., Tulcan A., Cosma C. - The "Industrial engineering" profile and competences, The 14th International Conference of Modern Technologies, Quality and Innovation – MODTECH 2010, Slanic-Moldova, Romania, 20-22 mai 2010, ISSN 2066-3919, pp.543-546
2. Stan D., Iclanzan T., Dume A., Seiculescu V. - Considerations on qualifications needs in the plastics and composites manufacturing branch, The

14th International Conference of Modern Technologies, Quality and Innovation – MODTECH 2010, Slanic-Moldova, Romania, 20-22 mai 2010, ISSN 2066-3919, pp.547-550

3. Tulcan A., Stan D., Turc C., Cosma C., Dume A. - Design of linear drive systems to retrofit a coordinate measuring machine, The 14th International Conference of Modern Technologies, Quality and Innovation – MODTECH 2010, Slanic-Moldova, Romania, 20-22 mai 2010, ISSN 2066-3919, pp.647-650

4. Țuț V., Tulcan A., Cosma C., Cioană C. - The integration of RE and RP techniques in industrial field, The 2nd WSEAS International Conference on Manufacturing Engineering, Quality and Production Systems (MEQAPS'10), Constanța, România, 2010, ISSN: 1792-4693, ISBN: 978-960-474-220-2, pp.129-132

5. Țuț V., Tulcan A., Cosma C., Serban I. - Application of CAD/CAM/FEA, Reverse Engineering and Rapid Prototyping in Manufacturing Industry, International Journal of Mechanics, Issue 4, Vol. 4/ 2010, ISSN: 1998-4448, pp. 79-86

6. Stan D., Serban I., Tulcan L., Turc C., Tulcan A. - Thermoplastics extrusion die with ultrasonic thermo-pellicular effect, The Proceedings of the 6th WSEAS - EEESD 2010 Conference, Special Session: Advanced Materials and Modern Fabrication Technologies for Sustainable Development, Timisoara, 21-23 oct. 2010, ISSN 1792-5924, ISBN 978-960-474-237-0, pp.404-408

7. Cioana C., Stan D., Cosma C., Tut V. - Development of virtual objects using NC programs, Proceedings of the 2nd WSEAS International Conference on Manufacturing Engineering, Quality and Production Systems, (MEQAPS'10), Constanta, 09-11 sept. 2010, ISBN 978-960-474-220-2, ISSN 1792-4693, pp.133-136

8. Cioana C., Stan D., Cosma C., Tut V. - NC programs used in reverse engineering technique, International Journal of Mechanics, ISSN 1998-4448, Issue 3, vol. 4 /2010, pp.71-78

9. Sirbu A., Stan D., Serban I., Oanca O. - Overview on the ultrasonic applications in the polymeric materials processing, Scientific Bulletin of the POLITEHNICA Univ. of Timisoara – Transaction on Mechanics, 55(69), fasc. 2 /2010, ISSN 1224-6077, pp.84-89

10. Iclanzan T., Serban I., Rotar D., Tut V. - Ultrasonic activation, a possible alternative application in the microinjection molding, International Journal of Material Forming Vol. 3 Suppl 1 pp.547-550 Springer Verlag France 2010

11. Rotar D., Cosma C., Tut V., Serban I. - Rapid Prototyping for a Microinjection Molding Die, WSEAS - The 6th Energy, Environment, Ecosystems & Sustainable Development Conf. (EEESD'10) Timisoara, 2010, pp.198-203

PHD STUDENTS

1. Ferician Florin Cornel - Researches on the technological possibilities of using the plasma electronic guns, Thesis supervisor: Prof. Tudor Iclanzan
2. Rotar Ioan Daniel - Studies of the polymeric materials flow processes through the interstices of the forming devices, Thesis supervisor: Prof. Tudor Iclanzan
3. Serban Iancu - Study of microinjection and injection of thin wall products, Thesis supervisor: Prof. Tudor Iclanzan
4. Tut Vlad Adrian - Research regarding the expert system for injection moulds conception, Thesis supervisor: Prof. Tudor Iclanzan
5. Cioana Cristian – Improvement of the reverse engineering techniques by virtual re-modeling of the plastic parts, Thesis supervisor: Prof. Tudor Iclanzan

RESEARCH TEAM

The team of the P.M.R.C consist of researchers which are doctor degree graduates and also, post-graduates and master students :

- Prof. dr. eng. Tudor Iclanzan – team leader
- Assoc. prof. dr. eng. Valentin Seiculescu
- Assoc. prof. dr. eng. Daniel Stan
- Assoc. prof. dr. eng. Aurel Tulcan
- Assist. prof. eng. Florin Ferician
- Lecturer eng. dr. Cristian Cosma
- Assist. prof. eng. dr. Adrian Dume
- Eng. Daniel Ioan Rotar, PhD student
- Eng. Serban Iancu, PhD student
- Eng. Tut Vlad Adrian, PhD student
- Eng. Cioana Cristian, PhD student

The management is assured by the team leader and the scientific board. The members of the team are

CONTACT

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3D measuring machine TESA MicroMs 343 DCC



Experimental ultrasonic devices



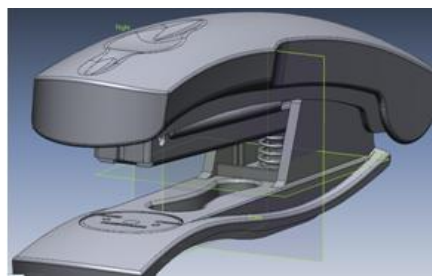
Roland Picza 3D scanner laser LPX - 600



Krauss-Maffei experimental injection machine and mould



Conference room and CAD/CAM laboratory

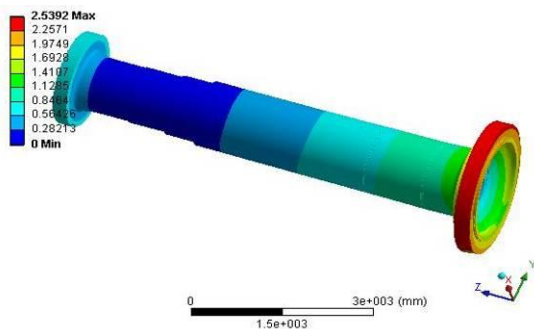


Real and virtual models. Mold cavities

RESEARCH CENTER IN STRENGTH OF MATERIALS AND SAFETY OF MECHANICAL STRUCTURES, CABLES AND CONDUCTORS

RESEARCH AREAS

- Fatigue and Fracture Mechanics
- Behaviour of composite materials at static loading and fatigue, cracking mechanism, plates behaviour at dynamic loading
- Life-time prolongation of steels at high temperatures
- Physical properties of aluminium, steel-aluminium and steel conductors
- Wire and wire ropes and round steel chains
- High temperature behaviour of steels, stability and creep of long vertical pipes, curved beams stress analysis
- Analysis and tests about behaviour of materials belonging of heavy devices being out of working life-time
- Numerical analysis and simulation of stress response of different structures
- Accuracy of solutions involved in the stress calculus of curved specimens



KEYWORDS

Wohler's curve, fatigue crack propagation, crack closure, displacement at crack opening, computer tests, life – time, fracture tenacity, stress intensity coefficient K_{IC} , J – integral, fatigue at variable deformation, cumulative degradation at variable loading, macroscopically aspects at fatigue fracture, dynamic fatigue, safety and risk, probabilistical aspects of fatigue and fracture mechanics, defects toleration, conductors, stress, strain, modulus of elasticity, creep, ambient temperature, thermal properties, term elasticity, thermal fatigue, fracture, pipes under pressure, composite materials, fatigue, dynamical, loads, composite plots.

FIELD DESCRIPTION

Endurance of Steel wire ropes and round steel chains, service and fatigue life, stress - strain, bending, ropes and chains for cranes and other hoisting or transporting machines.

Stress - Strain Test. Curves` equations for initial composite, steel and aluminium, final composite, steel and aluminium.

Studies concerning the life-time prolongation of steels at high temperatures, studies about the accuracy of solutions involved in the stress calculus of curved specimens. Researches can be used by electro technical materials industry and distributing electrical energy units. There are also useful in order to participate to international auctions.

Studies regarding the behaviour of composite materials under static, impact and fatigue loading, cracking mechanism, plate's behaviour at dynamic loading.

Integrity and durability studies on different types of steel belonging of mining equipments being out of working life-time. There were performed some researches regarding the behaviour at variable loads, impacts and also fracture mechanics analysis.

Creep at ambient temperature tests of aluminium and steel-aluminium conductors in order to certify their quality. The loading and unloading behaviours are described by typical diagrams and equations of curves have been estimated. Experimental researches were performed at ambient and results were extra poled beginning 100 or 1000 hours to 10000 hours.

Numerical analysis for estimation the integrity and durability of structures based on fracture mechanics and fatigue.



ACTIVITIES

- The life – time estimation of some strength elements (wire ropes, links, springs, etc) at imposed loading levels
- The strength at fatigue estimation of some steel and welded elements
- The analysis of the influence of simulated defects about the fatigue strength at welded elements
- The estimation of K_{IC} and J_{IC} for some machine parts steels
- The estimation of the dynamic tenacity coefficients K_{Idc} and J_{Idc}
- The analysis of crack propagation at cyclic loading and under repeated shocks
- Estimation of mechanical characteristics obtained at variable loads
- Computer programme analysis for durability of a bar belonging to a heavy minning machine, by using fracture mechanics theory
- Design devices for hanging cracking pipes
- Theoretical and experimental studies of vertical long specimens under compressive loading also into account thermal effects.

RESEARCH TEAM

- Prof.dr.eng. Nicolae NEGUȚ
- Prof.dr.eng. Ion DUMITRU
- Prof.dr.eng. Nicolae FAUR
- Prof.dr.eng. Pavel TRIPA
- Prof.dr.eng. Tiberiu BABEU
- Prof.dr.eng. Constantin CRISTUINEA
- Prof.dr.eng. Liviu MARȘAVINA
- Assoc.prof.dr.eng. Dana SILAGHI PERJU
- Lect.dr.eng. Marcela SAVA
- Lect.dr.eng. Mihai HLUȘCU
- Lect.dr.eng. Nicolaie CIOBOTARU
- Assist.eng. Iuliu SISAK
- Assist.eng. Radu NEGRU
- Eng. Laurentiu CULEA
- Eng. Anghel CERNESCU
- Eng. Cristian NEȘ
- Eng. Emanoil LINUL
- Eng. Dan Andrei ȘERBAN
- Eng. Lorand KUN
- Eng. Adrian BIRLAN
- Eng. Niculae PAȘCA
- Eng. Karla BERDICH
- Eng. Lucian BOGDAN

RESEARCH OFFERS

Bending endurance testing, Tensile fatigue testing, Experimental stress analysis, Fatigue prediction, Research on wires, Standards (ISO-TC 85), Stress-strain, Breaking test, Creep at ambient temperature test for 6 month, 1 year, 10 years creep;

Study – test for composite materials, Stress concentration and fatigue, Composite materials structures computation;

Expert study of equipment for heavy machines with expired life-time, Fracture mechanics testing, Fatigue with impact, Non-destructive testing;

High Temperature Study of Creep Properties, Theoretical Analysis and Creep Computation for pipes Stability and Creep for vertical long pipes



RESEARCH CONTRACTS

1. 99/2010, *Stress-strain tests for aluminum and steel aluminum conductors*, Project Manager: Faur Nicolae, Cernescu Anghel, Neș Cristian Beneficiary: SC Electroplast SA Bistrita, Value: 1785 RON
2. 63/2010, *Mechanical Testing of active conductors from the LEA Arad-Timisoara electrical line*, Project Manager: Ciobotaru, N., Culea, L., Cernescu, A., Kun, L... Beneficiary: ISPE București. Value: 6160 RON.
3. 26/2010, *Pressing and releasing insertion in senzo case*. Project Manager: Cernescu, A., Neș, C. Beneficiary: SC ESSER Romania SRL. Value: 1190 RON.
4. 14/2010, *Oil pressure sensor simulation (OPS)*, Project Manager: Cernescu, A. Beneficiary: SC HELLA Electronics Romania SRL. Value: 1163,3 RON.
5. 73/2010, *Tests on specimen samples*, Project Manager: Marsavina, L., Cernescu, A. Beneficiary: SC Clagi SRL, Value: 1071 RON.

DOCTORAL STUDIES

PhD THESIS

1. Moise Valentin, *Studies on the strength of some magnesium alloys with applications in the*

- automotive industry*, PhD coordinator: Ion Dumitru, 10.06.2010
2. Sechei Ramona Maria, *Theoretical and experimental aspects regarding the dynamic toughness of materials*, PhD coordinator: Ion Dumitru, 15.07.2010
 3. Segal Herman, *Contributii privind studiul durabilitatii cablurilor din otel si otel-aluminiu*, PhD coordinator: Tiberiu Dimitrie Babeu, 09.09.2010
 4. Chincea Ion, *Studiul teoretic și experimental de rezistență și deformabilitate a materialelor compozite utilizate în domeniul transporturilor*, PhD coordinator: Tiberiu Dimitrie Babeu, 22.10.2010
 5. Lupu Ioan, *Vibrations and vibroimpacts of mechanical systems*, PhD coordinator: Tiberiu Dimitrie Babeu, 09.09.2010
 6. Lautaru Maria, *Contributions to stress-strain studies in helicoidal springs of railway vehicles in order to optimize their behaviour in operation*, PhD coordinator: Tiberiu Dimitrie Babeu, 17.12.2010

PhD THEMES

Scientific supervisor: Prof.dr.eng. Ion Dumitru:

1. Branzei Nelu Florin, *Fatigue analysis of steel couplings used for rail vehicles*.
2. Kun Lorand, *Modeling and simulations in multiaxial fatigue*.
3. Cotuna Emil, *Theoretical and experimental studies regarding the stability of measurement precision of load cells*.

Scientific supervisor: Prof.dr.eng.Nicolae Faur:

1. Nes Cristian, *Research on fracture mechanics parameters evaluation by numerical methods*.
2. Enkelhardt Angeliha, *Stent optimisation studies*.
3. Birlan Adrian, *Research on thermal fields optimisation in plastic injection processes*.
4. Bogdan Lucian, *Cercetari privind durabilitatea protezelor de sold*.
5. Berdich Karla, *Cercetari privind optimizarea implanturilor de ureche medie*.

Scientific supervisor: Prof.dr.eng.Liviu Marsavina:

1. Linul Emanoil, *Mechanical Characterisation of Cellular Materials*.
2. Serban Dan, *The Fatigue behaviour of polymers*.
3. Palade Adrian, *Fretting Fatigue simulation*.
4. Ailinei Ionut, *Burability of solder joints*.
5. Almăjan Violeta, *Comportarea materialelor compozite folosite la echipamente sportive*.
6. Cocard Marius, *Durabilitatea conductelor din polietilena*.
7. Pașca Niculae, *Durabilitatea echipamentelor hidraulice*.

PUBLICATIONS

BOOKS

1. Marșavina, L., *Fracture Mechanics of Cellular Solids*, in *Cellular and Porous Materials in*

Structures and Processes, Editori Holm Altenbach and Andreas Öchsner, Editura Springer, ISBN 978-3-7091-0297-8, 2010.

2. Tripa, P., *Experimental Methods for Strains and Mechanical Stress Determination*, Editura MIRTON Timișoara, Colecția Tehne, ISBN 978-52-0895-0, 257 pages, 2010.

PAPERS

1. Dumitru I., Tripa, P., Hluscu, M., Kun, L.: *Durability analysis of fretted cylinders subject to variable pressure*, The 13th Symposium on Experimental Stress Analysis and Testing of Materials, Cluj Napoca, Romania, 11th-12th of June 2010, in Acta Technica Napocensis, Series: Applied Mathematics and Mechanics, nr. 53, vol II, 2010, pp. 267-272, ISSN: 1221-5872.

2. Dumitru, I., Hluscu, M., Moise, V.: *Current trends on the use of magnesium alloys in machine construction*, in Scientific Bulletin of Politehnica University of Timisoara, Transactions on Mechanics, vol. 55(69), Iss. 1, 2010, pp. 41-46, ISSN: 1224-6077.

3. Dumitru, I., Kun, L., Hluscu, M.: *Life-time estimation of an autofrettaged cylinder under repeated dynamic pressure*, The 4th International Conference on Advanced Concepts on Mechanical Engineering, Iasi, Romania, 17th-18th of June, 2010, in Bulletin of the Polytechnic Institute of Iasi, Machine Construction Series, Tomul LVI (LX), Fasc. 4A, 2010, pp. 429-436, ISSN: 1011-2855.

4. Kun, L., Cotuna, E., Dumitru, I.: *The influence of phase shift and frequency on critical plane positions under nonproportional cyclic loading*, The XII International Symposium Young People And Multidisciplinary Research, Timisoara, Romania, 11th-12th of P November, 2010, in Scientific Bulletin of Politehnica University of Timisoara, Transactions on Mechanics, vol. 55(69), Spec. Iss. S1, 2010, pp. 53-58, ISSN: 1224-6077.

5. Tripa, P., Dumitru, I., *Correlations between fracture tenacity (K_C , K_{IV}) and fracture energy (KV)*, A X-a Conferința națională multidisciplinară cu participare internațională "Profesorul Dorin Pavel-fondatorul hidroenergeticii românești", Sebeș, An X, Vol. 17/2010, p. 641-648, Editura AGIR București, ISSN 2067-7138, 2010.

6. D.Silaghi-Perju, D.Perju, H.Pirlea, G.A.Dumitrel, L.Draghici: *Dispersion Modelling of Nitrogen Dioxide Coming from Timisoara Thermal Power Plants*, Bul. St. al U.P.T., Seria Chimie si Ingineria Mediului, Vol.54(68),1, pg.37-40

7. L. Marsavina, T. Piski, *Bimaterial Four Point Bend Specimen with Sub-Interface Crack*, International Journal of Fracture, Vol. 164 (2), 2010, p. 325-333, ISSN 0376-9429
8. L. Marsavina, T. Sadovski, M. Kneć, R. Negru, *Non-linear behaviour of foams under static and impact three point bending*, International Journal of Non-Linear Mechanics, Vol. 45, 2010, p. 969 – 975, ISSN 0020-7462.
9. Faur N, Marsavina L, Cernescu A, Nes C, Linul E, *The Influence of The Steel and Aluminium Components Separation at the Conductors Locking for Stress-Strain Tests*, Key Engineering Materials, Advances in Fracture and Damage Mechanics VIII, Vol. 417-418, 2010, p 693-696, ISBN 978-0-87849-315-10.
10. Marsavina L., Susan-Resiga R., Faur N., Negru R., *Methodology to Assess Integrity with Application to Collector Copper Lamellas*, Theoretical and Applied Fracture Mechanics, Vol. 53 (2), 2010, p. 136-144, ISSN 0167-8442
11. E. Linul, L. Marsavina, A. Cernescu, *The effect of loading, the direction of deformation and density of rigid polyurethane foams subjected to compression*, Acta Technica Napocensis, Series: APPLIED MATHEMATICS AND MECHANICS, Nr. 53, Vol. II, 2010, p. 311-316, ISSN 1221 – 5872.

12. D. A. Serban, L. Marsavina, L. Culea, V. Silberschmidt, *Experimental study of mullins effect in semi-crystalline thermoplastic materials*, Acta Technica Napocensis, Series: APPLIED MATHEMATICS AND MECHANICS, Nr. 53, Vol. II, 2010, p. 317-322, ISSN 1221 – 5872.

PERSPECTIVES

The researches in the fields of fatigue and fracture mechanics present a topical interest. The implementation of new equipments in the laboratory of fatigue and fracture mechanics and the inclusion of the laboratory as a part of the National Research Centre in Construction and Fatigue, BCUM, code CNC SIS 19, will allow the extension of the researches to new directions and will offer the opportunity to solve any request in this field.

A special attention will be granted to new materials, and also to traditional materials with unknown mechanical characteristics regarding the fatigue behaviour.

CONTACT

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MECHANICAL MACHINES, TECHNOLOGY AND TRANSPORTATION

– MECHANICAL TECHNOLOGY DEPARTMENT -

GENERAL PRESENTATION AND MISSION

The *Mechanical Technology Department (TM)* is organized within the Department of Mechanical Machines, Technology and Transportation (MMUT). TM department is organized as a research unit and transfer of technology of the "Politehnica" University of Timișoara.

Mission is to coordinate teams of researchers from TM department of the Faculty of Mechanical Engineering, who are developing programs in the specific field of research.

RESEARCH FIELDS

The main fields of research are:

- Products, processes and manufacturing systems integrated design;
- Processes and manufacturing systems integrated management;
- Products and manufacturing devices new models design;
- Integrated Design of products, manufacturing processes and systems;
- Quality evaluation of the manufacturing processes and systems;
- New products and manufacturing equipment;
- The development of the equipments and technologies for non-conventional technological processes
- development and application of optimized materials processing technologies, with energy concentrated, laser, inkjet fluids, electrical erosion
- Studies referring to the development of modern constructive solutions for making of technological equipment from the processional and food industry
- The creation and the making of piezoceramic traducers for the usage in the construction of technological equipment
- Evaluation of degradation of the materials used in technologies equipment and the calculation of the remaining durability of exploitation
- Optimizing metallic flexible pipes processing

KEYWORDS

Integrated engineering, Concurrent engineering, Manufacturing engineering, Manufacturing processes management, Quality assurance, Equipment and technologies for non-conventional technological processes, Laser materials processing, Plan and equipment for food industry,

Piezoceramic traducers, Degradation of materials, remaining durability of exploitation.

ACTIVITIES

TM department assure the co-ordination and harmonization of the training programs through scientifically research (PhD. programs, post-graduated programs) for the researchers or research teams of different departments. The MASTER program developed is:

- Engineering labor relations, safety and health work
- Quality management process technology
- Integrated food manufacturing systems
- Integrated Food Manufacturing
- Manufacturing optimization of process equipment

The PhD. programs coordinated are in the field of Mechanical Engineering and Industrial Engineering. In the advanced doctoral training program UPT prof. PhD, eng. Nichici Alexandru, coordination of the teaching component of the course and direction of cross-discipline seminars: Objectives, strategies and methods in scientific research, Scientific communication and deontology.

- The research teams from TM department develop: fundamental and applicative research activities; products and technology design activities; technological development and technology transfer all attending the present industrial demands.
- TM department is involved in national and international research programs, is member of different professional and scientifically organizations and organizes different scientific meetings (seminars, conferences etc.).
- Participation to the EC Sixth Framework Program (FP6) and EC Seventh Framework Program (FP7) as a partner/coordinator to a network of excellence project.
- Participation to grant competitions through CNCISIS, ANCS national programs, structural funds.
- Developing of fundamental and applicative research activities, technological development for the present industrial demands.
- TM department members are part of the following professional bodies and associations: SPIE –Internat. Society for Optical Technologies
ASM – American Material Society
BENA – Balkan Environmental Association
ISL-FD – International Society of Lyophilization-Freeze Drying

AGIR – The General Association of the Engineers in Romania
ARTN – Romanian Association of Nonconventional Technologies
ASR – Romanian Welding Society
ACM-V – Association for Multidisciplinary Research West Zone

RESEARCH CONTRACTS

1. Marie Curie Cipru Program, *Nanocomposite Materials Manufacturing by Ultrasonic Welding (Ultra NanoMan)*, Director assist. prof. Ph.D. Crainic N.
2. Contract nr.3/2010: *Search for new concepts of assemblies dissimilar aluminum-magnesium* Bourgogne Technologies – Franta. Director assist. prof. Ph.D.Cicala E.
3. Contract FP7 nr.CP-IP 229335-2 MAGPRO² LIFE: *Advanced Magnetic nano-particles deliver smart Processes and Products for Life*. Internat. consortium. Director partener UPT assist. prof. Ph.D. Crainic N.
4. Contract Structural Funds 1/3/2010-2012 : PRACTICOR 48816: *Transnational network of educational guidance, career counseling and practice, coupled with the labor market in knowledge society*. Partners Politehnica University of Timisoara, University of Pitesti, Fraunhofer Institute Germany, Institute for Studies and Power Engineering Bucharest.
5. Contract FP7 nr. 09-ERIP-06862-05060: *Materials, Energy and Sustainable Growth*. International consortium. Director partener UPT assist. prof. Ph.D.Crainic N.

Prospective:

- Participation to the EC Seven Framework Program (FP7)
- Participation to grant competitions through national programs, sectorial program and direct international contract.

Proposal for new: Sectorial program, nr. 99/ 2009, IPA Cross Border: Equal Opportunities in Romania-Serbia border region as a result of the partnership in innovation, research to promote healthy and safe workplaces in SMEs. International consortium. Partener Director UPT prof. Ph. D. Tucu Dumitru.

PUBLICATIONS

BOOKS

1.Prof. Ph.D. eng. Nichici Alexandru: Scientific works, revised and added edition, Politehnica Publishing House, Timisoara, 2010, 302 p., ISBN 978-554-196-2.

- 2.Prof. Ph.D. eng. Richard Herman: Materials technology. Vol II, Politehnica Publishing House, Timisoara , 2010,200p. ISBN: 978-606-554-091-0.
3. Prof. Ph.D. eng. Tucu Dumitru: Company Management, University Horizons Publishing Timisoara , 2010, 285p., ISBN 978-973-638-471-4.
4. Prof. Ph.D. eng. Tucu Dumitru: Business Management, University Horizons Publishing Timisoara, 2010, 265p., ISBN 978-973-638-473-8.
5. Prof. Ph.D. eng. Tucu Dumitru: Optimization of quality costs, Eurostampa Publishing Timisoara, 2010, 166p., ISBN 978-606-569-076-9.

PUBLISHED PAPERS

- 1.Cicala E., Duffet G., Andrzejewski H., Grevey D.: *Continuous Welding of Al-Mg-Si Alloys with Nd:YAG Laser Irradiation: Tensile Properties Optimization of T-joint Seams*. In Lasers in Engineering. Vol.20 (2010), issue 3-4, pag.195-211, 12p. ISSN 0898-1507.
2. Țucu D., Mnerie D.: *Optimization of renewable energy supply*. Proc. 38th Internat. Sympos. on Agricultural Engineering, Opatija, Croatia, p.439, ISSN 1333-2651.
3. Mnerie D., Țucu D., Balcu I., Mnerie Gabriela Victoria, Mirica M.: *Bio-ethanol from cellulose sweepings*. Proc. 38th Internat. Sympos. on Agricultural Engineering, Opatija, Croatia, p.463, ISSN 1333-2651.
- 4.Fleser, T. and all.: *Numerical of alveolar stress during orthodontic space closure*. Proc. 15 th Congr. of BaSS 2010, European College of Gerrondontology, april 2010, Tesaloniki, Greece, p.153.
5. Fleser, T., Camelia Szuhaneck: *Mechanical behavior of orthodontic TMA wires*.WSEAS Trans. on Biology and Biomedicine, Issue 3, Volume 7, July 2010, p.277 – 286. ISSN: 1109-9518. World Scientific and Eng. Academy and Society. Univ. of Wisconsin, Stevens Point, USA.
6. Fleser, T., Camelia Szuhaneck: *The influence of welding method on mechanical properties of orthodontic metal appliances*. Proc. 86th Congress of the European Orthodontic Society, june 2010, Portoroz, Slovenia, p. 158.www.eos2010.si.
7. Fleșer, T., Szuhaneck, Camelia, Vasilescu, M., Petrovici, B.: *Optimization water jet processing alumina plates*. Conference / Exhibition, Materials Science / Technology, MS&T 2010, oct., 2010, Houston, Texas.
8. Fleșer, T., Faur, N., et al.: *Elastic properties evaluation of orthodontic welded appliances*. Proc. of 21th DAAAM Internat. Symp. Oct. 2010, Wien. p.0731-0732.
9. Fleser,T., Faur, N. et all: *Stress distribution associated with loaded orthodontic implants with different designs*. Proc. 2010 FDI Annual World

Dental Congress, Salvador de Bahia/Brazilia, sept 2010.

10. T. Fleşer, et al.: *Creep fatigue interaction assesment of 16Mo5 steel*. In Structural Integrity and Life, Beograd, vol.10, nr. 2, 2010, p. 83-88.UDK/UDC 621, ISSN 14151-3749. EISSN 1820-7863.

AWARDS

TM Department team has coorganizator international conferences.

PhD THESIS

In Department Mechanical Technology is thesis supervisor: Prof. dr.dhc. eng. Nanu Aurel, Prof. Ph.D. Nichici Alexandru, Prof. Ph.D. Popovici Vasile, Prof. Ph.D. Sporea Ioan, Prof. Ph.D. Fleser Traian, Prof. Ph.D. Tucu Dumitru, Assoc. prof. Ph.D. Eugen Cicală.

PhD Students

In 2010 was admitted to doctoral training cycle 4 students. 4 were supported public doctoral theses:

1. PhD Remus Boboescu: Process modeling of laser welding of metallic materials under Keyhole conditions. Scientific Coordinator Prof. Ph.D. Nichici Alexandru.

2. PhD Alin Vasile Mnerie: Contributions to the computer optimization of wire electric erosion machines. Scientific Coordinator Prof. Ph.D. Nanu Aurel.

3. PhD Gabriela Anghel: Research on drying systems optimization by freezing of food, - behavioral analysis of metallic materials and food. Scientific Coordinator Prof. Ph.D. Sporea Ioan.

4. PhD Valentin Glod: The industrial optimization cutting of steel plates with laser beam. Scientific Coordinator Prof. Ph.D. Fleser Traian.

RESEARCH TEAM

TM department consists of research teams with common and separate concerned research projects.

The human resources consist of researchers which are doctor degree graduates or which leads post-graduates programs. Also, in the team are working post-graduates and master students.

The TM department management is assured by the leader and the Scientific Council, which is composed of professors or associate professors that have been recognized for their research activity and results.

The Scientific Council is composed of the research team leaders.

The members of the research team are:

- Professor Ph.D. Richard Herman–team leader
- Prof. Ph.D. Traian Fleşer – team leader
- Prof. Ph.D. Dumitru Mnerie – team leader
- Prof. Ph.D. Dumitru Ţucu – team leader
- Prof. Ph.D. Mihai Ghiţă
- Prof. Ph.D. Titus Slavici
- Prof. Ph.D. Ioan David
- Assoc. prof. Ph.D. Nicolae Crainic
- Assoc. prof. Ph.D. Mircea Olariu
- Assoc. prof. Ph.D. Eugen Cicală
- Assoc. prof. Ph.D. Nistoran Botis Mihaela
- Assoc. prof. Ph.D. Antoniu-Levay Reviczky
- Assoc. prof. Ph.D. Mircea Vasilescu
- Lect. Ph.D. Tulcan Liliana
- Lect. Ph.D. Traian Botea
- Lect. Ph.D. Voicu Safta
- Lect. Ph.D. Gabriel Malaimare
- Lect. Ph.D. Dinu Gubencu
- Lect. Ph.D. Ioan Groza
- Lect. Ph.D. Adelina Han

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