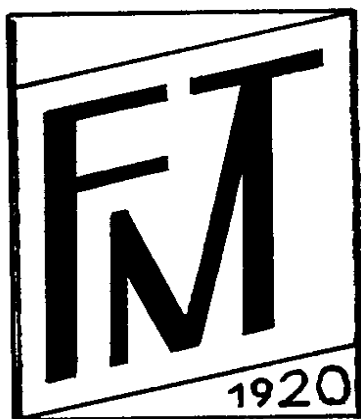


MECHANICAL ENGINEERING FACULTY



Bd. Mihai Viteazul, Nr. 1
300222 – Timișoara, Romania
Tel: +40-256-403521
Fax: +40-256-403523

E-mail: decan@mec.upt.ro
Web: www.mec.upt.ro

MEDICAL ENGINEERING RESEARCH GROUP

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

and

**PLATFORM OF IMPLANTOLOGY, INTELLIGENT
PROSTHETICS AND BIOMECHANICAL REHABILITATION**

GENERAL PRESENTATION

The *Centre for Modelling 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 from Politehnica University of Timisoara, University of Medicine and Pharmacy “Victor Babes” Timisoara, Hospital of Traumatology and Orthopedy No 1 Timisoara 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

- The first pilot program financed by WORLD BANK (2,000 USD) to set up the basic centre infrastructure was started in 1999;
- The main grant (430,000 USD) was finished in 2002, with the set up of the research infrastructure for three laboratories: medical imaging and modelling and design;
- During 2002-2008 other funds were attracted and three new laboratories – LOPIFO Laboratory for implant manufacturing – authorized by the Health Ministry, CIDUCOS CIDUCOS Laboratory for testing of medical devices – accredited by RENAR and Motion analysis Laboratory were created;
- During September 2006 – December 2008 a new important project for the amount of 8,381,981 Lei *Platform of implantology, intelligent prosthetics and biomechanical rehabilitation* was performed, with the set up of other 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 Modelling 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 and the *Platform of implantology, intelligent prosthetics and biomechanical rehabilitation* main goal is to support high level research and education in the field of Medical Engineering. The two entities are 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.

Our experience and competences are able to support high level research programs, as well as international scientific cooperation in order to integrate their activities in the European Research Area in the field of Medical Engineering.

RESEARCH FIELDS

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

KEYWORDS

Medical imaging, 3D reconstruction, dental and orthopaedic implants, upper limb prostheses, mandibular distractor, motion analysis, plantar pressure distribution, biocompatible materials, modelling of biological tissue, rapid prototyping, manufacturing of medical devices components.

ACTIVITIES

- Fundamental and applied research in Biomechanics, biomechanical modelling of human locomotory apparatus;
- Motion analysis of patients having different deficiencies and animals in order to evaluate the disability rate or the rehabilitation process based on biomechanical principles;
- Motion analysis of sportsmen in order to evaluate and improve their performances based on biomechanical principles;
- Static and dynamic study of the plantar pressure distribution both for normal and disabled subjects;
- Modelling and numerical analysis of stress and strain distributions in bone structures, implants, assembly of bone/implants and prosthetic components;
- Design of dental and orthopaedic implants both for human patients and animals;
- 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 types 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 methods to test various materials, implants and prosthetic devices, including fatigue tests;
- Design of modern technologies to manufacture implants and prosthetic devices.

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 a

patient submitted to a total hip replacement in 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 right 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 properties of canine bones;
- Conception, modelling, design and theoretical and experimental analysis of a low cost upper limb prosthesis.

CMPICSU AND PLATFORM LABORATORIES




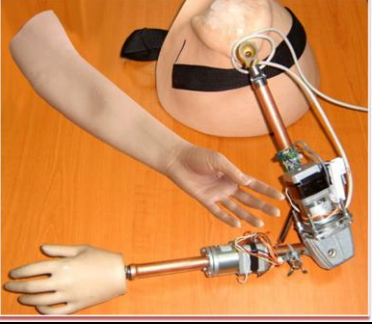
1. *LOPIFO Manufacturing Laboratory for implant devices, orthoses and prosthetic devices*: classical machining equipments used in prototype developing of prosthetic devices and medical instrumentation;
2. *Manufacturing Laboratory – CNC Machining and EDM Fabrication*: fabrication under precision and repeatability conditions of the implants and medical devices; the manufacturing conditions are provided by the computer numerical control of each machine.
3. *Manufacturing Laboratory – Rapid Prototyping Fabrication*. prototyping machines serve both in model validation and rapid fabrication; tools and ready to use parts are possible to build in both metals and plastics.
4. *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 conferences.
5. *Modelling and design laboratory* is equipped with professional hardware (20 Intel core workstations for design and analysis of prosthetic devices and implants; projector with hookup to laptop, instructor's computer; whiteboard) where is installed professional software: Ansys 11; Pro Engineering Wildfire 3; Mimics 10.
6. *Medical Imaging Laboratory*: computed tomography system (SIEMENS SOMATOM






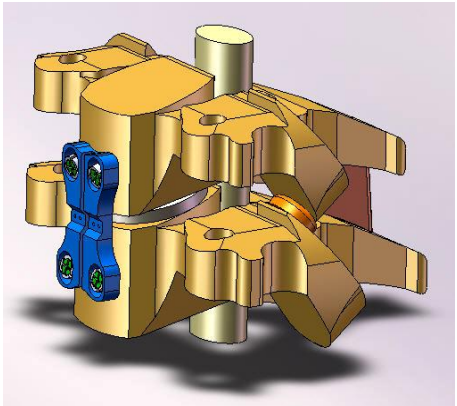
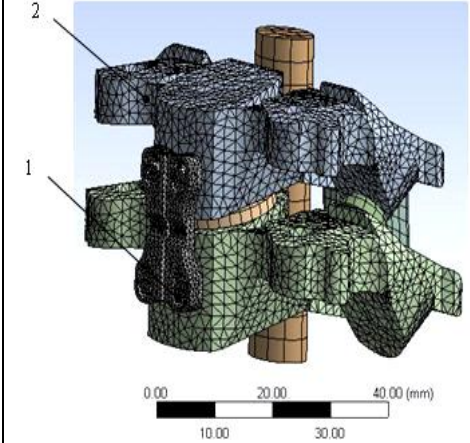
Plus 4 Power Computer Tomograph), electrosonatograph DDFAO system (computer- assisted screening and functional diagnosis), echo cardiograph ACUSON CV70™ (cardiovascular ultrasound system).

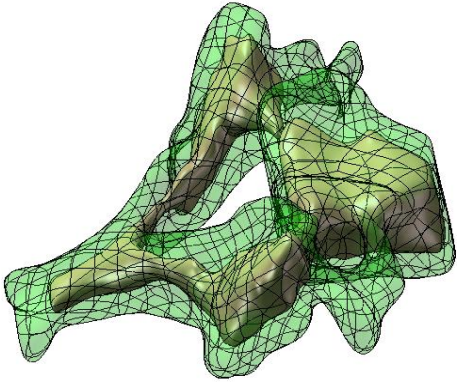
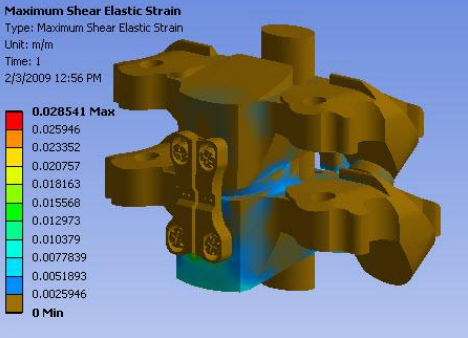


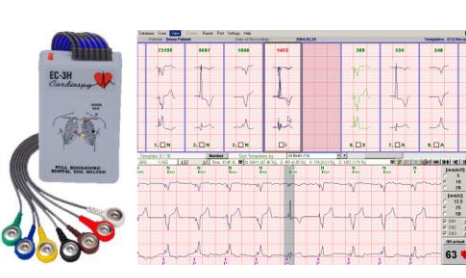


- 7. *CIDUCOS Testing Laboratory* accredited by RENAR conformally to SR EN ISO/CEI 17025:2005 standard: *corrosion test, hardness test, mass and density determination, metallographic analyses, mechanical tests, spectrometry test.*
- 8. *Medical investigations Laboratory* is an useful tool that explores many practices and various



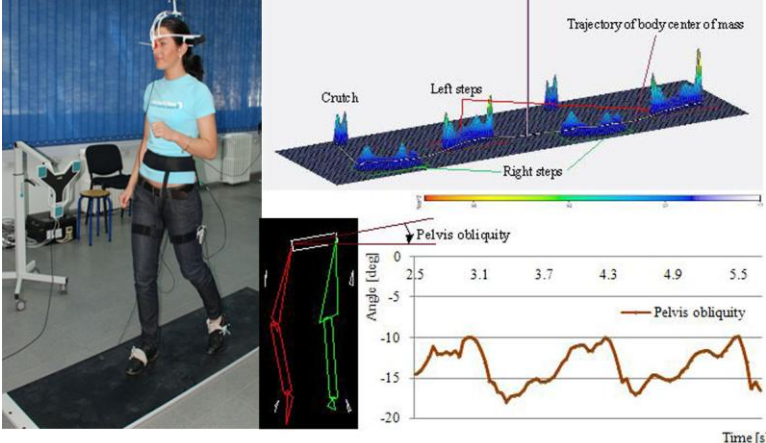
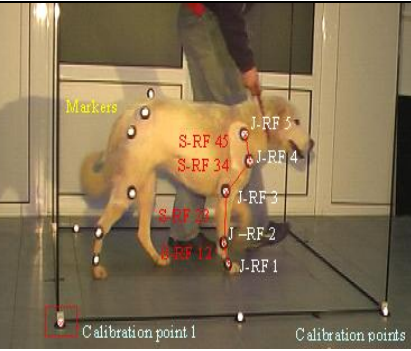

situations that arise in the field of usual medical investigations: vascular Doppler, pulsoximeter, holter system, audiometer, electrocardiograph, kit for measuring of human physiological parameters.

- 9. *Motion Analysis Laboratory:* Zebris measuring system for gait analysis and plantar pressure distribution determination, ARIEL Performance Analysis System (APAS) for motion analysis, and different ergometric devices (body band massage device, upright bike, treadmill).

<p>Manufacturing Laboratory - CNC Machining and EDM Fabrication</p>		
	<p><i>Dental implants fabrication on 5 axis CNC machining center</i></p>	<p><i>Orthopedic screws fabrication on Pinacho lathe machine</i></p>
		
	<p><i>Artificial disk fabrication on 3axis CNC milling machine</i></p>	
		
<p><i>Upper limb prosthesis prototype</i></p>		

<p>Manufacturing Laboratory – Rapid Prototyping Fabrication</p>		
	<p><i>Metal Powder Arcam S12 machine – metal substitution plate fabrication</i></p>	<p><i>Plastic powder EOS Formiga P100 machine – plastic substitution elements fabrication</i></p>
		
	<p><i>Titanium vertebra realized on Arcam S12 machine</i></p>	<p><i>Polyamide hand realized on EOS Formiga P100 machine</i></p>
<p>Multimedia Room</p>		
	<p><i>Audiovisual presentation</i></p>	
<p>Modelling & Design Laboratory</p>		
	<p><i>Geometry of an implanted spine model</i></p>	<p><i>Mesh of an implanted spine model</i></p>

		 <p>Maximum Shear Elastic Strain Type: Maximum Shear Elastic Strain Unit: m/m Time: 1 2/3/2009 12:56 PM</p> <p>0.028541 Max 0.025946 0.023352 0.020757 0.018163 0.015568 0.012973 0.010379 0.0077839 0.0051893 0.0025946 0 Min</p>
<p><i>Medical investigations Laboratory</i></p>		
		
	<p><i>Holter equipment</i></p>	<p><i>Blood pressure measurement system</i></p>
<p><i>Medical imaging Laboratory</i></p>	 <p><i>Somatom Plus 4 Power Computer tomography system</i></p>	

		
	Electrosomatograph DDFAO system	Echocardiograph ACUSON CV70™
Motion analysis Laboratory		
	Zebris measuring system for motion analysis and force distribution determination	
		
	APAS sequences from motion analyses	

PUBLICATIONS

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 4. M. Toth-Tascău, K. Menyhardt, D. I. Stoia *Robotic arm modelling and analysis*, Annals of DAAAM for 2009 & Proceedings of the 20th International DAAAM Symposium "Intelligent Manufacturing & Automation: Focus on Theory, Practice and Education", 25-28th November 2009, Vienna, pp. 0789-07990, ISSN 1726-9680;
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PhD STUDENTS

- Ovidiu Ghiba, - *Contributions to the conception and realization of hip prostheses*
- Delia Bugariu, - *Contributions to the improvement of knee prostheses*
- Cristian Săftescu-Jescu - *Contributions to the improvement of spine implants*
- Teodora Ioanovici - *Contributions to the improvement of total shoulder prostheses*
- Cristian Toader-Pasti – admitted 2009
- Andrei Craciun – admitted 2009
- Ion Popescu – admitted 2009

PERSPECTIVES

The *CMPICSU Research Centre* and the *Platform of implantology, intelligent prosthetics and biomechanical rehabilitation* 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 performances;
- 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, the two entities will enforce:

- Development of the production capacity in the manufacturing laboratories;
- Certification of a set of dental implants;
- Maintaining and improving of quality system in the CIDUCOS Testing Laboratory;
- 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 the PhD programmes in the field of Medical Engineering, for engineers and other specialists in the medical area of tissue engineering, orthopaedics, rehabilitation, etc.
- Promoting the collaboration in related fields both with Romanian and European universities and research institutes.

RESEARCH TEAM

- Prof. dr. eng. Mirela TOTH-TAȘCĂU – CMPICSU Director
- Prof. dr. eng. Mircea DREUCEAN – Platform Director
- Lecturer dr.eng. Lucian RUSU
- Lecturer dr. eng. Cosmina VIGARU
- 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. Cristian Toader-Pasti, PhD student
- Eng. Andrei Craciun, PhD student
- Eng. Ion Popescu, PhD student
- Eng. Mircea Krepelka, master student
- Eng. Costina Decianu, master student
- Associated research groups, as collaborators and partners in different projects, from The University of Medicine and Pharmacy “Victor Babes”, Timișoara and Hospital of Traumatology and Orthopedy No 1, Timișoara.

CONTACTS

- Prof.dr.eng. Mirela TOTH-TAȘCĂU – Director of *CMPICSU Research Centre*
Tel/Fax: + 40-256-403637
E-mail: mirela@cmpicsu.upt.ro
- Prof.dr.eng. Mircea DREUCEAN – Director of *Platform of implantology, intelligent prosthetics and biomechanical rehabilitation*
Tel/Fax: + 40-256-403637
E-mail: dreucean@mec.upt.ro

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 (25.000 USD) to set up the basic centre infrastructure;
- The main grant (317.000 USD) 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

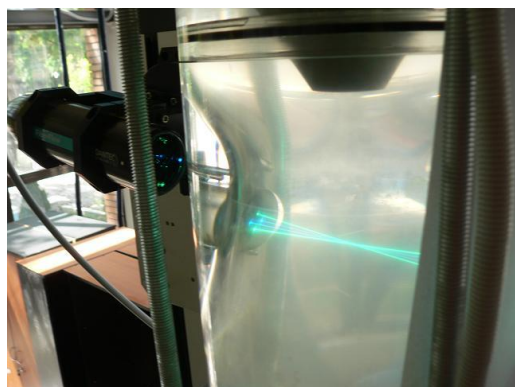
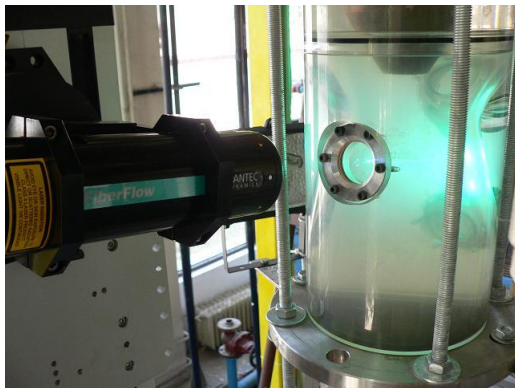
- *Numerical Simulation* in hydrodynamics of turbomachinery and hydraulic equipment and development of software bases for intelligent machines and installations
- *Development of numerical methods* to simulate the flow in turbomachines, cascades and development of complex models to determine the universal 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

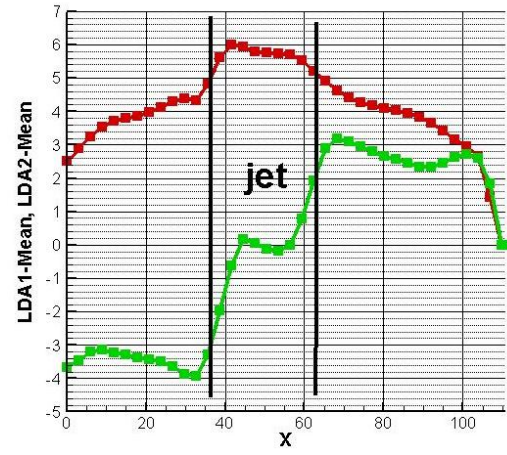
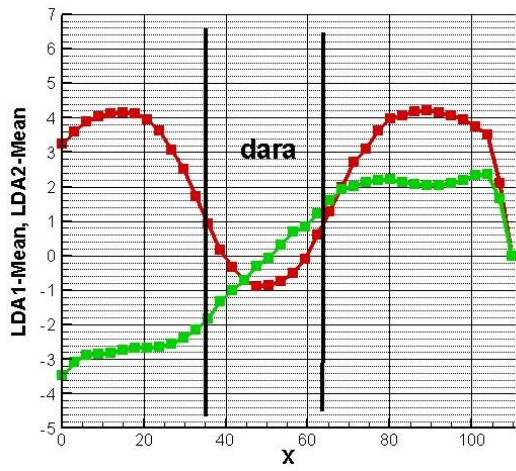
- Numerical analysis and stability analysis of decelerated swirling flows in hydraulic turbine draft tube; development of novel flow control techniques for Francis turbines operated at partial discharge.
- Full three-dimensional flow simulation and analysis in Kaplan and Francis hydraulic turbines;
- Parallel computing algorithms, development and implementation;
- Technical solutions for micro-hydropower 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.



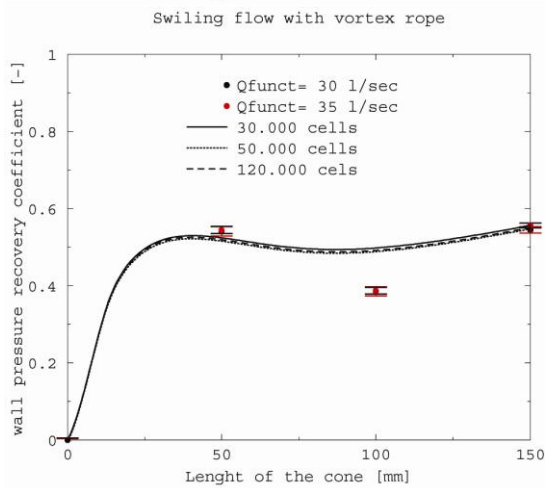
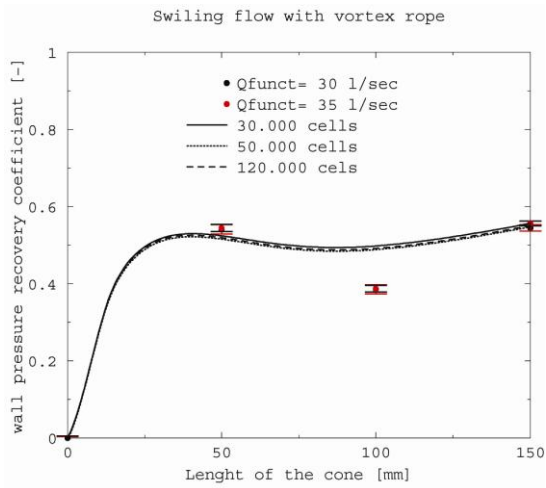
Vortex rope mitigation in the draft tube cone of a Francis turbine operating at partial discharge using the jet control technique



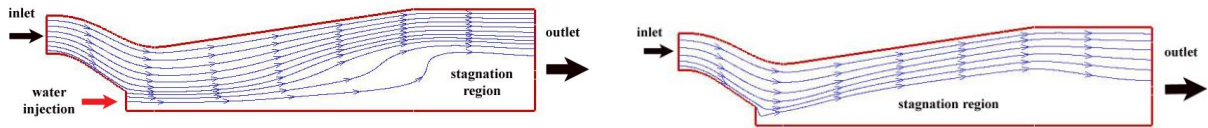
Closed loop test rig for experimental investigations of swirling flows and laser system to measure the velocity profiles



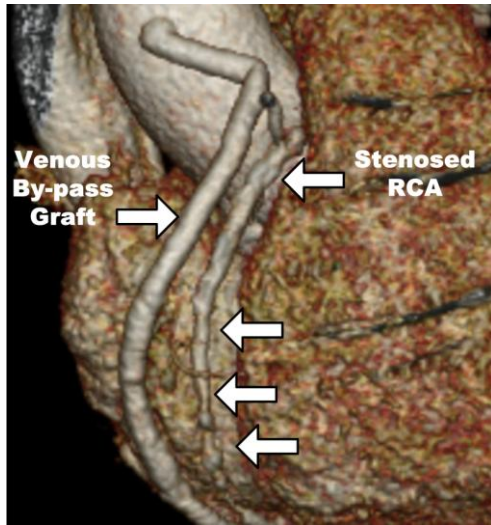
Velocity profiles without (left) and with (right) control jet.



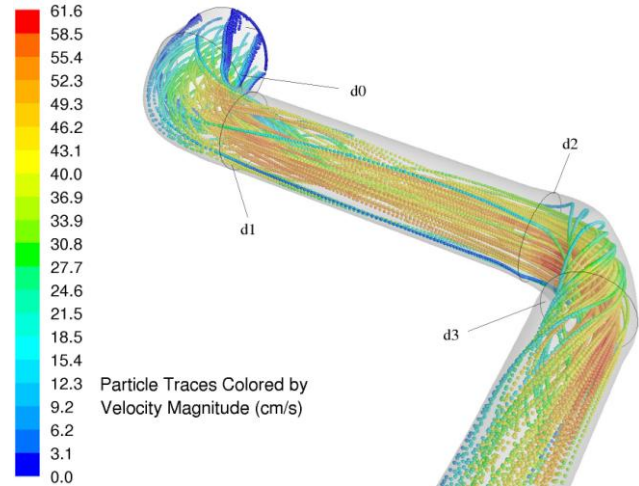
Test section for pressure measurements



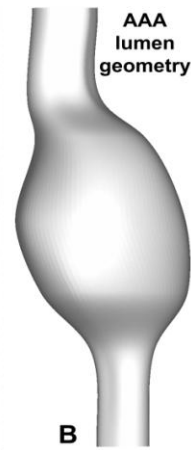
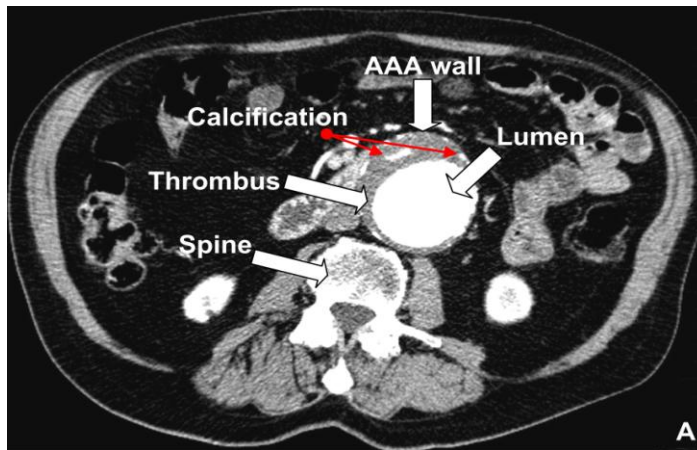
Flow profile without and with jet control



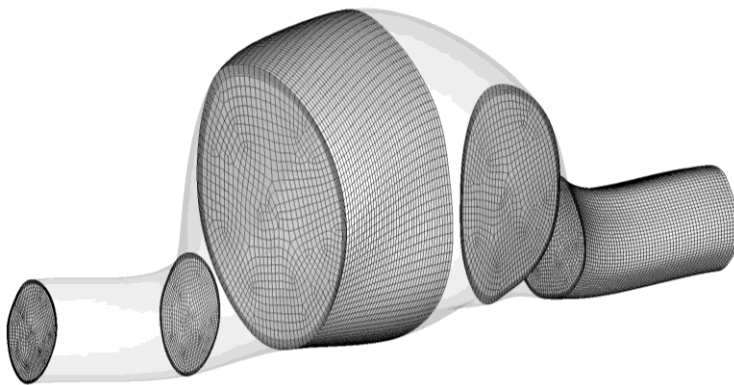
Venous bypass graft, 3D geometrical reconstruction.



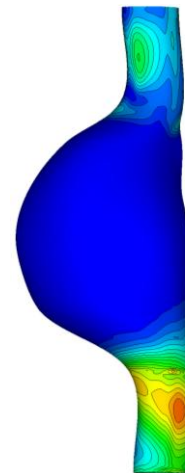
Particle distribution inside to the venous bypass graft



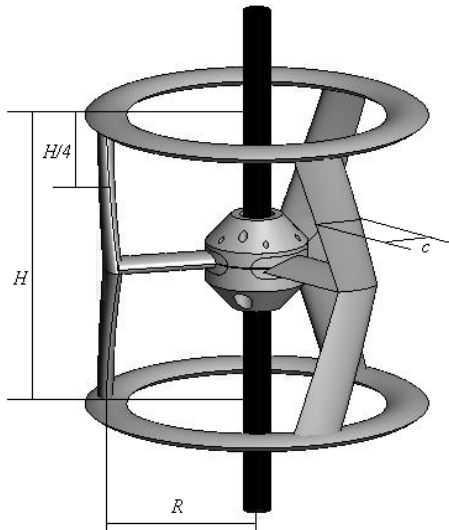
Abdominal aortic aneurism – AAA reconstruction using 3D CT slices.



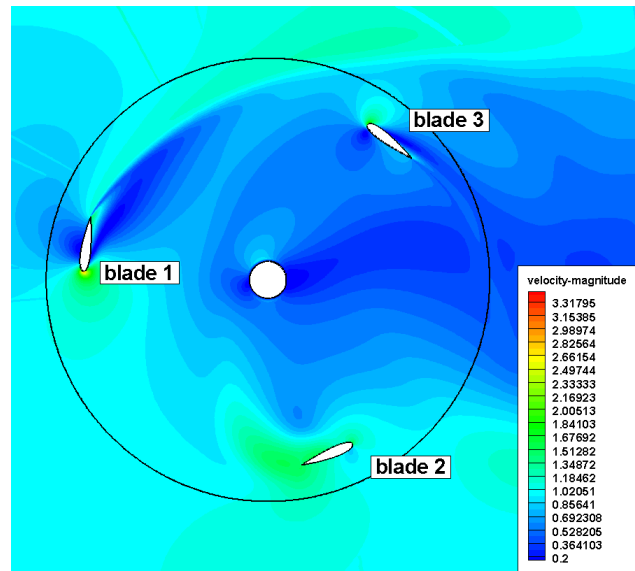
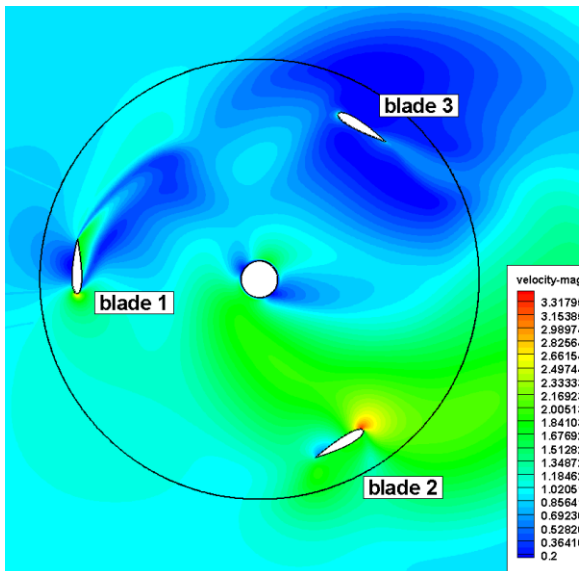
Computational domain discretization



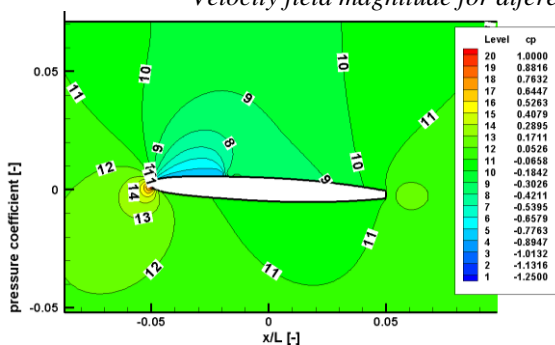
Wall shear stress distribution in AAA



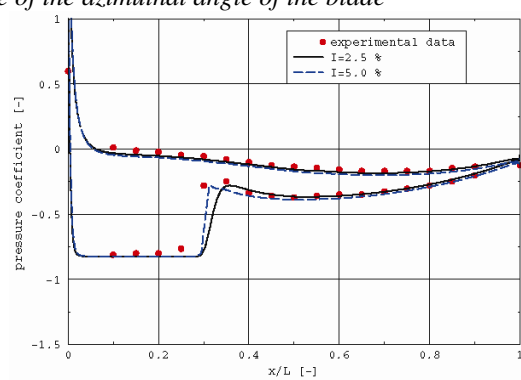
Achard turbine



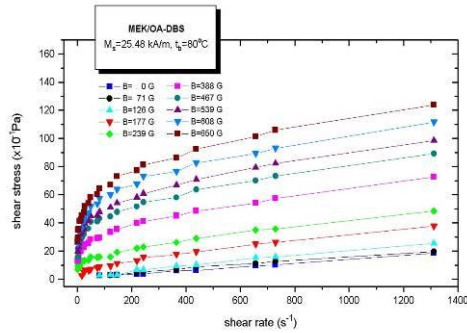
Velocity field magnitude for diferent value of the azimuthal angle of the blade



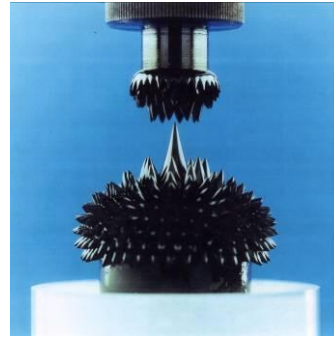
Pressure coefficient distribution on the NACA 0009 hydrofoil at 2,5 degree angle of attack and cavitation number 0.81



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

Research Facilities

Magnetometry Laboratory

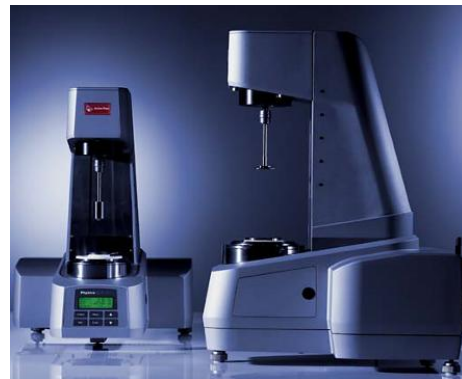
- VSM 880 magnetometer
- the DMS Vibrating Sample Magnetometer (VSM) is a computer-controlled measurement system capable of characterizing a wide variety of magnetic samples
- The VSM supports all known magnetic measurements such as Hysteresis and Minor Loops, IRM and DCD Remanence Loops, SFD, Delta 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 acces.

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

1. Ctr. 021-002/ 2007, PN2 POSTCOMB, *Researches for making CFD soft and original functionalmodel for postcombustion system, with results*, 22.240 RON/2009, Director Prof.dr.ing. Romeo Susan-Resiga.
2. Ctr. nr.119/ 12.11.2009, beneficiary S.C. Hidroelectrica S.A, Ramnicu Valcea, *Researches and experiments regarding the improvement of energetic and cavitationnal performances of the pumps PRO 10-195 from the pumping station Jidoaia ETAPA a II –a*, 136.850 RON/2009, Director Prof. dr. ing. Alexandru Baya.
3. Ctr. nr. 120/ 12.11.2009, beneficiary S.C. Hidroelectrica S.A, Ramnicu Valcea, *Researches and experiments regarding the increase of performances of the turbines Francis FVM de 57,5-128,5 CHE Bradisor-ETAPA a II-a*, 170.170 RON/2009, Director Prof.dr.ing. Liviu Anton.
4. Ctr. nr. 129/ 12.11.2009, beneficiar S.C. ZOPPAS INDUSTRIES Romania, *Numerical Simulation of the Pump Hydrodynamics with Heat Transfer*, 20.000 RON/2009, Director Prof.dr.ing. Romeo Resiga.
5. Ctr. nr. 71-083/ 2009 Program PN-II (BIMAPAFLU), *Processing of advanced magnetic nanostructures in the form of nanoparticles and Fe based nanofluids, for biomedical applications*, Value 16.020 RON/ 2009.
6. Ctr. nr. 7-018/2009, Program PN-II – ERA-NET(MAFINCO), *Magnetic Fluid – New Insulated and Cooling Medium for Power Transformers*, Value 54.000 RON/2009.
7. Ctr. nr.21-059/2009, Program PN-II, (CFEEL), *Functional compatibility of special electrical equipment, with magnetic ferrofluids (isolated passages, transformers, physical micro-particles ondulators, industrial frequency voltage dividers)*, value 41.235 RON/2009.
8. Ctr. nr.1373/2009, Program PN-II, (SEMARO-GAZ), *Sealing system based on magnetic nanofluids for gas valves*, value 40.000 RON/2009.
9. Ctr. nr. 71-083/2009, Program PN-II (BIMAPAFLU), *Processing of advanced magnetic nanostructures in the form of nanoparticles and Fe based nanofluids, for biomedical applications*, value 29.370 RON/ 2009, Director, Dr. Fiz. Ladislau Vekas.
10. Ctr. nr. 71-068/2009 Program PN-II (NANO-MAGPOLI), *Nanostructured biocompatible systems based on magnetic nanoparticles and polymers with response to external stimulus*, value 18.690 RON/2009.
11. Ctr. nr. Ro 0018, Cercetare cu execuție 85% Norvegia 15% Universitatea "Politehnica" Timișoara, *Improvement of the structures and efficiency of small horizontal axis wind generators with non-regulated blades*, Val. totala: 1.210.000 RON, 230.024 RON/2009, Director: Proștean O, coordinator MH: Miloș Teodor.
12. Ctr. nr. ID-34 Idei, CNCSIS, *Development of models for the estimation of material behaviour to cavitationnal*, Val. 950.000 RON, 184.450 RON/2009, director: Bordeasu Ilare.
13. Ctr. nr. ID35 Idei CNCSIS, *Study of the hydrodinamic and cavitation phenomena in the automatization and force systems*, Val.

- 965.453 RON, 398.127 RON/2009, Director Balasoiu Victor.
14. Contract nr. CNMP 1467/21047/2007-2010, Parteneriat IV - CNCISIS *Hydraulic adaptive systems for low power eolian turbines* – SHATEMP, Val. 448.000 RON, 88.524 RON/2009, Balasoiu Victor.
 15. Contract nr. ID 929/2008, nr. 679/2009, Idei CNCISIS, *Intelligent hydrodynamic transmissions*, 980.000 RON, 105.042,20 RON/2009, Director: Manea Adriana Sida
 16. Contract nr. 3416/21-036/2007, CNMP - PNCDI IV, Parteneriate, *Energetic supplying of a local comunity using air currents*, Val. 2.250.000RON, 284.506 RON/2009, Director: Miloş Teodor
 17. Contract nr. 1365/21-041/2007, CNMP - PNCDI IV, Parteneriate, *Optimization of intelligent energetic systems for water transportation for the increase of energetic efficiency and energy saving*, Val. 620.000 RON, 110.880 RON/2009, Director: Miloş Teodor
 18. Contract nr. 661/18.05.2007, SC CLAGI-Romania SRL, Biled, *Assimilation into fabrication of some wind turbines of low/medium power*, Val. 24.000 RON, 10.000 RON/2009, Director: Miloş Teodor.

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2. Alexandru Baya, Liviu Anton, Adrian Stuparu, *Measuring and monitoring of hydraulic input in real time*, students manual, Orizonturi Universitare Publishing House, Timisoara ISBN 978-973-638-408-0, 190 pp (2009)
3. Miloş Teodor, *Centrifuge and axial pumps and fans*, Politehnica Publishing House Timișoara, ISBN 978-973-625-838-1, 268 pp. (2009)
4. Daniel Catalin Stroita, *Dynamic identification of double flux turbines*, PhD Coordinator: Prof.dr.ing. Mircea BARGLAZAN, PhD Thesis, Series 9: Mechanical Engineering nr. 57, Politehnica Publishing House Timisoara, ISBN 978-973-625-902-9, 188 pp (2009)
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PhD Coordinator: Acad. Ioan ANTON, PhD Thesis, Series 9: Mechanical Engineering nr. 61, Politehnica Publishing House ISBN 978-973-625-933-3, ISSN 1842-4937, 236 pp, 2009

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2. N. Aldea, Rodica Turcu, Alexandrina Nan, Izabella Craciunescu, O. Pana, Yaning Xie, Wu Zhonghua, Doina Bica[†], L. Vekas, Florica Matei, *Investigation of nanostructured Fe₃O₄ polypyrrole core-shell composites by X-ray absorbtion spectroscopy and X-ray diffraction using synchrotron radiation*, Journal of Nanoparticle Research, 11 (6), pp. 1429-1439 (2009). Impact factor (ISI): 2.299
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4. P. Papaphilippou, L. Loizou, N. C. Popa, A. Han, L. Vekas, A. Odysseos, and T. Krasia-Christoforou, *Superparamagnetic Hybrid Micelles, Based on Iron Oxide Nanoparticles and Well-Defined Diblock Copolymers Possessing beta-Ketoester Functionalities*, Biomacromolecules, Vol. 10, Issue 9 (2009), pp. 2662-2671. Impact factor ISI 2008 4.146
5. Morjan, R. Alexandrescu, M. Scarisoreanu, C. Fleaca, F. Dumitrache, I. Soare, E. Popovici, L. Gavrilă, E. Vasile, V. Ciupina, N. C. Popa, *Controlled manufacturing of nanoparticles by the laser pyrolysis: Application to cementite iron carbide*, Applied Surface Science, 255, (2009), pp. 9638–9642. Impact factor ISI 2008 1.576
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11. Bordeasu, I., Popoviciu, M., Bălăsoiu, V., Gombos, R. Gombos, M. Ghiban, B., *Contributions upon the cavitation erosion of two cast irons used in manufacturing control valves*, Metalurgia International, vol. XIV (2009), no.11, pp. 5-7, ISSN 1582-2214. Impact factor (ISI): 0.333
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16. Mitelea, I., Varzaru, N., Bordeasu, I., Scurtu, D., *Failure Analysis of High Frequency Welding Fixed Joints of Thermoplastic Polymers*, Chem. Abs. Materiale plastice, Vol. 46, Nr.1, pp. 439- 443, ISSN 0025-5289, Impact factor (ISI): 0.804
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19. Cioablă, I. Ionel, I. Pădurean, A. Țenchea, F. Popescu, A. Savu, *Biogas production from agricultural residues. Test rig and results*, Metalurgia Internațional, Romanian Metallurgical Foundation, Scientific Publishing House, București, vol. XIV (2009), no. 3, pp. 40-44, ISSN 1582-2214, Impact factor (ISI): 0.333
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22. C. Constatin, M. Dobrin, I. Ionel, I. Pădurean, F. Popescu, *Implementation in the romanian energy industry the flue gas wet desulphurisation methods, dream and reality*, Metalurgia Internațional, Romanian Metallurgical Foundation, Scientific Publishing House București, vol. XIV (2009), no. 9, pp. 14-20, ISSN 1582-2214, Impact factor (ISI): 0.333
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18. Ioan Pădurean, *Influence Of Structural State On Cavitation Erosion Of Martensitic Stainless Steel Used In Casting Rotors Of Hydraulic Turbines*, *Metalurgia, Federația Patronală Metalurgia Și Editura Științifică F.M.R, București (60) 2009, Nr. 12, pp 21-26, ISSN 0461- 9579*
19. Georgeta Emilia Mocuța, Mihaela Popescu, Ioan Pădurean, Remus Belu-Nica *Metal Composite Materials And Their Application In The Transport's Field*, *Metalurgia Federația Patronală Metalurgia Și Editura Științifică F.M.R București, (60) 2009, Nr. 12, pp 30-35, ISSN 0461-9579*
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5. Bordeasu, I., Popoviciu, M. O., Novac, M. D., Băran, M., *Recorded Cracks in the Shaft of a Hydraulic Bulb Turbine*, Scientific Buletin of the Politehnica University of Timisoara Transactions on Mechanics, vol. 54/68, pp. 19-24, ISSN 1224-6077
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ORGANIZED CONFERENCE

1. 5rd Romanian-German Workshop on Turbomachiner Hydrodynamics, Timisoara, 01-04 iulie, 2009. Organizatori: Universitatea "Politehnica" Timișoara - CNISFC, Universitatea din Stuttgart, Academia Română - Filiala Timișoara.
2. Primul Workshop in exploatarea și re tehnologizarea hidroagregatelor din Romania, Timisoara, 23-24 iulie, 2009, Organizatori: Universitatea "Politehnica" Timișoara-CNISFC, Academia Română-Filiala Timișoara.

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. Alexandru BAYA
- Prof.dr.ing. Ilare BORDEAȘU
- 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
- Asist.ing. Rodica BĂDĂRĂU
- Asist.ing. Liliana SUCITU
- Asist.dr.ing. Daniel Cătălin STROIȚĂ
- Dr.ing. Nicolae POPA, CS I
- Conf.dr.ing. Nicoale CRAINIC
- Dr.fiz. Vlad SOCOLIUC, CS II
- Sl. dr.chim. Daniela RESIGA
- Sl.dr.ing. Adelina HAN
- Assist. Prof. Adrian STUPARU
- Dr.ing..chim. Camelia PODARU, CS
- Fiz. Oana MARINICA, CS
- Ing.fiz. Camelia DAIA, As. S.
- Ing.chim. Alina TACULESCU, As. S
- Phd. Stud. Alin BOSIIOC
- Phd. Stud. Constantin TANASA
- Phd. Stud. Alin ANTON
- Phd. Stud. Irina MOISA
- Phd. Stud. Alin JURCHELEA
- Phd. Stud. Adrian KARABENCIOV
- Phd.Stud. Nicolae BIRAU
- Phd.Stud. Elena DIMIAN
- Stud. Sorin CONSTANTIN
- Stud. Gheorghita GANGA
- Stud. Mariana TODIRUȚĂ
- Stud. Master Laurențiu MIRCEA
- Stud. Master Laurențiu Daniel CĂLIN
- Stud. Dușița PAVLOV
- Stud. Laura SĂLCIANU
- George GIULA
- Florica BALANEAN
- Tehn. Ioan POTORAC

CONTACTS

Prof.dr.ing. Romeo SUSAN-RESIGA,
 Director NCESCF
 Tel/Fax: + 40-256-403692
 E-mail: resiga@mh.mec.upt.ro
 romeo.resiga@mec.upt.ro
 http://mh.mec.upt.ro/cnisfc

Prof.dr.ing. Ilare BORDEASU
 Chair of the Hydraulic Machinery Div.
 Tel: + 40-256-403680
 E-mail: ilarica@mec.upt.ro
 http://www.mec.upt.ro/~mh/

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 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 underlined 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 director of the Centre is PhD. Prof. Eng. **Adrian Chiriac**, chair of the Department of Mechanics and Vibrations at the Faculty of Mechanical Engineering.

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

KEYWORDS

Vibration, vibroimpact, noise, impact, spectrum, auto-spectrum, prediction, diagnosis, homotopy methods, variational 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:

- 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;
- Methods for the study of the vibrations of mechanical systems, with applications in engineering.
- Fault diagnosis by vibrations at machines and equipment;
- Theoretical and experimental studies, concerning the elaboration of new methods and equipment for decreasing the levels of vibrations and noise;
- 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 generation 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. *Investigation of the acoustic field in the neighborhood of the production hall of S.C. Profial Company SRL Timișoara, Ctr. 73/2009, S.C.A&D Profial Company S.R.L Timisoara (Assoc.Prof. N. Herișanu)*
2. *Researches on the acoustic field generated by some noise sources of S.C. TIM SBD SRL Timișoara, Ctr. 50/12.05.2009, S.C. Tim SBD Timisoara (Assoc.Prof. N. Herișanu)*

3. *Assessment of the acoustic field in the neighborhood of ART CLUB 700 Timișoara*, Ctr. 131/ 24.11.2009, S.C. Versatil Art SRL Timișoara (Assoc.Prof. N. Herișanu)
4. *Study on the acoustic field generated by SC Gim & Ovi Service SRL*, Ctr. 132/ 24.11.2009, S.C. GIM & OVI SERVICE SRL, Timișoara (Assoc.Prof. N. Herișanu)
5. *Study on the noise abatement in Timișoara using elastic asphalt*. Ctr. 108/ 16.10.2009, Timișoara City Hall (Assoc.Prof. N. Herișanu)

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PAPERS IN ISI JOURNALS

1. N.Herisanu, V.Marinca, *An iteration procedure with application to Van der Pol oscillator*, International Journal of Nonlinear Science and Numerical Simulation, 2009, vol. 10, pp. 353-361
2. V. Marinca, N. Herișanu, C. Bota, B.Marinca, *An optimal Homotopy Asymptotic Method applied to the steady flow of a fourth-grade fluid past a porous plate*, Applied Mathematics Letters, 2009, vol. 22, pp. 245-251
3. V. Marinca, N. Herișanu, *An analytical approach to the dynamic analysis of a rotating electric machine*, Computers and Mathematics with Applications, 2009, vol.58, pp. 2320-2324
4. V. Marinca, N. Herișanu, *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, 2009, in press (on-line), doi: 10.1016/j.jsv.2009.11.005
5. G E Draganescu, A Messina, A Napoli, *Coherent and squeezed vibrations for discrete variable harmonic oscillators*, Journal of Modern Optics, Vol. 56, No. 4, 20 February 2009, pp. 508-515
6. G.E. Draganescu, L. Bereteu, A. Ercuta, G. Luca, *Anharmonic vibrations of a nano-sized oscillator with fractional damping*, Communications in Nonlinear Science and Numerical Simulation, 2009, in press (on-line), doi: 10.1016/j.cnsns.2009.05.006

PAPERS IN ISI PROCEEDINGS

1. Luca G., Nagy Ramona, Menyhardt K. *Dynamical analysis of an upper limb prosthesis*, Annals of DAAAM for 2009 & Proceedings of the 20th international DAAAM symposium - intelligent manufacturing & automation: focus on next generation of intelligent systems and solutions, 2, 791-792 (2009)

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1. Bacria V., Herisanu N., *Considerations upon the noise generated by some Diesel engines used in agriculture* Research Journal of

- Agricultural Science, 41 (2), 2009, pp. 325-330
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3. Bereteu L., Nagy Ramona, Boltosi Al., Chiriac A. *Tunable Magnetorheological Elastomers. Some Mechanical Applications*, Annals of the University of Oradea, Fascicle of Management and Technological Engineering, CD-rom edition, Vol. VIII (XVIII), 2009, S1, pp. 107-111
4. Boltosi Al., Chiriac A., Nagy Ramona, Bereteu L., Fenchea M., *Magnetorheological Fluid Damper in Modular Structure* Annals of the University of Oradea, Fascicle of Management and Technological Engineering, CD-rom edition, Vol. VIII (XVIII), 2009, S1, pp. 118-123
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3. Boltosi, A., Chiriac, A., Țirdea, A., Simoiu, D., *Stewart Platform Realized with Magnetorheological Dampers*, Studia Universitatis "Vasile Goldiș", Arad, Nr.4, 2009.

4. Lupu, I., V., Chiriac, A. *On the Vibration Level Determination at Electric Motors*, Studia Universitatis "Vasile Goldiș", Arad, Nr.4, 2009
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INTERNATIONAL CONFERENCES

1. Boltosi Alexandru, Hule Voichița, TIRDEA AMALIA, Simoiu Dorin, Chiriac Adrian *Experimental Test Bench for Magneto-rheological Damper* "Proceedings of the physics conference: TIM-08. AIP, Timisoara, Romania, The West University of Timisoara, Faculty of Physics Conference Proceedings, The Smithsonian/NASA Astrophysics Data System Digital Library for Physics and Astronomy, 2009" Volume 1131
2. Herisanu N., Marinca V., *Study on the dynamic behavior of an electrical machine rotor-bearing system with non-linear suspension by optimal variational iteration method*, 2nd International Congress of Serbian Society of Mechanics (IConSSM 2009), Palić (Subotica), Serbia, 1-5 June 2009
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4. Herisanu N., Marinca V., *Investigation of periodic solutions for a class of nonlinear oscillators*, 2-nd International Conference "Research people and actual tasks on multidisciplinary sciences", 10-12 June 2009, Lozenec, Bulgaria, pp. 24-28
5. Marinca V., Herisanu N., *Optimal iteration procedure for construction of periodic solutions of nonlinear oscillators*, 2-nd International Conference "Research people and actual tasks on multidisciplinary sciences", 10-12 June 2009, Lozenec, Bulgaria, pp. 29-33
6. Bacria V., Herisanu N., *Some aspects concerning the decrease of the noise generated by the contact between the tire and the road*, 2-nd International Conference "Research people and actual tasks on multidisciplinary sciences", 10-12 June 2009, Lozenec, Bulgaria, pp. 137-141
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10. V.Bacria, N.Herisanu, *Acoustical arrangement of the urban roads*, ISIRR 2009 10-th International Symposium "Interdisciplinary Regional Research Romania-Hungary-Serbia, Hunedoara, 23-24 aprilie 2009, S3-04
11. Bacria V., Herisanu N, *Acoustical investigation of aquatic fittings*, 8-th International Conference Noise. Vibration. Seismic actions. Intelligent protection systems, Resita, 21-24 octombrie 2009, pp. 16.

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1. R Anghelescu, V Anghelescu *Mathematics for economy*. „Politehnica” Publishing House, ISBN 978-973-687-937-1, 278 pages, 2009.
2. V Anghelescu, R Anghelescu *Statistics*. „Eurostampa” Publishing House, ISBN 978-873-687-926-6, 258 pages, 2009

PhD THESIS

1. Nicolae Ionel Valentin, *Internet monitoring and wireless solutions for the mechanical parameters*, September 2009, PhD coordinator: Cioară Titus
2. Căplescu Cristiana, *Methods and processing algorithms for the vibration signals*, July 2009, PhD coordinator: Cioară Titus
3. Boltosi Alexandru, *Vibration attenuators realized with magnetorheological composites*, 17 December 2009, PhD coordinator: Cioară Titus
4. Felicia (Dragu) Tupan *Informatizing and sorting noise and vibration experimental data*, 4 November 2009, PhD coordinator: Cioară Titus.

PhD THEMES

Scientific supervisor: Prof.dr.eng. Titus Cioară

1. Anghelescu Rodica Delia, *Optimization methods in the study of vibrations and vibroimpacts*
2. Birceanu Dănuț, *Study of noise generated by the elastic collision of two bodies*
3. Fântână Nicolae Eugen, *Measures of noise and vibration reduction in order to assure the environment comfort at heating systems with radiant panels, respectively, radiant floors*

4. Lupu Ioan, *Vibrations and vibroimpacts at electromechanical systems*
5. Palincaş Gabor Romeo, *Researches concerning the work of attachment - detachment device of an airbag*
6. Roşoga Daniela Lucia, *Mathematical models in the study of cylindrical sieves.*
7. Tocarciuc Alexandru, *Theoretical and experimental studies concerning the dynamic effects that appear in the poly-phase fluid transport by pipe networks*

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. eng. Liviu BERETEU
- Prof. dr. eng. Adrian CHIRIAC
- Prof. dr. eng. Titus CIOARĂ
- Prof. dr. Vasile MARINCA
- Prof. dr. eng. Ioan SMICALĂ
- Prof.dr. Gheorghe DRĂGĂNESCU
- Assoc. prof. dr. Pantele CHELU
- Assoc. prof. dr. eng. Nicolae HERIŞANU
- Lect. dr. Valeriu ANGHELESCU
- Lect. dr. eng. Gheorghe LUCA
- Asist. eng. Ramona NAGY
- Math. Cristiana CAPLESCU, PhD student
- Eng. Amalia TARDEA, PhD student
- Phys. Alexandru BOLTOSI, PhD student
- Eng. Dan STANESCU, Ph D Student

CONTACT

Prof. dr. eng. Adrian CHIRIAC, Director of the Centre
 Department of Mechanics and Vibrations
 Faculty of Mechanical Engineering
 Bul. Mihai Viteazu, no. 1
 300222, Timișoara
 E-mail: chiriac@mec.upt.ro
 Tel.: + 40-256-403627

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 design;
- Processes and manufacturing systems integrated management;
- Products and manufacturing devices new models design;
- Integrated Design of products, manufacturing processes and systems;
- Integrated control of the manufacturing processes and systems;
- New products and manufacturing equipment;
- The development of the equipments and technologies for non-conventional technological 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 post-graduate 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, is member of different professional and scientifically organizations and organizes different scientific meetings (seminars, conferences etc.).
- Participation to the EC Sixth Framework Program (FP6) as a partner to a network of excellence project: *Virtual Research Lab for a Knowledge Community in Production (VRL-KCiP)*, contract no. FP6-507487-2
- Participation to grant competitions through CNCSIS, national programs CEEEX, RELANSIN, AMTRANS, MATNANTECH etc.
- 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 2009: 11.559 €
2. Contract 105/24.09.2009, *Technical assistance contract*, Director: Assoc. Prof. Ion Grozav, Value for 2009: 2.434 Lei
3. Contract 147/09.11.2009, *Rapid prototyping of parts in automotive industry*, Director: Assoc. Prof. George Belgiu, Value for 2009: 1.400 Lei
4. Contract BC7/17.09.2009, *Cooperation and mutual support between Walter Romania and Training Center for Metal Cutting Technology within the Timisoara Politehnica*, Director: Lecturer Adrian But, Value for 2009: 4.741 Lei

5. Contract BC6/17.09.2009, *RENISHAW support for HTEC*, Director: Lecturer Adrian But, Value for 2009: 11.000 Lei

Prospective:

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

PUBLICATIONS

BOOKS

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3. Drăghici G., Drăghici A., *Collaborative Product Development in PLM Multisite Platform*, Advances in Manufacturing Engineering, Quality and Production Systems, Proceedings of the 1st WSEAS International Conference on Manufacturing Engineering, Quality and Production Systems MEQAPS'09, vol. II, Brasov, Romania, September 24-26, 2009, WSEAS Press, ISBN 978-960-474-122-9, ISSN 1790-2769, pp. 327-332 (ISI Proceedings)
4. Mazilescu, C. A., Drăghici, A., Drăghici, G., Mihartescu, A. A., Constantin, D., *How Learn and Process Information the Students in Technical Universities*, Annals of DAAAM for 2009 & Proceedings of the 20th International DAAAM Symposium, Editor B. Katalinic, Published by DAAAM International, Vienna, Austria 2009, ISBN 978-3-901509-70-4, ISSN 1726-9679, pp. 1763-1764 (ISI Proceedings)
5. Banciu, F., Drăghici, G., Mazilescu, C. A., *Methodology and Platform for Integrated Product Design*, Annals of DAAAM for 2009 & Proceedings of the 20th International DAAAM Symposium, Editor B. Katalinic, Published by DAAAM International, Vienna, Austria 2009, ISBN 978-3-901509-70-4, ISSN 1726-9679, pp. 0927-0928 (ISI Proceedings)
6. Pămîntaş, E., Turc, C., Belgiu, G., *Integrated Maintenance as Profitable Approach*, Annals of DAAAM for 2009 & Proceedings of the 20th International DAAAM Symposium, Editor B. Katalinic, Published by DAAAM International, Vienna, Austria 2009, ISSN 1726-9679, pp. 1131-1132 (ISI Proceedings)
7. Robu, N., But, A., *HTEC Implementation in "POLITEHNICA" University of Timisoara*, Proceedings of the 6th International Conference on Management of Technological Changes, ISBN 978-960-89832-6-7, pp. 541-544
8. Belgiu, G., Rușeț, V., Pămîntaş, E., Cărăușu, C., Turc, C. G., *Intelligent and adaptive controller for a metal cutting process*, Annals of DAAAM for 2009 & Proceedings of the 20th International DAAAM Symposium, Editor B. Katalinic, Published by DAAAM International, Vienna, Austria 2009, ISBN 978-3-901509-70-4, pp. 1301-1302
9. Turc, C. G., Belgiu, G., Pămîntaş, E., Rușeț, V., *Ultrasonic assisted of die sinking electrical discharge machining using standard equipments and devices*, Annals of DAAAM for 2009 & Proceedings of the 20th International DAAAM Symposium, Editor B. Katalinic, Published by DAAAM International, Vienna, Austria 2009, ISBN 978-3-901509-70-4, pp. 911-912
10. Belgiu, G., Oancă, O., Rușeț, V., Sîrbu, A., *The Geometry Influence of the Active Sonotrode Surfaces over the Quality of Ultrasonic Welding for the Plastic Materials*, Annals of DAAAM for 2009 & Proceedings of the 20th International DAAAM Symposium, Editor B. Katalinic, Published by DAAAM International, Vienna, Austria 2009, ISBN 978-3-901509-70-4, pp. 1213-1214 (ISI Proceedings)
11. Belgiu, G., Rușeț, D., Mocan, M., *Human Resource Management and the Influence of Optimal CAD/CAM/CAE/PLM Technologies in Tools and Mould Making Industry*, Annals of DAAAM for 2009 & Proceedings of the

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 17. Mihărtescu, A., Drăghici, A., Drăghici, G., *The Identification of Users and Their Relations with the Product Development Team*, Annals of the Oradea University, Fascicle of Management and Technological Engineering, Volume VIII (XVIII), ISSN 1583-0691, pp. 1896-1899 (Ulrich's Periodicals Directory)
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 19. Banciu, F., Drăghici, G., Turc, C., *Holistic Approach on Integrated, Collaborative Product Design*, Proceedings of the 13th ModTech International Conference - Modern Technologies, Quality and Innovation, Iasi Romania, 21-23 May 2009, ISSN 2066-3919, pp. 39-42 (Inspecc)
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 21. Belgiu G., Șerban, D.A., Negru-Străuți, G., *Industrial design – a way for designing pleasurable products and human interfaces*, Buletinul Științific al Universității "Politehnica" din Timișoara, Tom 54(68), Fasc.2, 2009, ISSN 1224 – 6077, 6 pp.
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 23. Riel, A., Tichkiewitch, S., Grajewski, D., Weiss, Z., Drăghici, A., Drăghici, G., Messnarz, R., *Formation and Certification of Integrated Design Engineering Skills*, International Conference on Engineering Design, ICED'09, Stanford University, Stanford, CA, USA, 24 - 27 August 2009
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1. Lidia Dejeu, *Product Modeling for the First Design Stages*, Thesis supervisor: Prof. George Drăghici (2002)
2. Felicia Banciu, *Developing of a Innovative, Collaborative Product Design Platform*, Thesis supervisor: Prof. George Drăghici (2002)
3. Ana-Andreea Mihărtescu, *Customer Requests Integration in the Product Design Stage*, Thesis supervisor: Prof. George Drăghici (2003)
4. Adrian Orița, *Functional Design for Product*, Thesis supervisor: Prof. George Drăghici (2005)
5. Sorin George Lemac, *Mathematical models for geometric entities description for manufacturing*, Thesis supervisor: Prof. George Drăghici (2001)
6. Dinu Iacob Poiana, *Study of drilling process using a singular blade*, Thesis supervisor: Prof. George Drăghici (2003)
7. Adrian Luca, *Product collaborative development on PLM multisite platform*, Thesis supervisor: Prof. George Drăghici (2009)
8. Dorian Ștef, *Integrated product design and manufacturing platform*, Thesis supervisor: Prof. George Drăghici (2009)

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. Ioan Pircea

- Assoc. prof. dr. eng. Dănuț Șosdean
- Lect. dr. eng. Adrian But
- Lect. dr. eng. Cristian-Gheorghe Turc
- Assist. Eng. Felicia Banciu
- Eng. Adrian Luca, PhD student
- Eng. Dorian Stef, PhD student

CONTACT

Prof. dr. eng. George DRĂGHICI – IERC Director
Faculty of Mechanical Engineering
Bul. Mihai Viteazu, nr. 1
300222, Timișoara, Romania
Tel/fax: +40-256-403610
Fax: +40-256-403523
Web: http://www.mec.utt.ro/~tcm/ccii_ro.html
E-mail: gdraghici@eng.upt

RESEARCH CENTRE FOR PROCESSING AND CHARACTERISATION OF ADVANCED MATERIALS

MAIN RESEARCH 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 microscopies 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.

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 61. Bălăbuc C, Todea Carmen, Filip L, Călniceanu M, Demian C, Locovei C, Răduță A., *Microscopic Investigation of Apical Microleakage after Laser-Assisted Root Canal Treatment*, 3rd Ed International Conference on Lasers in Medicine „New Highlights in Clinical Practice” Timisoara, 24-26 sept. 2009, Timisoara Medical Journal, Vol 59, Suppl 3, pp. 33, ISSN 1583-5251;
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3. Contract PNII- Capacity No. 3-322 / 2007, *Development at European level of the laboratory for welding and testing thermoplastic materials*, Financer: CNCISIS, Director: Popescu Mihaela, Value 2009 (UPT): 3.420 lei;
 4. 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 2009 P3(UPT): 90.000 lei;
 5. 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 Şerban, Value 2009(UPT): 103.320 lei;
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 8. Contract No. 686/19.01.2009 (Cod_1005), *Phenomenology modellation of friction weldability of materials with functional gradient*, Financer: CNCISIS, Director: Mitelea Ion, Value 2009(UPT): 95.000 lei;
 9. 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 2009(UPT): 20.000 lei;
 10. Contract No. 161/10.10.2008, *Execution services for the project intituled "Researches regarding the development of brazing technologies using concentrated energies for aluminum tubes used in autovehicles production"*, Financer: SC Contitech SRL Romania, Director: Nicoară Mircea, Value 2009(UPT): 11.290,72 lei;
 11. Contract No. 97/22.09.2009, *Researches and investigations concerning the characteristics and properties of superficial plating of parts from the current production*, Financer: SC Leman Industri Romania SRL, Director: Nicoară Mircea, Value 2009(UPT): 1.535,10 lei;

PhD THESIS – presented –

1. *Contributions regarding coated steels welding*, Author: Aurelian Magda, Scientific Coordinator: Prof.dr.eng. I. Milos.

RESEARCH CONTRACTS

1. Contract No. 9/2009, *Corrosion behaviour of aluminum alloys*, Financer: Alfred Kaercher AG, Director Radu Bogdan, Value 2009(UPT): 21.000 lei;
2. Contract No. 10/2009, *Suport software CAD/CAE/CAM Siemens PLM Solutions*, Financer: EADS Deutchland GmbH + SIEMENS Product Lifecycle Managemnts

12. Contract No. 136/09.12.2009, *Execution services for the project intituled "Consultancy regarding optimization of materials selection, constructive conception, technology design and quality ensurance for the production of electric heating elements"*, Financer: SC Zoppas Industries Romania SRL, Director: Nicoară Mircea, Value 2009(UPT): 45.384,72 lei;
13. Contract No. 19/28.01.2009, *Execution services for the project intituled "Technical asistance and consultancy regarding the quality of products from the current production of SC Zoppas Industries Romania SRL"*, Financer: SC Zoppas Industries Romania SRL, Director: Răduță Aurel, Value 2009(UPT): 3.570 lei;
14. Contract No. 23/18.02.2009, *Investigations of physical-chemical characteristics of some steels verified at inspections conducted by ISIM Timisoara*, Financer: ISIM Timisoara, Director: Răduță Aurel, Value 2009(UPT): 1.725,50 lei;
15. Contract No. 78/22.07.2009, *Tests and analysis for the investigation of materials quality from the current production of SC COSTEX SI CRIS SA*, Financer: SC COSTEX SI CRIS SA, Director: Răduță Aurel, Value 2009(UPT): 2.243,15 lei;
16. Contract No. 114/02.11.2009, *Studies and investigations regarding the quality of products form the auto parts production of SC Continental Automotive SRL*, Financer: SC Continental Automotive SRL, Director: Răduță Aurel, Value 2009(UPT): 3.570 lei;
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18. Contract No. 111/26.10.2009, *Destructive and non-destructive testing for the establishing of failure causes of the radiator from the Volvo XC90 autovehicle*, Financer: Corina BUTIU-VISKI, Director: Elvira Moga-Modrea, Value 2009(UPT): 476 lei;
19. Contract No. 183/15.12.2008, *Consulting in welding of railway stock*, Financer: SC Sudexpert SRL Timisoara, Director: Popescu Mihaela, Value 2009(UPT): 3.927 lei;
20. Contract No. 32/09.03.2009, *Training and authorization welders according to EN 287-1: Training and certification of 40 welders for gas shielded welding MIG/MAG and covered electrode*, Financer: S.C. ATON Transilvania S.A., Sinandrei, Director: BURCA Mircea, Value 2009(UPT): 19.000 lei;
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23. Contract No. 98/2009, *Quantitative analysis by X-Ray diffraction of Aghires caolinite*, Financer: Hudac Ștefania Carmen, Director: Lita Marin, Value 2009(UPT): 249 lei.

RESEARCH TEAM

- Prof. dr. eng. Viorel Aurel ȘERBAN - Director
- Prof. dr. eng. Marin TRUȘCULESCU
- Prof. dr. eng. Voicu Safta
- Prof. dr. eng. Ioan CĂRȚIȘ
- Prof.dr.eng. Livius Miloș
- Prof. dr. eng. Ion MITELEA
- Prof. dr. eng. Victor BUDĂU
- Prof. dr. eng. Roland Laurențiu CUCURUZ
- Prof. dr. eng. Livius UDRESCU
- Assoc. prof. dr. eng. Aurel RĂDUȚĂ
- Assoc. prof. dr. eng. Mircea NICOARĂ
- Assoc. prof. dr. eng. Bogdan RADU
- Assoc. prof. dr. eng. C.M. CRĂCIUNESCU
- Assoc. prof. dr. eng. Mihaela Popescu
- Lecturer dr.eng. Dan Mălai
- Lecturer dr. eng. Doru Dumbravă
- Lecturer dr. eng. Mircea Burcă
- Lecturer dr.eng. Daniel Țunea
- Lecturer dr. fiz. Marin LIȚĂ
- Lecturer dr. eng. Sebastian Titus DUMA
- Lecturer dr.eng. Cosmin CODREAN
- Lecturer dr.eng. Dragoș UȚU
- Assist. eng. Carmen OPRIȘ
- Assist. eng. Cosmin LOCOVEI
- Assist. eng. Aurelian Magda
- Assist.dr.eng. Camelia DEMIAN
- Eng. Angela ZIMCEA
- Eng. Miron GAVRILONI
- Eng. Elvira Moga-Modrea

Contact

Dr. eng. Sebastian Titus DUMA
 E-mail: sduma@eng.upt.ro
 Tel: + 40-256-403751

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 CNCIS 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.

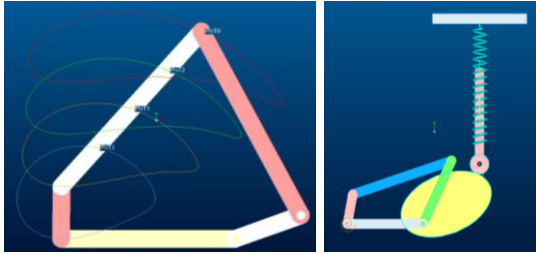
- CAD, artificial intelligence and virtual reality.

Keywords: 3D modeling, virtual reality, finite element method.

Researches in *MECHANISMS AND MECHANICAL DRIVES*

FIELD DESCRIPTION

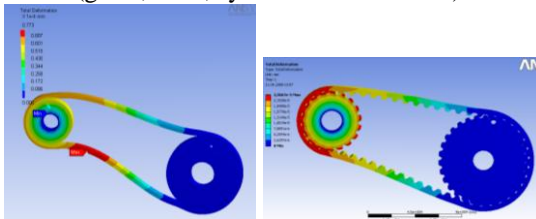
- theoretical study, design and tests of special purpose mechanisms and mechanical drives, cams and linkages, mechanical variators, behavior of machine elements and mechanisms



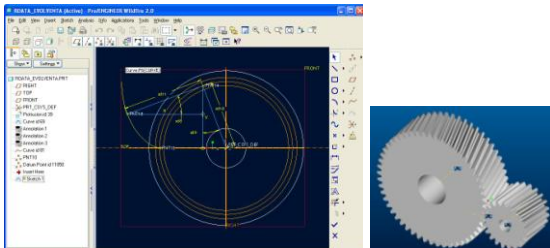
- tribological behavior of machine elements and mechanisms

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. Francisc KOVACS
- 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
- Assoc.prof.dr.eng. Francisc IOANOVICI
- Assoc.prof.dr.eng. Erwin-Christian LOVASZ
- Assoc.prof.dr.eng. Iosif CĂRĂBAȘ
- Assoc.prof.dr.eng. Mircea DREUCEAN
- Assoc.prof.dr.eng. Veronica ARGEȘANU
- Assoc.prof.dr.eng. Carmen STICLARU
- Assist.eng. Ioan COȚA
- Lect. Dr.eng. Angela DREUCEAN
- 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.

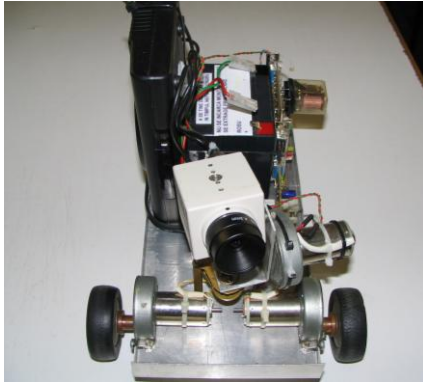


ACTIVITIES AND RESULTS

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

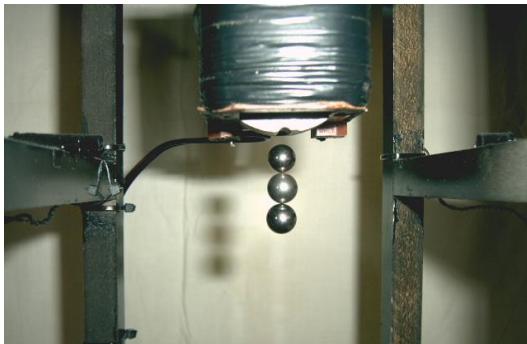


- Conception of flexible manufacturing modules, machining of medium – size parts (axles, bushings and prismatic parts).
- Flexible systems for manufacturing processes.



RESEARCH BENEFICIARES

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



RESEARCH TEAM

- Prof.dr.eng. Francisc KOVACS
- 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
- Assoc.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 BENEFICIARES

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



RESEARCH TEAM

- Prof.dr.eng. Dan PERJU
- Prof.dr.eng. Octavian GLIGOR
- Prof.dr.eng. Ioan NICOARĂ
- Prof.dr.eng. Alfred POMMERSHEIM
- Prof.dr.eng. Geroge 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
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- 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

1. Adrian G. R. *Dynamic stability of composite laminates* tratat, VDM Verlag (March 18, 2009) 160 pp., 978-3639053791, 2009;
2. Dolga V., Maniu I., Grigorescu S., Dobra A. *"Education and mechatronics research at "Politehnica" University of Timisoara in "Mechatronics platforms for education and research"*, monografie, Editura TODESCO 24 pp., ISBN 978-973-7695-79-6, 2009;
3. Lovasz E.-Chr., *Centroidal mechanisms*, Monografii, Editura "Politehnica" Timisoara, 320 pp., 978-973-625-920-3, 2009;
4. Maniu I., Varga St., Radulescu C., Dolga V., Bogdanov I., Ciupe V., *Robotics. Applications*, Tratat, Ed. "Politehnica", Timișoara, 297 pp., ISBN 978-973-625-842-8, 2009;
5. Bogdanov I., Maniu I., Dolga V., Radulescu C., Varga St., Ciupe V., *Robotics. Control system*, Tratat, Ed. "Politehnica", Timișoara, 217 pp., ISBN 978-973-625-903-6, 2009;
6. Maniu I., Dolga V., Ciupe V., Bogdanov I., Radulescu C., Varga St., *Robotics. Driving system.*, Tratat, Ed. "Politehnica", Timișoara, 339 pp., ISBN 978-973-625-996-8, 2009.

PUBLISHED PAPERS

1. K.-H. Modler, E.-C. Lovasz, G.F. Bär, R. Neumann, D. Perju, M. Perner, D. Mărgineanu, *General method for the synthesis of geared linkages with non-circular gears*, Mechanism and Machine Theory, vol. 44, pp. 726-738, ISSN 0094-114X, 2009;
2. D. Mocuta, C. Comes, V. Argesanu, A. Temelc, B. Dimitriu, M. Burlibasai, *The transition impact on life quality in Romania*, METALURGIA INTERNATIONAL vol. XIV (2009) special issue 00.15, pp. 92-94, ISSN 1726-9679, 2009;
3. V. Argesanu, M. Jula, *Basic topics of mechanical seals*, Annals of DAAAM for 2009 & PROCEEDINGS 2009, pp. 3241-3242, ISBN 978-3-901509-71-1;
4. V. Argesanu, A. Popa, C. Comes, *Remote-controlled mechatronic arm; Ergonomic system used in dentistry*, Annals of DAAAM for 2009 & PROCEEDINGS, pp. 3244-3245, ISBN 978-3-901509-71-1;
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6. V. Vacarescu, A. Draghici, V. Argesanu, C. F. Vacarescu, I. Crastiu, *Evaluation of an industrial welding robots' pose performances*, Annals of DAAAM for 2009 & PROCEEDINGS, pp. 1744-1745, ISBN 978-3-901509-71-1;
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8. M. Voinescu, A. Davidescu, V. Argesanu, *Ergonomical study regarding working in standing and seating postures*, Annals of DAAAM for 2009 & PROCEEDINGS, pp. 222-223, ISBN 978-3-901509-71-1;

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7. Mioc Mirella: *Medical Applications Oriented Knowledge Bases*, scientific supervisor: prof. Dr.eng. George Savii
8. Hoanca Radu: *Information System for Integrated Production Management*, scientific supervisor: Prof.dr.eng. George Savii
9. Gyiman Carmen: *Expert System for Production Management*, scientific supervisor: Prof.dr.eng. George Savii
10. Rusu Octav, *Studies about performance of railway apparatus for high speed trains*, scientific supervisor: prof. dr. eng. Lucian Mădăras;
11. Vela Daniel Gheorghe, *Contributions at functional and constructional development of harmonic drive*, scientific supervisor: prof. dr. eng. Lucian Mădăras;
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14. Moldovan Cristian, *Study of centroidal type mechanisms*, scientific supervisor: prof. dr. eng. Dan Perju;
15. Margineanu Eugenia, *Study of the influence of elasticity and hardness upon abrasive wear*, scientific supervisor: prof. dr. eng. Dan Perju;

PHD STUDENTS

1. Craciun Mihaela Daciana: *Information System for Credit Soliciting Companies Evaluation*, scientific supervisor: Prof.dr.eng. George Savi
2. Șerban Sorina Gabriela: *Computer Aided Education in Chemistry*, scientific supervisor: Prof.dr.eng. George Savii
3. Alba Claudio: *Information System for Remote Operation and Monitoring*, scientific supervisor: Prof.dr.eng. George Savii
4. Visa Mircea: *Computer Aided Design of Composite Materials*, scientific supervisor: Prof.dr.eng. George Savii
16. Lovasz Agneta, *Electronic mechanism library*, scientific supervisor: prof. dr. eng. Dan Perju;
17. Teodorescu Adriana, *Contribution to modelling, simulation and testing of mechatronics systems*, scientific supervisor: prof. dr. eng. Dan Perju;
18. Nicolaie Costel, *Contribution to improve the orthopedic corsets*, scientific supervisor: prof. dr. ing. Arjana Davidescu;
19. Voinescu Mihai, with scholarship, first year, *Contribution to improve the the inferior member prosthesis*, scientific supervisor: prof. dr. ing. Arjana Davidescu;

20. Mazuch Robert, without scholarship, first year, scientific supervisor: prof. dr. ing. Arjana Davidescu;
21. Semenescu Florin, without scholarship, first year, scientific supervisor: prof. dr. ing. Arjana Davidescu;
22. Bitea Alin, with scholarship, first year, scientific supervisor: prof. dr. ing. Valer Dolga;
23. Tilneac Mihaela, with scholarship, first year, scientific supervisor: prof. dr. ing. Valer Dolga;
24. Ciontos Ovidiu, with scholarship, first year, scientific supervisor: prof. dr. ing. Valer Dolga;
25. Vancu Alexandru, without scholarship, first year, scientific supervisor: prof. dr. ing. Valer Dolga;
26. Pasca Ghorghe, with scholarship, first year *Modelarea si simularea sistemelor de fabricatie flexibile robotizate*, scientific supervisor: prof. dr. ing. Inocentiu Maniu;
27. Voicu Mariana Claudia, without scholarship, first year, *Active damping of the flexible rolls from paper fabrication*, scientific supervisor: prof. dr. ing. Inocentiu Maniu;
28. Bistran Diana Alina, without scholarship, first year, *Numerical analyse of the stability of vortex flow*, scientific supervisor: prof. dr.eng. George Savii;
29. Chis Violeta, without scholarship, *Contributions to optimisation of energetical network connections*, scientific supervisor: prof. dr.eng. George Savii.

CONTACT

Prof. dr. eng. Erwin-Christian LOVASZ,
Head of Department, Bul. Mihai Viteazul Nr.1
300222 Timișoara, Romania
Tel: + 40-256-403551
E-mail: mecatronica@mec.upt.ro
Web: www.mec.upt.ro/mecatronica

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

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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/-

CONTACT

Director: Prof. Dr. eng. habil Ioana IONEL

1, Bv. Mihai Viteazu
300222 Timișoara

Tel. + 40-256-403670

Fax: + 40-256-403669

e-mail: ioana.ionel@mec.upt.ro

Web page:

<http://www.mec.upt.ro/~DEP4/CCMETTCP.pdf>

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 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. *Thermal-gas-dynamic modellation of internal combustion engines for alternative fuels operation* 685/ 2009 PNII-IDEI CNCSIS 980.000 RON – 111.896,20 RON - Mihon, L., Iorga, D., Padure, G., Ostoia, D., Tokar, Adriana, Irimescu, A.

PUBLICATIONS

BOOKS

1. Pop, Gh., Holotescu, S., *Comand and control systems for motor vehicles*, Students manual Politehnica Publishing House, Timisoara 136 pages, 978-973-625-937-1
2. Irimescu, A., *Internal combustion engines, Vol. I Thermodynamic processes*, Politehnica Publishing House, 224 pages, 978-973-625-950-0
3. Tokar, Adriana, Mihon, L., Ostoia, D., *Motor vehicles dynamics*, Mirton Publishing House, Timisoara 108 pages, 978-973-52-0712-0.

PUBLISHED PAPERS

1. Mihon, L., Ostoia, D., Negoitescu, Arina, Tokar, Adriana, *Simulation of vehcile's powertrain for performances evaluation DAAAM Proceedings*, 25-28.11.2009, Vienna, Austria 235 (2) ISSN 1726-9679
2. Ratiu S., Birtok-Baneasa C., Alic Carmen, Mihon, L., *New concepts in modeling air filters for internal combustion engines DAAAM Proceedings*, 25-28.11.2009, Vienna, Austria 171 (2) ISSN 1726-9679
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4. Tokar, Adriana, Negoitescu, Arina, Mihon, L., *Studies Regarding the CO2 Recovery from the Atmosphere Annals of DAAAM for 2009 & Proceedings of 20th DAAAM International Symposium*, Wien, Austria pp. 0349-0350, ISBN 978-3-901509-70-4
5. Mihon, L., Negoitescu, Arina, Tokar, Adrianadrana, Ostoia, D., *Tyre Quality Influence on Fuel Consumption for Motor Vehicles Annals of DAAAM for 2009 & Proceedings of 20th DAAAM International Symposium*, Wien, Austria pp. 0751-0753, ISBN 978-3-901509-70-5
6. Mihon, L., Ostoia, D., Negoitescu, Arina, Tokar, Adriana, *Simulation of Motor Vehicle's Powertrain for Evaluation of Performances and Emissions Annals of DAAAM for 2009 & Proceedings of 20th DAAAM International Symposium*, Wien, Austria pp. 0235-0237, ISBN 978-3-901509-70-6
7. Negoitescu, Arina, Tokar, Adriana, Ostoia, D., *Modelling of the Performance Level and Heat Flow for the ALCO R-251 FLO Diesel Engine 5th International Conferece on Sustainable Development, Stream: Process Modelling and Simulation*, Vilnius, Lithuania pp. 507-511, ISBN 978-9955-28-482-6
8. Ostoia, D., Negoitescu, Arina, Tokar, Adriana, *Evaluation Losses Leakiness by the Simulation of Pressure Loss in the Combustion Chamber of an Internal Combustion Engine*, 5th International Conferece on Sustainable Development, Stream: Process Modelling and Simulation, Vilnius, Lithuania pp. 512-516, ISBN 978-9955-28-482-7
9. Tokar, Adriana, Ostoia, D., Negoitescu, Arina, *Mathematical Simulation of a Tank Used for Equipping a High Speed Train in Order to Aim Safe Operation 5th International Conferece on Sustainable Development, Stream: Process Modelling and Simulation*, Vilnius, Lithuania pp. 517-521, ISBN 978-9955-28-482-8
10. Iliescu Mihaiela, Spanu Paulina, Nutu Emil, Mihon, L., *Experimental and Theoretical Studies on Mechanical Characteristics of an Important Composite Material Materiale plastice 46(1)*, 5 pp., ISSN 0025-5289
11. Amza Gheorghe, Luchian Cornelia, Nitoi Dan Florin, Dumitrache Florea, Borda Claudia, Voda Mircea, Mihon, L., *Experimental and Theoretical Researches Regarding Ultrasonic Welding Process Optimization of the Polymeric Matrix Composite Materials Materiale plastice 46(3)*, 9 pp., ISSN 0025-5289
12. Irimescu, A., *Full Load Performance of a Spark Ignition Engine Fueled with Gasoline-Isobutanol Blends Analele Universitatii Eftimie Murgu Resita Anul XVI Nr. 1/2009*, pp. 151, 6, ISSN 1453-7394
13. Irimescu, A., *Air-Fuel i-x Diagram for Gasoline-Bioethanol Blends Scientific Bulletin of the "Politehnica" University of Timisoara 54 (68) Fascicola 2*, pp. 37, 6, ISSN 1224-6077
14. Irimescu, A., Hiticas, I. *Full Load Performance of a Spark Ignition Engine with Faulty Variable Timing Scientific Bulletin of the "Politehnica" University of Timisoara 54(68) Fascicola 3*, pp. 45-48, ISSN 1224-6077
15. Negoitescu Arina, Tokar Adriana, - *Environmental Regulations for Marine Engines Operating with Natural Gas Fuel Scientific Bulletin of the "Politehnica" University of Timisoara, Vol.1*, pp. 47-51, ISSN 1224-6077
16. Tokar, Adriana, Negoitescu, Arina, *The Fuell Cell as an Option for Decentralized Power and Heat Generation and Automotive Industry Scientific Bulletin of the "Politehnica" University of Timisoara Vol 2*, pp. 63-67, ISSN 1224-6077

17. Negoïtescu, Arina, Tokar, Adriana, Ostoia, D., *The Importance of Non-Conventional Biofuel Utilization for Pollutant Emissions Reduction* ISIRR 2009 – 10th International Symposium “Interdisciplinary Regional Research” Romania – Hungary – Serbia, Annals of Faculty Engineering-Journal of Engineering, Hunedoara Vol 1, pp. S4-12, ISSN 1584-665
18. Tokar, Adriana, Sporea Ion, Negoïtescu, Arina, *Theoretical and Experimental Aspects Regarding the Sealed Efficiency of Diesel Engines Combustion Chambers* ISIRR 2009 – 10th International Symposium “Interdisciplinary Regional Research” Romania – Hungary – Serbia, Annals of Faculty Engineering-Journal of Engineering, Hunedoara Vol 1, pp. S5-33, ISSN 1584-665
19. Tokar, Adriana, Ostoia, D., Negoïtescu, Arina, *Studies and Tests Concerning Smelting Casting Alloy of Universal Aluminium* ISIRR 2009 – 10th International Symposium “Interdisciplinary Regional Research” Romania – Hungary – Serbia, Annals of Faculty Engineering-Journal of Engineering, Hunedoara Vol 1, pp. S5-36, ISSN 1584-665.
20. Padure, G., *Theoretical calculation of nitrogen oxides emitted by a diesel engine and calibration of results after experimental data* Buletinul Stiintific al UPT, Seria mecanica Tom 54(68), Fasc. 3/2009, pp. 57-62 ISSN 1224-6077
21. Mocuta Georgeta Emilia, Dan I., Rosca C., Popescu, Mihaela, Ostoia, D., *Technique for determination of fuel consumption in DIESEL LOCOMOTIVES* Buletinul Stiintific UPT, Seria Mecanica, Fasc. 1, 2009, Tom 54(68), pp. 1-4, ISSN 1224-6077
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23. Tokar Adriana, Negoitescu Arina, Mihon L., *Simulation of a Motor Vehicle Operating Conditions with Classical and LPG Fuel* The 8th International Conference "Fuel Economy, Safety and Reliability of Motor Vehicles", ESFA, Bucharest, Romania Vol 2 pp. 239-246, ISSN 2067-1083
24. Tokar D., Sporea I., Negoitescu, Arina, *Aluminium Alloys Structures, Mechanical Properties and After Casting Treatments* The 21 st International Conference "NAV-MAR-EDU", Mircea cel Batran Naval Academy, Constanța, Romania Vol 1 pp. 344-349, ISSN 1873-6749
25. Negrea Virgiliu Dan, Tokar, Adriana, Negoïtescu Arina, Ostoia, D., Negrea D. *The Non-Conventional Fuels and Noxious* 22nd International Automotive Conference with Exhibition SCIENCE AND MOTOR VEHICLES 2009 organized by JUMV, Beograd, Serbia Vol 1 pp. NMV0943-NMV0949, ISBN 978-86-80941-34-9
26. Padure, G., Negrea Virgiliu Dan, *Evaluation of the smoke degree and CO₂ emission in correlation with the distance covered by road vehicles* The 10th International Symposium "Interdisciplinary Regional Research" – ISIRR Hunedoara, 23-24.04.2009 Vol 1, pp. 4, CD proceedings
27. Padure, G., Irimescu, A., Calin, L., Trif, G., Cioabla, A., Vetres, I., *Theoretical Study of Emissions for Stationary Spark Ignition Engines Fueled with Biogas* BENA Conference "Management and Sustainable Protection of Environment", Alba Iulia, 06-07.05.2009 Vol 1 ISBN 4 978-973-1890-30-3

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

CONTACT PERSONS

Prof.dr.eng. Daniel IORGA (diorga@mec.upt.ro)
 Assoc.prof.dr.eng. Liviu MIHON (mihon@mec.upt.ro)
 Lect.dr.eng. Gelu PĂDURE (padure@mec.upt.ro)
 Lect. Dr.eng. Sorin HOLOTESCU (holos@mec.upt.ro)

Faculty of Mechanical Engineering
 1 Mihai Viteazul Bv., Timișoara, 300222
 Tel.: +40-256-403661, +40-256-403666
 Fax: +40-256-403520, +40-256-403669

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

- 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, Cal3qchr
- 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 (with attestation of ISCIR, the Romanian Authority for Safety of Boilers and Pressurized Installations) 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

RESULTS

RESEARCH PROJECTS / CONTRACTS

1. *Romanian atmospheric research 3D observator* STVES-115266 Grant Norwegian cooperation programme 1.083.580 RON – 473.945 RON NILU (Norvegia), INOE (Romania), UPT (Romania), UBB (Romania), UB (Romania), UAIC (Romania), IFIN (Romania), ANEM (Romania) Ionel, Ioana, Popescu, F., Luisa Isabela Dungan, Calin, L., Cebucean, V., Lontis, N., Trif, G., Cioabla, A., Vetres, I., Ionel, C., Marchis, I., Vasilescu, M., Gubencu, D.
2. *Promotion os short rotation coppice for district heating systems in Eastern Europe* IEE CALL 2009 – ALTENER (RES-H/C) Grant European Union 504.687,50 RON TTZ (Germania), BIOAZUL (Spania), BIOM (Cehia), UPT (Romania), BIOMASA (Slovakia), SITR (Polonia), LITBIOMA (Lituania), LSTA (Lituania), SDDE (Slovenia) Ionel, Ioana, Popescu, F., Oprisa, P.D., Luisa Dungan, Trif, G., Lontis, N., Cebucean, V., Calin, L.,

- Vetres, I., Petru Negrea, Ungureanu, C., Cioabla, A., Brateanu, G., Lelea, D., Laza, I.
3. EUBIONETIII- *Solutions for biomass fuel market barriers and raw material availability* (WP2) IEE/07/777/SI2.499477 Grant VTT Technical Reaserch: Center of Finland 5916 RON VTT (Finlanda), UPT (Romania) Ionel, Ioana, Popescu, F.
 4. EUBIONETIII- *Solutions for biomass fuel market barriers and raw material availability* (WP4) IEE/07/777/SI2.499477 Grant VTT Technical Reaserch: Center of Finland 5916 RON, VTT (Finlanda), UPT (Romania) Ionel, Ioana, Popescu, F.
 5. *Neighbourhood Programe Romania-Serbia, Banat region's sustainable development academic camp* 06SER02/03/06 Grant European Union 21250 RON, UPT (Romania), Universitatea "Novi Sad" (Serbia) Pavlovic M., Ionel, Ioana, Vojinovic, Mirjana, Lelea, D., Popescu, F., Padure, G., Nina Djapic, Rodoljub Stanojevic, Slavko Arsovski
 6. *Energy for a clean town* 22131 PNCD-II MEC 1.641.800 (740.000 UPT) RON, ISPE, OVM-ICPET, ECOPROIECT, COLTERM, ENINVEST, CCIB Ionel, Ioana, Popescu, F., Calin, L., Ionel C., Dungan, Luisa, Cebucean, D., Ionel, S., Cebucean, V., Trif, G., Lontis, N., Ungureanu, C., Lelea, D.
 7. *Romanian system network Lidar* 31-002 PN-II MEC 267.930 RON, UPT, INOE, METEO, UAIC, UBB, CRAIM, ESYRO Ionel, Ioana, Popescu, F., Calin, L., Ionel Ciprian Raul, Dungan, Luisa, Cebucean, D., Ionel, S., Cebucean, V., Trif, G., Lontis, N., Ungureanu, C., Lelea, D.
 8. *Measurements of COV emissions and particles* 792/2009 ACVACALOR BRAD ACVACALOR BRAD 5335,663 RON, Ionel, Ioana, Popescu, F.
 9. *Measurements of COV emissions* 155/2009 DETERGENTI SA 3.034,50 RON, Ionel, Ioana, Popescu, F., Lontis, N.
 10. *Measurements of COV, gasses and particles emissions*, 25/2009 AVVA 4.046 RON - Ionel, Ioana, Popescu, F., Lontis, N.
 11. *Measurements of gasses and particles* 42/2009 CONSTRUCȚII RUTIERE 2.023 RON Ionel, Ioana, Popescu, F., Lontis, N.
 12. *Measurements of gasses and particles* 38/2009 RAAAN ROMAG TERMO 44.385,20 RON - Ionel, Ioana, Popescu, F., Lontis, N.
 13. *Measurements of COV emissions* 57/2009 TRW AUTOMOTIVE 3.034,50 RON - Ionel, Ioana, Popescu, F., Lontis, N.
 14. *Measurements of environment* 60/2009 BERG BANAT (Suc Fagaras) 1.725,50 RON - Ionel, Ioana, Popescu, F., Lontis, N.
 15. *Measurements of COV emissions* 79/2009 TRW AUTOMOTIVE 297,50 RON - Ionel, Ioana, Popescu, F., Lontis, N.
 16. *Cercetare și dezvoltare în domeniul protecției mediului–Analiza calității aerului în municipiul Timișoara; măsurători CO2* 1235/2009 Primaria Timisoara Primaria Timisoara 33.000 RON - Ionel, Ioana, Popescu, F., Lontis, N., Dungan, Luisa, s.a.
 17. *Measurements of COV and particles*, 110/2009 GAMMET 2000 2023 RON - Ionel, Ioana, Popescu, F., Lontis, N.
 18. *Measurements of emissions* 113/2009 COCA-COLA 5.057,50 RON - Ionel, Ioana, Popescu, F., Lontis, N.
 19. *Measurements of COV and particles emissions* 118/2009 TMD FRICTION 3034,5 RON - Ionel, Ioana, Popescu, F., Lontis, N.
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2. Ionel, Ioana, Irimescu, A., Lontis, N., Popescu, F., Silaghi, F., Cioabla, A., Vetres, I., Cebucean, D., Silaghi, Diana *Resurse de energie nepoluanta*, Teme expriemntale Indrumator de laborator Editura Politehnica 118 973-625-947-0
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2. Ionel, Ioana, Ioan D, Francisc P., Cebrucean, Viorica, Trif, G., Dungan L *Post-combustion removal of carbon dioxide from flue gases* Metalurgia International Nr. 14 (1), 40, ISSN 1582-2214
3. Ionel, Ioana, Francisc P., Padure, G., Trif, G. *Procedure concerning the mercury removal from municipal waste combustion flue gases* Revista de Chimie Nr. 60 (1), 81, ISSN 0034-7752
4. D. Bădescu, M. Dobroiu, I. Ionel, I. Pădurean, G. Pădure, *Contribution regarding the national management system for reporting at European level of greenhouse gas emission data resulted from the industrial sectors covered by EU-ETS Direction* Revista Metalurgia International Vol. 14, nr.9/2009, pp. 27-34, ISSN 1582-2214
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7. Popescu, F., Ionel, Ioana, Ungureanu, C., *Air quality monitoring in the city of Timisoara* Journal of Environmental Protection and Ecology Vol. 10, nr. 1, pp. 1-13 ISSN 1311-5056
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9. Carmencita Constantin, Tomescu, C., Ionel, Ioana, Cebrucean, D., Padureanu, I. *Metode moderne privind gestiunea si managementul economic al gazelor cu efect de sera la operatorii din industria siderurgica* Metalurgia International Vol. XIV, nr.9, pp. 14-20 ISSN 1582-2214
10. Carmencita Constantin, Dobrin, M., Ionel, Ioana, Padureanu, I., Popescu, F., *Implementarea in industria energetica romaneasca a metodelor de desulfurare umeda a gazelor intreprinse si realitate* Metalurgia International Vol. XIV, nr. 9, pp. 21-26, ISSN 1582-2214
11. Dorel Bădescu, Claudia Tomescu, Ionel, Ioana, Padureanu, I., Cebrucean, V., *Implementation of the lime semidry desulphurisation process in the romanian energy industry-case study* Metalurgia International Vol. XIV, nr. 9, pp. 27-32, ISSN 1582-2214
12. Silaghi, Diana, Ionel, Ioana, Iosif Kaposta, Silaghi, F., Padureanu, I. *The solar radiation influence upon the tinnox selective catings in the solar collectors* Metalurgia International Vol. XIV, nr. 5, pp. 41-48, ISSN 1582-2214
13. Ionel, Ioana, Silaghi, Diana, Stepan, D., Silaghi, F., Padureanu, I. *Economical and acological analisis of a solar thermal system working in West Romania* Metalurgia International Vol. XIV, nr. 9, pp. 36-40, ISSN 1582-2214
14. Silaghi, F., Ionel, Ioana, Cioabla, A., Cebrucean, D., Popescu, F., *Comparative results concerning co-firing of biomass with pit coal in a pilot plant* Journal of Environmental Protection and Ecology acceptata spre publicare NB1575B/07.07.09, ISSN 1311-5056
15. Irimescu, A., Lontis, N., Ionel, Ioana, Ioan Padurean, *Carbon Dioxide Emissions Reduction Potential of Spark Ignition Engines Valve Train Diamond Like Carbon Coating* Metalurgia 61, pp. 10, ISSN 0461-9579
16. Cebrucean, V., Ionel, Ioana, Ioan Padurean, Cebrucean, D., *Modelarea numerica a procesului de transfer de caldura si de curgere in spatiul extratubular a unui schimbator de caldura cu fascicul de tevi si manta* Revista Metalurgia Nr. 10, pp. 5-15, ISSN 0461-9579
17. Irimescu, A., Lontis, N., Ionel, Ioana, Padureanu, I. *Potentialul tratamentului de acoperire cu carbon-diamant a componentelor sistemului de distributie la moatoare cu aprindere prin scanteie pentru reducerea emisiei de dioxid de carbon* Revista Metalurgia Nr. 11, pp. 10-15 ISSN 0461-9579
18. Ramon B., Ionel, Ioana, Iona Padureanu, Luisa Dungan, *Impactul asupra mediului al gazelor de evacuare in cazul locomotivei diesel hidraulice de 1000 kW* Revista Metalurgia Nr. 11, pp. 28-33, ISSN 0461-9579
19. Vetres, I., Ionel, Ioana, Padureanu, I., Lontis, N., *Sistemul Lidar pentru investigarea*

- aerosolului atmosferic* Revista Metalurgia Nr. 11, pp. 22-27, ISSN 0461-9579
20. Ionel, Ioana, Carmencita Constantin, Malina Anastasiu, Ungureanu, C., Oprisa, P.D., Popescu, F., *Valorificarea deseurilor prin co-incinerare rezultate experimentale si de modelare numerica* Revista Energetica Nr. 3, Vol. 57, pp. 135-143, ISSN 1453-2360
 21. Ionel, Ioana, Lelia Dobjanschi, Ungureanu, C., Silaghi, F., Popescu, F., Savu, A., *Research regarding desulphurization of flue gases resulted from the Electric thermal Power Plant Halanga* Revista Energetica Nr. 2, Vol. 57, pp. 98-102, ISSN 1453-2360
 22. Ionel, Ioana, Popescu, F., Lelea, D., *Laboratorul de analize de combustibili, investigatii ecologice si dispersia noxelor. Tehnici de masurare si management al calitatii* Buletin AGIR Anul XIV, Nr. 2-3, pp. 247-257, ISSN 1224-7928
 23. Ramon B., Ionel, Ioana, Luisa Dungan, Stepan, D., *Transport urban ecologic* Buletin AGIR Anul XIV, Nr. 2-3, pp. 141-145, ISSN 1224-7928
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 25. Oana Comsa, Ionel, Ioana, Tobias Weissbach *A 20 kW distribution network scenario for the study of the increased decentralized energy supply* Revista Energetica Nr.10, Vol.57, pp. 511-515, ISSN 1453-2360
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 33. Apascariței, Maria, Popescu, F., Ionel, Ioana, *Air pollution level in urban region of Bucharest and in rural region* WSEAS-Sustainability in Science Engineering, Volume II, pp. 330-336, ISBN 978-960-474-080-2
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 35. Trif, G., Ionel, Ioana, Cebucean, D., Popescu, F., Savu, A *Comparative results concerning co-firing of biomass residues with brown coal in a pilot plant MCS-6*, International symposium on combustion, Corsica, France CD Proceedings 115, 12 pp.
 36. Trif, G., Ionel, Ioana, Ungureanu C, Popescu, F., *Experimental Results Concerning Co-Firing of Sawdust and Corncob with Lignite Respectively Pit Coal* 7th European Biomass Conference & Exhibition "From Research to Industry and Markets", CCH-Congress Center, Hamburg, 29 june - 03 july 2009, Germany Volum conferinta 1251, pp. 6 ISBN 978-88-89407-57-3
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54. Silaghi, F., Ionel, Ioana, Apostol, G., Delia Calinoiu, *Energetical use of agricultural residues by means of co-combustion* International Conference integrated systems for agro food production Proceedings of International Conference integrated systems for agro food production, pp. 283-288, ISBN 978-973-638-449-3
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57. Ionel, Ioana, *Teoretical and experimental results concerning co-combustion of fossil and biofuels in a cogeneration plant, using internal combustion diesel engines* 33-th annual congress of the American Romanian Academy of Arts and Sciences Proceedings of 33-th annual congress of the American Romanian Academy of Arts and Sciences, pp. 431-435, ISBN 978-2-553-01433-8
58. Lontis, N., Ionel, Ioana, Padure, G., Popescu, F., *Study of the influence of butanol concentration in mixtures with diesel on the Nox emission of a small cogeneration plant using diesel engines* 33-th annual congress of the American Romanian Academy of Arts and Sciences Proceedings of 33-th annual congress of the American Romanian Academy of Arts and Sciences, pp. 431-435, ISBN 978-2-553-01433-8
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63. Nicoale Lontis, Ionel, Ioana, Popescu, F., Padure, G., Apascaritei, Maria, *Environmental impact of the co-combustion of butanol and diesel in a micro-cogeneration power plant* International Conf Management and sustainable protection of environment, BENA Conference, Alba Iulia 2009 Aeternitas Publishing House, Book of abstracts pag.255 ISBN 978-973-1890-30-3
64. Silaghi, Diana, Ionel, Ioana, Octavian C., *The experimental data processing in a solar heating system* International Conf Management and sustainable protection of environment, BENA Conference, Alba Iulia 2009 Aeternitas Publishing House, Book of abstracts, pp. 239, ISBN 978-973-1890-30-3
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66. Stepan, D., Ionel, Ioana, Werner Stefanescu, Luisa Dungan *Noise control in railway vehicles* International Conf Management and sustainable protection of environment, BENA Conference, Alba Iulia 2009 Aeternitas Publishing House, Book of abstracts pp. 156, ISBN 978-973-1890-30-3

PhD THESIS

PhD supervisor: Prof.dr.eng. habil Ioana Ionel,
Prof.dr.eng. Mihai Jadaneant

1. Eng. Adrian Cioabla, *The biogas production from waste biomass*
2. Eng. Dan Simion STEPAN: *Researches regarding the reduction of vibrations, noise in transportation /railway vehicles*

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 Işalniţa 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 energo-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, *NO_x reduction applied to diesel engines with co-combustion from railway vehicles.*
5. Eng. Veters Ioan, *Atmospherically investigations with Lidar systems.*

6. Eng. Apostol Gabriel, *Theoretical and experimental studies on air quality of the airport Traian Vuia Timisoara.*
7. Eng. Rosca Ciprian, *Ecological aspect of the transportation and sustainable development.*
8. Eng. Badescu Dorel, *Impact of the scheme EU ETS on Romanian industrial sector.*
9. Eng. Tomescu Claudia, *Implementation of the pollution legislation upon the energy production of Romania.*
10. Eng. Calinoiu Delia, *Research regarding photovoltaic solar panels*
11. Eng. Nisulescu Catalin, *Contribution to improvement of the LIDAR systems in Timisoara*
12. Eng. Cebrucean Viorica, *Numerical simulation on CO₂ absorption process.*
13. Eng. Maria Apascaritei, *Research in area of air quality.*

RESEARCH TEAM

- Prof.dr.eng. Corneliu UNGUREANU
- Prof.dr.eng.habil Ioana IONEL
- Assoc.prof.dr.eng. Dan OPRISA-STANESCU
- Assoc.prof.dr.eng. Dorin LELEA
- Lect. dr. eng. Francisc POPESCU
- Ass. Eng. Gavrilă TRIF-TORDAI
- Ass.dr.eng. Adrian CIOABLA
- 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. Nicolae GIORGI, PhD Student
- Eng. Casian Petru BULZU, PhD Student
- Eng. Veters Ioan, PhD Student
- Eng. Cebrucean Viorica
- Eng. Maria Apascaritei
- Techn. Gavril BRATEANU

CONTACT

Prof. Dr. eng. habil Ioana IONEL
Faculty of Mechanical Engineering
1 Mihai Viteazul Bv.
Timișoara, RO-300222, Romania
Tel.: +40-256-403670
Fax: +40-256-403669
E-mail: ionel_monica@hotmail.com
ioana.ionel@mec.upt.ro
Web: <http://energieregen.mec.upt.ro/>
www.mechu.ro

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. *Nanofluid magnetic – un nou mediu izolator și de răcire pentru transformatoarele electrice* 7-018/2009 MNT-ERA.NET (FP 7) MECI (CNMP) - pentru partenerii romani 463.334 RON – 100.000 RON U.P.T. (Coordonator parteneri romani); Acad.Rom.-Fil. Timisoara (RO); S.C. ROSEAL Odorheiu Secuiesc (RO); Institutul de Fizica Experimentala, Academia de Stiinte a Slovaciei (coordonator international, SK); Institutul de Fizica, Academia de Stiinte a Slovaciei (SK), Institutul de Cercetari si proiectari electrotehnice Nová Dubnica (SK), Facultatea de Aeronautica, Universitatea Tehnica din Kosice (SK), Facultatea de Inginerie Electrica si Informatica, Univ. Tehnica din Kosice (SK) UPT: Stoian, Floriana (director proiect), Holotescu, S., Marinica, Oana, Han, Adelina, Pop, Gh.
2. *Sistem integrat de determinare a sudabilitatii cu facicul laser a materialelor polimerice, de monitorizare si control in timp real a procesului de sudare* (POLYWELDSYS) 71-

088/2007 PN II Parteneriate MECI (CNMP) 423.331 RON ISIM Timisoara (coordonator) Universitatea Politehnica Timisoara, ICPE-CA Bucuresti Holotescu, S., (Responsabil proiect partener UPT); Nichici A., Stoian, Floriana, Stoica, V., Cicala Eugen, Han, Adelina, Walkovschi Ioan

3. *Cercetarea fundamentala a fenomenelor termice si fluidodinamice din micro-dispozitive de racire* 670/2009 PCE-IDEI CNCSIS 1.000.000 RON – 92.647,22 RON - Director: Lelea, D., Echipa: Cioabla, A., Laza, I., Mihon, L., Negoitescu, Arina
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12. Damian, C., Jădăneanţ, M., *Experimental determinations of the axle boxes temperatures for high - speed trains*, Buletinul UPT, Seria Mecanica Tom 54(68) Fascicola 3, 10 pp., ISSN 1224-6077
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21. Argesanu Veronica, Jula M., Laza, I. *Thermo elastic instability within a class IV friction joint* Simpozion International ISIRR 2009, Hunedoara CD simpozion 4 CD proceedings
22. Laza I., Ostoia D, Moldovan L., *Study regarding mass repartition to road vehicle with multiple destinations* Simpozion International ISIRR 2009, Hunedoara CD simpozion 4 CD proceedings

PhD THESIS

PhD supervisor: Prof.dr.eng. Mihai JĂDĂNEANȚ

1. Eng. Cristian DAMIAN: *Contributions to the thermal study of the axle boxes with rolling bearing at high speed trains*
2. Eng. Vartolimei-Malenovschi Mihaiel, *Energy management in military industry*

PhD supervisor: Prof.dr.eng. Mihai NAGI

1. Eng. Ovidiu SAFTOIU: *Studies and researches regarding the optimisation of the main steam condenser operation for the 350 MW steam turbine, in the conditions of the variation of the cooling fluid parameters*
2. Eng. Paul ILIES: *Constructive and operational optimization of the aluminum heat exchangers manufactured at S.C. RAAL S.A. Bistrita*

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. Mariela Augusta SPOREA: *Studies and researches regarding the recovery of exhaust gases from the cupola furnace*

PhD supervisor: Prof.dr.eng. Mihai JĂDĂNEANȚ

1. Eng. Poaparad Mihai: *Road vehicle pollution*
2. Patan Traian, *Transportation logistics and system Ro-La*
3. Bacala Miodrag, *Internal combustion engines and non-conventional fuels*
4. 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. Paul ILIEȘ, PhD Student

- Eng. Vlad MARȚIAN, PhD Student
- Eng. Mariela SPOREA, PhD Student
- Eng. Francisc SZIKSZAI, PhD Student
- Eng. Cătălin BOJAN, PhD Student
- Eng. Ovidiu SAFTOIU, PhD Student
- Eng. Ciprian CAIA, PhD Student
- Eng. Tiberiu STANCIU, PhD Student
- Eng. Mihaela BUCULEI, PhD Student
- Eng. Cristian DAMIAN, PhD Student
- Eng. Sorin RUSU, PhD Student
- Eng. Gh.-Florin OANCEA, PhD Student
- Eng. Doina MIHON, PhD Student
- Eng. Gh.-Marcel MOCUȚA, PhD Student
- Eng. Constantin STROIE, PhD Student
- Eng. Laurențiu CĂLIN, PhD Student
- Eng. Florin MĂRCUȚ, PhD Student
- Eng. Ion Cornel LUPUT, PhD Student
- Jurist Alexandru JĂDĂNEANȚ, PhD Student

CONTACT

Prof.dr.eng. Mihai Nagi (nagi@mec.upt.ro)
 Prof.dr.eng. Mihai Jădăneanț (mihaij@mec.upt.ro)
 Assoc.prof.dr.eng. F. D.Stoian (floriana.stoian@mec.upt.ro)
 Assoc.prof.dr.eng. Ioan Laza (laza@mec.upt.ro)
 Assoc.prof.dr.eng. Dorin Lelea (ldorin@mec.upt.ro)

Faculty of Mechanical Engineering
 1 Mihai Viteazul Bv.
 Timișoara, RO-300222, Romania
 Tel.: +40-256-403661
 Fax: +40-256-403520

Web page: www.mec.upt.ro/~tmtar/

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

Keywords: *railway traction, traction estimation, combustibile 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 combustibile 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 container special trains

Analysis of the transport types with respect to conveyance of material, quantity, periods of time, transports relations

RESULTS

RESEARCH CONTRACTS

- *Energy efficiency and environmental criteria in the awarding of regional rail transport vehicles and services IEE/08/690 ECORailS*, Contract manager: G. E. Mocuța
- *Consultancy on classification on the technical transport system 178/8.12.2008*, Contract manager: M. Herman, L.Dungan

BOOKS

1. Mihaela Herman- *Non-conventional transport-basics*, Students book, "Politehnica" Publishing House, Timișoara, ISBN 978-606-554-026-2, pp. 103.

PUBLISHED PAPERS

1. Ramon Balogh, Ioana Ionel, Ion Padureanu, Luisa Dungan, *The impact on the environment of the exhausting gases of the Diesel hydraulic locomotive of 1000 kW*, Revue Metalurgia, nr. 11, pp. 28-33, ISSN 0461-9579
2. Mocuța Georgeta Emilia – *Method for analysis of flexible robotic manufacturing system for rolling stock components*, Machine Design 2009 Novi Sad, pp. 327-331, ISSN 1821-1259
3. Mocuța Georgeta Emilia, Popescu Mihaela, Padurean Ioan, Belu Nica Remus – *Metal composite materials and their application in the transport's field*, Metalurgia nr. 12 2009, pp. 30-34, ISSN 0461-9579
4. Mocuța G.E., Popescu M., Nicoara M., Marta C., Raduta A., Magda A.- *A new alternative offered by toptig welding for automotive applications*, Annals of the Oradea University, Fascicle of Management and Technological Engineering, Volume VIII (XVIII), 2009, pp. 751-760, ISSN 1583-0691
5. Mocuța Georgeta Emilia, Popescu Mihaela, Rosca Ciprian Aurel, Caneparu Anzele- *Development of logistics concept*, Annals of the Oradea University. Fascicle of Management and Technological Engineering, Volume VIII (XVIII), 2009, pp. 1919-1926, ISSN 1583-0691
6. Mocuța Georgeta Emilia, Alexandru Potocean, Ioan Dănuț Dan, *Brake energy recovery to electric locomotives and diesel electric locomotives*, Buletinul Stiintific UPT, Seria Mecanica, Fasc. 4, 2009, Tom 54(68), ISSN 1224-6077, pp. 65-69
7. Mocuța Georgeta Emilia, Dan Ioan Danut, Rosca Ciprian Aurel, Popescu Mihaela, Ostoia Daniel, *Technique for determination of fuel consumption in diesel locomotives*, Buletinul Stiintific UPT, Seria Mecanica, Fasc. 1, 2009, Tom 54(68), ISSN 1224-6077, pp. 1-4
8. Mocuța Georgeta Emilia, *Logistic – instrument and concept under a continuous evolution*, Buletin AGIR nr. 2-3/2009, pp. 88-93, ISSN 1224-7928
9. Mocuța Georgeta Emilia, Mihalache Laurentiu, Vizitiu Georgiana, Secara Diana Maria, *Logistic prorogatives of the transport*, Buletin AGIR, nr. 1-2 / 2009, pp. 102-106, ISSN 1224-7928
10. Mocuța Georgeta Emilia, Anca Nicoleta Don, Luiza Elena Radu, Florentina Jujescu, *Sound pollution-a consequence of the transportation outgrowth*, Buletin AGIR nr. 4/ 2009, pp. 130-135, ISSN 1224-7928
11. Mircea Corneliu Dungan, Mihaiela Herman, *Rising the quality of the railway education on accordance of the European transport regulation*, Buletin AGIR, 2-3, pp. 99-101, ISSN 1224-7928
12. Mihaiela Herman, *The optimization of the railway transport process-request of a quality management*, Buletin AGIR, 2-3, pp. 114, 3, ISSN 1224-7928
13. Dan Simion Stepan, Mihaiela Herman, *Experimental methods to pursue the operation of a railway command and control station*, Buletin AGIR, 2-3, pp. 107, ISSN 1224-7928
14. Eugen Ghita, Ramon Balogh, *An Algorithm for the Estimation of the position of the Center of Oscillation of a Bogie*, Buletinul Stiintific al Universitatii "Politehnica" din Timisoara, Tom 54(68), Fasc.1, pp. 77-80, ISSN 1224-6077
15. Ramon Balogh, Ioana Ionel, Luisa Izabel Dungan, Dan Stepan, *Ecological urabn transport*, Buletin AGIR, Anul XIV, nr.2-3, pp. 141-145, ISSN 1224-7928
16. Luisa Izabel Dungan, *General aspects regarding the safety against derailment*, Buletin AGIR, Anul XIV, nr.2-3, pp. 117-123, ISSN 1224-7928
17. Alexandru Traistaru, Luisa Izabel Dungan, *Particular problems to raise the quality of railway command and control instalation*, Buletin AGIR, Anul XIV, nr.2-3, pp. 130-134, ISSN 1224-7928

18. Alexandru Traistaru, Ramon Balogh, Luisa Izabel Dungan, *The influence of the instalation resistance of ballast on the operation of the railboard circuit*, Buletin AGIR, Anul XIV, nr. 2-3, pp. 152-155, ISSN 1224-7928
19. Mihaela Herman, Richard Herman, Mihai Florin Buriac, *Aspects of the influence of loading on the railway vehicle and cheking possibilities of their effects*, Editura Sudura Timisoara, pp. 64, 10, ISSN 1842-5518
20. Eugen Ghita, Lucia Vilceanu, Ramon Balogh, Mihaela Dobra, *An experimental analysis about the fracture of the wheelset-axles of the 5100 kW electric locomotive*, Revista Acta Technica Corviniensis Bulletin of Engineering, pp. 49-54, ISSN 2067-3809
21. Mihaela Herman, Ioan Iulian Ciobanu, *The economic importance of the road and railway transport*, Editura Aegis, Timisoara, ISBN 978-973-1916-08-8
22. A. Tudor, A. Huiet Coordonator: E. Ghita, *The persepectives of the railway and light-rail urban transport in the city of Timisoara in the framework of the Vision 2030 project*, Students Scientific Symposium HD 39 STUD
23. G. F., Padure, M. F., Buriac, Coordonator: Luisa Izabel Dungan, *The verification of the bordering of the LE 060-EA inside the cinematic limits*, Students Scientific Symposium HD 39 STUD
24. A.F. Jivulescu, Coordonator: Luisa Izabel Dungan, *Romanian railway transport during the last five years*, International Conference „Students Technical Days”, ISSN 1843-1917
25. Ana-Cosmina Tudor, Nicolae Tudor, Mihaela Herman, *The estimation of the railway traffic in the Jebel railway station*, International Conference „Students Technical Days”, ISSN 1843-1917
26. Mihai F. Buriac, Gabriel F. Pădure, Mihaela Herman, *The railway vehicles quality-a circumstance of the safety circulation*, International Conference „Students Technical Days”, ISSN 1843-1917
27. Dan Stepan, Ioana Ionel, Werner Stefanescu, Luisa Izabel Dungan, *Noise control in railway vehicles*, Journal of Environmental Protection and Ecology, NB 1572B/07.07.09, ISSN 1311-5056
28. Mocuta Georgeta Emilia, *Noise pollution emitted by consequence of the urban transport development*, Journal of Environmental Protection and Ecology, Re No 1639A/07.07.09, ISSN 1311-5065
29. Mocuta Georgeta Emilia, Popescu Mihaela, Rosca Ciprian Aurel, *Noise pollution emitted*

by rail transportation systems, Journal of Environmental Protection and Ecology, Re No 1576A/ 06.07.09, ISSN 1311-5065

30. Rosca Ciprian Aurel, Mocuta Georgeta Emilia, Popescu Mihaela, Ionel Ioana, Stepan Dan Simion, Matei Mircea, *Sustainable development of transport in the west region of Romania*, Journal of Environmental Protection and Ecology, Re No 1577A/ 06.07.09, ISSN 1311-5065

PhD STUDENTS

PhD supervisor: Prof.dr.eng.Lucian Mădăras :

Ph.D.student: Mircea MATEI - *Contributions regarding the improvement of the characteristics of the secondary suspension of a Diesel engine*

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

Ph.D.student: Ramon BALOGH - *Contribution and researches in order to decrease the flue gas emissions of the LDH 125 locomotive*

RESEARCH TEAM

1. Assoc.prof.dr.eng. Eugen GHITA
 2. Assoc.prof.dr.eng. Georgeta Emilia MOCUȚA
 3. Lect.dr.eng. Mihaela HERMAN
 4. Lect.dr.eng. Gabriel URSU-NEAMT
 5. Lect.dr.eng. Luiza-Izabel DUNGAN
- Dr.eng. Dan STEPAN
Ph.D.student Mircea MATEI
Ph.D.student Ramon BALOGH

CONTACT

Assoc. prof. dr. eng. Eugen Ghita Faculty of Mechanical Engineering
1 Mihai Viteazul Bv.
Timișoara, RO-300222, Romania
Tel.: +40-256-403725
E-mail: eugen.ghita@mec.upt.ro

Researches in URBAN TRANSPORTATION, ROAD TRAFFIC SAFETY, ROAD TRAFFIC CONTROL, INTELIGENT 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 electrical systems for terrestrial transportation using batteries with supercapacitors*, TRANS-SUPERCAP - D 21-018/2007, PN II, Iancului, D., Robu, N., Gonczi, A., Cipleu, A., Ghita, E.
2. *Consultancy services for the passenger transportation planning of Timis county.*, 15758/03.11.2009, Iancului, D., Robu, N., Gonczi, A., Cipleu, A.
3. *Study for the enlargement of the local and metropolitan public transportation network in Timisoara*, 299/08.12.2009, D. Iancului, N. Robu, I. Bogdanov, A. Cipleu
4. *Study for the development of the infrastructure, regulations and administration of the public parking in Timisoara*, 308/16.12.2009, Gonczi, A., Iancului, D., Robu, N., Bogdanov, I., Cipleu, A.

BOOKS

1. Iancului, D., Robu, N., Bogdanov, I., Gonczi, A., *Vision 2030 - Timisoara A European high-tech metropolis with historic and cultural roots – Roads, public transportation, railways, urban development and air transportation*, Brumar Publishing House Timisoara, ISBN 978-973-602-480-1, pp. 80.

PUBLISHED PAPERS

1. Ștefănescu, W., Irimie, L., *Study concerning the phonic pollution generated by the urban traffic in the town of Timisoara, Part I*, JEPE, nr. 10(1):65-72/2009, ISSN 1311-5065
2. Ștefănescu, W., Irimie, L., *Study concerning the phonic pollution generated by the urban traffic in the town of Timisoara, Part II*, JEPE, nr. 10(3):65-72/2009, ISSN 1311-5065
3. Ștefănescu, W., Pugna, A., Pleniceanu, A., *Consideration regarding of basaltic materials usage with mineralizers imput in machine building*, Annales of DAAM for 2009 & Proceeding of the 20th International DAAM Symposium, volume 20, No 1, pp. 0525, ISBN 978-3-901509-70-4, ISSN 1726-9679
4. Ștefănescu, W., Ștefănescu, P., *The noise and the urban traffic*, Sesiune Internațională de Comunicări "Pași spre un învățământ de calitate" ediția a IV-a, Timișoara, Romania, Editura Aegis, Timișoara, pp. 173, ISBN 978-973-1916-08-8
5. Ștefănescu, W., Ștefănescu, P., *Urban Congestions -problems and increase approach fluent in road transport*, Sesiune Internațională de Comunicări "Pași spre un învățământ de calitate" ediția a IV-a,

Timișoara, Romania, Editura Aegis, Timișoara, pp. 175, ISBN 978-973-1916-08-8

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. Assist.eng. Petre PĂDUCEL: *Studies concerning the improvement of the quality of intersection signaling systems in urban traffic*;
6. Eng. Culita CHIS: *Research on the improvement of the traffic capacity through modern command and control systems for road signals*;
7. Eng. Ovidiu RĂDULESCU: *Studies concerning the improvement of the quality of intersection signaling systems in urban traffic*;
8. Eng. Alexandru TRĂISTARU: *Reasearch on the improvement of the command and control systems for railways*;
9. Eng. Remus Ioan URSULESCU: *Contributions concerning the optimization of the propulsion systems of the agricultural tractors on wheels*;
10. Eng. Sebastian MATEȘ: *The influence of the dynamic characteristics of the vehicle on the traffic flow parameters*.

RESEARCH TEAM

- Prof.dr.eng. Ion DANILA- cons.prof
- Assoc.prof.dr.eng. Dumitru IANCU LUI
- Lect.dr.eng. Attila GONCZI
- Lect.dr.eng. Werner ȘTEFĂNESCU
- Lect.dr.eng. Ionel VANDICI
- Lect. dr.eng. Adrian CIPLEU
- Assist.eng. Petre PADUCEL
- Assist. eng. Remus URSULESCU
- Ph.D. Student Lucian IRIMIE

CONTACT

Lect. dr. eng. Werner ȘTEFĂNESCU

Faculty of Mechanical Engineering

1 Mihai Viteazul Bv.

Timișoara, 300222, Romania

Tel.: +40-256-403720

Fax: +40-256-403520

E-mail: it@mec.upt.ro; wstefanescu@mpt.utt.ro

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
 - ARTN – Romanian Association of Nonconventional 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. Iclanzan T., Stan D., Seiculescu V., Tulcan A., Cosma C., decizie OSIM 1032331 (7/3506)/30.06.2009, *Micro-injection mould*.

PUBLICATIONS

BOOKS

1. Dume A. - Cercetari privind imbunatatirea tehnicilor de prototipare rapida prin frezare - Doc. thesis, Ed. POLITEHNICA, Timisoara, 2008, 176 pg., ISBN 978-973-625-767-4

PUBLISHED PAPERS

1. Cosma C., Dume A., Tulcan A., Iclanzan T. - *Rapid development of products using the technique of reverse engineering*, Annals of DAAAM for 2009 & Proceedings of the 20th International DAAAM Symposium - Intelligent Manufacturing & Automation: Focus on Theory, Practice and Education, Book Series: Annals of DAAAM and Proceedings, Published: 2009, pp. 347-348.
2. Cosma C., Cioana C., Stan D., Iclanzan T. - *Techniques of obtaining geometric models*, Annals of DAAAM for 2009 & Proceedings of the 20th International DAAAM Symposium - Intelligent Manufacturing & Automation: Focus on Theory, Practice and Education, Book

Series: Annals of DAAAM and Proceedings,
Published: 2009, pp. 723-724.

3. Dume A., Cosma C., Stan D., Iclanzan T. - *Getting scanned complex parts*, Annals of DAAAM for 2009 & Proceedings of the 20th International DAAAM Symposium - Intelligent Manufacturing & Automation: Focus on Theory, Practice and Education, Book Series: Annals of DAAAM and Proceedings, Published: 2009, pp. 639-640.
4. Tulcan Liliana, Nistoran Botiș Mihaela, Tulcan Aurel - *Ultrasonic cleaning in the food industry, Integrated systems for agri-food productions*, SIPA'09, Nyiregyhaza, Hungary, 12-14 sept. 2009, ISBN 978-963-9909-40-3, pp. 289-292
5. Țuț V. A., Cosma C., Iclanzan T. - *Some considerations about high speed machining*, Scientific Bulletin of the „Politehnica” University of Timisoara, Romania, Fasc. 1/2009 - Transactions on Mechanics, pp. 67-74, ISSN 1224-6077
6. Cioana C., Iclanzan T., Cosma C. - *Sketch based 3d modeling method*, Scientific Bulletin of the „Politehnica” University of Timisoara, Romania, Fasc. 2/2009 - Transactions on Mechanics, pp. 43-47, ISSN 1224-6077
7. Țuț V., Cosma C., Iclanzan T. - *Some considerations about high speed machining*, Scientific Bulletin of the „Politehnica” University of Timisoara/Romania, Tom 54(68), Fasc.1, 2009, ISSN 1224 – 6077, pp. 67-72.

PhD THESIS

1. Sirbu Alin Nicusor - Theoretical and experimental research regarding the ultrasonic activation of the polymeric materials flow processes, Thesis supervisor: Prof. Tudor Iclanzan

PhD STUDENTS

1. Groza Bogdan Gruia - *Optimization of the management integrated systems in industrial engineering*, Thesis supervisor: Prof. Tudor Iclanzan
2. Ferician Florin Cornel - *Researches on the technological possibilities of using the plasma electronic guns*, Thesis supervisor: Prof. Tudor Iclanzan
3. Stancau Adelina - *Studies for the applicability of the QFD techniques in polymeric material parts design*, Thesis supervisor: Prof. Tudor Iclanzan
4. Rotar Ioan Daniel - *Studies of the polymeric materials flow processes through the interstices of the forming devices*, Thesis supervisor: Prof. Tudor Iclanzan

5. Serban Iancu - *Study of microinjection and injection of thin wall products*, Thesis supervisor: Prof. Tudor Iclanzan

6. Țuț Vlad Adrian - *Research regarding the expert system for injection moulds conception*, Thesis supervisor: Prof. Tudor Iclanzan

AWARDS

1. *Silver medal*, Bucharest International Technical Fair -TIB, Salon INVENTIKA 2009, for CBI: RO00836/2007, “Microinjection mould”, authors: Iclanzan T.A., Stan D.V., Seiculescu V., Tulcan A., Cosma C.
2. *Silver medal*, Salon International des Inventions, techniques et nouveau produits, Geneva 2009, for CBI: RO 00836/2007, “Microinjection mould”, authors: Iclanzan T.A., Stan D.V., Seiculescu V., Tulcan A., Cosma C.

RESEARCH TEAM

The human resources of the P.M.R.C consist of researchers which are doctor degree graduates or which leads post-graduates programs in the Department of Manufacturing Engineering. Also, in the team are working post-graduates and master students. The management is assured by the team leader and the scientific board.

The members of the research team are:

- 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. Eng. Florin Ferician
- Assist. Eng. dr. Cristian Cosma
- Assist. Eng. dr. Adrian Dume
- Eng. Daniel Ioan Rotar, PhD student
- Eng. Serban Iancu, PhD student
- Eng. Tut Vlad Adrian, PhD student

CONTACT

Prof.dr.eng. Tudor ICLĂNZAN – team leader
Faculty of Mechanical Engineering
Bul. Mihai Viteazu, nr. 1
300222, Timișoara, Romania
Tel: +40-256-403611
Fax: +40-256-403523
E-mail: ticlancan@eng.upt.ro



3D measuring machine TESA MicroMs 343 DCC



Experimental ultrasonic devices



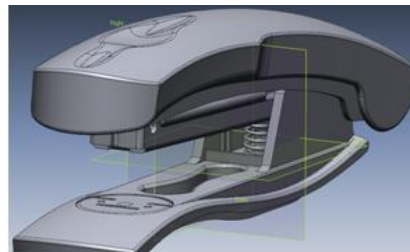
Roland Picza 3D scanner laser LPX – 600



Krauss-Maffei experimental injection machine and mould



Conference room and CAD/CAM laboratory

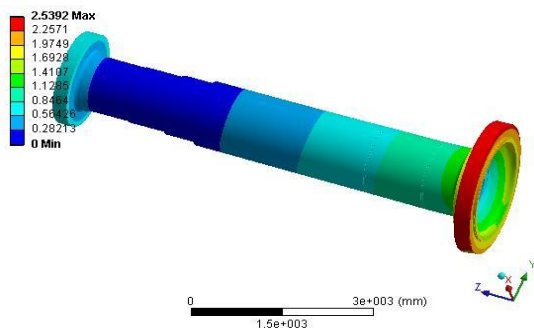


Real and virtual models. Mold cavities

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
- Accuracy of solutions involved in the stress calculus of curved specimens
- 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



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 concerning the behaviour of composite materials at static loading and fatigue, cracking mechanism, plate's behaviour at dynamic loading.

There is analysed the influence of working life-time of different types of steel belonging, of minning 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 ambiantal and results were extra poled beginning 100 or 1000 hours to 10000 hours.



ACTIVITIES

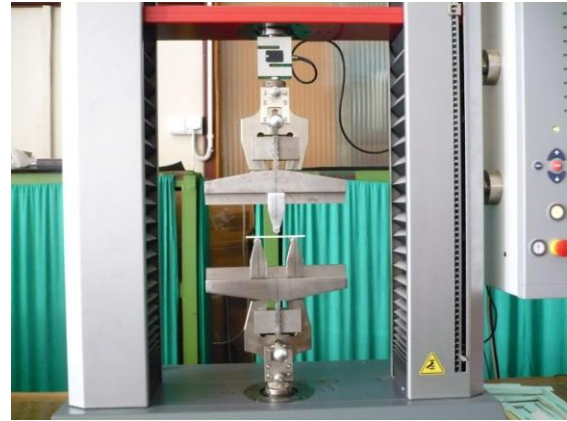
- The life – time estimation of some strength elements (wire ropes, links, springs, etc) at imposed loading levels
- The strength at fatigue estimation of some steel and welded elements
- The analysis of the influence of simulated defects about the fatigue strength at welded elements
- The estimation 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. Josif HAJDU
- Prof.dr.eng. Tiberiu BABEU
- Prof.dr.eng. Constantin CRISTUINEA
- Assoc.prof.dr.eng. Dana SILAGHI PERJU
- Assoc.prof.dr.eng. Liviu MARȘAVINA
- 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. Claudia SECRIERU
- Eng. Maria SECHEI
- Eng. Anghel CERNESCU
- Eng. Cristian NEȘ
- Eng. Emanoil LINUL
- Eng. Dan Andrei ȘERBAN
- Eng. Lorand KUN
- Eng. Adrian BIRLAN

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. 99/2009, *Research on stress strain characteristics of aluminum and steel to aluminum wire*, Project Manager: Faur Nicolae, Cernescu Anghel, Beneficiary: SC Electroplast SA Bistrita, Value: 4.900 RON.
2. 694/2007, *Studies of stress and strain for aluminum, steel, aluminum wire*, Project Manager: Faur, N., Cernescu, Anghel. Beneficiary: SC IPROEB Bistrita. Value: 8.200 RON.
3. 14/2009, *Attempts to stress and strain for aluminum conductors, steel, aluminum ntip 4-AL1/22-ST1A, (L110)*. Project Manager: Faur, N., Cernescu, A. Beneficiary: SC PRYSMIAN, Slatina. Value: 2.142 RON.
4. 2/2009, *PLASTICS TESTING*, Project Manager: Marsavina, L., Cernescu, A., Linul, E. Beneficiary: SC DPR DRAXELMAIER PROCESE DE PRODUCTIE ROMANIA SRL, Timisoara. Value: 10.507,70 RON.
5. 31/2009, *FIXING ANCHORS TEST - Seat belts* Project Manager: Marsavina, L., Cernescu, A. Beneficiary: SC Leman Industrie SRL. Timisoara. Value: 1.428 RON.
6. 46/2009, *Experimental tests and calculations on the strength NUMERICAL skeleton of seats SHT0001*, Project Manager: Marsavina, L., Cernescu, A. Beneficiary: SC SHIMATEX Romania SRL. Value: 261,80 RON.

DOCTORAL STUDIES

PhD THESIS

1. Cernescu Anghel Vasile, *Researches about the effect of mean stress and stress ratio in fatigue crack growth for an alloy steel*, PhD coordinator: Ion Dumitru, 30.09.2009
2. Secieru Claudia, *Applications of Fractal Analysis in the case of dynamic fracture*, PhD coordinator: Ion Dumitru, 14.10.2009
3. Negru Radu, *Contribution to the study of stress concentration effect with applications in fracture mechanics and materials fatigue*, PhD coordinator: Liviu Marsavina, 11.10.2009
4. Culea Laurențiu, *Research upon Applied Reverse Engineering in Biomechanical Structure Modeling*, Nicolae Faur, 17.07.2009

PhD THEMES

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

1. Branzei Nelu Florin, *Fatigue analysis study of steel railway couplings used for transportation*.
2. Sechei Ramona Maria, *Experimental and theoretical aspects regarding material dynamic toughness*.
3. Cotuna Emil, *Study of stability elastic elements of the traducers of load*.

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*.

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*.

PUBLICATIONS

BOOKS

1. Marșavina, L., Sadowski T., *Crack-Interface interaction in composite materials*, Editura Springer, ISBN 978-90-481-2790-0, 2009.
2. Marșavina, L., Sadowski T., *Advances in strength of materials*, Trans Tech Publication, ISBN 13978-0-87849-351-7, pp. 222, 2009.

3. Neguț, N., *Machinery and equipment for continuous transport*, Editura Politehnica Timișoara, ISBN 978-973-625-670-7, pages 129, 2009.
4. Dumitru, I., *Fatigue calculation bases*, Editura Eurostampa Timisoara, ISBN 978-973-687-820-6, pp. 326, 2009.

PAPERS

1. Hluscu, M., Tripa, P., Dumbrava, M., *The Evolution of the Cracking Pipe's Materials and their Behaviour to Creep*, Scientific Bulletin of the "POLITEHNICA" University of Timisoara, Tom 54 (68), Fasc. 2, pp. 13-18, 6, ISSN 1224-6077, 2009
2. Hluscu, M., *Finite Element Modelling for CMT Joining Dissimilar Materials Galvanized Steel Aluminium*, Scientific Bulletin of the "POLITEHNICA" University of Timisoara, Tom 54 (68), Fasc. 4, pp. 29-34, 6, ISSN 1224-6077, 2009.
3. Tripa, P., Hluscu, M., *The Mechanical Behaviour of a Thermoresistant Steel*, Scientific Bulletin of the "POLITEHNICA" University of Timisoara, Tom 54 (68), Fasc. 3, pp. 68-73, 6, ISSN 1224-6077, 2009.
4. Pasca, N., Bechir, C., Faur, N., *Study of Theoretical Nominal Coefficient Variation of Stress Concentration Based on the Distance Between Two Holes Unbalanced for a Plate of Finite Width*, Scientific Bulletin of the "POLITEHNICA" University of Timisoara, Tom 54(68), Fasc. Special ISSUE S1, pp. 35-40, 6, ISSN 1224-6077, 2009.
5. Dumitru, I., Cernescu, A., *Fatigue crack growth under variable amplitude loadings: A theoretical Study*, Advances in Strength of Materials, pp. 6, ISSN 1013-9826, 2009.
6. Bortun, C., Faur, N., Cernescu, A., *Experimental assessment by finite elements method of the residual stress state and of the heat flow from the laser weldings of the alloys of CoCrMo used in RPD (Removable Partial Dentures) technology*, Advances in Strength of Materials, pp. 6, ISSN 1013-9826, 2009.
7. Szuhaneck C., Faur, N., Cernescu, A., *Biomechanical 3D analysis of stress induced by orthodontic implants*, Advances in Strength of Materials, pp. 5, ISSN 1013-9826, 2009.
8. Marsavina, L., Audenaert, K., De Schutter, G., Faur, N., Marsavina, D., *Experimental And Numerical Determination Of The Chloride Penetration In Cracked Concrete*, Construction and Building Materials, pp. 264-274, ISSN 0950-0618, 2009.

9. Dumitru, I., Marsavina, L., Faur, N., *ESTIMATING DURABILITY OF STEELS AT REPEATED BENDING IMPACTS*, International Journal of Fracture, pp. 89-100, ISSN 0376-9429, 2009.
10. Sava, M., *Comparison between the most Classical used Models and a proposed Model for Compressible Materials*, Scientific Bulletin of the "POLITEHNICA" University of Timisoara, Tom 54 (68), pp. 51-54, ISSN 1224-6077, 2009.

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

Prof.dr.eng. Nicolae FAUR
Faculty of Mechanical Engineering
Bul. Mihai Viteazu, nr. 1, 300223 Timișoara

Tel: +40-256-403577
Fax: +40-256-403572
e-mail: faur@mec.upt.ro



