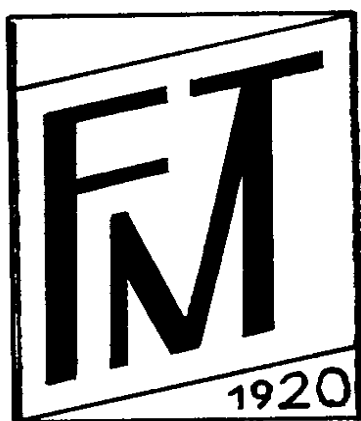


# FACULTY OF MECHANICAL ENGINEERING



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**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 gained and three new laboratories – LOIFO 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.



### CMPCSU 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), electrosomatograph 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).

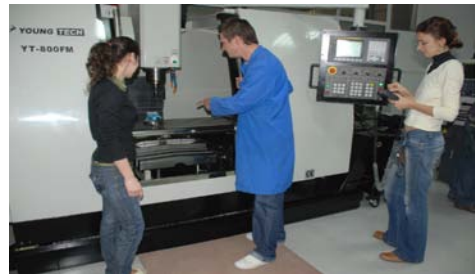
**RESEARCH CONTRACTS**

10. Program COST Action 537, Orthopedic Group WG 3, *Core Laboratories for the Improvement of Medical Devices in Clinical Practice from the Failure of the Explanted Prostheses Analysis (FEPA)*", COST – European Cooperation in the field of Scientific and Technical Research supported by the EU RTD Framework Programme.
11. Platform code CNCSIS 43, Contract MEC no 05/15.09.2006, *Platform of implantology, intelligent prosthetics and biomechanical rehabilitation*, Director Assoc. prof. dr. eng. Mircea Dreucean, total value 8,381,981 RON, value for 2008 year: 3,602,902 RON
12. Contract CEEEX-Medical Sciences Academy no.45/2005, Director Prof. dr. eng. Mirela Toth-Tașcău, *Development of innovative therapies for osteoarticular reconstruction CELL-ART*. Beneficiary: Ministry of Education and Research, total value: 200,000 RON, value for 2008 year: 13,000 RON
13. Contract CEEEX-Medical Sciences Academy no.70/2006, Director Assoc. prof. dr. eng. Mircea Dreucean, *Bio-orthopedy innovative methods for osteoarticular reconstruction BIOART*. Beneficiary: Ministry of Education and Research, total value: 250,000 RON, value for 2008 year: 120,500 RON
14. Contract CEEEX 114/2006, *Virtual Reality Based Cooperative Environment for Pre-Surgery Planning in Orthopaedics – MERVI*. Beneficiary: Ministry of Education and Research, total value: 315,000 RON, value for 2008 year: 196,002 RON
15. Contract GR98/11.06.2008, CNCSIS code 95, type TD, Director PhD student Dan Ioan Stoia, *Modelling, developing and testing of implants for spine*, Beneficiary: Ministry of Education and Research, value for 2006 year: 19,500 RON
16. Contract GR98/11.06.2008, CNCSIS code 93, type TD, Director PhD student Karoly Menyhardt, *Research, drawing and manufacturing of intelligent system for upper limb prosthesis*, Beneficiary: Ministry of Education and Research, value for 2008: 20,000 RON
17. Contract CNCSIS type BD, CNCSIS code 31, Director PhD student Ovidiu Ghiba, *Contributions to conception and realization of hip prostheses*, value for 2008 year: 11,000 RON.

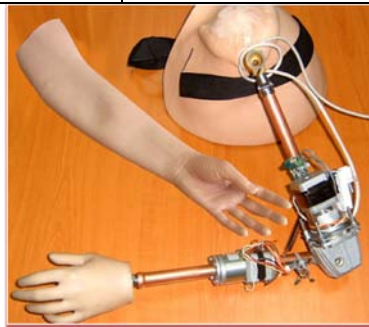
<p><b>Manufacturing Laboratory - CNC Machining and EDM Fabrication</b></p>	 <p><i>Dental implants fabrication on 5 axis CNC machining center</i></p>	 <p><i>Orthopedic screws fabrication on Pinacho lathe machine</i></p>
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*Maxillo-facial plate implant fabrication on white EDM machine*



*Artificial disk fabrication on 3axis CNC milling machine*



*Upper limb prosthesis prototype*

***Manufacturing Laboratory – Rapid Prototyping Fabrication***



*Metal Powder Arcam S12 machine – metal substitution plate fabrication*



*Plastic powder EOS Formiga P100 machine – plastic substitution elements fabrication*



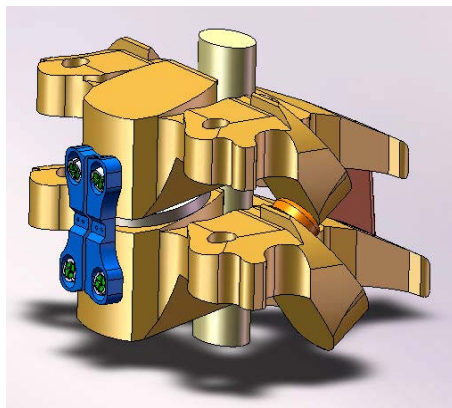
*Titanium vertebra realized on Arcam S12 machine*

**Multimedia Room**

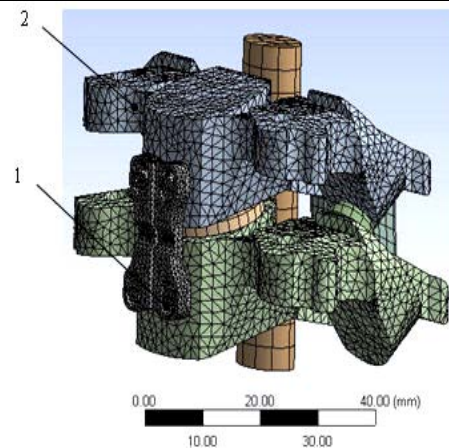


*Audiovisual presentation*

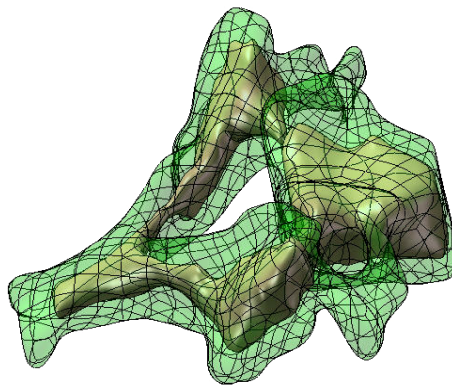
**Modelling & Design Laboratory**



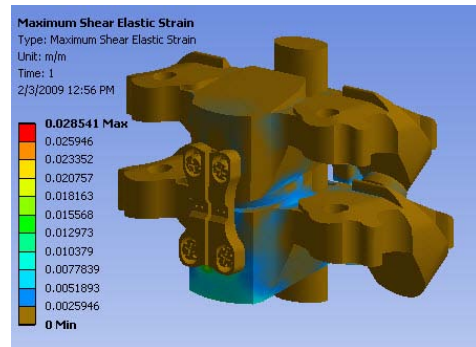
*Geometry of an implanted spine model*



*Mesh of an implanted spine model*

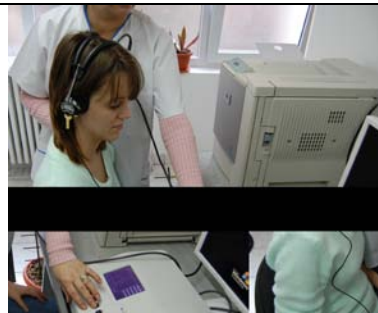


*Model of vertebra*



*FE analysis results for maximum shear elastic stain*






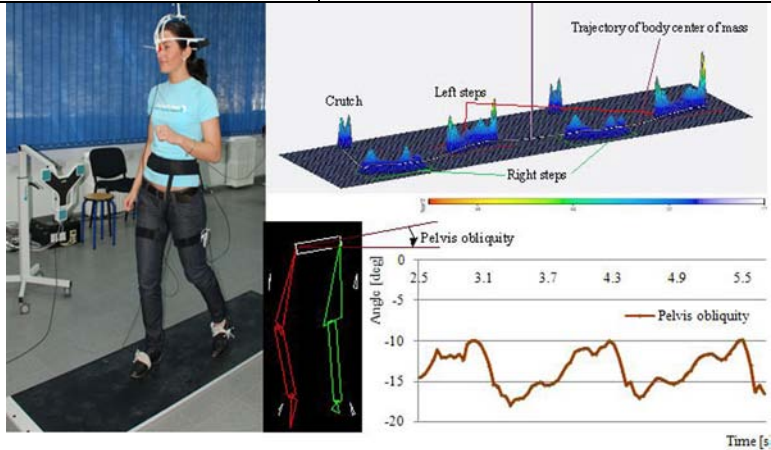
**Medical investigations Laboratory**



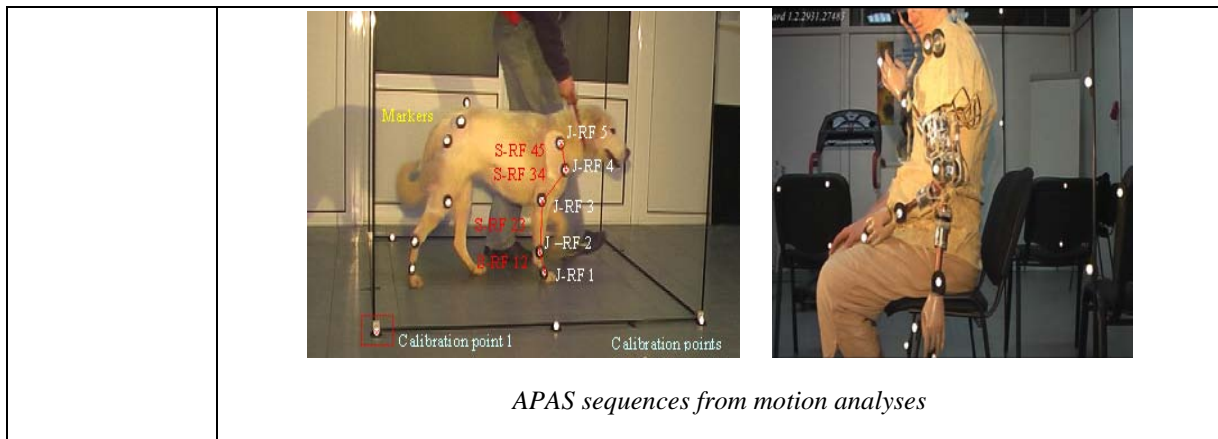
*Audiometer equipment*



*Pulseoximeter device*

	 <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>	
<p><i>Motion analysis Laboratory</i></p>	 <p><i>Electrosomatograph DDFAO system</i></p>	 <p><i>Echocardiograph ACUSON CV70™</i></p>
	 <p><i>Zebris measuring system for motion analysis and force distribution determination</i></p>	





## PUBLICATIONS

### BOOKS

1. Mirela Toth-Tascău, Mircea Dreucean – *Robotics Elements*, Publishing House Editura Politehnica Timișoara, 2008, ISBN 973-625-364-3, 340 p.
2. Dan Ioan Stoia – *Modelling, developing and testing of implants for spine*, Publishing House Editura Politehnica Timișoara, 2008, 978-973-625-697-4, 243 p.
3. Karoly Menyhardt – *Research, drawing and manufacturing of intelligent system for upper limb prosthesis*, Publishing House Editura Politehnica Timișoara, 2008, 978-973-625-763-6, 148 p.

### PAPERS IN JOURNALS

1. D. Malița, M. Toth-Tașcău, M. Dreucean, D. Vermeșan, R. Prejbeanu, I. Măli, H. Vermeșan M. Mogoseanu, D.I. Stoia, O. Ghiba - *A combined biomechanical -radiological analysis of a patient needing a hip implant revision*, Journal of Orthopedics and Traumatology Nr. 1/2(12)2008, pp. 59-66, ISSN 1454-6213.
2. R. Dascălu, C. Igna, M. Toth-Tașcău, M. Sabău, L. Schuszler, M. Șereș, K. Menyhardt - *Kinematic variables to describe differences between normal dogs and dogs with osteochondritis dissecans of the humeral head*, Buletin USAMV-CN. Bulletin of University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca. Veterinary Medicine, Vol 65, No 2 (2008), pp. 160-165, ISSN 1843-5270.
3. M. Toth-Tascau, M. Dreucean - *Path planning of a mobile robot using visibility graph method*, Bulletin of the Transilvania University of Brasov, Proceedings of the International Conference „ROBOTICS’08”, Vol. 15(50) – Series A, Special issue No.1, Vol. II, 2008, Volume 2, pp.495-500, ISSN 1223-9631, ISBN 978-973-598-387-1.

4. K.Menyhardt, M. Toth-Tascău, *Low cost intelligent upper limb prosthesis*, Bulletin of the Transilvania University of Brasov, Proceedings of the International Conference „ROBOTICS’08”, Vol. 15(50) – Series A, Special issue No.1, Vol. II, 2008, Volume 2, pp.761-766, ISSN 1223-9631, ISBN 978-973-598-387-1.
5. G. Tanasie, RF. Tatu, S. Anghel, V. Paunescu, M. Buncean, M. Tascău, C. Tatu, M. Dreucean, C. Bunu, C. Igna, V. Paunescu - *Stem Cells Based Articular Reconstruction In Animal Models*, Official Journal of the Romanian Society of Physiological Sciences: Physiology "Physiology - from experiment to medical practice", Nr. 18.2(58), pp. 72, ISSN 1223-2076.
6. O. Ghiba, L. Rusu - *Geometrical design of custom-made femoral stem prostheses*, Annals of the Oradea University, Fascicle of Management and Technological Engineering, 7(17), 835-840, ISSN 1583-0691.
7. M. Dreucean, M. Toth-Tașcău, *New Technologies in the Fabrication of Medical Implants*, IRT 3000 inovacije razvoj tehnologije, No 17/2008, pp. 78-83.

### PAPERS IN ISI PROCEEDINGS

1. M. Dreucean, G. Tanasie, M.Toth-Tașcău, H. Boss, B. Hoinoiu, D. Poenaru, *Articular Rehabilitation Controlled by Image Processing-Study on Animals*, Tissue Engineering, Part A TERMIS-EU 2008 Meeting, Vol 14, No 5, pp. 804-805, ISSN 1937-3341
2. G. Tanasie, M. Toth-Tașcău, F. Mirea, M. Dreucean, S. Anghel, L. Schluszer, C. Igna, *Combined Bioimplants for Articular Defects Healing*, Tissue Engineering, Part A TERMIS-EU 2008 Meeting, Vol 14, No 5, pp. 825-826, ISSN 1937-3341

3. D.I. Stoia, M. Toth-Tașcău, *Multipart 3D Reconstruction of a human cervical vertebra*, Recent Advances in Electrical Engineering, A Series of Reference Books and Textbooks 9th WSEAS International Conference on Automation and Information, (ICAI'08), Bucharest, Romania, pp. 170-173, ISBN 978-960-6766-77-0
4. M. Dreucean, M. Toth-Tașcău, L. Rusu, D.I. Stoia, K. Menyhardt, *Engineering Aspects of the Osteoarticular Reconstruction with Stem Cells. Study on Animals*, Recent Advances in Biology and Medicine, A Series of Reference Books and Textbooks, 9th WSEAS International Conference on Mathematics & Computers in Biology and Chemistry (MCBC'08) Bucharest, Romania, pp. 128-131, ISBN 978-960-6766-75-6
5. D.I. Stoia, M. Toth-Tașcău, *Unicortical - Bicortical Behavior of a Hybrid Bone Screw*, The Annals of DAAAM for 2008 & Proceedings of The 19th International DAAAM Symposium "Intelligent Manufacturing & Automation: Focus on Next Generation of Intelligent Systems and Solutions", Trnava, Slovakia, pp. 1313-1314, ISSN 1726-9679
6. K. Menyhardt, R. Nagy, Gh. Luca, *Kinematical Analysis of an Upper Limb Prosthesis*, The Annals of DAAAM for 2008 & Proceedings of The 19th International DAAAM Symposium "Intelligent Manufacturing & Automation: Focus on Next Generation of Intelligent Systems and Solutions", Trnava, Slovakia, pp. 841-842, ISSN 1726-9679
7. M. Dreucean, M. Toth-Tașcău, *CAD/CAM Methods In The Customization Of Medical Implants*, The Annals of DAAAM for 2008 & Proceedings of The 19th International DAAAM Symposium "Intelligent Manufacturing & Automation: Focus on Next Generation of Intelligent Systems and Solutions", Trnava, Slovakia, pp. 0441-0442, ISSN 1726-9679
8. D.I. Stoia, N. Faur, M. Toth-Tașcău, L. Culea, *In Vitro Experimental Testing of a Cervical Implanted Unit*, Advances in Strength of Materials, Trans Tech Publications Ltd Switzerland, Key Engineering Materials, Vol. 399, pp. 205-210, ISSN 1013-9826
9. November 13-16th, 2008, ISBN 978-606-521-131-5, pp. 130-131.
2. D.I. Stoia, M. Toth-Tașcău, C. Precup, L. Rusu, *Biomechanical Behavior of a Cervical Fixation Screw*, Third International Conference on Biomaterials and Medical Devices (BiomMedD'2008), Bucharest, Romania, November 13-16th, 2008, ISBN 978-606-521-131-5, pp. 128-129.
3. M. Dreucean, M. Toth-Tașcău, C. Florea, *Nanoindentation on Atomic Force Microscope*, 1st International Conference "Science and Higher Education in Function of Sustainable Development" SED 2008, 17 - 19. September 2008, Užice, Serbia, ISBN 978-86-83573-07-3, p. 1-6.
4. D.I. Stoia, *Pulsatory Testing of a Cadaveric Implanted Unit*, 1st International Conference "Science and Higher Education in Function of Sustainable Development" SED 2008, 17 - 19. September 2008, Užice, Serbia, ISBN 978-86-83573-07-3, pp. 1-6
5. D.I. Stoia, *Rapid Prototyping Using Plastic Sheet Lamination - Method, Processes and Parameters*, 8th International Conference "Research and Development in Mechanical Industry" RaDMI 2008, 14 - 17 September 2008, Užice, Serbia, ISBN 978-86-83803-24-3, pp.352-357.
6. M. Toth-Tașcău, M. Dreucean, G. Rusu, L. Rusu, *Quality Assurance based on Interlaboratory Comparison in CIDUCOS Testing Laboratory*, 8th International Conference "Research and Development in Mechanical Industry" RaDMI 2008, 14 - 17 September 2008, Užice, Serbia, ISBN 978-86-83803-24-3, pp. 611-617.
7. M. Toth-Tașcău, M. Dreucean, L. Rusu, C. Igna, R. Dascalu, Mă Sabău, *Mechanical Properties Evaluation of Canine Bones using Torsion and Bending Tests*, 8th International Conference "Research and Development in Mechanical Industry" RaDMI 2008, 14 - 17 September 2008, Užice, Serbia, ISBN 978-86-83803-24-3, pp. 95-104.
8. K. Menyhardt, *Frame design of a smart prosthesis*, 8th International Conference "Research and Development in Mechanical Industry" RaDMI 2008, 14 - 17 September 2008, Užice, Serbia, ISBN 978-86-83803-24-3, pp. 868-873.
9. K. Menyhardt, M. Toth-Tașcău, *Mobility study of an upper limb prosthesis*, 3rd International Conference "From Scientific Computing to Computational Engineering", 3-IC-SCCE, Athens, 9-11 July 2008, ISBN 978-960-530-097-5, pp. 399-405.

#### INTERNATIONAL CONFERENCES

1. M. Toth-Tașcău, M. Dreucean, L. Rusu, D.I. Stoia, G. Tanasie, C. Igna, R. Dascalu, M. Sabău - *Mechanical testing of healthy canine bones*, Third International Conference on Biomaterials and Medical Devices (BiomMedD'2008), Bucharest, Romania,

10. D.I. Stoia, M. Toth-Tașcău, M. Dreucean, L. Rusu, *modelling and numerical analysis of an implanted cervical functional unit*, 3rd International Conference "From Scientific Computing to Computational Engineering", 3-IC-SCCE, Athens, 9-11 July 2008, ISBN 978-960-530-097-5, pp. 409-416.
11. D.I. Stoia, *Reconstruction of a third lumbar vertebra from CT images*, Proceedings of the 8th International Conference on Technical Informatics – CONTI'2008, ISBN 1844-539X, pp. 87-90.
12. D.I. Stoia, M. Toth-Tașcău, C. Precup, *Stress Acting at the Bone-Screw interface of an Implanted Cervical Segment*, Proceedings of the 8th International Conference on Technical Informatics – CONTI'2008, ISBN 1844-539X, pp. 179-182.
13. G. Rusu, M. Toth-Tașcău, G. Bandur, L. Rusu, *Mechanical characteristics of some poly(methyl methacrylate) based polymers with biodegradable potential*, 34 Jupiter Conference, NU ROBOTI FTS, Beograd, ISBN 978-86-7083-628-0, pp. 87-92.
14. M.Toth-Tașcău, M. Dreucean, H. Vermeșan, D.I. Stoia, D. Malița, D. Vermeșan, R. Prejbeanu, L. Rusu, O. Ghiba, *A combined biomechanical -radiological analysis of a patient needing a hip implant revision*, 34 Jupiter Conference, NU ROBOTI FTS, Beograd, ISBN 978-86-7083-628-0, pp. 81-86.
15. A. Totorean, V. Vanatu, O. Ghiba, *Studies that concern optimizing the design process for personalized hip endoprosthesis*, CONGRESSIS People Meeting Medicine, The 5th International Congress for Medical Students and Yang Doctors, 3-6 April, 2008, Iasi, pp. 140.

#### NATIONAL CONFERENCES

1. V. Vanatu, A. Totorean, O. Ghiba, *New modelling methods for custom-made hip prosthesis*, Student Technical Days, XII<sup>th</sup> edition, 11-18 may 2008, Timisoara, Scientific paper volume, Conference Collection, pp. 544-549, ISSN 1843-1917
2. I. Oprea, A. Totorean, V. Vanatu, O. Ghiba, *Plantar distribution correction using custom-made orthosis*, National Medical Bioengineering Symposium for students and young researchers, XI<sup>th</sup> edition, Iasi 22-25 May 2008, Abstract Volume, pp. 28.
3. C. Săftescu-Jescu, D.I. Stoia, *Modelling of the implanted lumbar functional unit*, Student Technical Days, XII<sup>th</sup> edition, 11-18 may 2008, Timisoara, Scientific paper volume, Conference Collection, pp. 475, 5, ISSN 1843-1917
4. G. Tanasie, C. Bunu, F. Bojin, D. Nistor, C. Tatu, C. Igna, L. Schluszer, M. Tascu, M. Dreucean, V. Paunescu, *Articular reconstruction using mezenchimale stem cells*, National Symposium VIASAN-CEEX (Module 1), 28-30 September 2008, Sinaia, Abstract volume pp. 46, 1, ISBN: 978-973-708-341-8

#### PhD THESES

- Dan Ioan Stoia – *Modelling, developing and testing of implants for spine*
- Menyhardt Karoly - *Intelligent prosthetic system for human upper limb*

#### PhD STUDENTS

- Arcadie Bianu - *Biomechanical studies for improving physical performances of sport-beginners*
- 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*

#### 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 – Director CMPICSU
- Assoc. 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
- Associated research groups, as collaborators and partners in different projects, from The University of Medicine and Pharmacy “Victor Babes”, Timisoara and Hospital of Traumatology and Orthopedy No 1, Timisoara.

#### CONTACTS

- Prof. dr. eng. Mirela TOTH-TAȘCĂU – Director of *CMPICSU Research Centre*  
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- Assoc. 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](mailto: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 (25000 USD) to set up the basic centre infrastructure;
- The main grant (317000USD) was finished in 2002, with the set up of the research infrastructure for the three main laboratories: magnetometry, rheology, and numerical simulation;
- A partnership with Microsoft Company allowed the continuous development and upgrade of the software infrastructure



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

### MISSION

The *National Center for Engineering of Systems with Complex Fluids (NCESF)* 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

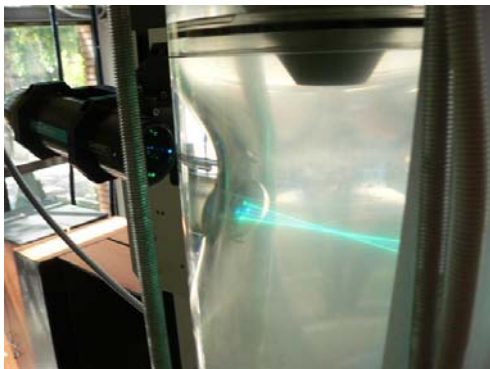
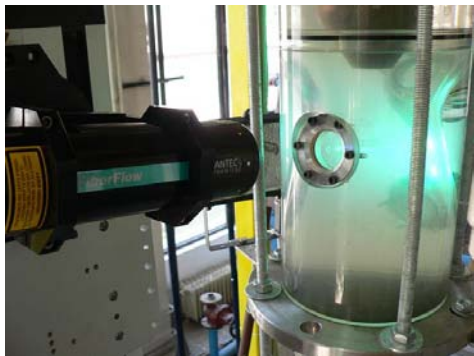
- *Optimization of hydraulic machinery* using modern numerical methods
- *Cavitation* in turbomachinery with application to Francis and Kaplan turbines, cavitation erosion of materials used for hydraulic machines.
- *Design* of hydraulic drive systems for several industrial applications, modular optimization 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

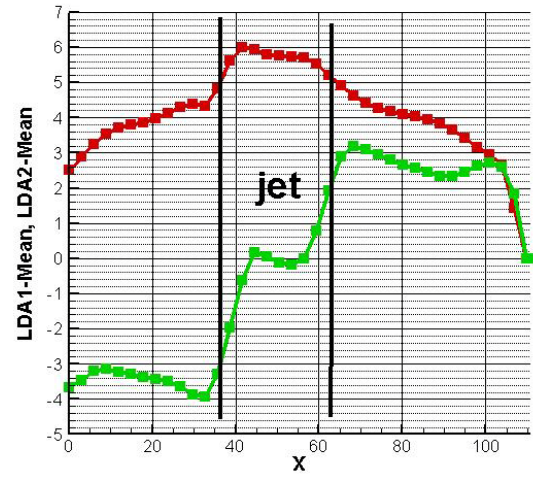
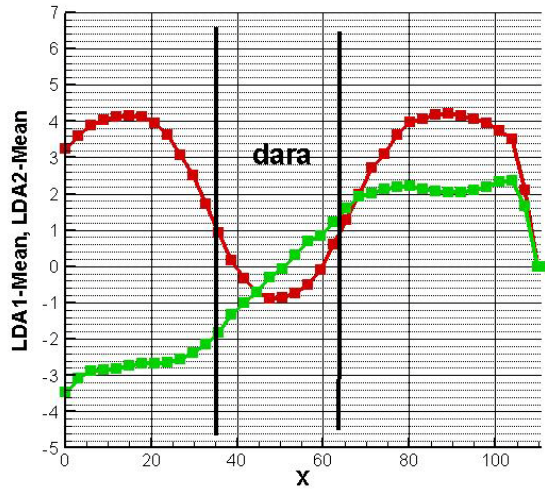
- Numerical analysis and stability analysis of decelerated swirling flows in hydraulic turbine draft tube; development of novel flow control techniques for Francis turbines operated at partial discharge.
- Full three-dimensional flow simulation and analysis in Kaplan and Francis hydraulic turbines;
-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



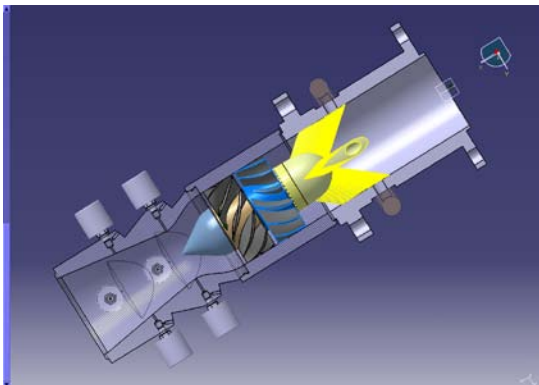
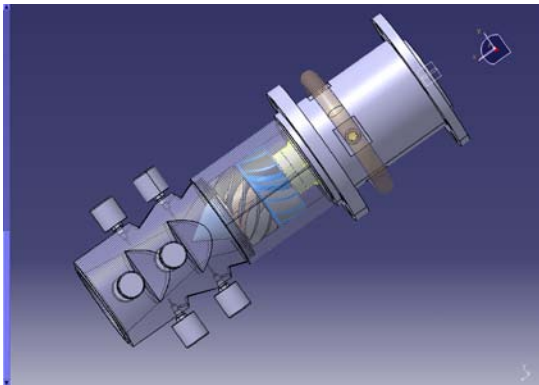
*Vortex rope mitigation in the draft tube cone of a Francis turbine operating at partial discharge using the jet control technique*



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

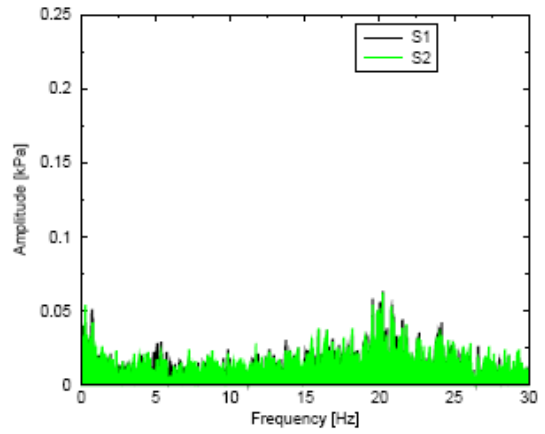
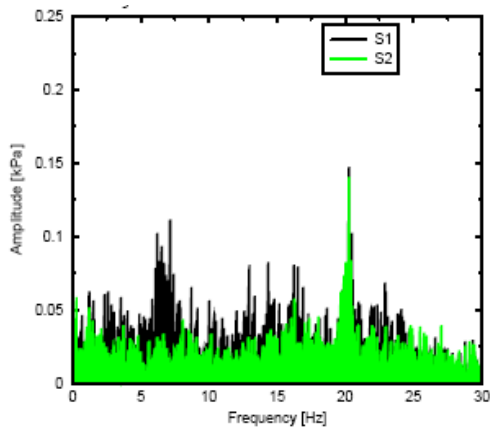


Velocity profiles without (left) and with (right) control jet

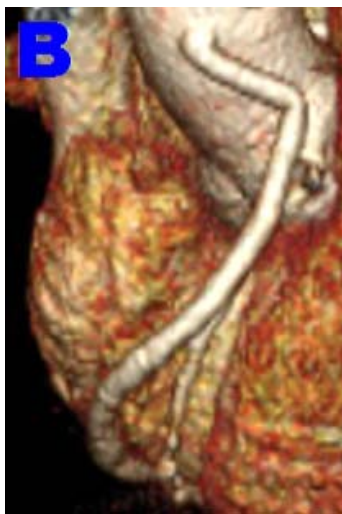


Test section for pressure measurements

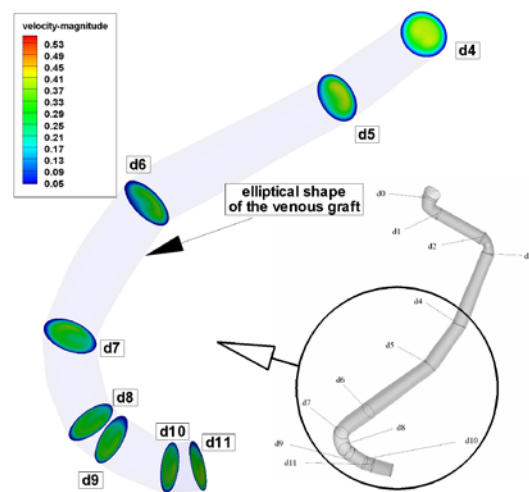




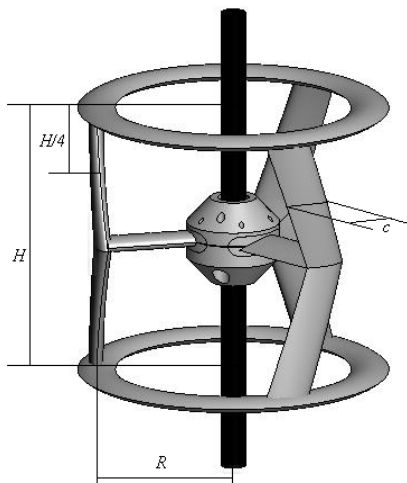
Fourier transform of pressure fluctuation without and with jet control



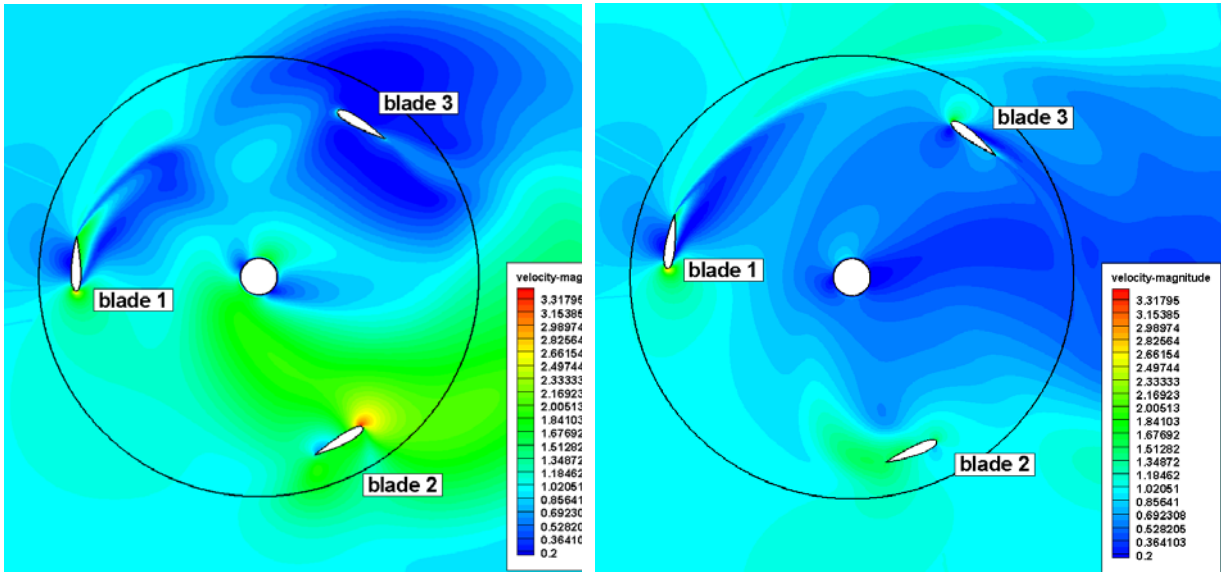
Venous bypass graft, 3D geometrical reconstruction



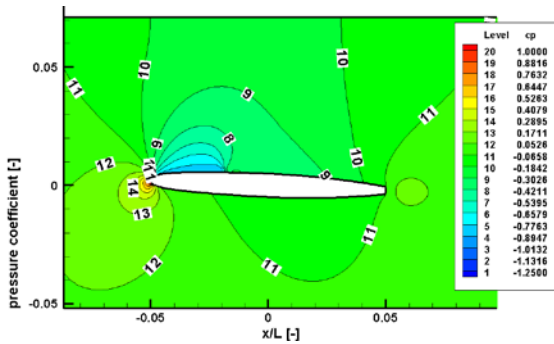
Velocity field computed in the venous bypass graft



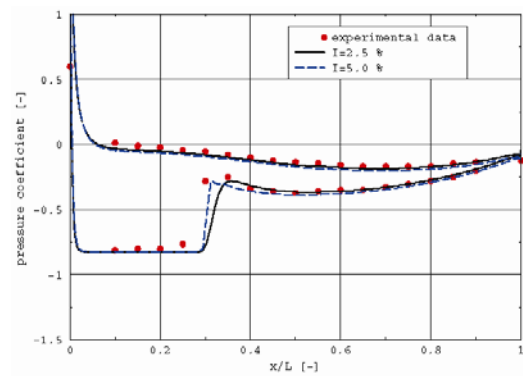
Achard turbine



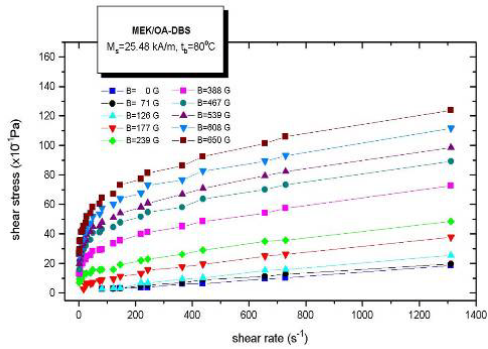
Velocity field magnitude for different value of the azimuthal angle of the blade



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



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



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



Surface instabilities

### Magnetometry Laboratory

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



### Rheology Laboratory

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

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



### Numerical Simulation and Parallel Computing Laboratory

Hardware infrastructure:

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

Software infrastructure

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



### RESEARCH CONTRACTS

1. SCOPES Joint Research Project IB7320-110942, *Turbomachinery Swirling Flow Optimization and Control with Technology of Magnetorheological Fluid Systems*, in

partnership with Ecole Polytechnique Federale de Lausanne, 7,400 CHF / 2008, Director Prof.dr.ing. Romeo Susan-Resiga.

2. Taming the Vortex Rope project – TAVORO, contract 2214/19.04.2007 between General

- Electric Company – Canada and UPT, 20,000 USD, Director Prof.dr.ing. Romeo Susan-Resiga.
3. CEEX-M1-C2-1185 (iSMART-flow), Contract 64/2006 MATNANTECH, Subcontract UPT 9226/24.07.2006, *Integration os Special Magnetorheological Technologies and Advanced Flow Control in Industrial Applications*, 399,040 RON / 2008, Director: Prof.dr.ing. Romeo Susan-Resiga.
  4. CEEX-M1-C2-1180 (CARDIOCOMP), Contract 81/2006 VIASAN, Subcontract UPT 9229/24.07.2006, *Computer Optimized Diagnosis, Surgical Treatment and Prognosis of Cardiovascular Diseases*, 112,800 RON / 2008, Director: Prof.dr.ing. Romeo Susan-Resiga.
  5. CEEX Contract X2C05/3 (TEHNOMED), Subcontract UPT 9159/21.07.2006, *Hydrodynamics and mass transfer in bubble columns with applications in advanced environment technologies*, 30,000 RON / 2008, Director: Prof.dr.ing. Romeo Susan-Resiga.
  6. CEEX Contract X2C16/2006 (MARGAS), Subcontract UPT 9256/20.07.2006, *Mathematical and numerical model for liquid gas transport with ship*, 74.500 RON/2008, Director Prof.dr.ing. Romeo RESIGA.
  7. PN2 Contract 021-002/2007 (POSTCOMB), Partener P3 UPT, *Cercetari de realizare soft CFD si model functional original sistem postcombustie, cu validarea rezultatelor*, 25,000 RON /2008, Director Prof.dr.ing. Romeo RESIGA.
  8. Ctr. nr.151/23.10.2008, *Cercetari si experimentari privind cresterea performantelor turbinelor Francis 57.5-128.5 CHE Bradisor*, 135,000 RON /2008, Director Prof. Dr. Ing. Baya Alexandru
  9. Ctr. nr.152/23.10.2008, *Cercetari si experimentari privind imbunatatirea performantelor energetice si cavitationale ale pompelor PRO 10-195 de la statia de pompe Jidoaia*, 154,700 RON /2008, Director Prof. Dr. Ing. Anton Liviu
  10. Ctr. nr. 147/15.10.2008, *Numerical Simulation of the Pump Hydrodynamics with Heat Transfer* ,11,176 RON/ 2008, , Director Prof.dr.ing. Romeo RESIGA
  11. CEEX 83/2006 *Nanofluidice magnetice pentru etanșări rotitoare fără scăpări: producere, caracterizare multiplă și experimentare în modele de etanșare de înaltă performanță*, 114,550 RON /2008, Director Conf. Dr. Ing. Nicolae Crainic
  12. CEEX 11711/2005 *Nanoparticule pe bază de fier și oxid de fier pentru nanofluidice magnetice: preparare, caracterizare și aplicații*, 30,500 RON/ 2008, Director Fiz. Oana Marinica
  13. PN II, ctr. nr. 71-083/2007, *Procesarea de nanostructuri magnetice avansate sub formă de nanoparticule și nanofluidice pe bază de fier, pentru aplicații biomedicale*, 60,000 RON / 2008, Director conf. Dr. Ing. Nicolae Crainic
  14. PN II, ctr. nr. 35/68/2007: *Studiul fenomenelor hidrodinamice si de cavitate in sistemele de actionare si automatizare si de forta*, 398.127 RON/2008: Director: Prof dr.ing. Victor Balasoiu.
  15. Grant Parteneriat II- CNMP 1467/21047/2007 - SHATEMP, Etapa II/2008: *Sisteme hidraulice adaptive pentru turbine eolienme de mica putere*; 88.524 RON/ 2008, Director: Prof. dr.ing. Victor Balasoiu.
  16. Contract nr. BC146/13.10.2008, *Analiză privind soluția de fiabilizare a arborelui turbinelor aplicată cu ocazia re tehnologizării hidroagregatelor din CHE porțile de Fier II. Propuneri de metodologie de urmărire în timp a stării arborilor turbinelor din CHE Porțile de Fier II și CHE Gogosu*, 35.000 RON, Director Prof.dr.ing. Ilare Bordeasu.
  17. Grant CNCSIS ID 34/77/01.10.2007, faza 2008, *Models development for the evaluation of materials behavior to cavitation*, Val 425000 RON. Director: Prof.dr.ing. Ilare Bordeasu.
  18. CNMP - PNCDI IV, Contract 1365/21-041/2007, faza 2008, *Optimize of the intelligent energy systems for water transport for increasing energy efficiency and energy saving*, 120.000 RON, Val. 2007-2010: 620.000RON, Partener P3: Universitatea "Politehnica" din Timișoara, Responsabil Contract: Conf.dr.ing. T. Milos, Director proiect.
  19. CNMP - PNCDI IV, Contract 3416/21-036/2007, faza 2008, *Energy service of a local community using the currents of air*, 300.000 RON, Valoare 2007-2010: 740.000RON, Coordonator: Universitatea "Politehnica" din Timișoara, Responsabil Contract: Conf.dr.ing. T. Milos, Director proiect.
  20. Contract nr. 661/18.05.2007 Beneficiar: SC CLAGI SRL, Biled, România, *Dealing in manufacturing of families of wind turbines for small / medium power*, Valoare Contract: 21.000 RON, Valoare 2008: 7.000 RON, Contractor Universitatea "Politehnica" din Timișoara, Responsabil Contract: Conf.dr.ing. Teodor MILOȘ.
  21. CNCSIS, PNII, Idei, contract nr. 929/2008, *Study Intelligent hydrodynamic transmissions*, Val. 980.000 RON, Director Sl. Dr. ing. Adriana Sida Manea.

## PUBLICATIONS

## BOOKS

1. Sebastian Muntean, *Analiza numerica a curgerii in turbinele hidraulice Francis*, Editura Orizonturi Universitare, Timisoara
2. A-M Georgescu, Sanda-C. Georgescu, S.I. Bernad, *Proceedings of the 4th Workshop on Vortex Dominated Flows*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 53(67), Fascicola 3, ISSN 1224 – 6007
3. I. Pădurean, *Mecanica fluidelor, mașini și acționări hidraulice fundamente teoretice, aplicații*, Editura Eurostampa Timișoara, ISBN 978-973-687-758-2, octombrie 2008.
4. Balasoiu V., Cristian I., Bordeasu I., *Equipment and hydraulic systems for actioned and automation*, Orizonturi Universitare Timisoara Publishing, Vol. II, Volume machines, 2008, ISBN: 978-973-638-313-7, ISBN: 978-973-638-314-6, pp.500
5. Sporea I., Bordeasu, I., Mandek Fr., *Aluminum alloy refractory castings in pistons*, Politehnica Publishing, Timisoara/2008, ISBN 978-973-625-627-1, pp.220

## JOURNAL PAPERS

1. Bernad S, Georgescu A, Georgescu SC, Susan-Resiga R, Anton I, *Flow investigations in Achard turbine*, Proceedings of the Romanian Academy Series A-Mathematics Physics Technical Sciences Information Science 9 (2):129-140, 2008.
2. Bernad SI, Barbat T, Bernad ES, Susan-Resiga R., *Cardio vascular surgery - Simulation based medical intervention*, MATHEMATICS AND COMPUTERS IN BIOLOGY AND CHEMISTRY, pp: 100-106, 2008.
3. Bernad S. I., Georgescu A., Georgescu S., Resiga R., *Numerical Investigation of the Unsteady Flow in the Achard Turbine*, In New Aspects of Fluid Mechanics and Aerodynamics" WSEAS Mechanical Engineering Series WSEAS Press, ISSN 1790-5095, ISBN 978-960-6766-98-5, pp. 59-65.
4. Georgescu S.-C., Georgescu A.-M., Bernad S. I., *Innovative simplified 2D numerical modelling of the inter-influence of vertical axis cross-flow turbines mounted in hydropower farms*, Scientific Bulletin "Politehnica" University of Timisoara, Transactions on Mechanics, 53(67), No 3, pp. 57-62, 2008, ISSN 1224-6077.
5. Georgescu A.-M., Georgescu S.-C., Bernad S. I., Hasegan L. V., *Staggered arrangement of three bladed, vertical axis, cross-flow turbine towers in farms*, Scientific Bulletin

6. Bernad S. I., Barbat T., Georgescu A.-M., Georgescu S.-C., Susan-Resiga R., *Unsteady Flow Simulation in the Achard Turbines Mounted in Hydropower Farms*, Scientific Bulletin "Politehnica" University of Timisoara, Transactions on Mechanics, 53(67), No 3, pp. 69-74, 2008, ISSN 1224-6077
7. F.D. Stoian, S. Holotescu, V. Stoica, Doina Bica, L. Vékás, *Comparative study of convective heat transfer in water and water based magnetizable nanofluid for thermal applications*, J. Optoelectronics and Advanced Materials, Vol.10, No.4, 773-776 (2008).
8. D. Dadarlat, C. Neamtu, M. Streza, Rodica Turcu, I. Craciunescu, Doina Bica, L. Vékás, *High accuracy photopyroelectric investigation of dynamic thermal parameters of  $Fe_3O_4$  and  $CoFe_2O_4$  magnetic nanofluids*, J. Nanoparticle Research, DOI 10.1007/s11051-008-9386-z (2008).
9. E. Tombácz, Doina Bica, A. Hajdu, E. Illés, A. Majzik, L. Vékás, *Surfactant double layer stabilized magnetic nanofluids for biomedical application*, J. Phys. Condensed Matter, Vol.20, 204103 (6 pp.) (2008).
10. A. Nan, S. Karsten, I. Craciunescu, Rodica Turcu, L. Vékás, J. Liebscher, *New shells for magnetic nanoparticles based on polypyrrole functionalized with  $\alpha$ -amino acids*, ARKIVOC (xv), 307-320 (2008).
11. R. Alexandrescu, I. Morjan, F. Dumitrache, M. Scarisoreanu, I. Soare, C. Fleaca, R. Birjega, E. Popovici, L. Gavrilă, G. Prodan, V. Ciupina, G. Filoti, V. Kuncser, L. Vékás, *Photochemistry aspects of the laser pyrolysis addressing the preparation of oxide semiconductor photocatalysts*, International Journal of Photoenergy, ID 604181 (11 pp.), (2008).
12. C. Bălăn , Diana Broboană, E. Gheorghiu, L. Vékás, *Rheological characterization of complex fluids in electro-magnetic fields*, J. Non-Newtonian Fluid Mech., Vol.154, 22-30 (2008).
13. Maria Bălășoiu, V. L. Aksenov, Doina Bica, V. N. Duginov, K. I. Gritsaj, T. Mamedov, V. Tripadus, L. Vékás, V. A. Zhukov, *Muon spectroscopy of a frozen ferrofluid*, Magnetohydrodynamics, Vol. 44, No.1, 61-68 (2008).
14. L. Vékás, *Ferrofluids and Magnetorheological Fluids (review)*, Advances in Science and Technology, Vol. 54, pp. 127-136 (2008).

15. A. Hajdú, E. Tombácz, E. Illés, Doina Bica, L. Vékás, *Magnetite Nanoparticles Stabilized Under Physiological Conditions for Biomedical Application*, Progr. Colloid Polym. Sci., DOI 10.1007/2882\_2008\_111, Vol.135, 29-37 (2008).
16. Maria Bălăşoiu, S.G. Barsov, Doina Bica, L. Vékás, S.I. Vorobiev, K.I. Gritsaj, V.N. Duginov, V.A. Zhukov, E.N. Komarov, V.P. Koptev, S.A. Kotov, T.N. Mamedov, C. Petrescu, G.V. Schherbakov,  *$\mu$ SR study of the properties of Fe<sub>3</sub>O<sub>4</sub> –based nanostructured magnetic systems*, JETP Letters, Vol.88, pp. 210-213 (2008).
17. I. D. Baciú, M. Bărglăzan, *Boundary Element Method Experimentally validated for an axial airfoils cascade* Univ. Politeh. Bucureşti, Scientific Bulletin, Series: D Mechanical Engineering, Vol. 70, nr. 4, (2008)
18. I. C. Mandiș, D. N. Robescu, M. Bărglăzan, *Capitalization of Wind Potential using a modified Banki Turbine*, Univ. Politeh. Bucureşti, Scientific Bulletin, Series : D Mechanical Engineering, Vol. 70, nr. 4, (2008)
19. A. Catanase, M. Bărglăzan *Frequency Response Characteristics of Hydraulic Turbines of Pelton type*, WSEAS Transactions on Fluid Mechanics Aprilie, 6, 50, Art. 433, (2008)
20. D.C.Stroiță, M. Bărglăzan, *Characteristic curves for Double –Flux Water Turbine SDC-125*, Scientific Bulletin of the „POLITEHNICA” University of Timișoara, Transactions on Hydrotechnics, Tom 53( 67), Fascicola 2 , pp. 237-241 . ISSN 1224-6042. (2008)
21. C. D. Stroiță, M. Bărglăzan, A. Manea, *Penstock Influence on a Double-Flux Water Turbine*, Hervex ediția a XVI-a Râmnicu Vâlcea, ISSN 1454-8003 (2008)
22. M. Bărglăzan, *Fluid Dynamic Consideration about Axial Water and Wind Turbines*, Hervex ediția a XVI-a Râmnicu Vâlcea, ISSN 1454-8003 (2008)
23. D. Robescu, M. Bărglăzan, V. Silvestru, M. Ionescu, I. C. Mandiș, *Study of a wind turbine model with vertical axis and double air flow through the rotor*, Scientific Bulletin of the „Politehnica” University of Timișoara Transactions on Mechanics Tom 53(67), Proceedings of the International Conference on Hydraulic Machinery and Equipments (HME), Timișoara, , ISSN !224-6077 pp. 197-203 (2008)
24. A. Marin, M. Bărglăzan, P. Drumea, Ioana Ilie, *Adaptive Control for Hydropower Plants*, Scientific Bulletin of the „Politehnica”, University of Timișoara Transactions on Mechanics Tom 53(67), Proceedings of the International Conference on Hydraulic Machinery and Equipments (HME), Timișoara, ISSN !224-6077 pp. 327-331
25. I. D. Baciú, M. Bărglăzan, *Experimental – Numeric Comparison of an Aerodynamic “S” profile cascade*, Scientific Bulletin of the „Politehnica” University of Timișoara Transactions on Mechanics Tom 53(67), Proceedings of the International Conference on Hydraulic Machinery and Equipments (HME), Timișoara, ISSN !224-6077 pp. 39-45, (2008)
26. Bordeasu, I., Bădărău, R., Jurchela, A., *The Deformations And Microstructural Transformations Analyses Produced By Cavitation To The Austenitic Stainless Steel*, Machine Design, Monograf University of Novi Sad, Faculty of Technical Sciences, 2008, ISBN 978-86-7892-105-6, pp.411-414
27. Ghita,E., Bordeasu, I., Cernescu, A., Bălăşoiu, V., Ciucă, I., *On the Behaviour of the Elastic Elements Belonging to the Elastic Tram Wheel at Particular Loading*, Chem.Abs. Materiale plastice, Vol. 45, Nr.1, MPLAAM 45(1) (2008), pp. 97-101, ISSN 0025-5289,
28. Anton, L.E., Bordeasu, I., Tabără, I., *Considerations Regarding the use EPO 99 B Resin in manufacturing Axial Hydraulic Machinery Runners*, Chem.Abs. Materiale plastice, Vol. 45 Nr. 2, MPLAAM 45(2) (2008), pp.190-192, ISSN 0025-5289
29. Mitelea, I., Vărzaru, N., Popovici, D., Popescu, M., Bordeasu, I., *Researches of high frequency (HF) welding process validation for some polymers*, Chem.Abs. Materiale plastice, Vol. 45, Nr.1, MPLAAM 45(3) (2008), pp. 289-294, ISSN 0025-5289
30. Pătrășcoiu, C-tin, Bordeasu. I., Săceanu, C-tin, *Command And Control In Interaction Between Two Dynamical Systems*, Scientific Bulletin “Politehnica” University of Timisoara, Transactions of Mechanics, Tom 53(67), Fascicola 1, ISSN:1224-6077, Timisoara, 2008, pp.107-110
31. Bordeasu, I., Popoviciu, M., Mitelea, I., Bălăşoiu, V., *Cavitation eroded zones analysis for G-X5 CrNi 13.4 stainless steel*, Scientific Bulletin of the Politehnica University of Timisoara Transactions on Mechanic, Special Issue ISSN 1224-6077, Tom 53 (67), pp.413-420
32. Popoviciu, M., Bordeasu, I., *Cavitation Erosion Qualities Of 40cr10 Steel*, Scientific Bulletin of the Politehnica University of Timisoara Transactions on Mechanic, Special Issue ISSN 1224-6077, Tom 53 (67), pp.445-452

33. Pavelescu, Th., Bordeasu, I., Popoviciu, M., Bălăsoiu, V., Hadăr, A., *Considerations regarding the cracks of the stay vanes of a great dimensions kaplan turbine*, Scientific Bulletin of the Politehnica University of Timisoara Transactions on Mechanics, Special Issue ISSN 1224-6077, Tom 53 (67), pp.143-152
34. Bordeasu, I., Jurchela, A., Karabenciov, A., Bordeasu, D., Bodin Fl., *Nickel's Influence over Cavitation Erosion Of Stainless Steels With Constant Chromium Content*, Scientific Bulletin of the Politehnica University of Timisoara Transactions on Mechanics, Special Issue ISSN 1224-6077, Tom 53 (67), pp.421-424
35. Balasoiu, V., Dobanda, E., Gombos, R., Bordeasu, I., Gombos, M., Popoviciu, M.O., *Mathematical Models And Numerical Simulation Used To Study Flow Parameters Inside Of Positioning Equipments*, Scientific Bulletin of the Politehnica University of Timisoara Transactions on Mechanics, Special Issue ISSN 1224-6077, Tom 53 (67), pp.275-282
36. Manea, Adriana Sida, Gyulai, Francisc, *Modeling Of Performances Of Small Power Wind Turbine With Horizontal Axis*, Scientific Bulletin of the "Politehnica" University of Timisoara, Romania, Transaction on Mechanics, Special Issue ISSN 124-6077, Tom 53(67), The International Conference on Hydraulic Machinery and Equipments, Timisoara, October 16-17, 2008, Romania, pp. 187-190
37. Teodor Milos, Eugen Dobanda, Adriana Manea, Rodica Badarau, Daniel Stroita, *The Automatic Adjustment Of The Optimum Operating Point Depending On The Requirements Of The Water Supply Using An Intelligent Pump*, Scientific Bulletin of the "Politehnica" University of Timisoara, Romania, Transaction on Mechanics, Special Issue ISSN 124-6077, Tom 53(67), The International Conference on Hydraulic Machinery and Equipments, Timisoara, October 16-17, 2008, Romania, pp. 247-252
38. T. Miloş, *Cad Procedure For Blade Design Of Centrifugal Pump Impeller Using Conformal Mapping Method*, A Cincea Conferință a Hidroenergeticienilor din România, Dorin Pavel 2008, Publicat în Scietific Bulletin of University POLITEHNICA of Bucharest, Series D, Mechanical Engineering, Vol.70/2008, No. 4, ISSN 1454-2358. pp. 213-220
39. T. Miloş, F. Gyulai, *Cad Technique For Blade Design Of Small Power Wind Turbine*, Proceedings of the The International Conference on Hydraulic Machinery and Equipments, HME 2008, Timisoara, Romania, October 16-17, 2008, Publicată în Scientific Bulletin of the Politehnica University of Timisoara, Transactions on Mechanics Special Issue, ISSN 1224 – 6077; Tom 53 (67), pp. 191-196.
40. E. Maican, M. Bayer, A. Al. Tabara, V. Balasoiu - *Optimizarea unei componente mecanice polimerice a unui transportor de material vegetal (Optimization of a Polymeric Rod from Plants Conveying Equipment)*. In Materiale Plastice, MPLAAM 45 (2) 2008,(pp.131-220), ISSN 0025/ 5289, Vol 45, nr.2, iunie 2008, pp 184-189, Institute for Scientific Information (ISI), Indicele de impact pe anul 2006: 0,404, recensed by: Chemical Abstract Current Contentsand Indexed by ISI
41. Victor Balasoiu, Ilarie Bordeasu, Mircea Octavian Popoviciu, *Hydrodynamics of Directional Spool Valves for Electrohydraulic Distributors*, Scientific Bulletin of the Politehnica Universite of Timisoara, Transactions on Mechanics Special Issue, ISSN 1224 – 6077; Tom 53 (67), pp 283-286, The International Conference on Hydraulic Machinery and Equipments Timisoara, October 16-17, 2008, Romania *Revista CNCISIS B+, BDI, pp.283-286*
42. Victor Balasoiu, Eugen Dobanda, Radu Ioan Gombos, Ilare Bordeasu, Mihai Petre Gombos, Mircea Octavian Popoviciu, *Mathematical Model used to Study the Flow Parameters in Positioning Equipment*, Scientific Bulletin of the Politehnica Universite of Timisoara, Transactions on Mechanics Special Issue, ISSN 1224 – 6077; Tom 53 (67), pp. 275-282, The International Conference on Hydraulic Machinery and Equipments Timisoara, October 16-17, 2008, Romania *Revista CNCISIS B+, BDI, pp.275-282*
43. Eugen Dobanda, Victor Balasoiu, *Modeling the Yaw Mechanism of Horizontal Wind Turbines. Theoretical Approach*, Scientific Bulletin of the Politehnica Universite of Timisoara, Transactions on Mechanics Special Issue, ISSN 1224 – 6077; Tom 53 (67), The International Conference on Hydraulic Machinery and Equipments Timisoara, October 16-17, 2008, Romania *Revista CNCISIS B+, BDI, pp. 309-314*
44. Eugen DOBÂNDĂ: *On the Dynamic Behaviour of Horizontal Wind Turbines. Theoretical Approach*, Scientific Bulletin of the Politehnica Universite of Timisoara, Transactions on Mechanics Special Issue, ISSN 1224 – 6077; Tom 53 (67), 181-186, The International Conference on Hydraulic Machinery and Equipments Timisoara,

- October 16-17, 2008, Romania *Revista CNCISIS B+*, *BDI*, pp. 181-186
45. Ionel Doru Baci - A "S" Profile Axial Cascade, Tested in Wind Tunnel, Transactions on Mechanics Special Issue, ISSN 1224 – 6077; Tom 53 (67), The International Conference on Hydraulic Machinery and Equipments Timisoara, October 16-17, 2008, Romania *Revista CNCISIS B+*, *BDI*, pp.45-48
  46. Rodica Badarau, Francisc Gyulai - *The Necessity to Adapt the Construction of Low Power Wind Turbines to the Power Offer of the Locations*. Transactions on Mechanics Special Issue, ISSN 1224 – 6077; Tom 53 (67), The International Conference on Hydraulic Machinery and Equipments Timisoara, October 16-17, 2008, Romania *Revista CNCISIS B+*, *BDI*, pp.161-166
  47. DOBÂNDĂ Eugen. – „On The Load Of Axial Turbomachines Blade”, 5<sup>th</sup> National Conference Of The Romanian Hydropower Engineers Dorin Pavel, Universitatea Politehnica Bucuresti, University Politehnica Of Bucharest Scientific Bulletin, Series D: Mechanical Engineering, ISSN 1454-2358, Vol. 70, Number 4, 2008, pp. 173 – 180 (8 Pag.), (*Revistă Cotată B<sup>+</sup> BDI- CNCISIS*), pp.181-186
  48. Velescu, C., *The theoretical study of cavitation in the gear pump. First part: Analytically exactly relation for the calculus of discharge in the gear pumps*, Proceedings of the The International Conference on Hydraulic Machinery and Equipments, HME 2008, Timisoara, Romania, October 16-17, 2008, Publicată în Scientific Bulletin of the Politehnica University of Timisoara, Transactions on Mechanics Special Issue, ISSN 1224 – 6077; Tom 53 (67). pp. 457-468
  49. Velescu, C., *The theoretical study of cavitation in the gear pump. Second part: The calculus of critical pressure in the gear pumps*, Proceedings of the The International Conference on Hydraulic Machinery and Equipments, HME 2008, Timisoara, Romania, October 16-17, 2008, Publicată în Scientific Bulletin of the Politehnica University of Timisoara, Transactions on Mechanics Special Issue, ISSN 1224 – 6077; Tom 53 (67), pp. 469-478.
  50. Pădurean Ioan, Nedelcu Dorian, Elvira Pădurean, Arpad Fay, Truşculescu Marin, *Researches upon cavitation erosion resistance of martensitic stainless steel used for molding Kaplan and Francis turbines runner blades*, Metalurgia Internațional, Romanian Metallurgical Foundation, Scientific Publishing House (F.M.R) ISSN 1582-2214, vol. XIII (2008), no.5, pp. 34-40
  51. Pădurean Ioan, Nedelcu Dorian, Elvira Pădurean, Arpad Fay, Truşculescu Marin *Cavitation erosion resistance of the austenitic stainless steel from welding reconditioned hydraulic turbines blades zones*, Metalurgia Internațional, Romanian Metallurgical Foundation, Scientific Publishing House (F.M.R) ISSN 1582-2214, (vol. XIII), no.6, 2008, pp. 26-31
  52. Pădurean Ioan, Truşculescu Marin Arpad Fay, Nedelcu Dorian, Elvira Pădurean, *About cavitation erosion resistance of the austenitic stainless steel heat treated*, Metalurgia Internațional Romanian Metallurgical Foundation, Scientific Publishing House (F.M.R) ISSN 1582-2214, (vol. XIII), no.9, 2008, pp. 23-26
  53. Pădurean Ioan, Truşculescu Marin Arpad Fay, Nedelcu Dorian, Elvira Pădurean, *About cavitation erosion resistance of the martensitic stainless steel from zones reconditioned by welding*, Metalurgia Internațional, Romanian Metallurgical Foundation, Scientific Publishing House (F.M.R) ISSN 1582-2214, (vol. XIII), no.10, 2008, pp. 60-66
  54. D.Nedelcu, G.R.Gillich, Florentina Cziplă, I. Ciucă, I. Pădurean *Consideration about Using Polymers in Adaptive Guardrails Construction*, Materiale Plastice București-România, Chem. Abs.:MPLAAM 45 (1) (3-128), ISSN 0025 / 5289, Vol. 45, nr. 1, martie 2008-09-04, pp. 47-52
  55. Pădurean Ioan, Nedelcu Dorian, Elvira Pădurean, Arpad Fay, Truşculescu Marin *Research upon increasing cavitation\_erosion resistance of austenitic steel used for moulding Kaplan and Francis turbines runner blades*, Metalurgia Federația Patronală Metalurgia și Editura Științifică F.M.R, ISSN 0461-9579, (60) 2008, nr. 5, pp. 10-16
  56. Pădurean Ioan, Truşculescu Marin, Arpad Fay, Nedelcu Dorian, Elvira Pădurean *Research upon cavitation resistance erosion of the GX5CRNI9-10 austenitic stainless steel thermally treated*, Metalurgia, Federația Patronală Metalurgia și Editura Științifică F.M.R, ISSN 0461-9579 (60) 2008, nr. 7, pp.26-30
  57. Pădurean Ioan, Truşculescu Marin, Arpad Fay, Nedelcu Dorian, Elvira Pădurean, *Research upon cavitation resistance of the GX4CrNi13-4 martensitic stainless from the blade areas of the hydraulic turbines repaired by welding*, Metalurgia Federația Patronală Metalurgia și Editura Științifică F.M.R ISSN 0461-9579 (60) 2008, nr. 8, pp 47-56
  58. Florentina Cziplă, Doina Frunzăverde, Dorian Nedelcu, Cornelia Anghel, Ioan Pădurean *Utilizarea modelului statistic predictiv la*



- studierea diagramei de echilibru fazic în sistemul ternar Al-Cu-Si*. Metalurgia, Federația Patronală Metalurgia și Editura Științifică F.M.R ISSN 0461-9579(60) 2008, nr. 12, pp 5-9
59. Florentina Cziplé, Doina Frunzăverde, Dorian Nedelcu, Ioan Pădurean *The thermodynamic characterization of the regular solution in ternary system Al-Cu-Si*, Metalurgia Federația Patronală Metalurgia și Editura Științifică F.M.R, ISSN 0461-9579, (60) 2008, nr. 12, pp 33-38
  60. Ioan Pădurean, Viorel Constantin Câmpian, Dorian Nedelcu, Octavian Oancă, Ilare Bordeasu, *Influence of structural state on cavitation erosion of austenitic stainless steel gx5CrNi19-10 after solution treatment*, Revue Roumaine Des Sciences Techniques, Série De, Mécanique Appliquée, Romanian Journal Of Technical Sciences, Applied Mechanics, ISSN 0035-4074, Tome 53, No 1, ian – apr. 2008, pp 73-80
  61. Dorian Nedelcu, Viorel Constantin Câmpian, Ioan Pădurean, *Service life estimation for runner's blade of an axial turbine*, Revue Roumaine Des Sciences Techniques, Série De Mécanique Appliquée, Romanian Journal Of Technical Sciences Applied Mechanics, ISSN 0035-4074, Tome 53, No 1, ian – apr. 2008, pp 81-94
  62. Ioan Padurean, Marin Trusculescu, Dorian Nedelcu, Octavian Megheles, Mircea Popoviciu, Elvira Padurean, *Research upon Cavitation Erosion Resistance of Heat Treated Martensitic Stainless Steels*, Scientific Bulletin of the Politehnica University of Timisoara Transactions on Mechanics Special issue. Tom 53 (67), ISSN- 1224-6077, Proceedings of The International Conference on Hydraulic Machinery and Equipments, Timisoara, Romania, October 16-17, 2008, pp 429-436
  63. Ioan Padurean, Marin Trusculescu, Dorian Nedelcu, Octavian Megheles, Mircea Popoviciu, Ioan Hota. *About Influences of the Structural State in Cavitation Erosion Resistance of Thermally Treated Austenitic Stainless Steels*, Scientific Bulletin of the Politehnica University of Timisoara Transactions on Mechanics Special issue. Tom 53 (67), ISSN- 1224-6077, Proceedings of The International Conference on Hydraulic Machinery and Equipments Timisoara, Romania, October 16-17, 2008, pp 437-440
  64. Dorian Nedelcu, Viorel Campian, Ioan Padurean, *Stress and Deformations on Pelton Bucket Turbine Calculated by Finite Elements Method* Scientific Bulletin of the Politehnica University of Timisoara Transactions on Mechanics Special issue. Tom 53 (67), ISSN- 1224-6077 Proceedings of The International Conference on Hydraulic Machinery and Equipments Timisoara, Romania, October 16-17, 2008 pp 137-142
  65. Octavian Megheles, Ioan Hota, Claudiu Iavornic, Sigrid Jianu, Ioan Pădurean *Optimization of the Geometry of the Hydraulic Lay-Out of a Bulb Turbine to Decrease Pressure Losses* Scientific Bulletin of the Politehnica University of Timisoara Transactions on Mechanics Special issue. Tom 53 (67), ISSN- 1224-6077 Proceedings of The International Conference on Hydraulic Machinery and Equipments Timisoara, Romania, October 16-17, 2008 pp 131-136
- ### INTERNATIONAL CONFERENCES
1. Sebastian Muntean, Romeo Susan-Resiga, Bosioc Alin, Stuparu Adrian, Baya Alexandru, Anton Liviu, *“Mitigation of Pressure Fluctuations in a Conical Diffuser with Precessing Vortex Rope Using Axial Jet Control Method”* 24<sup>th</sup> IAHR Symposium on Hydraulic Machinery and Systems, Foz do Iguassu, ISBN: 978-85-60858-13-1, Brazilia, Oct. 2008.
  2. Susan-Resiga R., Muntean S., *“Decelerated Swirling Flow Control in the Discharge Cone Francis Turbines”* Invited Lecture, The Fourth Symposium on Fluid Machinery and Fluid Engineering, Beijing, China, Nov 2008.
  3. Bernad S. I., Georgescu A.-M., Georgescu S.-C., Barbat T., Susan-Resiga R., *“Numerical simulation of 2D unsteady flow around a blade of Achard turbine”*, Proceedings of the 24th IAHR Symposium on Hydraulic Machinery and Systems, October 27-31, Foz do Iguassu, Brazil, CD-ROM, Paper #100, ISBN: 978-85-60858-13
  4. Susan-Resiga R., Muntean S., Tanasa C., Bosioc A., *„Hydrodynamic Design and Analysis of a Swirling Flow Generator”*, 4<sup>th</sup> German-Romanian Wokshop, Stuttgart, Germania, Jun. 2008,
  5. Muntean S., Susan-Resiga R., Bosioc A. *“Pressure Measurement in a Conical Difuser with Swirling Flow and Axial Jet Control”*, 4<sup>th</sup> German-Romanian Wokshop, Stuttgart, Germania, Jun. 2008,
  6. Susan-Resiga R., Muntean S., Bosioc A., *„Blade Design for a Swirling Flow Generator”*, 4<sup>th</sup> German-Romanian Wokshop, Stuttgart, Germania, Jun. 2008.
  7. Bosioc A., Susan-Resiga R., Muntean S., *„Design and Manufacturing of a Convergent-Divergent Test Section for Swirling Flow Aparatus”*, 4<sup>th</sup> German-Romanian Wokshop, Stuttgart, Germania, Jun 2008.

8. Stuparu A., Muntean S., Baya A., Anton L., “*Numerical Investigation of the energetic and Cavitational Behavior of a centrifugal pump with double flux*”, 4<sup>th</sup> German-Romanian Wokshop, Stuttgart, Germania, Jun 2008.
9. Anton L., Stuparu A., Muntean S., Baya A., “*Experimental and 2D Numerical Investigation of the flow in a Inducer with Straight Hydrofoil Cascade*”, 4<sup>th</sup> German-Romanian Wokshop, Stuttgart, Germania, Jun 2008.
10. Bernad S., Susan-Resiga R., Barbat T., Bernad E.S., “*Cardiovascular Diseas Numerical Investigations. The CARDIOCOMP project-Timisoara, Romania*”, 4<sup>th</sup> German-Romanian Wokshop, Stuttgart, Germania, Jun 2008.
11. Bernad S., Susan-Resiga R., Georgescu A.M., Georgescu C.S., “*Marine Turbine development FLUENT. Numerical Investigations*”, 4<sup>th</sup> German-Romanian Wokshop, Stuttgart, Germania, Jun 2008.
12. Broboana, D; Bernad, S; Balan, C, *Investigation of vortical structures in bifurcations*, 15th International Congress on Rheology/80th Annual Meeting of the Society-of-Rheology, August 3-8, 2008, Monterey, USA, PTS 1 AND 2 1027291-293, 2008.
13. Bordeasu, I., Popoviciu, M., Hadăr, A., Bălășoiu, V., *Cylinder with Differential Piston For Mass Measurements, Materials, Methods and Technologies*. International Scientific Publications, Bulgaria, 2008, Vol 2, Part 1, ISSN 1313-2539, pp.74-83.
14. Bordeasu, I. Anton, L.E., Baya, A., Jurchela, A. *The Necessity of Considering Cavitation Erosion a Mechanic Phenomena, Against Chemical Corosion*, Annals of DAAAM for 2008 & Proceedings of The 19th International DAAAM Symposium “Intelligent Manufacturing & Automation: Focus on New Generation of Intelligent Systems and Solutions”, Trnava Slovakia, 22-25th October 2008, ISSN 1726-9679, ISBN 3-901509-58-5, pp. 0145-0146
15. Bordeasu, I. Ghiban, B. Popoviciu, M.O. Balasoiu, V. Birau, N. Karabenciov, A.: *The Damage of Austenite - Ferrite Stainless Steels by Cavitation Erosion*, Annals of DAAAM for 2008 & Proceedings of The 19th International DAAAM Symposium “Intelligent Manufacturing & Automation: Focus on New Generation of Intelligent Systems and Solutions”, Trnava Slovakia, 22-25th October 2008, ISSN 1726-9679, ISBN 3-901509-58-5, pp. 0147-0148
16. Balasoiu, V. Bordeasu, I. Popoviciu, M. Gombos, R. Gombos, M. *The Cavitation Phenomenon in the Flow Zone*, Annals of DAAAM for 2008 & Proceedings of The 19th International DAAAM Symposium “Intelligent Manufacturing & Automation: Focus on New Generation of Intelligent Systems and Solutions”, Trnava Slovakia, 22-25th October 2008, ISSN 1726-9679, ISBN 3-901509-58-5, pp. 0059-0060
17. Ghiban, B. Bordeasu, I. Ghiban, N. Ciuca, S. Badarau, R. Hadar, A. Ciuca, I. , Serban, N.: *Some Aspects of Cavitation Damages in Austenitic Stainless Steels*, Annals of DAAAM for 2008 & Proceedings of The 19th International DAAAM Symposium “Intelligent Manufacturing & Automation: Focus on New Generation of Intelligent Systems and Solutions”, Trnava Slovakia, 22-25th October 2008, ISSN 1726-9679, ISBN 3-901509-58-5, pp. 0541-0542
18. Ghiban, B. Ghiban, N. Serban, N. Hadar, A. Bordeasu, I. Jiga, G.: *The Calculus of the Thermodynamic Activity of Carbon in Silicon Alloyed Austenitic Stainless Steels*, Annals of DAAAM for 2008 & Proceedings of The 19th International DAAAM Symposium “Intelligent Manufacturing & Automation: Focus on New Generation of Intelligent Systems and Solutions”, Trnava Slovakia, 22-25th October 2008, ISSN 1726-9679, ISBN 3-901509-58-5, pp. 0543-0544
19. Bălășoiu, V., Bordeasu, I., Popoviciu, M., *Hydrodynamics Fenomens in Sliding Control Valves*, The 5<sup>th</sup> International Symposium “Shape, mechanical and industrial design of products in mechanical engineering 2008” KOD 2008, 15 - 16. April 2008, Novi Sad, Serbia, ISBN 978-86-7892-104-9, pp. 305-308
20. Manea, Adriana Sida; Barglazan, M.; Stroita, D. C. Balasoiu, V., *Kaplan Turbine Blade Design With Octavian Popa Method* , The 19th International DAAAM Symposium, “Intelligent Manufacturing & Automation: Focus On New Generation Of Intelligent Systems And Solutions”, 22-25th October 2008, Trnava, Slovakia, pp. 0787-0788, DAAAAM International Vienna 2008, ISI PROCEEDINGS, ISSN 1726-9679, ISBN 978-3-901509-68-1
21. Stroita, D.C.; Barglazan, M.; Manea, A.S. Balasoiu, V., *Double-Flux Water Turbine Dynamics*, The 19th International DAAAM Symposium , “Intelligent Manufacturing & Automation: Focus on New Generation of Intelligent Systems and Solutions”, 22-25th October 2008, pp. 1325-1326, DAAAAM International Vienna 2008, ISI PROCEEDINGS, ISSN 1726-9679, ISBN 978-3-901509-68-1
22. Adrian STUPARU, Sebastian MUNTEAN, Alexandru BAYA, Liviu Eugen ANTON ,

- „Numerical Investigation of the Flow in a Straight and Bended hydrofoil Cascade of an Inducer”, Annals of DAAAM for 2008 & Proceedings of the 19th International DAAAM Symposium „Intelligent Manufacturing & Automation: Focus on Next Generation of Intelligent Systems and Solutions”, 22-25 october 2008, Trnava, Slovacia, pp. 1327-1328, ISSN 1726-9679, ISI Proceedings
23. Liviu Eugen ANTON, Adrian STUPARU, Sebastian MUNTEAN, Alexandru BAYA , „3D Numerical Simulation of the Turbulent Flow in an Inducer”, Annals of DAAAM for 2008 & Proceedings of the 19th International DAAAM Symposium „Intelligent Manufacturing & Automation: Focus on Next Generation of Intelligent Systems and Solutions”, 22-25 october 2008, Trnava, Slovacia, pp. 21-22, ISSN 1726-9679, ISI Proceedings
  24. T. Miloş, *The Adjustment Of The Optimum Operating Point Of A Pump Depending On The Requirements Of The Water Supply*, The 19th International DAAAM Symposium, "Intelligent Manufacturing & Automation: Focus on Next Generation of Intelligent Systems and Solutions", 22-25th October 2008, Trnava, Slovakia, pp. 869-870.
  25. M. Vartolomei, T. Miloş, M. Vartolomei *Economic Engineering Study Regarding Aeolian Installation Manufacturing System using CPM and PERT Methods* The 19th International DAAAM Symposium "Intelligent Manufacturing & Automation: Focus On Next Generation Of Intelligent Systems And Solutions", 22-25th October 2008, Trnava, Slovakia, pp. 1447-1448.
  26. V. Duran, M. Vartolomei, T. Miloş, M. Vartolomei *Economic Efficiency in Energy Renewable Sources Management*, The 19th International DAAAM Symposium "Intelligent Manufacturing & Automation: Focus on Next Generation of Intelligent Systems and Solutions", 22-25th October 2008, Trnava, Slovakia, pp. 465-466.
  27. Victor Balasoiu, Ilare Bordeasu, Mircea Popoviciu, Radu Gombos, Mihai Gombos, *The Cavitation phenomena in the Flow Zone Distributors Body – Spool Valve*, The 19th International DAAAM Symposium „Intelligent Manufacturing & Automation : Focus on Next Generation of Intelligent Systems and Solution”, 22-25 oct, 2008, Trnava, Slovacia, ISSN 1726-9679, ISBN 3-901.509-58-5, pg. Proceedings DAAAM Symposium is Thomson Scientific for Scientific Information ISTP/ISI Proceedings. pp. 0059-0060
- ### NATIONAL CONFERENCES
1. Bernad S. I., Georgescu A.-M., Georgescu C., Bărbat T., “*Marine turbine development. Fluent numerical investigations*”, In: “Conferința Progrese în Simularea Echipamentelor și Proceselor Industriale. Soluții Eficiente cu ANSYS & FLUENT”, 29-30 Mai, Sinaia, CD-ROM, 8 pages, ISBN: 975-686-521-612-7.
  2. Romeo SUSAN-RESIGA, Sandor I. BERNAD, Tiberiu BĂRBAT, Elena S. BERNAD, “*Blood Flow in Heart By-pass. Numerical Investigations*”, In: “Conferința Progrese în Simularea Echipamentelor și Proceselor Industriale. Soluții Eficiente cu ANSYS & FLUENT”, 29-30 Mai, Sinaia, CD-ROM, 10 pages, ISBN: 975-686-521-612-7.
  3. Georgescu A.-M., Georgescu S.-C., Bernad S. I., “*Inter-influence of the vertical axis, cross-flow, marine current turbines mounted in farms*”, Proceedings of the Conference Excellence Research – A Way to Innovation CEEEX2008, July 27-29, Brasov, vol. 2, Editura Tehnica, eds N. Vasiliu & S. Lanyi, pp. 192/1-192/6.
  4. Bosioc Alin, Romeo Susan-Resiga, Sebastian Muntean, „*Unsteady Pressure Measurements in Conical Diffuser with Swirling Flow*” ,Proceedings of the 4<sup>th</sup> Workshop on Vortex Dominated Flows, Tom 53(67), Fascicola 3, ISSN 1224-6077,Scientific bulletin of the “Politehnica” University of Timisoara, pp 81-89 Bucuresti, Romania, Sept. 2008.
  5. Adrian STUPARU, Sebastian MUNTEAN, Alexandru BAYA, Liviu Eugen ANTON, „*3D Numerical Investigation of Flow trough the Centrifugal Pump with Double Flux*”, Scientific Bulletin of the „Politehnica” University Of Timisoara, Transactions on Mechanics, Tom 53(67),Fascicola 3, 2008, ISSN 1224-6077, pp. 75-80
  6. Karabenciov,A., Bordeasu, I., Berbecel, V., Sporea,I., Cârpean, I., *Evaluation of the Comportment of the Materials to Cavitations Erosion Used the Mechanics Characteristics*, Part II, The 8-th Moredisciplinary National Conference with International Participation, professor Dorin Pavel, Romanian Hydroenergy Founder, Science and Engineering, Vol.13, Sebeş, 30-31 may 2008, ISBN 973-8130-82-4; ISBN 978-973-720-197-3, pp. 443-450
  7. Bordeasu, I., Bădărău, R., Bălăsoiu, V., Hadăr, A., Berbecel, V., *Evaluation of the Comportment of the Materials to Cavitations Erosion Using the Mechanics Characteristics*, Part II, The 8-th Moredisciplinary National Conference with International Participation, professor Dorin Pavel, Romanian Hydroenergy Founder, Science and Engineering, Vol.13,

- Sebeş, 30-31 may 2008, ISBN 973-8130-82-4; ISBN 978-973-720-197-3, pp. 435-442
8. Podoleanu, C., Bordeaşu, I., Florescu, C-tin., Neşte, S.Z., *Documentation Regarding the Evaluation of the Comportment of the Material to Cavitations Erosion Used the Chemical and the Microstructure Constitution*, The 8-th Moredisciplinary National Conference with International Participation, professor Dorin Pavel, Romanian Hydroenergy Founder, Science and Engineering, Vol.13, Sebeş, 30-31 may 2008, ISBN 973-8130-82-4; ISBN 978-973-720-197-3, pp. 501-508
  9. Bordeaşu, I., Bădărău, R., Birău, N., Bodin, F., Neşte, S.Z., *Models Used in the Evaluation of the Cavitations Damage Produced in the Vibratory Device*, The 8-th Moredisciplinary National Conference with International Participation, professor Dorin Pavel, Romanian Hydroenergy Founder, Science and Engineering, Vol.13, Sebeş, 30-31 may 2008, ISBN 973-8130-82-4; ISBN 978-973-720-197-3, pp. 493-500
  10. Jurchela, A., Bordeaşu, I., Karabenciov, A., Podoleanu, C., *Studies Regarding the Models Used in the Evaluation of the Cavitations Erosion Produced in the Hydrodynamic Tunnel and the Device with Rotating Disc*, The 8-th Moredisciplinary National Conference with International Participation, professor Dorin Pavel, Romanian Hydroenergy Founder, Science and Engineering, Vol.14, Sebeş, 30-31 may 2008, ISBN 973-8130-82-4; ISBN 978-973-720-198-0, pp. 275-282
  11. Bădărău, R., Bordeaşu, I., Gyulai, Fr., *Considerations Upon the Model Weibul Used in the Aeroenergy Potential*, The 8-th Moredisciplinary National Conference with International Participation, professor Dorin Pavel, Romanian Hydroenergy Founder, Science and Engineering, Vol.14, Sebeş, 30-31 may 2008, ISBN 973-8130-82-4; ISBN 978-973-720-198-0, pp. 87-92,
  12. Mitelea, I., Sporea I., Tokar, A., Girniceanu, Gh., Bordeasu, I., *Correlation of the Refractory of the Aluminium Alloy working at the High Temperature and the Amount of Phases (the Right Side) contained in alloy* . The Durability and Reliability of the Mechanics Systems, Scientific Symposium with International Participation, Edition I, 20-21.06.2008, Tg.Jiu, pp. 170-173, ISBN 978-973-180-1
  13. T. Miloş, D.V. Munteanu, C. Jupâneanţ, A.V. Prunean, *Blade Design For Small Power Wind*

*Turbine Using Cad Techniques*, Conferinţa HERVEX-2008, Râmnicu Vâlcea.

14. Dobanda Eugen - *Mathematical modeling of the wind turbines*, ŞTIINŢĂ ŞI INGINERIE, Lucrările celei de-a VIII-a Conferinţe Naţionale multidisciplinare - cu participare internaţională "Profesorul Dorin Pavel - fondatorul hidroenergeticii româneşti", Editura AGIR, Bucureşti, 2008, vol. 14, ISBN 973-8130-82-4 / 978-973-720-198-0, pp. 81 – 86 (6 pp.)

#### 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
- Assist. Prof. Adrian STUPARU
- Phd. Stud. Alin BOSIOC
- Phd. Stud. Constantin TANASA
- Phd. Stud. Alin ANTON
- Stud. Ioan NINACI
- Stud. Sorin CONSTANTIN
- Stud. Gheorghita GANGA
- George GIULA
- Florica BALANEAN
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#### CONTACTS

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<http://www.mec.upt.ro/~mh/>

## RESEARCH CENTRE FOR VIBROIMPACTS AND MECHANICAL VIBRATIONS

### GENERAL PRESENTATION

Because of the existing tradition due to the results obtained in research, the premises appeared for funding a centre of scientific excellence with preoccupations in the field of vibroimpacts and mechanical vibrations. As consequence of the competitions organized by CNCISIS, concerning the identification and evaluation of the research centers, the developed activity was specially appreciated, so the research centre was recognized. By the certificate no. 15/CC-B from 11/05/2001, it has been recognized as a **research centre**, type B: **VIBROIMPACTS AND MECHANICAL VIBRATIONS**. It has to be underlined that the research in the field of the vibroimpacts is done, with priority, by the collective from this centre.

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

### MISSION

The main mission of the centre is to realize specific activities of continue training, research, technical assistance, documentation and 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 and technical acoustics;
- expertise and consulting in specialty;
- promotion of the field, selected from the themes of the specialty as a high field, and realization of cooperation programs with other research institutes in this field;

### RESEARCH FIELDS

The main fields of the research are:

- vibroimpacting interactions and vibroimpacts
- mechanical vibrations
- technical acoustics
- vibrations of nonlinear systems

### KEYWORDS

Vibration, vibroimpact, noise, impact, spectrum, auto-spectrum, prediction, diagnosis, homotopy variational method; stability, weakly nonlinearity

### ACTIVITIES

- Dynamics of vibroimpact systems. Theoretical and experimental methods for the study of stable vibroimpact motions;

- Modeling of work of vibroimpact mechanisms, calculus and optimization algorithms;
- Methods of study for the vibrations of mechanical systems, with applications in engineering. Diagnosis by vibrations of defections at machines and equipment;
- Theoretical and experimental studies, concerning the elaboration of new methods and equipment for the decreasing of levels of vibrations and noises;
- Expertise of capacity of isolation at airy noise of building elements. Determination of noise levels at civil buildings;
- Application of the Homotopy method to the study of stability of nonlinear oscillation with cubic elastic restoring force

### RESEARCH PROJECTS

1. CNCISIS Project 356/2007 *Mathematical models based on coherent and squeezed states of the biophotonic radiation*. Director prof. dr. G. Draganescu, Value 19.500 ROL
2. CEEEX VIASAN Project 6295/27.07.2006, *Optimization of the stomatologic treatemets based on laser techniques*, prof. dr. G. Draganescu Value: 60.000 ROL
3. CEEEX Project 1908/2008, *Development of the laboratory of acoustics and vibrations in accord with the European Comission directives*, eng. Nicolae Herisanu, Value: 16.000 RON
4. CEEEX Project 212/2008 *Identification based on modeling and experimental analysis of the properties of nanocomposite materials used to the step bearings*. eng. Nicolae Herisanu, Value: 45.500 RON
5. CEEEX Project 61/2008, *Experimental Nonlinear virtual analysis and optimal control applied to multi-body mechanical systems with elastic elements applied in robotics*, eng. Nicolae Herisanu, Value: 45.000 RON

### PUBLICATIONS

#### PUBLISHED PAPERS

- 1 C Sinescu, G Draganescu, D Dodenciu L Bereteu, M Negrutiu, M Romanu, *Quantitative parameters which describe sound speech distortions due to inadequate dental mounting*, Physica A, 387 (5-6) 1205-1217, ISSN 0378-4371

- 2 N.Herisanu, V.Marinca, T. Dordea, Gh. Madescu, *A new analytical approach to nonlinear vibration of an electrical machine*, Proceedings of the Romanian Academy Series A, vol.9, no.3, pp.229-236, 1454-8267, 2008
- 3 V.Marinca, N.Herisanu, 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, 2008.03.019, ISSN 0893-9659, 2008
- 4 V.Marinca, N.Herisanu, *Application of Optimal Homotopy Asymptotic Method for solving nonlinear equations arising in heat transfer*, Int. Communications in Heat and Mass Transfer, vol.35, pp.710-715, ISSN 0735-1933, 2008
- 5 V.Marinca, N.Herisanu, I.Nemes, *Optimal Homotopy Asymptotic Method with application to thin film flow*, Central European Journal of Physics, vol.6(3), pp.648-653, ISSN 1895-1082, 2008
- 6 V.Marinca, N.Herisanu, *Periodic solutions of Duffing equation with strong nonlinearity*, Chaos, Solitons & Fractals, vol.37(1), pp.144-149, ISSN, 0960-0779
- 7 V.Marinca, N.Herisanu, C.Bota, *Application of the variational iteration method to some nonlinear one-dimensional oscillations*, Mecanica, vol.43, pp.75-79, ISSN 0025-6455, 2008
- 8 C Sinescu, M Negrutiu, G Draganescu, C Todea, D Dodencu, M Romanu, *Microleakage in Dentistry: New Methods for Investigation the Gaps in Biomaterials*, Progress in Biomedical Optics and Imaging - SPIE Proceedings, Vol 6843, art. no. 68430P, 10 pages, 2008, ISSN 0277-786X
- 9 Negrutiu M, Sinescu C, Draganescu G, Todea C, Dodenciu D, Rominu R, *Microspectral analysis with laser in microleakage evaluation between infrastructure and veneer materials in fixed partial dentures*, Progress in Biomedical Optics and Imaging - SPIE Proceedings, Vol. 6843, 68430Q, 8 pages, 2008, ISSN 0277-786X
- 10 G Draganescu, A Ercuta, L Bereteu, *Identification of nonlinear anelastic models*, Journal of Physics: Conference Series, Vol 96, 012178, 7 pages, 2008, ISSN 1742-6588
- 11 V.Marinca, N.Herisanu, *An approximate solution of a boundary layer equation in unbounded domain*, Facta Universitatis, University of Nis, Serbia, vol7/2008, 2008, ISSN 0354-2009
- 12 Luca, G., Chiriac, A., Vigar, C., *Contributions Concerning The Determination Of Critical Numbers Of Rotations Of Shafts, With Applications In Textile Industry*, Studia Universitatis "Vasile Goldis" din Arad, Nr.3, pp.181, 9 pages, 2008 ISSN 1842-0508
- 13 Bereteu, L., Boltosi, A., Nagy, R., Chiriac, A., *Double Separating Screen Active Control*, Analele Univ. de Vest din Timisoara, Ser. Fizica, Vol. XLX, 4 pages, 2008, ISSN 1224-9718
- 14 Boltosi, A., Chiriac, A., Nagy, R., Bereteu, L., Hule, V. *Magnetorheological Fluid Damper With External Magnetic Circuit*, Ser. Fizica, Vol. XLX, 4 pages, 2008, ISSN 1224-9718
- 15 Boltosi, A., Hule, V., Tirdea, A., Simoiu, D., Chiriac, A., *Experimental Test Bench For Magnetorheological Damper*, Ser. Fizica, Vol. XLX, 4 pages, 2008, ISSN 1224-9718
- 16 Chiriac, A., Nagy, R., Boltosi, A., Bereteu, L., Hule, V. *Acoustic Attenuation Improvement Of Double Separating Screen*, Ser. Fizica, Vol. XLX, 4 pages, 2008, ISSN 1224-9718
- 17 Nagy, R., Bereteu, L., Chiriac, A., Boltosi, A. *On The Determination Of Dynamic Reaction Forces*, Ser. Fizica, Vol. XLX, 4 pages, 2008, ISSN 1224-9718
- 18 Bereteu, L., Nagy, R., Boltosi, A., Chiriac, A. *Study And Tests Of A Semi-Active Damper, Using Complex Media*, Annals Of The Univ. Of Oradea, Fasc. Manag. And Techn. Engin., Vol. VI (XVI), CD Edit., pp. 80, 8 pages, 2008, ISSN 1583-0691
- 19 Boltosi, A., Chiriac, A., Nagy, R., Bereteu, L. *Steward Platform. Application Of Smart Fluid Dampers In This Field*, Annals Of The Univ. Of Oradea, Fasc. Manag. And Techn. Engin. Vol. VI (XVI), CD Edit., pp. 107, 8 pages, 2008, ISSN 1583-0691
- 20 Chiriac, A., Boltosi, A., Bereteu, L., Nagy, R. *On The Energetic Efficiency Of Some Mechanical Transmissions*, Annals Of The Univ. Of Oradea, Fasc. Manag. And Techn. Engin., Vol. VI (XVI), CD Edit., pp. 167, 7 pages, 2008, ISSN 1583-0691
- 21 Lupu, I., Chiriac, A. *Some Considerations Concerning The Vibrations Level At Electric Motors*, Annals Of The Univ. Of Oradea, Fasc. Manag. And Techn. Engin. Vol. VI (XVI), CD Edit., pp. 394, 5 pages, 2008, ISSN 1583-0691
- 22 Nagy, R., Bereteu, L., Chiriac, A., Boltosi, A. *Environment Noise In Industrial Zones*, Annals Of The Univ. Of Oradea, Fasc. Manag.

- And Techn. Engin. Vol. VI (XVI), CD Edit., pp. 430, 6 pages, 2008, ISSN 1583-0691
- 23 Chiriac, A., Luca, G. *Dynamique du Dispositif de Livraison Active du Fil d'une Machine a Tricoter, sans Mecanisme Tendeur du Fil*, Studia Universitatis "Vasile Goldis" din Arad, Nr.3, pp.190, 9 pages., 2008, ISSN 1842-0508
  - 24 Boltosi, A., Bereteu, L., Biro, I., Chiriac, A., Nagy, R., *Application Of Smart Fluid Devices To Prosthetics*, The 32-nd Research And Develop. Conf. Of Hungarian Acad. Of Science, Godollo, Hungary, CDROM, 2008 ISSN 963-611-423-7
  - 25 Bereteu, L., Boltosi, A., Chiriac, A., Nagy, R. *Prosthesis And Orthosis Realized With Smart Fluid Devices*, CDROM, 2008 ISSN 963-611-423-7
  - 26 Boltosi, A., Bereteu, L., Biro, I., Chiriac, A., Nagy, R. *Application Of Smart Fluid Devices To Prosthetics*, CDROM, 2008 ISSN 963-611-423-7
  - 27 Chelu Pantele, Negru Radu, *Low-Velocity Impact Response of a Laminated Composite Plate Using Homotopy Analisis Method*, Nonlinear Dynamics of Composite and Smart Structures, Euromech Colloquium 498, 21-24 May 2008, Kazimierz Dolny, Poland, Nonlinear Dynamics of Composite and Smart Structures, Euromech Colloquium 498, Conference Proceedings, 2008, pp. 119-124, 978-83-88691-35-5

### BOOKS

1. Gh Draganescu, *Coherent states ; applications*. „Politehnica” Publishing House, ISBN (10) 973-625-311-2; ISBN (13) 978-973-625-724-7, 21 oct 2008, 200 pages
2. R Nagy, *Researches concerning the nonlinear behavior of some mechanical systems with discontinuities due to impacts*, ISBN 978-973-625-786-5, Ed Politehnica Timisoara, 115 pages
3. Simoiu Dorin, *Theoretical and experimental studies concerning the loads, induced by the wind on a mechanical structure. Applications to a structure of parabolic aerial*, ISBN 978-973-625-645-5, 2008, 147 pages

### PhD THESIS

1. Nagy Ramona, *Researches concerning the nonlinear behavior of some mechanical systems with discontinuities due to impacts*, 3 December 2008 cood prof dr N Faur
2. Simoiu Dorin, *Theoretical and experimental studies concerning the loads, induced by the wind on a mechanical structure. Applications to*

*a structure of parabolic aerial*, 5 june 2008, PhD coordinator: Cioară Titus

3. Țirdea Amalia, *Methods and equipment for vibration isolation for the mechanical pressing machines*, 23 September 2008, PhD coordinator: Cioară Titus

### PhD THEMES

Scientific supervisor: Prof.dr.eng. Titus Cioară

1. Anghelescu Rodica Delia, *Optimizing methods in the study of vibrations and vibroimpacts*
2. Birceanu Dănuț, *Study of noise generated by the elastic collision of two bodies*
3. Boltoși Alexandru, *Vibration attenuators realized with magnetorheological composites*
4. Căplescu Cristiana, *Methods and processing algorithms for the vibration signals*
5. 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*
6. Lupu Ioan, *Vibrations and vibroimpacts at electromechanical systems*
7. Nicolae Ionel Valentin, *Internet monitoring and wireless solutions for the mechanical parameters*
8. Palincaș Gabor Romeo, *Researches concerning the work of attachment - detachment device of an airbag*
9. Roșoga Daniela Lucia, *Mathematical models in the study of cylindrical sieves*.
10. Tocarciuc Alexandru, *Theoretical and experimental studies concerning the dynamic effects that appear in the poly-phase fluid transport by pipe networks*

### PERSPECTIVES

The results obtained by the collective will be developed in a few priority directions, concerning the elaboration of general methods for the study of vibroimpact motions, modeling of work of mechanisms (calculus algorithm and optimization), studies concerning the attenuation of sonorous sources and elaboration of methods and equipment for the decreasing of vibration levels.

### 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
- Assoc. prof. dr. Pantele CHELUC
- Prof.dr. Gheorghe DRĂGĂNESCU
- Assoc. prof. dr. eng. Nicolae HERIȘANU

- Lect. dr. Valeriu ANGHELESCU
- Lect. eng. Nicolae FÂNTÂNĂ
- Lect. dr. eng. Gheorghe LUCA
- Asist. eng. Ramona NAGY
- Phys. Alexandru BOLTOSI, PhD student
- Eng. Alexandru TOCARCIUC, PhD student
- Eng Dan STANESCU, Ph D Student
- Eng Bugariu Delia Ph D Student
- Eng Saftescu Jescu Cristian Ph D Student
- Eng Ioanovici Teodora Georgiana PhD Student

#### CONTACT

Prof. dr. eng. Adrian CHIRIAC, Director of the Centre  
 Department of Mechanics and Vibrations  
 Faculty of Mechanical Engineering  
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## INTEGRATED ENGINEERING RESEARCH CENTRE I. E. R. C.

#### GENERAL PRESENTATION AND MISSION

The *Integrated Engineering Research Centre (IERC)* is organized within the Department of Manufacturing Engineering (TCM), the Department of Mechanical Technology (TM) and the Department of Welding Equipment and Technology (UTS). 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 from different departments of the Faculty of Mechanical Engineering, 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;
- Welding processes modeling;
- Advanced materials joining
- Welding technology optimisation using computer
- Limiting methods for stress and distortion in welded structures;
- Defectology of welded structures

- The development of the equipments and technologies for non-conventional technological processes
- Studies referring to the optimization of laser materials processing
- Studies referring to the development of modern constructive solutions for making of technological equipment from the processional and food industry
- The creation and the making of piezoceramic traducers for the usage in the construction of technological equipment
- Studies referring to the degradation of the materials used in technologies equipment and the calculation of the remaining durability of exploitation
- Optimizing metallic flexible pipes processing

#### KEYWORDS

Integrated engineering, Concurrent engineering, Manufacturing engineering, Materials advanced welding, Manufacturing processes management, Platurgy, Rapid prototyping and three-dimensional measurements, Cold forming, Non-traditional machining processes, Welding processes, Welding equipment, Defectology, Quality assurance, Equipment and technologies for non-conventional technological processes, Laser materials processing, Plan and equipment for food industry, Piezoceramic traductors, Degradation of materials, remaining durability of exploitation.

#### 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 of different departments. 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 CNCISIS, national programs CEEX, RELANSIN, AMTRANS, INFRAS, MATNANTECH etc.
- IERC members are part of the following professional bodies and associations:  
EMIRAcle – European Manufacturing and Innovation Research Association, a cluster leading experience  
AGIR – The General Association of the Engineers in Romania  
AUIF – Academic Association of Manufacturing Engineering in Romania  
ARTN – Romanian Association of Nonconventional Technologies  
ASR – Romanian Welding Society  
ACM-V – Association for Multidisciplinary Research West Zone  
AWS – American Welding Society  
ISL-FD – International Society of Lyophilization- Freeze Drying  
B.EN.A – Balkan Environmental Association

#### RESEARCH CONTRACTS

1. Contract NMP2-CT-2004-507487 FP6, *Virtual Research Lab for a Knowledge Community in Production*, Network of Excellence, Director: Prof. George Drăghici, Value for 2008: 8.198 €
2. LLP-LdV-TOI-2008-FR-117025, *Certified Integrated Design Engineer, iDesigner*, Director: Prof. George Drăghici, Value for 2008: 10.000 €
3. Contract CEEX 243/2006-2008, *National Research Network for Integrated Product and Process Engineering*, Director: Prof. George Drăghici, Value for 2008: 202.526 Lei
4. Contract CEEX 238/2006-2008, *Research Network for a New Production Process based for on-line Failures Prediction in Integrated Maintenance and Reliability*, Director: Prof. George Drăghici, Value for 2008: 76.800 Lei
5. Contract 42/24.03.2008, Technical assistance contract, Director: Assoc. Prof. Ion Grozav, Value for 2008: 1.500 Lei
6. Contract BC54/04.04.2008/20.03.08, Technical assistance contract, Director: Assoc. Prof. Ion Grozav, Value for 2008: 2.096 Lei
7. Contract CEEX nr. 2052/2006-2008, *Fundamental and applied researches on water jet and abrasive particles magnetic activated manufacturing – ELMAJET*, Director: Assoc. Prof. Mircea Vasilescu, Value: 1.500.000 Lei
8. Contract CEEX 3091/2007-2008, *The biocombustible obtained on cellulose waste valorification in chemico-enzimeted integrated system*, Partner director: Prof. Țucu Dumitru, Value: 236.160 Lei
9. Contract CEEX- MIPCUC nr. 758/2006-2008, UPT 10673/11.09.06. *The method and echipment for chlorine maked and used to water chlorination with direct introduced in network used*. Partner director: Prof. Țucu Dumitru, Value: Val. 335.000 Lei
10. CNCISIS no. 358/2008, *The expensive national and international visibility R&D activities in range of evaluation situation high stressed parts in processed technical systems*. Director: Prof. Traian Fleșer, Value: 43.500 Lei
11. CNCISIS 46/393 GR, 2007-2008: *Dezvoltarea modelului virtual 3D al articulatiei de sold prin tehnici CAD/CAM si Rapid Prototyping*, Director: Assoc. Prof. Nicolae Crainic, Value: 200.000 Lei
12. Contract CEEX nr. 2045/2006-2008: *New technologie in human implantology baseed on animals osteointegrations*, Partner director: Prof. Ghiță Mihai
13. Marie Curie Cipru Program, *Nanocomposite Materials Manufacturing by Ultrasonic Welding (UltraNanoMan)*, Director assist. prof. Crainic N.
14. Contract nr.2/31.01.2008: *La recherche de nouveaux concepts d'assemblage – assemblage des matériaux dissimilaires par faisceau laser – ATLAS*. Bourgogne Technologies – Franta. Director assist. prof. Cicala Eugen. Val. 15.155 euro
15. Contract nr.4/14.02.2008: *L'optimisation par la méthode des plans d'expériences des emballages réalisés en carton ondulé*. Glaizer Group- Franta. Director assist. prof. Cicala Eugen. 4.676 euro (2008).

16. Contract COBIL: *Block copolymers as stabilizers for magnetic nanoparticles: Synthesis and caracterisation*. Partener assistant Han Adelina PhD.Val. 15.000 euro.

**Prospective:**

- Participation to the **EC Seven Framework Program (FP7)**
- Participation to grant competitions through CNCISIS, national programs CEEEX, RELANSIN, AMTRANS, INFRAS, MATNANTECH, etc.

**PUBLICATIONS**

**BOOKS**

1. Suru, P., Pămîntaş, E., *Reducing of noise and vibration level in machine-tools and equipments*, Ed. POLITEHNICA, Timisoara, 2008, ISBN 978-973-625-584-7, 192 pages
2. Drăghici A., Drăghici G., *Building a Knowledge Share Culture in a Virtual Organization. Case Study for VRL-KCiP NoE, in Methods and Tools for Effective Knowledge Life-Cycle-Management*, A. Bernard, S. Tichkiewitch (eds.), Springer Verlag, 2008, ISBN 978-3-540-78431-9-3, 6 pages
3. Cupşa E., Drăghici G., *Continuous Product Quality Improvement in Mass Production, in Virtual Design and Automation*, edited by Zenobia Weiss, Publishing House of Poznan University of Technology, Poznan, Poland, 2008, ISBN 978-83-7143-388-7, 8 pages
4. Cotet, C.E., Drăghici, G., Brîndasu, P.D., Căruţaşu, G., *On-Line Integrated System for Human Resource Selection and Monitoring in Virtual Research Networks*, DAAAM International Scientific Book, 2008, ISBN 978-3-901509-68-2, 20 pages
5. Niemann J., Tichkiewitch S., Westkämper E. Eds., Drăghici G., Drăghici A., Grozav I., Turc C., ş.a., *Design of Sustainable Product Life Cycle*, Springer Verlag, 2008, ISBN 978-3-540-79081-5, 209 pages
6. Botiş Nistoran Mihaela, Tulcan Liliana, Gubencu D.: *Agro-food processes base*. The West Editure Timisoara, 2008, 158 p. ISBN 978-973-36-0468-6.
7. Slavici T.: *The artificial intelligence*. Mirton Editure, Timisoara, 2008, 210 pp. ISBN 978-973-52-0211-8.
8. Slavici T.: *Programing languages. C language*. Eurostampa Editure, Timisoara, 2008, 220 P ISBN 978-973-687-608-0.
9. Tucu D.: *The firm's management*. Orizonturi Universitare Editure Timisoara, 2008, 206 pp. ISBN 978-973-638-358-8.
10. Groza I., Gubencu D., Slavici T.: *Introduction in informatics*. "Ion Slavici" Fundation, Timisoara, 2008, 432 pp. ISBN 978-973-88962-0-8.
11. Fleser T. s.a.: *Research Trends in Mechanics*. Academie Editure, Bucuresti, 2008, ISBN 978-973-27-1574-2.
12. Fleser T.: *Mechanical systems fabrication. The base technological processes*. SUDURA Editure Timisoara, 2008, 326 pp. ISBN (13)978-(10)973-8359-55-9.
13. Fleser T.: *Mentenace and reliability of technical systems and parts*. SUDURA Editure Timisoara, 2008, 373 pp. ISBN (13)978-(10)973-8387-59-10.
14. Fleser T.: *Introduction in fabrication technology elaboration*. Mirton Editure, Timisoara, 2008, 280 pp. ISBN (13)978-(10)973- 52-0442-6.
15. Fleser T., Tulcan Liliana: *Fabrication technology, mentenance and recuperation. Practicces applications*. Mirton Editure, Timisoara, 2008, 220 pp. ISBN (13)978-(10)973-52-0441-9 80
16. Nichici A.: *Scientific publications. Conception- elaboration, presentation*. POLITEHNICA Editure Timisoara, 2008, 212 pages.
17. Boboescu R.: *Theoretical studies on matematics fundaments*. Orizonturi Universitare Editure Timisoara, 2008, 328 pp. ISBN 978-973-638-374-8.

**PUBLISHED PAPERS**

1. Iliescu, S., Grozav, I., Pleşu, N., Pascariu, A., Ilia., G., *Design of experiments applied to the study of the reaction between phenylpsphonic dichloride with bisphenol by inverse phase transfer catalysis methode*, Polimer Engineering and Science, Volume 48 Issue 7, ISSN 1548-2634, pp. 1304-1311
2. Draghici, A., Molcho, G., Draghici, G., *Intelligent System and Solutions for Knowledge Management in Virtual Research Teams – Ontology and Expertise Map*, Annals of DAAAM for 2008 & Proceedings of the 19th International DAAAM Symposium, ISBN 978-3-901509-68-1, pp. 217-218
3. Anghel, V, Draghici, G., *Simulation of the Diagnosis Based on Model to a Nuclear Detritiation Installation*, 12th WSEAS

- International Conference on SYSTEMS, ISBN 978-960-6766-83-1, pp. 306-309
4. Banciu F., Grozav I., Drăghici G., *Redesign Case Of A Jigsaw*, Academic Journal of Manufacturing Engineering, vol. 6, issue 1, ISSN 1583-7904, pp. 18-28
  5. Grozav, I., *Quality Improvement by Axiomatic Design*, Buletinul AGIR, Anul XIII, nr. 1-2, Anul XIII, nr. 1-2, ISSN 1224-7928, pp. 105-111
  6. Anghel V., Drăghici G., *Application Of The Entropy Law For Designing And The Maintenance Of The Complex Nuclear Systems*, Academic Journal of Manufacturing Engineering, vol. 6, issue 1, ISSN 1583-7904, pp. 12-17
  7. Schmidt A., Drăghici G., *Product Life Cycle Modeling Using Sadt Method*, Academic Journal of Manufacturing Engineering, vol. 6, issue 1, ISSN 1583-7904, pp. 132-137
  8. Nae L., Predinca N., Drăghici G., *Change Management In Product Lifecycle Management*, Academic Journal of Manufacturing Engineering, vol. 6, issue 3, ISSN 1583-7904, pp. 107-112
  9. Sebe A.P., Minciu C., Drăghici G., *Considerations Regarding The Computation Of Continuous Coherent Tool Orientation In Medial Machining Of Geometrically Complex Surfaces*, Academic Journal of Manufacturing Engineering, vol. 6, issue 3, ISSN 1583-7904, pp. 155-160
  10. Belgiu, G., Pămîntaş, E., Putz, V., *Thermal Deformation Study Of A Main Spindle System For A Cnc Lathe Machine*, Annals of the Oradea University, Fascicle of Management and Technological Engineering, Ed. Universitas, Volume VII (XVII), 2008, ISSN 1583-0691, pp. 201/1215÷1218
  11. Pămîntaş, E., Belgiu, G., Dumbravă, D., *The Rate Of Cutting Tool Wear As Characteristic Quantity For Diagnose And Control Of The Metal Cutting Processes*, Academic Journal of Manufacturing Engineering, Politehnica Publishing, Vol.6. No.2/2008, ISSN 1583-7904, pp. 111÷116
  12. Belgiu, G., Pămîntaş, E., Putz, V., Sander, B., Timm, L., *Aspects On Thermal Deformation Behaviour Of A Cnc Machine Tool*, Buletinul Institutului Politehnic din Iași, Tomul LIV (LVIII), Fasc. 1-3, Secția Construcției de Mașini, 2008, ISSN 1011-2855, pp. 485÷490
  13. Pămîntaş, E., Botea, T., Banciu F., *Useful Aspects For The Application Of The Predictive Maintenance Basic Concept*, Academic Journal of Manufacturing Engineering, Vol. 6, ISSUE 3/2008, ISSN 1583-7905, pp. 125-130
  14. Turc, C.-G., *A Study On Optimum Electrical Discharge Machining Conditions Using Design Of Experiments*, Academic Journal of Manufacturing Engineering, Vol. 6, ISSUE 2/2008, ISSN 1583-7905, pp. 163-168
  15. Grozav, I., Banciu, F., Turc, C., *Computer Aided Force Separation Method*, 18th CIRP Design Conference, Enschede, Design Synthesis, Conference abstracts, ISBN 978-90-365-2634-0, pp. 59, 6 pages. E-book, Grozav.pdf
  16. Turc, C.-G., Grozav, I., Banciu, F., *Implementation of fuzzy logic algorithms for work pieces choosing in early design stage*, 19th CIRP Design Conference, Enschede, Design Synthesis, Conference abstracts, ISBN 978-90-365-2634-0, pp. 66, 6 pages. E-book, Turc.pdf
  17. Drăghici G., Savii G.G., Drăghici A., *Building a Collaborative Product Development Network*, 18<sup>th</sup> CIRP Design Conference, Enschede, Design Synthesis, Conference abstracts, ISBN 978-90-365-2634-0, pp.24, 10 pages. E-book, Draghici.pdf
  18. Drăghici G., Drăghici A., *Building an Efficient Research Team for Attending the Product Lifecycle Management Industrial Needs*, The 32<sup>rd</sup> Annual Congress of the American Romanian Academy of Arts and Sciences (ARA), Wentworth Institute of Technology Boston, MA, USA, Proceedings, Scientific Editors: Marian Gh. Simion, Ilie Tălpășanu, Polytechnic International Press Canada, ISBN 978-2-553-01424-6, pp. 229-232
  19. Drăghici G., Banciu F., Belgiu G., Grozav I., *Conceptual Design in Collaborative Multisite Product Lifecycle Management Platform*, Conference Excellence Research – a way to innovation - CEEX, Brasov, 27-29 iulie 2008, Editors: N. Vasiliu, L. Szabolcs, Vol. III, Editura Tehnică, 2008, ISSN 1844-7090, pp. 243-248
  20. Crainic, N., Doina Bica, Nóvoa, P. J. R. M. Sá, O Carlos P. Popa, N., C., Marques, A., T., Vekas, L.: *The use of magnetic nanofluid to obtain magnetic nanomaterials*. Journal of Nanoscience and Nanotechnology, Porto, may 2008. 12 pages. ISSN 1533-4880.
  21. M. Ilie, E. Cicala, D. Grevey, S. Mattei, V. Stoica: *Diode laser welding of ABS: Experimenta and process modeling*. Optics &

- Laser Technology, dec., 2008. ISSN 0030-3992.
22. A. Soveja, E. Cicală, D. Grevey, J.M. Jouvard: *Optimisation of TA6V alloy surface laser texturing using an experimental design approach*. Optics and Lasers in Engineering, 46 (2008), pp. 671-678. ISSN 0143-8166.
  23. E. Cicala, A. Soveja, P. Salla-mand, D. Grevey, J-M. Jouvard: *The application of the random balance method in laser machining of metals*. Journal of Materials Processing Technology. 196 (2008), pp. 393-401. ISSN 0924-0136.
  24. C.Sticlaru,A.,Davidescu, N. Crainic, C.Faur: *Studies on Stress and Strain State of a Hip Joint Endoprosthesis*. Annals of DAAAM 2008& Pro-cee. Intelligent Manufacturing & Automation, vol 19, no1. pp. 357-358, ISSN 1726-9679.
  25. Mnerie, D., Gabriela Victoria Anghel: *Some applications of lyophilization in agriculture*. Proc. of the 36, International Symposium on agricultural engineering, Actual Tasks on Agricultural Engineering, Opatija. Croatia, 11-15, february, 2008, pp. 491-496, ISSN 1333-2651.
  26. Mnerie, D., Tucu, D., Gabriela Victoria Anghel, Slavici, T.: *Study about integration capacity of systems for agro-food production*. Proc. of the 36, International Symposium on agricultural engineering, Actual Tasks on Agricultural Engineering, Opatija. Croatia, 11-15, february, 2008. ISSN 1333-2651.
  27. Nistoran Botiș Mihaela, Boboescu R.: *Surfaces quality at the processing by anodic dissolution*. 8-th International Conference "Research and Development in Mechanical Industry", RaDMI, Novi Sad, Serbia. ISSN 86-83083-21-X.
  28. Fleser, T., Pascu, R.: *Researches and technological solutions in some composite materials undismantle joining*. Proc. 2 th Internat. Conf. Advanced Composite Materials, COMAT 2008, Brasov. ISSN 1844-9336.
  29. D. Bica, A. Han, M.V. Avdeev, E. Tombácz, A. Hajdú, N.C. Popa, I. Morjan, F. Dumitrache, N. Crainic, L. Tulcan, L. Vékás: *Laser pyrolysis synthesized magnetic nanoparticles in hydro-carbon and water based suspensions*. 11<sup>th</sup> International Conference on electrorheological fluids and magnetorheological suspensions, Dresden, 2008.
  30. L. Vékás, I. Borbáth, Adelina Han: *Magnetic nanofluids and leakage-free rotating seals*. Proc. 1<sup>st</sup> European Spin-Off Meeting&Conference, Budapest (Hungary) October 17.
  31. Sporea I. , Artemov,I., Boboescu,R., Bujor, V.: *The elaboration of the weel box casting tehnology from the gyrating breaker for braking into pieces hard materials*. Proc. 5<sup>th</sup> International symposium KOD (Forming and design in Mecanical Science) April 2008, Faculty of Tehnical Science Novi Sad Serbia.
  32. Čermák, B., Tucu, D., Mnerie, D., *About Relationship Between Wheat Quality and Possibility for Increasing Dosage of Wheat in Broiler Feed Mixtures*. Proc. 20th Croatian and 3rd International Congress of Technologists for Post-harvest Technology "Zrnko '08", 18-20 November 2008, Stubičke Toplice, Croatia. ISBN 978-953-6135-76-9.
  33. Vasilescu, M., D., Vasiu, R., I.: *A new solutuion for abrasive cleaning metallic component used in maschine for industry*. Proc. 20th Croatian and 3rd International Congress of Technologists for Post-harvest Technology "Zrnko '08", 18-20 November 2008, Stubičke Toplice, Croatia.
  34. Tucu D.: *Optimization of Integrated Approach to Renewable Energy Supply*. Proc. 20th Croatian and 3rd International Congress of Technologists for Post-harvest Technology "Zrnko '08", 18-20 November 2008, Stubičke Toplice, Croatia.
  35. Tucu, D.; Mirica, N.; Mnerie, D.; Slavici, T.: *About Possibilities for Increasing the Quality of Water Used in Post Harvest Preparation of Food Raw Materials*. Proc. 20th Croatian and 3rd International Congress of Technologists for Post-harvest Technology "Zrnko '08", 18-20 November 2008, Stubičke Toplice, Croatia.
  36. Crainic,N., Doina Bica, Nóvoa,P., J., Correia, N., Popa,N., C., Moreira de Sá, C., P., Marques, A., T., Vekas, L.: *The use of magnetic nanofluid to obtain magnetic nanomaterial*. Proc. 1st IC4N-2008: International Conference from Nanoparticles and Nanomaterials to Nanodevices and Nanosystems,16-18 Jun 2008.
  37. Mnerie, D., Vacha, F., Tucu, D., Mnerie Gabriela Victoria: *About using cereal feeding in fishes nutrition for enlargement areas policy for fishery in fresh water from Banat region (Romania)*. Proc. 20th Croatian and 3rd International Congress of Technologists for Post-harvest Technology "Zrnko '08", 18-20 November 2008, Stubičke Toplice, Croatia.

**PRIZES**

1. "Toma Dragos" Award for prof.dr.eng. Tucu Dumitru: The Agriculture and Silviculture Scientific Academy.
2. Prof.dr.eng Tucu, D.: The 2th premium AGIR Timis, for book publication: Integrated systems for milling and panification.

**PhD THESIS**

1. Vancia Simona, *Posibility for optimisation with laser processing on some optical glasses*, Thesis supervisor: Prof.dr.eng. Popovici Vasile.

**In course PhD THEMES**

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. Vasile Anghel, *Researches Regarding Industrial Maintenance's Models, Methods and Tools for The Nuclear Field*, Thesis supervisor: Prof. George Drăghici (2002)
4. Ana-Andreea Mihărtescu, *Customer Requests Integration in the Product Design Stage*, Thesis supervisor: Prof. George Drăghici (2003)
5. Adrian Orița, *Functional Design for Product*, Thesis supervisor: Prof. George Drăghici (2005)
6. Milenco-Sava Mânzat, *Product Data Management and Product Lifecycle Management*, Thesis supervisor: Prof. George Drăghici (2006)
7. Alin Schmidt, *Product Model Development in the Integrated Engineering Context*, Thesis supervisor: Prof. George Drăghici (2004)
8. Daniel Ion Mocan, *Development of the Design Methodology of the Manufacturing Process in the Integrated Engineering Context*, Thesis supervisor: Prof. George Drăghici (2002)
9. Adrian Nicolae Diaconu, Thesis supervisor: Prof. George Drăghici (2007)
10. Ava Diaconu, Thesis supervisor: Prof. George Drăghici (2007)
11. Traian Patan-Lala, Thesis supervisor: Prof. George Drăghici (2008)
12. Anghel Gabriela, *Reserches for drying systems optimisation with food-products refrigering*. Thesis supervisor: Prof. dr. eng. Sporea Ion.

13. Mnerie Alin, *Contribution on PC Used optimisation for wire electrical erosion mashines*. Thesis supervisor: Prof. dr. eng. Nanu Aurel.
14. Boboescu Remus, *The dinamic phenomens modelation wich effect in materials laser welding*. Thesis supervisor: Prof. dr. eng. Nichici Alexandru.
15. Cucu Steliana, *Optimisation on technological processes and production in food-industry*. Thesis supervisor: Prof. dr. eng. Popovici Vasile.
16. Chirculescu Ramona, *Laser cutting optimization on stick organical materials*. Thesis supervisor: Prof. dr. eng. Nichici Alexandru.
17. Petrovici Branco, *Contributions in materials proceesing with abrasive in fluid jet*. Thesis supervisor: Prof. dr. eng. Fleșer Traian.

**RESEARCH TEAM**

IERC consists of research teams with common research projects, in three departments: Manufacturing Engineering, Mechanical Technology and Welding Equipments and Technology. 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 Scientific Council is composed of the research team leaders.

The members of the research team are:

- Prof. dr. eng. George Drăghici – IERC director
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- Prof.dr.eng. Richard Herman – team leader
- Prof.dr.eng. Dumitru Mnerie – team leader
- Prof. dr. eng. Dumitru Țucu – team leader
- Assoc. prof. dr. eng. Ion Grozav
- Assoc. prof. dr. eng. Eugen Pămîntaş
- Assoc. prof. dr. eng. Viorel Putz
- Assoc. prof. dr. eng. Florin Grosu
- 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. Alin Schmidt, PhD student
- Prof.dr.eng. Dumitru Mnerie – team leader
- Prof. dr. eng. Dumitru Țucu – team leader
- Prof. dr. eng. Aurel Mărcușanu

- Prof. dr. eng. Mihai Ghiță
- Prof. dr. eng. Titus Slavici
- Prof. dr. eng. Ioan David
- Assoc. prof. dr. eng. Nicolae Crainic
- Assoc. prof. dr. eng. Mircea Olariu
- Assoc. prof. dr. eng. Eugen Cicală
- Assoc. prof. dr. eng. Nistoran Botis Mihaela
- Assoc. prof. dr. eng. Antoniu-Levay Reviczky
- Assoc. prof. dr. eng. Mircea Vasilescu
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## 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  $\mu\text{m}$  average dimension) has been produced via a powder metallurgy technique.

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

### TECHNOLOGY AND EQUIPMENT FOR INDUCTION HARDENING

#### FIELD DESCRIPTION

Surface treatments are important in order to improve exploitation characteristics of wear stressed machine parts. Induction hardening is the proper treatment for cylindrical parts and plane surfaces, applied in serial manufacturing.

#### ACTIVITIES AND RESULTS

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

### INCREASE OF RELIABILITY ON DIFFERENT MACHINE PARTS BY SURFACE ENGINEERING

#### FIELD DESCRIPTION

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

#### ACTIVITIES AND RESULTS

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

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

#### FIELD DESCRIPTION

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

#### ACTIVITIES AND RESULTS

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

### WELDING TECHNOLOGIES AND EQUIPMENTS (FUSION AND RESISTANCE)

#### FIELD DESCRIPTION

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

### MAIN PUBLICATIONS

#### BOOKS

1. Mitelea I. *Materials selection in mechanical engineering*, Ed. Politehnica, Timisoara, pp. 415, ISBN 978-973-625-644-8;
2. Popescu M., Marta C., *Joining of advanced materials. Experimental themes*, Ed. Politehnica, Timisoara, pp. 220, ISBN 978-973-625-762-9;
3. Popescu M., Marta C., Magda A., Voicu A., Locovei C., Dupta A. *Thermal coatings and restorations – Experimental themes*, Ed. Politehnica, Timisoara, pp. 160, ISBN 978-973-623-3;
4. Grita G., Negoitescu St., *Welding equipments. Part one*, Ed. Lux Libris Brasov, pp. 280, ISBN 978-973-131-035-0;
5. Iulian Georgevici, Ion Mitelea, Ion-Drăgost Uțu, *Soft martensitic stainless steels*, Ed.

Politehnica, Timisoara, pp. 183, ISBN 978-973-625-458-1;

6. Ion-Drăgost Uțu, *Heat resisting coatings*, Ed. Politehnica, Timisoara, pp. 150, ISBN 978-973-625-591-5.

#### PUBLISHED PAPERS

1. Drăgulescu D., Demian C., Rusu L., Răduță A., Popescu M., Cucuruz L. R., Prejbeanu R., Vida Simiti I., *Properties and Behavior of an Orthopedic Implant*, MP Materialprüfung. Materials Testing, 5/2008, Volume 50, pp. 250-255, ISSN 0025-5300, F. 0.106 (ISI);
2. Labbe E., Serban F., Nicoara M., Lodini A., *Evaluation of the residual stresses and determination of the proportion of residual austenite in an Austempered Ductile Iron having undergone thermo mechanical treatments*, Stress Evaluation in materials using neutrons and Synchrotron Radiation 95-100, 2008, Trans Tech Publication LTD, Stafa-Zurich, Switzerland, MATER. SCI. FORUM, pp. 571-572, ISSN 0255-5476, F. 0.602 (ISI);
3. Mitelea I., Varzaru N., Popovici D., Popescu M., Bordeasu I., *Researches of high frequency welding process validation for some polymers*, Revista de Materiale Plastice, vol. 45, nr. 3, pp. 289-294, ISSN 0025-5289, F. 0.412 (ISI)
4. Demian C., Șerban V.A., Răduță A., Vida Simiti I., Deleanu B., Locovei C., *Researches concerning the quality assessment of a recovered hip rod*, AGIR Bulletin, Quality – Environment,, Year XIII, nr. 1-2/2008, january-june, pp. 134-141, ISSN 1224-7928 (CNCSIS C);
5. D. Dehelean, R. Cojocar, B. Radu, V. Safta, *Monitoring the friction stir welding process of aluminum and magnesium alloys*, The Paton Welding Journal, Nr.11/2008, pp. 99-102, ISSN 0957-798X;
6. Dumbrava D., Opris C., Herman M., Sipetan R., *Program for the calculus of remnant stress and deformations at butt welding of steel or aluminum alloys sheets*, Journal "SUDURA", nr. 6/2007 (published in january 2008), pp. 29-36, ISSN 1453-0384 (CNCSIS B+);
7. Popescu M, Magda A. *Problems at welders authorization*, AGIR Bulletin Nr 1-2, 6 pages, ISSN 1224 – 7928 (CNCSIS C);
8. Voicu A., Șerban V.A., Răduță A., Popescu M., Demian C., Tita B, *The Influence of Cyclic Efforts on Titanium Implants' Mechanical Properties*, Annals of the Oradea University, Fascicle of Management and Technological Engineering, Vol. VII (XVII), 2008 pp. 118-125, ISSN 1583-0691 (CNCSIS B+);
9. Șerban V.A., Răduță A., Voicu A., *Titanium implants' corrosion behaviour under the influence of cyclic efforts*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 53(67), Fasc. 2, 2008, pp. 1-4, ISSN 1224-6077 (CNCSIS B+);
10. Șerban V.A., Răduță A., Voicu A., Popescu M., Tita D., *The influence of manufacturing over titanium implants corrosion rate*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 53(67), Fasc. 2, 2008, pp. 5-8, ISSN 1224-6077 (CNCSIS B+);
11. Mocuța G.E., Popescu M., Răduță A., Belu-Nica R., Groza D., *TOPTIG-new robotic TIG welding*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 53(67), Fasc. 2, 2008, pp. 37-42, ISSN 1224-6077 (CNCSIS B+);
12. A. Magda, M. Popescu, G E Mocuta, M. Nicoara, A.Raduta, R. Belu-Nica, *L'UTILISATION DES ACIERS REVETUS DANS L'INDUSTRIE D'AUTOMOBILES*, The Scientific Symposium Transport and Logistics - Postadhering Developpment"16-17 October 2008, Timișoara, România, Scientific Bulletin UPT, Transactions on Mechanics, Fasc. S2, 2008, Tom 53(67), pp. 159-167, ISSN 1224-6077 (CNCSIS B+);
13. Georgeta Emilia MOCUȚA, Mihaela POPESCU, Aurel RĂDUȚĂ, Remus BELU-NICA, *Possibilities offered by toptig for automotive applications*, The Scientific Symposium Transport and Logistics - Postadhering Developpment"16-17 October 2008, Timișoara, România, Scientific Bulletin UPT, Transactions on Mechanics, Fasc. S2, 2008, Tom 53(67), pp. 175-181, ISSN 1224-6077 (CNCSIS B+);
14. Demian C., Răduță A., Popescu M., Voicu A., Nicoară M., Locovei C., *The corrosion behavior of austenitic stainless steel use for surgical implants manufacturing*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 53(67), Fasc. 3, 2008, pp. 92-95, ISSN 1224-6077 (CNCSIS B+);
15. Răduță A., Șerban V.A., Demian C., Nicoară M., Locovei C., Popescu M., Rușeț V., *Technological failures in austenitic stainless steel joints*, Scientific Bulletin of the "Politehnica" University of Timisoara,



- Transactions on Mechanics, Tom 53(67), Fasc. 4, 2008, pp. 1-5, ISSN 1224-6077 (CNCSIS B+);
16. Nicoară M., Răduță A., Tatu F., Demian C., Locovei C., Popescu M., *Some aspects regarding fracture of commercial stem for centro-medullar osteosynthesis*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 53(67), Fasc. 4, 2008, pp. 6-11, ISSN 1224-6077 (CNCSIS B+);
  17. Demian C., Popescu M., Răduță A., Nica – Belu R., Nicoară M., Locovei C., *Aspects of the resistance welded joints of composite materials*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 53(67), Fasc. 4, 2008, pp. 12-15, ISSN 1224-6077 (CNCSIS B+);
  18. Nicoară M., Răduță A., Demian C., Locovei C., Labbé E., Popescu M., *Some metallographic aspects of sealing defects at brazing of aluminum alloys tubes*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 53(67), Fasc. 4, 2008, pp. 87-93, ISSN 1224-6077 (CNCSIS B+);
  19. Cucuruz L.R., Liță M., Nicoară M., Demian C., *Untersuchungen uber die anlasssprödigkeit von mehrstoffaluminiumbronzen*, Scientific Bulletin of the "Politehnica" University of Timisoara, Romania, Transaction on Mechanics, Tom 53(67), Fasc. 1, 2008, pp. 39-44, ISSN 1224-6077 (CNCSIS B+);
  20. Nicoară M., Răduță A., Tatu F., Demian C., Locovei C., Popescu M., *Some aspects regarding fracture of commercial stem for centro-medullar osteosynthesis*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 53(67), Fasc. 4, 2008, pp. 6-11, ISSN 1224-6077 (CNCSIS B+);
  21. M. Popescu, G.E. Mocuța, A. Magda, C. Marta, A.Caneparu, C. Locovei, R. Nica Belu, C. Bodnărescu, *Recent advances in cold metal transfer for transportation vehicle*, The Scientific Symposium Transport and Logistics - Postadhering Developpment"16-17 October 2008, Timișoara, România, Buletinul Stiintific UPT, Seria Mecanica, Fasc. S2, 2008, Tom 53(67), pp. 167-175, ISSN 1224-6077 (CNCSIS B+);
  22. Mircea VODA, Cosmin CODREAN, Carmen OPRIS, Viorel Aurel SERBAN, *Characterization of load behaviour for a DC04 non electro-plated steel – aluminum 6016-T4 joint, laser brazed with brazing flux*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 53 (66), Fasc. 3, 2008, pp. 1-6, ISSN 1224-6077 (CNCSIS B+);
  23. Marin LIȚĂ, Cosmin CODREAN, Carmen OPRIS, Roland Laurentiu CUCURUZ, *Metallographic analysis of the welds in the membrane walls made using semi automatic MAG technology*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 53 (66), Fasc. 3, 2008, pp. 7-12, ISSN 1224-6077 (CNCSIS B+);
  24. Cosmin CODREAN, Viorel-Aurel ȘERBAN, Dragoș BUZDUGAN, Ion-Dragoș UȚU, *Experiments regarding the elaboration of bulk amorphous soft magnetic iron based alloys as rod shape*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 53 (67), Fasc. 4, 2008, pp. 16-19, ISSN 1224-6077 (CNCSIS B+);
  25. Ion MITELEA, Gheorghe GĂVĂNESCU, Dan SAVU, Ion-Dragoș UȚU, *Studies on electromagnetic interaction to submerged welding with two-wires (part i: development of the electrodynamic forces)*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 53 (67), Fasc. 1, 2008, pp. 91-96, ISSN 1224-6077 (CNCSIS B+);
  26. Ion MITELEA, Doina Erdei, Ion-Dragoș UȚU, *Constitution and the transformation characteristics of the gold colored alloys*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 53 (67), Fasc. 2, 2008, pp. 9-14, ISSN 1224-6077 (CNCSIS B+);
  27. I. MITELEA, I. D. UȚU, C. POGAN, *Characteristics of P.T.A. (Plasma Transferred Arc) deposition on titanium alloys*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 53 (66), Fasc. 3, 2008, pp. 18-29, ISSN 1224-6077 (CNCSIS B+);
  28. I. MITELEA, C. CRĂCIUNESCU, I.D. UȚU, *The interface layer-substrate by P.T.A (Plasma Transferred Arc) deposition with transferred arc*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 53 (67), Fasc. 3, 2008, pp. 38-43, ISSN 1224-6077 (CNCSIS B+);
  29. I. MITELEA, I.D. UȚU, C. POGAN, *The effect of process parameters on the hardness of wc coatings deposited by plasma*

- transferred arc (P.T.A) welding*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 53 (67), Fasc. 4, 2008, pp. 36-43, ISSN 1224-6077 (CNCSIS B+);
30. Gh.Glita I.Lucaciu D.Tunea S.Glita, *The rebuilding of certain components of mixing machines ,by semimechanized electric arc welding*, Annals of the Oradea University, Fascicle of Management and Tehnological Engineering, Vol. VII (XVII), pp. 238, ISSN 158-3 0691;
  31. Gh.Glita P.Caneparu I.Lucaciu S.Glita M.Burca, *Projection mechanized welding of 3 steel bar wire nets*, Annals of the Oradea University, Fascicle of Management and Tehnological Engineering, Vol. VII (XVII), pp. 229, ISSN 158-3 0691;
  32. Magda, A., Popescu, M., Negoitescu, S, *The problems of galvanized steel*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Fasc. 2, 2008, Tom 53(67), pp. 29-36, ISSN 1224-6077;
  33. Mihaela POPESCU, Georgeta Emilia MOCUȚA, Constantin MARTA, Angela CÂNEPARU, Adrian VOICU, Remus BELUNICA, Marius Ionuț DANCU, *Matériaux composites - innovations dans le domaine des transports*, The Scientific Symposium Transport and Logistics - Postadhering Development"16-17 October 2008, Timișoara, România, Buletinul Stiintific UPT, Seria Mecanica, Fasc. S2, 2008, Tom 53(67), pp. 181-185, ISSN 1224-6077;
  34. Mihaela POPESCU, Georgeta Emilia MOCUȚA, Ion MITELEA, Adrian VOICU, Romulus RĂDULESCU, Denisa RĂDULESCU, *Les matériaux composite et leur comportement au feu dans application aux véhicule ferroviaire*, The Scientific Symposium Transport and Logistics - Postadhering Development"16-17 October 2008, Timișoara, România, Buletinul Stiintific UPT, Seria Mecanica, Fasc. S2, 2008, Tom 53(67), pp. 185-192, ISSN 1224-6077;
  35. Magda A., Codrean C., Popescu M., *Galvanized sheet brazing*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 53(67), Fasc. 3, 2008, pp. 13-18, , ISSN 1224-6077;
  36. Popescu, M., Argesanu, V., Mocuta, GE.,Jula, M., Magda, A., Voicu A., *The applications of ergonomics principles in design-specials materials for dental practice*, Annals of the Oradea University, Fascicle of Management and Technological Engineering, Vol. VII (XVII), 2008 pp. 118, ISSN 1583-0691;
  37. Popescu M., Marta C., Mocuța E.G., Caneparu A., Gabrian A., *When welding PEHD pipelines*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 53(67), Fasc. 3, 2008, pp. 13-18, , ISSN 1224-6077;
  38. Duma Sebastian, *The influence of the thermic treatment on the uniformity and stability in time of the hardness for 100Cr6 steel*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 53(67), Fasc. 4, 2008, pp. 54-59, ISSN 1224-6077;
  39. Iovanas, R., Binchiciu, A., Serban, V., Binchiciu, I., Dozescu, S.- *Amorphous materials for copper brazing*, Welding in the World, Volume 52, Issue SPEC. ISS;
  40. Mitelea I, Budau V, Rosu R, *Ti-WSC+TiC Composites deposited by plasma transferred arc welding*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 53(67), Fasc. 4, 2008, pp. 43-48, ISSN 1224-6077;
  41. Budau V, Oanca O, Craciunescu C.M., *Macro and microscopic aspects observed on ultrasonic welding of shape memory alloys*, Annals of the Oradea University. Fascicle of management and technological engineering, Vol VII (XVII), pp. 1244 – 1248, ISSN 1583-0691;
  42. Gh. Glita, I. Lucaciu, S. Glita, D. Tunea, *The rebuilding of certain components of mixing machines , by semi-mechanized electric arc welding*, Annals of the Oradea University. Fascicle of management and technological engineering, Vol VII (XVII), pp. 1413 – 1420, ISSN 1583-0691;
  43. Popescu M., Mocuta G.E., Raduta A., Magda A., Locovei C., Voicu A., *Les processus de coupage thermique, comme des techniques connexes du soudage, appliques aux principes du «developpement durable*, COFRET'08, 11-13 juin 2008, Nantes-France, Proceedings on CD, ISBN 2.6905267.61.5;
  44. Popescu M., Șerban V.A., Raduta A., Nicoara M., Magda A., Locovei C., Demian C., *Le concept du « développement durable » appliqué aux « processus spéciaux » du soudage*, COFRET'08, 11-13 juin 2008, Nantes-France, Proceedings on CD, ISBN 2.6905267.61.5;
  45. Mocuta G.E., Popescu M., Raduta A., Belu-Nica R., *TOPTIG -state-of-the-art engineering - exceptional performance for applications in*

- the automotive industry*, 8th International Conference "Research and Development in Mechanical Industry" RaDMI 2008, 14 - 17 September 2008, Užice, Serbia, Proceedings on CD, ISBN 86-83803-21-X (HTMS);
46. Răduță A., Demian C., Nicoara M., Locovei C., *Researches regarding the identification of material and technological defects causing crack in austenitic stainless steels joints*, The 6th International Conference Structural Integrity of Welded Structures 05-06.11.2008 – ISCS08, ISIM Timisoara, Romania, pp.195-203, ISSN: 1842-5518;
  47. Demian C., Răduță A., Popescu M., Voicu A., Nicoara M., Locovei C., *The corrosion behavior of 316L grade stainless steel in biological simulated environment*, The 6th International Conference Structural Integrity of Welded Structures 05-06.11.2008 – ISCS08, ISIM Timisoara, Romania, pp.227-231, ISSN: 1842-5518;
  48. Șerban V.A., Raduta A., Voicu A., Popescu M., Tita A.V., *Comparative study concerning corrosion behavior for metallic biomaterials utilized for implants manufacturing*, The 6th International Conference Structural Integrity of Welded Structures 05-06.11.2008 – ISCS08, ISIM Timisoara, Romania, pp.213-219, ISSN: 1842-5518;
  49. Magda A., Popescu M., Nicoara M., Demian C., Voicu A., *Le comportement des aciers galvanisés soudés par procédés à l'arc et brasage, au point de vue du « développement durable »*, COFRET'08, 11-13 juin 2008, Nantes-France, Proceedings on CD, ISBN 2.6905267.61.5;
  50. Nicoară M., *Metallic Foams*, European Summer School on Smart and New Materials, Charleville-Mezieres, France, pp.104-117, ISBN 978-973-625-407-9;
  51. VA Șerban, C Codrean, D Uțu, C Opreș, *Fe-based Bulk Metallic Glasses Used for Magnetic Shielding*, The 13th International Conference on Rapidly Quenched & Metastable Materials RQ13, Dresden, Germany, August 24 - 29, 2008, Journal of Physics: Conference Series, ISSN 1742-6588;
  52. VA Șerban, C Codrean, D Uțu, A Ercuța, *Amorphous alloys for brazing copper based alloys*, The 13th International Conference on Rapidly Quenched & Metastable Materials RQ13, Dresden, Germany, August 24 - 29, 2008, Journal of Physics: Conference Series, ISSN 1742-6588;
  53. VA Șerban, C Codrean, D Uțu, *Bulk Amorphous Soft Magnetic Iron Based Alloy with Mechanical Strength and Corrosion Resistance*, Strength of Materials Laboratory at 85 years 21-22 November 2008, Timisoara, Romania, Advances in Strength of Materials, ISSN 1013-9826;
  54. V.A. Șerban, C. Codrean, B. Radu, M. Burcă, C. Opreș, *Experimental research concerning electric spot brazing of copper based alloys with amorphous brazing alloys*, Innovative Technologies for Joining Advanced Materials, 12-13 June 2008, Timisoara, Proceedings of the International Conference, ISSN 1844-4938;
  55. V.A.Șerban, C. Codrean, C. Opris, D. Utu, M. Lita, *The activation energy and kinetic of the nanocrystallization process of Al85Ni9Nd4Co2 amorphous alloy*, Advanced Topics in Optoelectronics, Microelectronics and Nanotechnologies, ATOM-N 2008", Proceedings of the International Conference, 28-31 August, Constanta Romania, ISBN: 978-973-755-387-4;
  56. I. Mitelea, D. Utu, C. Pogan, *Dilution phenomenon during coating of titanium alloys by Plasma Transferred Arc (PTA) process*, 1st EUCOMAS Conference Berlin, mai 26-27, 2008, VDI-Berichte 2028, pp. 337-344, ISBN 978-3-18-092028-3;
  57. I. Mitelea, D. Stefan, D. Utu, *Investigations on the pulsed MIG/MAG of dissimilar austenitic-ferritic steels (W735-X10CrNiTi18.9)*, 1st EUCOMAS Conference Berlin, mai 26-27, 2008, VDI-Berichte 2028, pp. 383-390, ISBN 978-3-18-092028-3;
  58. M. Burca G. Glita I. Lucaciu, *Mechanized MAG welding of tube-tulular palte joints for heat exchangers*, 8th International Conference "RESEARCH AND DEVELOPMENT IN MECHANICAL INDUSTRY "RaDMI 2008 14-17 Sept. 2008.Uzice Serbia, pp. 6, ISBN 86-83803-21-X (HTMS);
  59. I.Lucaciu S. Glita Gh. Glita, *Research regarding electrical pressure welding of the fitting/shielding on truck brake plate*, The 5th International Symposium About Design in Mechanical Engineering NOVI SAD,15-16 APRIL 2008 pp. 261-266, ISBN 978-86-7892-104-9;
  60. Popescu, M., Mocuta, GE, Rosca, CA., *Quality management system in a combined transport freight*, The 5th International Symposium, KOD 2008, 15-16 april 2008, Novi Sad, Serbia, Faculty of Technical Sciences, pp. 369, ISBN 978-86-7892-104-9;
  61. Popescu, M., Magda, A., Locovei, C., Belu-Nica, R., Vartolomei, M, *La certification des*

- compagnies a la condition d'assurance du management de la qualité et du milieu au soudage, conformément EN ISO et les nouvelles directives EWF*, 1st International Conference<sup>2</sup>SCIENCE AND HIGHER EDUCATION IN FUNCTION OF SUSTAINABLE DEVELOPMENT<sup>2</sup> SED 2008 17 - 19. September 2008, Užice, Serbia, Proceeding, CD, pp. 312, ISBN 86-83803-21-X (HTMS);
62. Magda, A., Popescu, M., Mocuta, GE, Belu-Nica, R., *Aspects spécifiques des revêtements – les aciers revêtus DANS L'INDUSTRIE D'AUTOMOBILE*, 1st International Conference<sup>2</sup>SCIENCE AND HIGHER EDUCATION IN FUNCTION OF SUSTAINABLE DEVELOPMENT<sup>2</sup> SED 2008 17 - 19. September 2008, Užice, Serbia, Proceeding, CD, pp. 318, ISBN 86-83803-21-X (HTMS);
63. Popescu, M., Magda, A., Mocuta, GE, Demian, C., Perianu, I., *Inovative welding processes thin sheet galvanized steel for automotive*, 8th International Conference<sup>2</sup>Research and Development in Mechanical Industry<sup>2</sup> RaDMI 2008 14 - 17. September 2008, Užice, Serbia, Proceeding, CD, pp. 214, ISBN 86-83803-21-X (HTMS);
64. Magda, A., Milos, L., Popescu, M., *Brazing MIG technology for joining galvanized steel approach in the context of "durable development"*, The 2nd International Conference Innovative technologies for joining advanced materials Timișoara, Romania, 12-13.06.2008, pp. 137, ISSN 1844-4938;
65. Mocuta, GE, Popescu, M., *Sound pollution consequence of the transport development*, International Conference on Mechanical engineering Bratislava, Slovakia, pp. 75, ISBN 978-86-7892-104-9;
66. Milos, L., Berger, E., *ANSYS analyses of composite pipe welding processes*, International Conference Innovative technologies for Joining Advanced Materials, Timisoara – Romania, Proceedings on CD, 6 pages. /CD, ISBN 1844-4938;
67. Petrica, A., Milos, L., *The quality analysis of the thermal sprayed deposited layers by electronical microscopy*, The 19th DAAM International conference "Intelligent manufacturing and Automation" Trnava – Slovakia, Proceedings on CD, 8 pages. /CD, ISBN 1335-1532;
68. R. Cojocar, D. Dehelean, B. Radu, L. Botila, *Friction stir welding of AZ31B magnesium alloy*, ISIM 2008 Conference, 2008, pp. 91;
- PhD THESIS – presented –**
1. *Studies and researches on the high productivity flux welding process*, Author: Gavanescu Gheorghe. Scientific Coordinator: Prof.dr.eng. I.Mitelea.
  2. *Friction welding aptitude of heat treated and thermochemical treated steels* – Author: Mosila Adrian, Scientific Coordinator: Prof.dr.eng. I.Mitelea.
  3. *Researches on making "white-black" welded joints* - Author: Stefan Dragos, Scientific Coordinator: Prof.dr.eng. I.Mitelea.

### RESEARCH CONTRACTS

1. Contract No. C1/14.01.2008, *Training welders according to EN 287-1, grades: 141, T, BW, t4, 5, D183, wm, PF,ss,nb and respectively 141+111,T,BW,t4,5,D183,wm,PF,ss,nb*, Financer: KHAN MONTAGEN GERMANY, Partner: TUV Academy Budapest, Value 2008: 10.323 euro;
2. Contract CEEX 1285/2006-2008, Nr. contract 82/ 2006, *Optimisation of dento-parodontal treatments using laser technology – multidisciplinary testing– OTDP-LAS-TEST (partner P1)*, Financer: MEC, Director Partner P1: Raduta Aurel, Value P1 2008: 334.000 lei;
3. Contract No. 71-050, *Innovative technologies for obtaining by thermal spraying cermet composites microlayers, corrosion and wear resistant*, Financer: M.Ed.C., Director: Șerban Viorel-Aurel, Value 2008: 598.562 lei;
4. Contract ID\_18, nr.66/2007, *Bulk amorphous ferromagnetic and nanocrystalline alloys with applicability for making magnetic shields*, Financer M.Ed.C., Director: Viorel-Aurel Șerban, Value 2008: 180.000 lei;
5. Contract CEEX 221/2006, *Innovative brazing amorphous alloys for special industrial applications – NOVABRAZ*, Financer: M.Ed.C., Director: Șerban Viorel-Aurel, Value 2008: 67.000 lei;
6. Contract 98GR/11.06.2008, *Researches concerning the increase of the performances of MCrAlY layers deposited by HVOF method and modified by laser re-melting*, Financer: M.Ed.C., Director: Utu Dragos, Value 2008: 75.000 lei;
7. Contract No. 151/P1, *Development at European level of the laboratory for welding and testing thermoplastic materials*, Financer: CNCSIS,

- Director: Popescu Mihaela, Value 2008: 28.300 lei;
8. 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 2008 P3: 5.900 lei;
  9. Contract CEEEX 561/ 2005, *Nanocontrol and Multifunctionality in Shape Memory Materials, Microlayers and Architectures*, Financer M.Ed.C., Director: Budau Victor, Value 2008 UPT: 27.000 lei;
  10. Contract CEEEX 10622/2006, *Plurifunctional layers for plating titanium alloys using advanced technologies*, MICROFUNCTIA, Financer M.Ed.C., Director: Mitelea Ion, Value 2008 UPT: 80.000 lei;
  11. Contract 17/ 29.01.2008, *Evaluation and assessment of physical and chemical characteristics of some steels verified at inspections conducted by ISIM Timisoara*, Financer: ISIM Timișoara, Director: Răduță Aurel, Value 2008: 1.380,30 lei;
  12. Contract. 50/01.04.2008, *Analysis and tests for verifying the quality of materials from the current production of S.C. COSTEX & CRIS S.A.*, Financer: S.C. COSTEX&CRIS S.R.L., Director: Răduță Aurel, Value 2008: 1.599,36 lei;
  13. Contract 154/ 24.10.2008, *Studies and investigations concerning the quality of products from the auto parts production*, Financer: S.C. Continental Automotive Romania S.R.L., Director: Răduță Aurel, Value: 3.570 lei;
  14. Contract 643 / 2007, *Technical assistance and consultancy in the field of tool and equipment quality from the current production of Contitech Romania*, Financer: ContiTech Romania S.R.L., Director: Nicoară Mircea, Value 2008: 6.496,27 lei;
  15. Contract 740 / 2007, *Technical assistance and consultancy in the field of materials, tool and semi-finished products quality from the current production*, Financer: SC. DURA AUTOMOTIVE Romania S.R.L., Director: Nicoară Mircea, Value 2008: 2.101 Euro;
  16. Contract 794 / 2007, *Studies and researches concerning the usage of bonding with induction currents of aluminum parts from the current production of Contitech Romania*, Financer: ContiTech Romania S.R.L., Director: Nicoară Mircea, Value 2008: 7.756,80 lei;
  17. Contract 13/12.02.2008, *Technical assistance and consultancy in the field of tool, equipment and products quality from the current production of ESSER Romania*, Financer: Esser Romania S.R.L., Director: Nicoară Mircea, Value 2008: 3.792 lei;
  18. Contract 32/10.03.2008, *Analysis and tests for verifying the quality of materials used in the current production, project DOKA, of S.C. Bega Tehnomet*, Financer: Bega Tehnomet, Director: Nicoară Mircea, Value 2008: 1.380,4 lei;
  19. Contract 33/13.03.2008, *Technical assistance and consultancy in the field of tool and equipment quality from the current production of Continental Automotive Products*, Financer: Continental Automotive Products, Director: Nicoară Mircea, Value 2008: 1.701 lei
  20. Contract 114/16 iulie 2008, *Analysis and tests for verifying the quality of materials used in the current production of ContiTech Romania*, Financer: ContiTech Romania S.R.L., Director: Nicoară Mircea, Value 2008: 7.445,4 lei;
  21. Contract 140/07.10.2008, *Studies and investigations regarding the quality of advanced materials and coating in auto parts production*, Financer: SC. DURA AUTOMOTIVE Romania S.R.L., Director: Nicoară Mircea, Value 2008 : 390 lei
  22. Contract 153/24.10.2008, *Studies and investigations regarding mechanical stress distribution in an orthopedic implant for tibia ORTOVIT 8x300 mm*, Financer: Kelemen Gheorghe, Director: Nicoară Mircea, Value 2008 : 1.190 lei ;
  23. Contract 774/ 24.10.2007, *Analysis and tests for the inspection of screen and shower cabins from the production line of S.C. Mondial S.A.*, Financer : S.C. Mondial S.A., Director: Locovei Cosmin, Value 2008 : 13.090 lei;
  24. Contract 41/18.03.2008, *Spectral analysis for metallic samples from the oil pipes in Calacea area*, Financer: S.C. Tehntrade International S.R.L., Director: Locovei Cosmin, Value 2008: 909,16 lei;
  25. Contract 17/2008, *Study upon the degradation phenomena of some areas from two steam pipes from boilers 4 and 5 of S.C. Complexul energetic Rovinari*, Financer ISIM Timișoara, Director: Viorel Aurel Șerban, Value 2008: 23.800 lei;
  26. Contract 66/18.04.2008, *Investigations in the field of weld quality analysis*, Financer: ISIM Timisoara, Director: B. Radu, Value 2008: 2.380 lei;

27. Contract 18/21.02.2008, *Welders training according to EN 287-1:1.1. Certification and qualification of the process 783/SR EN4063-2000 "Electric arc welding of studs with ceramic ring according to SR EN 14555/2007, stud diameter = 19mm*, Financer: AUTOHTON TIM TIMISOARA, Director: Milos L., Value 2008: 8.000 lei;
28. Contract 65/16.04.2008, *Technical assistance at electric spot welding of omega rule on zinc-plated sheet 3 mm thick*, Financer: SC TES WELDING TIMISOARA, Working staff: Glita G., Burca M., Dupta A., Value 2008: 1.190 lei;
29. Contract 84/16.05.2008, *Welders training and authorization according to SR EN 287-1, qualifying procedure 135/136, MIG/MAG welding*, Financer SC ATON TRANSILVANIA SA, Director: Milos L., Value 2008: 50.000 lei;
30. Contract 102/2008, *Welders training and authorization according to EN 287-1:1.1. Training and certification welders for welding with shielding gas MAG : EN 287-1 135 P FW W01 t10 PB ss*, Financer : AUTOHTON TIM TIMISOARA, Director: Milos L., Value 2008 : 12.850 lei ;
31. Contract 129/2008, *Welders training according to EN 287-1 qualificative 135,T,FW,W01,t12,wm,PF,ss,nb*, Financer : SC MCM SA BOCSA, Director: Milos L., Value 2008 : 43.700 lei ;
32. Contract 151/22,10,2008, *Researches regarding WIG welding of saws used for metals cutting*, Financer: SC HNP Techdevices SRL Timisoara, Director: Glita G., Value 2008 : 13.700 lei ;
33. Contract nr.8/2008, *Consultancy in welding and cutting*, Financer: S.C. SUDEXPERT S.R.L. Timisoara, Director: Popescu Mihaela, Value 2008 : 3.570 lei ;
34. Contract 183/2008, *Consulting in welding railway rolling stock components*, Financer: KHAN MONTAGEN GmbH SCHUTTORG Germany, Director: Livius Milos, Value 2008: 9.323 Euro;
35. Contract: 129/28.08.2008, *Welders training according to EN 287-1, qualificative 135,T,FW,W01,t12,wm,PF,ss,nb*, Financer : SC MCM Steel SA Bocsa - Caras Severin, Director: Livius Milos, Value 2008: 43.700 lei;

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

### GENERAL PRESENTATION

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

The head of the research centre is **Prof. Dr. eng. Inocențiu Maniu**

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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

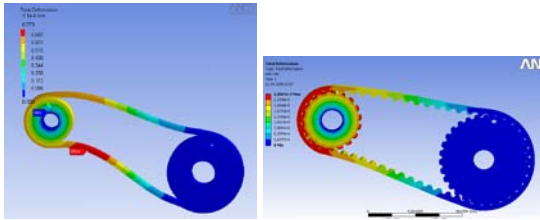
- theoretical study, design and tests of special purpose mechanisms and mechanical drives, cams and linkages, mechanical variators, behavior of machine elements and mechanisms



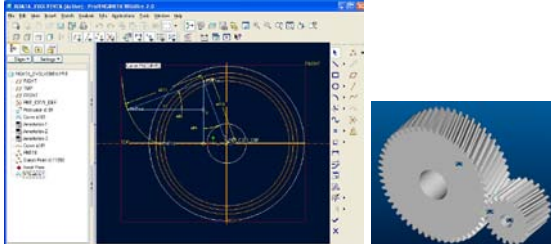
- tribological behavior of machine elements and mechanisms

## 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 ARGÈȘANU
- 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.

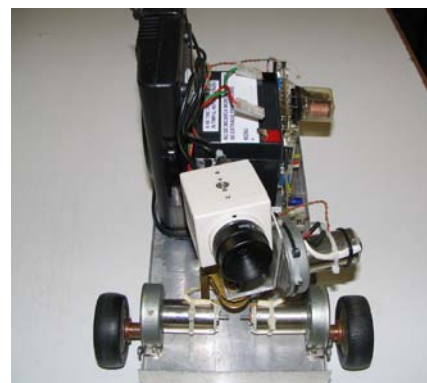


## ACTIVITIES AND RESULTS

- 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 BENEFICIARIES

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 BENEFICIARIES

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
- Lect. Dr.eng. Marius MATEAȘ
- Lect. Dr.eng. Liana DEHELEAN
- Lect. Dr.eng. Adrian George RADU
- Lect. Dr.eng. Andreea DOBRA
- Assist.eng. Adriana TEODORESCU.



#### RESEARCH OFFERS

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



- Optical and optoelectrical equipments. Bio-medical apparatus.

#### PUBLICATIONS

##### BOOKS

1. Lovasz E.-Chr. *Getriebelehre II Kurvengetriebe*, Manual Editura Politehnica CNCSIS B+, 128 pp, ISBN 978-973-625-715-5, 2008;
2. Argesanu V. *Machine parts. Mechanical transmissions*, Monografie, Editura Politehnica national, CNCSIS B+ 361pp. ISBN 978-973-625-764-3, 2008;
3. Madaras L., Argesanu V., Jula M., Ioanovici Fr. *Machine parts, vol.I*, Monografie, Editura Eurostampa CNCSIS B+, 400 pp. ISBN 973-687-308-0; 973-687-307-2, 2008;
4. Lovasz, E; Carabas, I; Maniu, I; Perju, D; Mesaros V; Vacarescu, V; Dehelean, L., si altii *New Trends in Mechanisms*, tratat Ed. Academica Greifswald, 300 pp., ISBN 978-3-9402-37-10-1, 2008;
5. Vatau S., Radulescu C. *Mobile robots-Walking robots*, Editura Politehnica, Timisoara, 142 pp., ISBN 978-973-625-664-6, ISBN 978-973-625-666-0, 2008;
6. Dolga V. *Data acquisition systems, interfaces and virtual instrumentation*, Editura Politehnica Timisoara, 269 pp. ISBN 978-973-625-583-0, 2008;
7. Gruescu C. Nicoara I. Costache M. Ionescu C. *Applications of Ray Tracing method in imaging and non-imaging optics* Editura "Politehnica" Timisoara, CNCSIS, 271 pp. ISBN 978-972-625-542-7, 2008;
8. Maniu I., Varga S., Radulescu C., Dolga V., Bogdanov I., Ciupe V. *Robotics. Mechanical system*, Tratat Editura Politehnica, 302 pp. ISBN 978-973-625-609-7, ISBN 978-973-625-610-3, 2008;
9. Rădulescu, C., Vatau, S. *Mobile robots. Automated guide vehicles*, Vol. I, ediția 1-a, Editura Politehnica, Timisoara, 176 pp., ISBN: 978-973-625-664-6, 978-973-625-665-3 (vol. I), 2008;
10. Toth-Tascau M., Dreucean M. *Robotics elements*, Tratat Politehnica, 350 pp. ISBN 10 973-625-364-3, ISBN 13 978-973-625-364-5, 2008;

##### PUBLISHED PAPERS

1. K.-H. Modler, E.-C. Lovasz, G.F. Bär, R. Neumann, D. Perju, M. Perner, D. Margineanu *General Method for the synthesis of geared linkages with non-circular gears* Mechanism and Machine Theory vol. II, 10.1016/j.mechmachtheory. 2008, 05.006 ISBN 0094-114X, impact 0,839;
2. Nemes D. I., Dragoi M., Poenaru D. V., Cretu O., Vermesan H., Prejbeanu R., Vermesan D., Popa D., Dragoi R., Suciuc O., Surducian D., Nemes C., Lovasz E. *Complex assessments and therapies of the secondary scoliosis in inflammatory rheumatic diseases* Arthritis and Rheumatism, vol.58, Issue 9, 736-736, 1 pp. ISBN 0004-3591, impact 7,677, 2008;
3. Gruescu C. Nicoara I. Popov D. Bodea R. *Optical Glass Compatibility For the Design of Achromatic Systems* Science of Sintering, doi: 10.2298/SOS0802131G, UDK 666.3-128:621.315.612 40(2008), 10 pp. ISSN 0350-820X;
4. Dreucean M., Tanasie G., Toth-Tascau M., Boss H., Hoinoiu B. *Articular Rehabilitation Controlled by Image Processing-Study on Animals Tissue Engineering*, Part A Volume 15 Number 5, ISSN 1937-3341, impact 4.409 (2008);

5. Tanasie G., Toth-Tascau M., Mirea F., Dreucean M., Anghel S., Schluszer L., Igna C. *Combined Bioimplants for Articular Defects Healing Tissue Engineering*, Part A Volume 15 Number 5 ISSN 1937-3341, impact 4.409 (2008);
6. Lovasz E.-Chr. Modler K.-H., Perju D., Mărgineanu D., Zăbavă E. *On the relative sliding at the cam mechanisms with the tangential/flat follower*, Proceedings of X-th International Congress on the Theory of Machines and Mechanisms, Liberec, Cehien, 02.09-05.09.2008, pp. 371-376, 6 pages, ISBN978-80-7372-370-5;
7. Argesanu V., Jula M., Luchin M., Margineanu D. *Lip seals and mechanical face seals – performance criteria*; Annals of DAAAM for 2008 & Proceedings, The 19-th International DAAAM Symposium Intelligent Manufacturing & Automation: Focus on Next Generation of Inteligen Systems and Solutions, 22-25th october, 2008, Slovak University of Technology, DAAAM International Vienna, Austria, EU pp. 0031-0033, ISBN 1726-9679;
8. Argesanu V., Jula M., Luchin M., Radu A. *Considerations upon the circular section circlips/retaining rings axial load/carrying capacity* Annals of DAAAM for 2008 & Proceedings .The 19-th International DAAAM Symposium Intelligent Manufacturing & Automation: Focus on Next Generation of Inteligen Systems and Solutions, 22-25th october, 2008, Slovak University of Technology, DAAAM International Vienna, Austria, EU, pp. 0033-0035, ISBN 1726-9679;
9. Ciupe V., Dehelean N., Maniu I. *Distributed concentrator for solar power generation* Annals of DAAAM for 2008. The 19th International DAAAM Symposium, Trnava, Slovakia, pp. 279-280, 2 pages. ISBN: 978-3-901509-68-1, ISSN: 1726-9679;
10. Davidescu A.; Savii G.; Sticlaru C. *Digital Image Processing in Scanning Electron Microscopy Analysis of Protective Coatings* Annals of DAAAM 2008&Proceedings Intelligent Manufacturing & Automation, vol 19, no1, pp. 357 - 358, 2 pages, ISSN 1726-9679; ISBN 978-3-901509-68-1;
11. Sticlaru C.; Davidescu A.; Crainic N.; Faur C. *Studies on stress and strain state of a hip joint endoprosthesis* Annals of DAAAM 2008&Proceedings Intelligent Manufacturing & Automation, vol 19, no2, pp.11311-1313, 2 pp. ISSN 1726-9679; ISBN 978-3-901509-68-2;
12. Dehelean N.M., Ciupe V., Maniu I. *Modified Mechanism of a Stirling Engine for Use with Solar Power Generators*, Annals of DAAAM for 2008 & Proceedings of the 19th International DAAAM Symposium, pp. 0369, 2, ISBN 978-3-901509-68-1;
13. Dobra A. *Method of measuring plantar pressure with resistive sensors*, The 19th International DAAAM Symposonum, pp. 387, 2 pages, ISBN 978-3-901509-68-1;
14. Moldovan C, Dolga V *Parallel robot with variable link length mechanisms*, Annals of DAAAM for 2008 & Proceedings of the 19th International DAAAM Symposium pp. 449. ,2 pages, ISBN 978-3-901509-68-1;
15. Popa A, Popa M, Silea I, Varlan A *Indoor Navigation of a Wheeled Mobile Robot CHSI* 2008, pp. 1015-1020, ISBN 978-1-4244-1542-7;
16. Vacarescu, V.; Lovasz E.; Vacarescu C.-F. *The modelling of end-effector's pose errors for the equivalent kinematical chain of the upper human limb*; The Annals and Proceedings of The 19th International DAAAM Symposion "Intelligent Manufacturing & Automation", Trnava, Slovakia pp. 1433-1434, 2 pages, ISSN 1726-9679 ISBN 978-3-901509-68-1;
17. Vacarescu, V.; Lovasz E.; Vacarescu C.-F., Margineanu, D. *The method for the evaluation of spinal column posture* The Annals and Proceedings of The 19th International DAAAM Symposion "Intelligent Manufacturing & Automation" Trnava, Slovakia, pp. 1435-1436., 2 pages, ISSN 1726-9679 ISBN 978-3-901509-68-1;
18. Vacarescu, V.; Lovasz E.; Margineanu, D. *Algorithm for determination of human spinal column deviation tip scoliosis*, The X. IFToMM International Conference on the Theory of Machines and Mechanisms Proceedings, Liberec, Czech Republic; pp. 671-679, 8 pages. ISBN 978-80-7372-370-5, 2008;
19. Vatau S., Cioi D. *Jrobo: simulation and control with java for quadruped robot* ISI Proceedings of The 19th International daaam symposium "Intelligent Manufacturing & Automation: Focus on Next Generation of Intelligent Systems and Solutions", pp. 1455-1456; ISBN 978-3-901509-68-1, 2008;
20. Vatau S., Cioi D. *Graphical user interface for quadruped's leg robot* ISI Proceedings of The 19<sup>th</sup> International DAAAM symposium "Intelligent Manufacturing & Automation: Focus on Next Generation of Intelligent Systems and Solutions", pp. 1453-1454; ISBN 978-3-901509-68-1, 2008;
21. Dolga, V., Dolga, L., Filipescu, H. *Analogy in modelling mechatronic systems* 19th DAAAM

- Intern. Symp. 2008 „Intelligent Manufacturing & Automation”, Trnava, Slovakia, 22-25th october pp. 0413, 2 pag., ISSN 1726-9679, ISBN 978-3-901509-68-1
22. Dolga, L., Dolga V., *The tensometric force sensor. Design, evaluation and optimal*; 19th DAAAM Intern. Symp. 2008 „Intelligent Manufacturing & Automation”, Trnava, Slovakia, 22-25th october; pp. 0411, 2 pages. ISSN 1726-9679, ISBN 978-3-901509-68-1;
  23. Dolga, V., Dolga, L., Filipescu, H. *Robotics, rapid control prototyping and “dSPACE” hardware* 19st DAAAM Intern. Symp. 2008 „Intelligent Manufacturing & Automation”, Trnava, Slovakia, 22-25th october pp. 0415, 2 pages. ISSN 1726-9679, ISBN 978-3-901509-68-1;
  24. Gruescu C. Hora H. Nicoara I. Lovasz E. *Influence of Mechanically Induced Birefringence* Proceedings of the 6th International Conference of DAAAM Baltic, Industrial Engineering, Tallinn, 2008; pp. 239-244; ISBN 978-9985-59-783-5;
  25. Gruescu C. Ionescu C. Nicoara I. Breaban F. *Increase of Precision and Efficiency of Laser Cutting by Means of Optical System Optimization* Proceedings of the 6th International Conference of DAAAM Baltic, Industrial Engineering, Tallinn, 2008"; pp. 245-250; ISBN 978-9985-59-783-5;
  26. Dreucean M., Toth-Tascau M., Rusu L., Stoia D. I., Menyhardt K.; *Engineering Aspects of the Osteoarticular Reconstruction with Stem Cells. Study on Animals* Proceedings of the 9th WSEAS Conference on Mathematics & Computers in Biology and Chemistry (MCBC `2008) Bucharest, Romania; pp. 128-131, ISBN 978-960-6766-75-6;
  27. Dreucean M., Toth-Tascau M. *CAD/CAM Methods In The Customization Of Medical Implants* The Annals of DAAAM for 2008 & Proceedings of The 19th International DAAAM Symposium "Intelligent Manufacturing & Automation: Focus on Next Generation of Intelligent Systems and Solutions", Trnava, Slovakia; pp. 0441-0442 ISSN 1726-9679, 2008;
  28. Modler K.-H., Lin S., Hanke U., Lovasz E.C. *Getriebetechnische Lösungen für Stabilisierende Formgebungsprozesse*, VDI Berichte, Issue 2050, 2008, pages 187-194; ISBN0083-5560;
  29. Popa A, Popa M., Silea I. *Mobile Robot Navigation with Obstacle Avoidance Capability PEMCC* 2008, pp. 1225-1232, ISBN 978-1-4244-1741-4;
  30. Savii G.G., Neidenbach N., Wolf *Mastering E. It Security Issues in Outsourcing* Annals of the DAAAM for 2008 & Proceedings of The 18th International DAAAM Symposium - Intelligent Manufacturing & Automation: Focus on Next Generation of Intelligent Systems and Solutions. 22-25 October 2008, Trnava, Slovakia, ISSN 1726-9679, pp. 357-358, 2, ISBN 978-3-901509-68-1;
  31. Dreucean M., Sticlaru C. *CAD-CAE Models Library for Pre-Surgery Planning In Product Engineering-Tools and Methods Based on Virtual Reality*, Springer Netherlands 2008 473482; ISBN 978-4020-8199-6 (HB), ISBN 978-1-4020-8200-9;
  32. Perju D., Lovasz, E.-C., K.-H. Modler, D. Margineanu, *On the balance's mechanism of Beranger type* Buletinul Institutului Politehnic din Iasi Tomul LIV (LVIII) fasc. 4, pp. 173-178, 6 pages, pp. 1011-2855, Machine Construction;
  33. Modler K.-H., Lovasz E.-C., Perju D., Margineanu D., *Transmission Equation of the RSSR-Linkages with Singularities* Buletinul Universitatii "Politehnica" din Timisoara Tom 53 (67), Fasc. S1, pp. 21-26, 6 pages. ISSN 1224-6077, Seria Mecanica;
  34. Lovasz E.-C., Perju D., Margineanu D., Zabava E.S., Modler K.-H., *Evaluation of Wear Susceptibility of a Cam Mechanism with Tangential Oscillating Follower* Buletinul Universitatii "Politehnica" din Timisoara Tom 53 (67), Fasc. S1, pp. 27-30, 6 pages; ISSN 1224-6077, Seria Mecanica;
  35. Modler K.-H., Schlüter O., Krenek K., Lovasz E.-C., Margineanu D. *The Viete's Formulas Method as a Mechanisms Synthesis Tool* Buletinul Universitatii "Politehnica" din Timisoara; Tom 53 (67), Fasc. S1, pp.310-315, 6 pages; 1224-6077, Seria Mecanica;
  36. Popescu M., Argesanu V., Mocuta G., Jula M., Magda A., Voicu A., *The applications of ergonomic principles in design – specials materials for dental practice*; Annals of the Oradea University; vol VII(XVII) pp 1704-1713, ISSN 1583-0691, Fascicle of Management and Technological Engineering
  37. Mateas M., Davidescu A., Argesanu V. *Considerations about ergonomic indicators for the dental units*; Buletinul Stiintific al Universitatii "Politehnica" din Timisoara Tom 53 (67), Fasc. S1, pp. 268-271, ISBN 1224-6077, CNCSIS B+
  38. Argesanu V., Vacarescu V., Ianosi E. *Considerations about ergonomic factors in dentistry*, Buletinul Stiintific al Universitatii

- "Politehnica" din Timisoara; Tom 53 (67), Fasc. S1, pp. 277-281; ISBN1224-6077, CNCSIS B+
39. Ianosi E., Argesanu V., Vacarescu V., *Considerations about ergonomic risks minimization in dentistry* Buletinul Stiintific al Universitatii "Politehnica" din Timisoara Tom 53 (67), Fasc. S1, pp. 281-285; ISBN 1224-6077, CNCSIS B+
40. Dehelean N.M., Dehelean L.M., Argesanu V. *A schema for a new dentist arm fixture* Bulletin of The Transilvania University of Brasov, Proceedings of the International Conference ROBOTICS '08, Vol. 15(50) Series A, Special issue no. I vol I, 2008, pp. 129-133 ISSN 1223-9631, ISBN 978-973-598-387-1
41. Anghel M., Argesanu V., Valceanu C., Talpos – Niculescu, I.A *A correct posture – A healthy dental doctor*, Timisoara Medical Journal, vol. 58 (suppl 1); pp. 61, ISSN 1583-5251 Medical Journal;
42. Argesanu V., Anghel M., Comes C., Lovasz E. C. *Ergonomically design-vital element upon dental medic's health* Timisoara, Medical Journal, vol. 58 (suppl 2), pp. 60-61 ISSN, 1583-5251, 2008;
43. Comes C., Anghel M., Argesanu V., Penta S. *Working management processes in dental health* Timisoara Medical Journal, vol. 58 (suppl 3), pp. 62, ISSN 1583-5251 Medical Journal, 2008;
44. Ciupe V., Maniu I., Lovasz E.-C. *Imagistic method for determining the positioning performance of a pneumatic axis* Bulletin of the Transilvania University of Brasov, Proceedings of the International Conference Robotics '08, Vol. 15, Series A, Vo. 1, pp.353-357, 5 pages, ISSN: 1223-9631, ISBN: 978-973-598-387-1, CNCSIS B+
45. Davidescu A., Sticlaru C., Mateas M. *The influence of temperature upon stress and strain state of a ball bearing* Bul. Inst.Polit. Iași, Tom LIV(LVIII), Fasc.4, Secția Constr.de mașini Tom LIV(LVIII), Fasc.4, pp. 261-268, 8pages; ISSN 1011-2855, CNCSIS B;
46. Davidescu A., Nicolaie C., Argesanu V., Mateas M. *Ergonomics Studies upon Workers Standing up Posture* Bul. St. Univ. Politehnica Timisoara, Seria Mecanica; Tom 53(67), Fasc.S1, pp. 259-264, 6 pages. ISSN 1224-6077, CNCSIS B;
47. Davidescu A., Savii G., Mateas M., Sticlaru C. *Graphical User Interface for Modeling Bivariate Data with LOESS Method* Bul. St. Univ. Politehnica Timisoara, Seria Mecanica Tom 53(67), Fasc.S1, pp. 241-244, 4 pages.; ISSN 1224-6078, CNCSIS B;
48. Dehelean L.M., Dolga V., *Mechatronic and Ergonomic Constrain in Medical Equipment Design*, Buletinul Institutului Politehnic din Iasi, Universitatea Tehnica "Gh.Asachi", Iasi, Tom LIV (LVIII), Fascicula 3, pp. 167, 12 pages; ISSN 1011-2855 CNCSIS B+;
49. Dehelean L.M. *Synchronization Mechanisms for Stirling Engine* Buletinul Stiintific al Universitatii "Politehnica", Ed.Politehnica, Timisoara; Tom 53(67), Fascicola S1, pp.301, 4 pages. ISSN 1224-6077; 1 CNCSIS B+;
50. Dehelean N.M., Cuipe V., Maniu I. *A New Mechanism to Synchronize a Stirling Engine* Buletinul Stiintific al Universitatii "Politehnica", Ed.Politehnica, Timisoara Tom 53(67), Fascicola S1, pp. 81, 4 pp.; ISSN 1224-6077, CNCSIS B+;
51. Dehelean N.M., Dehelean L.M., Argesanu V.A *Schema for a New Dentist Arm Fixture* Bulletin of the Transilvania University of Brasov, Vol. 15(50), Seria A, pp. 129, 4 pages. ISSN 1223-9631, CNCSIS B+;
52. Mateas M., Davidescu A., Sticlaru C. *Consideration about inteligent braces displacement measurement*; Bul. Inst. Polit. Iași, Tom LIV(LVIII), Fasc.4, Secția Constr.de mașini, Tom LIV(LVIII), Fasc. 4, pp. 179-185, 6 pp. CNCSIS B+;
53. Mateas M., Vacarescu V., Lovasz E., Ianosi E., Crastiu I. *Consideration about pain reaction evaluation to non-verbal children* Buletinul Stiintific U.P.T. Tom 53(67), Fasc S1; pp. 265-268, ISSN 1224-6077, CNCSIS B+;
54. Mateas M., Davidescu A., Argesanu V. *Consideration about ergonomic indicators for the dental units* Proceedings of MTM2008 in Scientific Bulletin of the „POLITEHNICA” University of Timișoara, Romania, Transactions on Mechanics, 2008; Tom 53 (67) Fasc.S1, pp. 149-153; ISSN 1224 – 6078, CNCSIS B+;
55. Sticlaru C., Davidescu A., Crainic N., Faur C. *Modelling a hip joint endoprothesis using proEngineer and Ansys*, Proceedings of COMEFIM'9, Iași, Romania, 12-14 June, 2008, Buletinul Institutului Politehnic din Iași, Tomul LIV (LVIII), Publicat de Universitatea Tehnică „Gh. Asachi“ Iași, Fascicula 4, secția Construcții de mașini; Tom LIV(LVIII), Fasc. 4, pp. 187-196; ISSN 1011-2855, CNCSIS B+;
56. Radu A., Sticlaru C. *Modellieren der spannungen der mobilen elastischen kupplungen* Proceedings of MTM2008 in Scientific Bulletin of the „POLITEHNICA” University of

- Timișoara, Romania, Transactions on Mechanics, 2008 Tom 53 (67) Fasc.S1, pp. 149-153; ISSN 1224 – 6078, CNCSIS B+;
57. Radu A., Sticlaru C., *Einfluss der belastungen auf elastische mobile kupplungen. Aspecte an der kontaktfläche*, Proceedings of MTM2008 in Scientific Bulletin of the „POLITEHNICA” University of Timișoara, Romania, Transactions on Mechanics, 2008; Tom 53 (67) Fasc. S1, pp. 153-158; ISSN 1224–6079, CNCSIS B+;
  58. Argeșanu V., Vacarescu V., Ianosi E. *Considerations about ergonomic risk factors in dentistry*; Proceedings of MTM2008 in Scientific Bulletin of the „POLITEHNICA” University of Timișoara, Romania, Transactions on Mechanics, 2008 tom 53(67), Fasc. S1,2008, pg. 277-281, 5 pp. ISSN 1224-6077, CNCSIS B+;
  59. Ianosi E., Argeșanu V., Vacarescu V. *Considerations about ergonomic risks minimization in dentistry*; Proceedings of MTM2008 in Scientific Bulletin of the „POLITEHNICA” University of Timișoara, Romania, Transactions on Mechanics, 2008 tom 53(67), Fasc. S1,2008, pp. 281-285, 3pp. ISSN 1224-6077, CNCSIS B+;
  60. Mateaș M., Vacarescu V., Lovasz E. *Considerations about pain reaction evaluation non-verbal children*, Proceedings of MTM2008 in Scientific Bulletin of the „POLITEHNICA” University of Timișoara, Romania, Transactions on Mechanics, 2008 tom 53(67), Fasc. S1,2008, pp. 265-268, 4pp. ISSN 1224-6077, CNCSIS B+;
  61. Dolga, V., Dolga, L., *Considerations about the nonlinearities of the mechatronics systems* Buletinul Inst. Politehnic din Iași, Secția Construcții de mașini, tom LIV, f.3, pp. 147 - 156, 10 pages. ISSN 1011-2855, CNCSIS B+;
  62. Dolga, V., Dolga, L.; *Obstacles detection in mobile robots control within the operation environment* Buletinul Inst. Politehnic din Iași, Secția Construcții de mașini,; LIV, f.3, pp. 157 -162, 6 pages. ISSN 1011-2855, CNCSIS B+;
  63. Dolga, V., Dolga, L., *Shape memory alloy actuators in biomechanics* Bulletin of Transylvania University Brasov vol.15 (50) series A, pp.197-202, no.1, vol.1, 7 pages. ISSN 1223 – 9631, CNCSIS B+;
  64. Dolga, V., Dolga, L., *Rapid prototyping and control in mechatronics* Proceedings of MTM2008 in Scientific Bulletin of the „POLITEHNICA” University of Timișoara, Romania, Transactions on Mechanics, 2008 tom 53(67), fasc. S1, pp.183-188, 6 pages. ISSN 1224-6077, CNCSIS B+;
  65. Dumache C. Gruescu C. Nicoara I. *Polar Characteristic of Energetic Intensity Emitted by an Anisotropic Thermal Source Irregularly Shaped*, Annals of the Academy of Romanian Scientists, Series on Science and Technology of Information, Ed. Printech, București, 2008 pp. 43, 6 pages. ISBN (13) 978-606-521-022-6, CNCSIS B+;
  66. Gruescu C. Bodea R. Nicoara I. *Improvement of Optical Entities by Means of Polynomial Aspheric Surfaces* Analele Universității “Eftimie Murgu” Reșița Anul XV, Nr. 1, 2008 6 pages. ISSN 1453 – 7394 CNCSIS C;
  67. Gruescu C. Bodea R. Lovasz E. *Relative Rotation Angle Between Spinal Vertebrae Using Complex Shape Markers*, Annals of the Oradea University, Fascicle of Management and Technological Engineering, 2008 VII(XVII), pp. 847, 6 pages. ISSN 1583-0691 CNCSIS B;
  68. Maniu I. *The use of pneumo-hydraulic multipliers in robotic industrial applications* Proceedings of MTM2008 in Scientific Bulletin of the „POLITEHNICA” University of Timișoara, Romania, Transactions on Mechanics, 2008; pp. 179, 4 pages. ISSN 1224-6077 CNCSIS B+;
  69. Hoigne D., Dreucean M., Sticlaru C., Kuenzler U., Messmer P. *Virtual Osteosynthesis with FEA Application* 68 Jahreskongress der Schweizerischen Gesellschaft fuer Orthopaedie, Unter der Mitwirkung der Schweizerischen Gesellschaft fuer Handchirurgie SGH, Abstract published in Swiss Medical Forum 2008 ; 8(37), Suppl. 44, pp. 43 S, ISSN 1424-4020 Organul oficial al Societatii Elvetiene de Chirurgie
  70. Tanasie G., Tatu RF., Anghel S., Paunescu V., Buncean M., Tascu M., Tatu C., Dreucean M., Bunu C., Igna C., Paunescu V. *Stem Cells Based Articular Reconstruction In Animal Models Physiology - from experiment to medical practice*, Proceedings of the The 10th Congress of the Romanian Society of Physiological Sciences, Cluj-Napoca, June 5th - 7th , 2008, in Fiziologia-Physiology, Official Journal of the Romanian Society of Physiological Sciences, nr 2/ 2008, ISSN 1223-2076, CNCSIS C;
  71. Malița D., Toth-Tașcău M., Dreucean M., Vermeșan D., Prejbeanu R., Malița I., Vermeșan H., Mogoșeanu M., Stoia D.I., Ghiba O., *Analiza corelațiilor dintre studiul biomecanic și aspectele imagistice asupra unui caz de pierdere de a cănfecțioasă a*

- endoprotezei de șold* ; Revista de ortopedie și Traumatologie a Asociației de Ortopedie Româno-Italo-Spaniole, Nr. ½(12)2008 Nr. ½(12)2008 pp. 58-67 ISSN 1454-6213, CNCSIS B;
72. Dreucean M., Sticlaru C. *CAD Models for Solving the Trajectories of 3D Mechanisms* Proceedings of MTM2008 in Scientific Bulletin of the „POLITEHNICA” University of Timișoara, Romania, Transactions on Mechanics, 2008; Transactions on Mechanics Tom 53 (67), Fasc. z, 2008 ISSN 1224-6077; CNCSIS B+;
73. Carabas I., Sticlaru C., Davidescu A. *Logical Mechanism for negation function* Proceedings of MTM2008 in Scientific Bulletin of the „POLITEHNICA” University of Timișoara, Romania, Transactions on Mechanics, 2008 Tom 53(67) Fasc. S1, 2008; ISSN 1224-6077, CNCSIS B+;
74. Dobra A., Joni N. *Toward the creation of databases with specific elements enabling the automatic configuration of arc welding robotic system* Bulletin of The Transilvania University of Brasov, Proceedings of the International Conference ROBOTICS '08; Vol. 15(50) Series A, Special issue no. I vol I, 2008, pp. 639-645; ISBN 978-973-598-387-1, ISSN 1223-9631, CNCSIS B+;
75. Dobra A., *Proposal software for determine plane (disk) cams profile* Proceedings of MTM2008 in Scientific Bulletin of the „POLITEHNICA” University of Timișoara, Romania, Transactions on Mechanics, 2008 tom 53(67) Fasc. S, pp. 31-37, pp. 6 ISSN 1224-6077; CNCSIS B+;
76. Ianoși E., Argeșanu V., Văcărescu V. *Considerations about ergonomic risks minimisation in dentistry* Proceedings of MTM2008 in Scientific Bulletin of the „POLITEHNICA” University of Timișoara, Romania, Transactions on Mechanics, 2009 Tom 53(67), Fasc. S1, pp. 281-284; ISSN 1224-6077, CNCSIS B+;
77. Moldovan C., Ciupe V., Dolga V. *Intelligent system for controlling the number of passengers in shuttle buses*; Proceedings of COMEFIM'9, Iași, Romania, 12-14 June, 2008, Buletinul Institutului Politehnic din Iași, Tomul LIV (LVIII), Publicat de Universitatea Tehnică „Gh. Asachi” Iași, Fascicula 4, secția Construcții de mașini; Tomul LIV (LVIII), Fasc. X, 2008 ISSN 1011-2855. CNCSIS B+;
78. Vatau S., Radulescu C., Valer D. *Petri Net Controller for Walking Robot*; Proceedings of COMEFIM'9, Iași, Romania, 12-14 June, 2008, Buletinul Institutului Politehnic din Iași, Tomul LIV (LVIII), Publicat de Universitatea Tehnică „Gh. Asachi” Iași, Fascicula 4, secția Construcții de mașini; Tomul LIV (LVIII), Fasc. X, 2008, pp. 351 – 358, 8pp. ISSN 1011-2855 CNCSIS B+;
79. Vatau S., Radulescu C., Valer D. *Mechanical design and control system configuration of quadruped walking robot* Proceedings of ROBOTICS'08, Bulletin of the Transilvania University of Brasov, Vol.15(50)-Series A, Special Issue No.1, Vol.I; Tomul LIV (LVIII), Fasc. X, 2008, pp. 253 – 258, 6; ISBN 978-973-598-387-1, ISSN 1223-9631 CNCSIS B+;
80. Carabas I. Gruescu C. Nicoara I *Aptness for Competition Sports Practice of Disabled Persons Wearing Artificial Knee* Proceedings of MTM2008 in Scientific Bulletin of the „POLITEHNICA” University of Timișoara, Romania, Transactions on Mechanics; Tom 52(66), 6 pages. ISSN 1224-6077, CNCSIS B+;
81. Rădulescu, C., Varga, S. *Movements' Geometrical Coupling of the Trajectory Generator Mechanisms*, Bulletin of the Transilvania University of Brașov, The 4-th International Conference „ROBOTICA 08”, Brașov, Romania, 13-14 November, 2008, Vol. 15 (50) Seria A , Special Issue No.1 Vol. 1, 2008, pp. 91- 98; ISBN 978-973-598-387-1, ISSN 1223-9631; 50, 50; CNCSIS B+
82. Rădulescu, C. *Movements Coupling of the Quasi-Spherical Orientation Mechanisms* Proceedings of MTM2008 in Scientific Bulletin of the „POLITEHNICA” University of Timișoara, Romania, Transactions on Mechanics; Tom 53 (67), Fasc. S1, 2008, pp. 211- 214; ISSN 1224- 6077; CNCSIS B+;
83. Rădulescu, C. *Movements Coupling of the Orientation Mechanisms* Proceedings of MTM2008 in Scientific Bulletin of the „POLITEHNICA” University of Timișoara, Romania, Transactions on Mechanics; Tom 53 (67), Fasc. S1, 2008, pp. 207- 210; ISSN 1224-6077, CNCSIS B+;
84. Toth-Tascau M., Dreucean M., *Path Planning of a Mobile Robot Using Visibility Graph Method* Bulletin of the Transilvania University of Brașov, The 4-th International Conference „ROBOTICA 08”, Brașov, Romania, 13-14 November, 2008, vol 15(50)-Series A, ISSN 1223-9631, Special Issue No. 1 Vol II, pp. 495, 500; ISBN 978-973-598-387-1, ISSN 1223-9631, CNCSIS B+;
85. Margineanu D., Perju D., Lovasz E.-Ch., Vacarescu V., Ciupe V. *Considerations about one type of adaptive intelligent spine brace*

- Bulletin of the Transilvania University of Braşov, The 4-th International Conference „ROBOTICA 08”, Braşov, Romania, 13-14 November, 2008, vol 15(50)-Series A, ISSN 1223-9631, Special Issue No. 1 Vol II, pag.313/6; ISBN 978-973-598-387-1, ISSN 1223-9632, CNC SIS B+;
86. Lovasz, E.; Argesanu V.; Jula M.; Carabas I., Vacarescu, V. *Human Spine Investigation for good posture in dental medicine* Medicine in Evolution, 2008, Timisoara; pp. 54-58, 5 pp.; ISSN 1454-8224; 20, 20, 20, 20, 20 Categoria D CNC SIS, Ed. Waldpress, Timisoara;
  87. Comes C., Anghel M., Argesanu V., Penta S. *Trans-disciplinary in human centered workplace design for dental medicine* Interdisciplinary approach to present dental medicine, 1'st Edition, International Congress, June 25-28, 2008, Timisoara; Abstract's Journal, Vol I/ 2008, pp. 79-80, ISSN 1844-4903;
  88. Lovasz E. C., Argesanu V., Jula M., Carabas I., Vacarescu V. *Human spine investigation for good posture in dental medicine* Interdisciplinary approach to present dental medicine, 1'st Edition, International Congress, June 25-28, 2008, Timisoara; Abstract's Journal, Vol I/ 2008, Interdisciplinary approach to present dental medicine, 1'st Edition, International Congress, June 25-28, 2008, Timisoara; pp. 83-84 ISSN 1844-4903;
  89. Lovasz E. C., Argesanu V., Jula M., Carabas I., Vacarescu V. *Human spine investigation for good posture in dental medicine* Interdisciplinary approach to present dental medicine, 1'st Edition, International Congress, June 25-28, 2008, Timisoara; Medicine in evolution, nr. 3, 2008; pp. 54-57 ISSN 1454-8224;
  90. Argesanu V., *Proiectarea ergonomica a locului de munca din medicina dentara pe baza conceptului de ergonomie uman centrata* Congresul al XXII-lea, International de Medicina Dentara "Tehnici de varf in medicina dentara", Program EMC al FDI, 9-12 aprilie 2008, Bucuresti, si cel de-al XVII-lea Congres al AMSPPR (Asociatia Medicilor Stomatologi cu Practica Privata din Romania) Viata stomatologica, www.dental.ro, afiliata la FDI(Federatia Dentara Internationala), publicata in International Dental Journal 12; pp; ISSN 0020-6539 vol 63;
  91. Anghel M., Lungeanu D., Argesanu V., Comes C., Talpos C. I. *Morphological changes induced by the working routine and posture in stomatology* Al XX-lea International Symposium on Morphological Sciences Abstract's book 43, 2008;
  92. Ianos E., *Considerations about non invasive temperature measurement in the food industry;* International Conference on SCIENCE and TECHNIQUE in the AGRI- FOOD Business, University of Szeged Faculty of Engineering in cooperation with Hungarian Academy of Sciences Regional Committee in Szeged and the Hungarian Scientific Society for Food Industry, Proceedins of the International Conference on SCIENCE and TECHNIQUE in the AGRI- FOOD Business\_CD; 4, ISBN 963 482 676 8;
  93. Ianos E. *Analysis method with application in the implementation of food safety management systems* International Conference on SCIENCE and TECHNIQUE in the AGRI- FOOD Business, University of Szeged Faculty of Engineering in cooperation with Hungarian Academy of Sciences Regional Committee in Szeged and the Hungarian Scientific Society for Food Industry, Proceedins of the International Conference on SCIENCE and TECHNIQUE in the AGRI-FOOD Business\_CD8, ISBN 963 482 676 8;
  94. Vacarescu V., Lovasz E., Mateas M., Margineanu D. *Algorithm for determination of human spine deviation tip scoliosis X* Conferenceon thr Theory of Machines and Mechanisms, Liberec, Czech Republic, pp. 671-679, 8 pp. ISBN 978-80-7372-370-5, 2008;
  95. Militaru R. *The integrated management system and risk assessment*, 8th International Conference, Research and Development in Mechanical Industry, RaDMI 200814 - 17. September 2008, Užice, Serbia; Proceeding on CD, pp. 533-540, ISBN 86-83803-21-X;
  96. Dreucean A., *The belts and pulley tooth geometry influence on certain kinematic aspects of synchronous belt drives*, 8th International Conference, Research and Development in Mechanical Industry, RaDMI 200814 - 17. September 2008, Užice, Serbia Proceeding on CD, pp. 163-170 ISBN 86-83803-21-X;
  97. Dolga, V., Dolga, L., *Applying the Bologna structure in the education in mechatronics at the Politehnica University of Timisoara*, 9th International Workshop on Research and Education in Mechatronics September 18th-19th REM 2008 pp. 13, 7 pages. ISBN 88-88412-33-6;
  98. Dolga, V., Dolga, L. *The educational design project within mechatronics. Modelling, simulation and virtual instrumentation;* 10th



- International Workshop on Research and Education in Mechatronics September 18th-19th REM 2009 pp. 27, 8 pages. ISBN 88-88412-33-7;
99. Gruescu C. Dumache C. Nicoara I. *Experimental Study Aiming to Establish Specific Characteristics of Stationary Optical Processes*, The 4th edition of the International Conference, Advanced Topics in Optoelectronics, Microelectronics and Nanotechnologies, 28-31 aug., 2008, Constanta; Advanced Topics in Optoelectronics, Microelectronics and Nanotechnologies, Ed. Matrix Rom, Bucuresti, 2008, 4 pages; ISBN 978-973-755-387-4;
  100. Rădulescu, C., Vatau, S., *Kinematic Analysis off Mobile Robot With Different Tips off Wheels*; The 9th International Conference on Automation / Robotics in Theory and Practice, ROBTEP 2008, Nový-Smokovec Vysoké Tatry, Slovakia, June 9-11, 2008, Proceedings of ROBTEP 2008, Acta Mechanica Slovaca, 2-A / 2008, 8 pp. ISSN 1335-2393;
  101. Toth-Tașcău M., Drucean M., Vermeșan H., Stoia D.I., Malița D., Vermeșan D., Prejbeanu R., Rusu L., Ghiba O. *A Combined Biomechanical-Radiological Analysis of a Patient Needing a Hip Implant Revision* Proceedings of 34th JUPITER Conference, Beograd, Serbia, June 2008, pp. 381-386 Proceedings; 381, 386; ISBN 978-86-7083-628-0
  102. Stoia D. I., Toth-Tașcău M., Drucean M., Rusu L.; *Modeling and Numerical Analysis of an implanted Cervical Functional Unit* Proceedings of 3rd IC-SCCE International Conference „From Scientific Computing to Computational Engineering”, Athens, Greece, 9-11 July 2008, organized by LFME-Laboratory of Fluid Mechanics and Energy Abstract Proceedings 409, 416; ISBN 978-960-530-098-2;
  103. Toth-Tașcău M., Drucean M., Rusu L., Igna C., Dascalu R., Sațău M.; *Mechanical Properties Evaluation Of Canine Bones Using Torsion And Bending Tests* Proceedings of 8th International Conference <sup>2</sup>Research and Development in Mechanical Industry<sup>2</sup> RaDMI 2008, 14 - 17. September 2008, Užice, Serbia, Ediție CD ISBN 978-86-83803-24-8 pp. 95-104; CD Proceedings; ISBN 978-86-83803-24-8;
  104. Toth-Tașcău M., Drucean M., Rusu G., Rusu L. *Quality Assurance Based On Interlaboratory Comparison in CIDUCOS Testing Laboratory*; Proceedings of 8th International Conference <sup>2</sup>Research and Development in Mechanical Industry<sup>2</sup> RaDMI 2008, 14 - 17. September 2008, Užice, Serbia, Ediție CD ISBN 978-86-83803-24-8 pp. 611-617; CD Proceedings; ISBN 978-86-83803-24-8;

## GRANTS / RESEARCH PROGRAMS

1. VEGA 16565/2005; FP6; UE, 135.000 Euro, Coordonator Universitatea Transilvania din Brasov, Parteneri IPA Stuttgart, ICCS Grecia, IAR SA Brasov, Siemens PSE SRL Brasov, IFMA Clermont-Ferrand Franta, ELECTROLUX Italia, Universitatea Da Coruna Spania, TNO Olanda, Berne University o fApplied Sciences Elvetia, University of Leeds Anglia, Canam Steel Romania, Universitatea Politecnica o fCartagena Spania, Autoliv Romania SA Brasov, ATTT aisbl Belgia, Heriot Watt University Edinburgh Anglia, Delft University of Technology Olanda, Universitatea Politehnica din Timisoara, Romania, Director UPT: Conf. dr. ing. Mircea Drucean;
2. *Development and implementation of performant rehabilitation and investigation systems for human spine deformation at school aged people and sedentary professional* CEEEX 88/2006 financer MEC, 2008 value: 920000 lei, partners: Universitatea "Politehnica" Timisoara (coord.), Spitalul Clinic Municipal de urgenta Timisoara (partener 1), Inspectoratul judetean Timis (partener 2), Clinica de recuperare medicina fizica si balneologie Timisoara (partener 3), director conf. Dr. Ing. Erwin-Christian Lovasz;
3. *Workplace ergoengineering – aplicatii in dental medicine*, PNCDI 2 nr. 91-022/2007 financer; CNMP 2008 value: 501.072 lei, partners: Universitatea "Politehnica" Timisoara (coord), Universitatea de Medicina si Farmacie "Victor Babes" Timisoara (P1), Asociatia Societatea Romana de Ergonomie Dentara Bucuresti (P2). SC RA-OL SRL Timisoara (P3), Universitatea "Ovidius" Constanta (P4);
4. *Intelligent CAD Methods used for customized design of bone system deficiency corrections*, 98GR/11.06.2008 CNCSIS cod 347 Grant CNCSIS; MEC – ANCS, 2008 value: 21.000 lei, director: prof.dr.ing. Arjana Davidescu;
5. *Functiona –constructive optimization of mobile quadruped robots*, GR98/11.06.2008, Tema 5, COD 132, 2008 Grant CNCSIS TD, 2008 value: 25.000 lei, director: drd. Ing. Steliana Vatau;
6. *Simulation, Control and Testing Platform with applications in mechatronics* – CONMEC 112

- 03/ 15.09.2006, CEEEX, CNMP Bucuresti 2008 value: 184600 lei, U Tehnica Cluj Napoca (CO), IPA Cluj Napoca (P1) , Universitatea "Babes Bolyai" Cluj (P3), director: prof.dr.ing. Valer Dolga;
7. *Complex mechatronic systems for medical systems* 72197 / 02/ 01.10.2008 Financer: CNMP Bucuresti, 2008 value: 0 lei, U Tehnica Cluj Napoca (CO) Univ. Transilvania Brasov (P1), director: prof. dr. ing. Valer Dolga;
  8. *Autonomous modular system for atmospheric condition on railways* 72169 / 02/ 01.10.2008 Financer: CNMP Bucuresti, 2008 value: 0 lei, INCDMF (CO) Academia de stiinte tehnice(P1), ICPE (P3), IRECSO (P4), director: prof. dr. ing. Valer Dolga;
  9. *Advanced pneumatic systems for precise in robotics in other industrial applications, based on the development of new types of proportional servo - distributors in mechatronic conception (SPASERVODIST)* 89 CEEEX – II 03-2006, CEEEX, CNMP 2008 value:138500 lei P1: Universitatea Politehnica Bucuresti (coordonator), P2: Universitatea POLITEHNICA din Timisoara, P3: Universitatea Tehnica din Cluj Napoca, P4: Institutul national cercetare dezvoltare pentru optoelectronica filiala institutul de cercetari pentru hidraulica si pneumatica, P5: Institutul National de Cercetare Dezvoltare Pentru Mecanica Fina, P6: Fabricatie Aparatura Stiintifica si Ecologica, director: prof.dr.ing. Inocentiu Maniu;
  10. *Development of an informatics platform for potential characterization of fine mechanics, Mechatronics and automation branches, regarding the increase of competitiveness and optimization of specific activities – development of a collaborative environment* IPCPMMA, 105 CEEEX /15.09.2006, CEEEX, CNMP 2008 value: 80000 lei, P1: Institutul Național de Cercetare-Dezvoltare pentru Mecanică Fină (Coordonator proiect), P2: Institutul Român de Cercetări Economico-Sociale și Sondaje, P3: Academia de Științe tehnice din România, P4: Comitetul Electrotehnic Român, P5: Universitatea „Politehnica” Timișoara, P6: Institutul de Proiectări pentru Automatizări Craiova, P7: Centrul de Cercetare-Dezvoltare pentru Mecatronică din Universitatea „Politehnica” București, P8: Institutul Național de Cercetare-Dezvoltare pentru Optoelectronică 2000; director: prof.dr.ing. Inocentiu Maniu;
  11. *Bioorthopedic inovative methods for articular reconstruction (BIOART)*, 70/2006 CEEEX, MEdC, value 2008: 120500 lei, Universitatea de Medicina si Farmacie Timisoara, director: conf.dr.ing. Mircea Dreucan;
  12. *Virtual Reality Colaborative Environment for orthopedical preoperatory planificatoiu – MERVI*; 114/2006, CEEEX ; MEdC, value 2008: 196.002 lei, Universitatea Transilvania Brasov, director: conf.dr.ing. Mircea Dreucan;
  13. *Technical assistance and consulting in pneumatic and hydraulic systems*, 657/22.01.2008, with SC TRW Automotive Safety Systems SRL Timisoara value for 2008: 3.200 lei, director: as. dr. ing. Ciupe Valentin, sef lucrari dr. ing. Grigorescu Sanda;
  14. *Kinematic and dinamic analiysis for mechanisms used in automotive*, 784/14.11.2007; S.C. Takata-Petri Romania S.R.L, value for 2008: 3.840 lei, director: sef lucr. dr. ing. Dan Margineanu, conf. dr. ing. Erwin-Christian Lovasz;
  15. *Advanced design in proEnginner – contract cadru – 655/16.04.2007 cu 8 anexe*, Continental utomotive Romanian SRL, value for 2008: 22.400 lei, director: conf. dr. ing. Sticlaru Carmen.

#### 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
5. Uruioc Constantin: *Information System for Efficient Knowledge Transfer*, scientific supervisor: Prof.dr.eng. George Savii
6. Penteliuc-Cotosman Dumitru: *Information System for Distance Learning*, scientific supervisor: Prof.dr.eng. George Savii
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;
12. Olaru Mihai, *Contributions concerning risk improvement stabilization in traffic safety*, scientific supervisor: prof. dr. eng. Lucian Mădăras;
13. Marinca Petru, *Contributions concerning functional and constructional development of direction and brake mechanisms for vehicles*, scientific supervisor: prof. dr. eng. Lucian Mădăras;
14. Zăbavă Eugen Sever, *Contributions to synthesis of cam mechanisms with tangential follower*, scientific supervisor: prof. dr. eng. Dan Perju;
15. Moldovan Cristian, *Study of centroidal type mechanisms*, scientific supervisor: prof. dr. eng. Dan Perju;
16. Margineanu Eugenia, *Study of the influence of elasticity and hardness upon abrasive wear*, scientific supervisor: prof. dr. eng. Dan Perju;
17. Lovasz Agneta, *Electronic mechanism library*, scientific supervisor: prof. dr. eng. Dan Perju;
18. Teodorescu Adriana, *Contribution to modelling, simulation and testing of mechatronics systems*, scientific supervisor: prof. dr. eng. Dan Perju;
19. Nicolaie Costel, *Contribution to improve the orthopedic corsets*, scientific supervisor: prof. dr. ing. Arjana Davidescu;
20. Voinescu Mihai, with scholarship, first year, *Contribution to improve the the inferior member prosthesis*, scientific supervisor: prof. dr. ing. Arjana Davidescu;
21. Mazuch Robert, without scholarship, first year, scientific supervisor: prof. dr. ing. Arjana Davidescu;
22. Semenescu Florin, without scholarship, first year, scientific supervisor: prof. dr. ing. Arjana Davidescu;
23. Bitea Alin, with scholarship, first year, scientific supervisor: prof. dr. ing. Valer Dolga;
24. Tilneac Mihaela, with scholarship, first year, scientific supervisor: prof. dr. ing. Valer Dolga;
25. Ciontos Ovidiu, with scholarship, first year, scientific supervisor: prof. dr. ing. Valer Dolga;
26. Vancu Alexandru, without scholarship, first year, scientific supervisor: prof. dr. ing. Valer Dolga;
27. Pasca Gheorghe, with scholarship, first year *Modelarea si simularea sistemelor de fabricatie flexibile robotizate*, scientific supervisor: prof. dr. ing. Inocentiu Maniu;
28. Voicu Mariana Claudia, without scholarship, first year, *Active damping of the flexible rolls from paper fabrication*, scientific supervisor: prof. dr. ing. Inocentiu Maniu;
29. Bistriana Diana Alina, without scholarship, first year, *Numerical analyse of the stability of vortex flow*, scientific supervisor: prof. dr.ing. George Savii;
30. Chis Violeta, without scholarship, *Contributions to optimisation of energetical network connections*, scientific supervisor: prof. dr.ing. George Savii;

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TRANSPORTATION AND POLLUTION CONTROL**

**GENERAL PRESENTATION**

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

- Thermal machines and equipment
- Environmental protection
- Transport vehicles

The research team includes the members of the founding chairs:

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

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

**CONTACT**

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**MISSION**

- To promote its main expertise fields, by means of research projects & university curricula, by fundamental & applied, industrial, lab scaled & numerical simulations research, by offering expertise & consultancy, by performing educational activities at undergraduate &

graduate level, doctoral training, and post-university or expert training;

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

**Researches in 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. Contract CEEEX 108/ 10.10 2005 (EmSHIPs) : *“Research regarding the control assessment systems emissions produced by naval transportation devices. phase 2: Emission modelling and emissions analysis.* Director: Lect. Dr.eng Gelu Padure, Prof.dr.ing. Ioana Ionel, value: 24520 RON
2. *Integral system for determination of laser welding of polymer materials with control in real time,* Contr.UPT nr. 71-088/2007-2010, POLYWELDSYS, Director: Holotescu Sorin, Valoare: 210092 RON.
3. PN II MEC – ANCS *The possibilities and limitations of the ecologisation of urban traffic by using fuels obtained from vegetable oils,*

X1C01/2005 CEEEX MEC – ANCS, Director: Mihon Liviu, Valoare: 11000 RON.

4. *Development of the technical abilities of soft skills type at SC KLEMAT SRL Timisoara*, 017-553.04.02 PHARE MEC – ANCS, Director Mihon Liviu, Valoare: 450 EUR.

### PUBLICATIONS

#### BOOKS

1. Sorin RATIU, Liviu MIHON, *Internal Combustion Engines for road vehicles, process and performances*, MIRTON-TIMISOARA NATIONALA, pp. 278, ISBN 978-973-52-0314-6.
2. Nicolae BURNETE, s.a., Liviu MIHON, *Diesel Engines and bio-fuels for urban transportation*, MEDIAMIRA-CLUJ-NAPOCA NATIONALA, pp. 1054, ISBN 978-973-713-217-8.
3. V. Stoica, S. Holotescu, *Engine and vehicles, students book*, Editura Politehnica Timisoara nationala/recunoscuta CNCISIS, pp. 100.

#### PUBLISHED PAPERS

1. Tokar A., Negoitescu A. S., Ostoia D., Hamat C., *Local Heat and Mass Transfer on the Combustion Chamber Wall of the Diesel Engine*, Scientific Bulletin of the “Politehnica” University of Timisoara, Transactions on Mechanics 53(67), Fasc. 2, 4 pp, 2008.
2. Tokar A. Negoitescu A. S., Ostoia D. , *The Influence Oil Lubrication of the Piston-Cylinder Dynamic*, Analele Universității” Eftimie Murgu”, , ANUL XV, Reșița, 2008, Ed. “Eftimie Murgu”, Engineering fasc. 7pp.
3. Negoitescu A. S., Nagi M., Tokar A., Ostoia D., *The Diesel Power Station as a Socio-Political and Technical Challenge*, Scientific Bulletin of the “Politehnica” University of Timisoara, Transactions on Mechanics, Tom 53(67), Fasc. S2, 4 pp 2008.
4. Ostoia D., Mihon L., Tokar A., Negoitescu A. S., *Studies regarding the Truck Accident Causation in European Union*, Scientific Bulletin of the “Politehnica” University of Timisoara, Transactions on Mechanics, Editura Politehnica Tom 53(67), Fasc. S2, 4 pp, 2008.
5. Ostoia D., Negrea V.D., Tokar A., Negoitescu A. S., *Research Regarding the Work Conditions and the Behaviour in Time of the Diesel Engine Piston Rings*, CONGRESS “MVM 2008”, Kragujevac, Serbia International Congress Motor Vehicles and Motors 7 pp.
6. Mihon L., Ostoia Daniel, *The Dynamic Behavior of road vehicle* , Second International Congress Automotive, Safety and Environment Craiova, SMAT 08, pp. 4.

7. V.D.Negrea, G.Pădure, I.Negrea, G.Dragomir, F. Blaga, *Optimisation of a two stroke naval diesel engine uniflow scavenged using fuzzy functions*, TEHNONAV 2008 - The 6th edition of the international conference on naval and mechanical engineering – New technologies for future clean mobility and environment, Constanța, 22-24.05.2008 Vol. 1 pp. 6.
8. Liviu Mihon, Doina Mihon, *Exhaust gases tests on dynos*, TEHNONAV 2008, Ovidius University Annals of Mechanical, Industrial and Maritime Engineering, Volume X, Tom I, 2008.
9. Liviu Mihon, Daniel Ostoia, *The Dynamic Behavior of Road Vehicle*, SMAT 2008 - International Congress Automotive, Safety and Environment – Craiova, Tom I pp. 125.
10. Liviu MIHON, Doina MIHON, *Emission's Control for Vehicles*, SMAT 2008 - International Congress Automotive, Safety and Environment – Craiova Tom II pp. 417.

#### PhD THESIS

1. Eng. George DRAGOMIR: *Researches regarding the constructive and operational improvement of a road vehicle internal combustion engine, in correlation with the process of construction and the adjustment to the road conditions and pollution control*, PhD supervisor: Prof.dr.eng. Virgiliu Dan Negrea
2. Eng. Virgil STOICA: *Studies regarding the vaporization of hydrocarbons*, PhD supervisor: Prof.dr.eng. Virgiliu Dan Negrea
3. Mariana Dora FORTOFOI: *Researches regarding the systemic-cybernetic approach of the traffic on public roads, in correlation with the civil, criminal and administrative responsibility*, PhD supervisor: Prof.dr.eng. Virgiliu Dan Negrea

### 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. Virgiliu Dan Negrea

4. Eng. Sandu IONESCU: *Studies and researches regarding the heat transfer enhancement in heat exchangers with discontinuous fins*
5. Eng. Liviu Mircea POINARIU: *Studies and researches regarding the conditions and accuracy of measurement of the performance parameters for electronically controlled spark-ignition engines*

6. Eng. Cristian Dumitru BOZAN: *Researches regarding the performance control level for a supercharged diesel engine by the improvement of intermediate cooler constructive and operational characteristics*
7. Eng. Adela FILIP: *Studies and researches regarding the improvement of thermo-mechanical performances of components made by sinterization from atomic clusters with application to internal combustion engines*
8. Eng. Radu THUMA BRANZEAZU: *Contributions regarding the pollutants control for very high pressure direct injection diesel engine*
9. Eng. Radu MARIAN: *Researches regarding the low power diesel engines performances with the use of double injection*
10. Eng. Ferencz VOLLONCS: *Researches regarding the effects of the fittings made between technical inspections on the technical and operational performances and the level of pollutants of urban road vehicles*
11. Eng. Narcis Petru URICANU: *Studies and researches regarding the level of pollutants measured at the cars technical inspection, as a function of their type, duration and conditions of operation*
12. Eng. Radu Iuliu COVACI: *Researches regarding the constructive and operational optimisation of a diesel engine from the point of view of the energetic and pollution performances*
13. Eng. Florian Călin NEGRUTIU: *Contributions regarding the pollutants evaluation in connection with the conditions of operation for heavy vehicles equipped with high pressure direct injection diesel engines*
14. Eng. Adriana TOKAR: *Researches regarding the interaction between the automobile equipped with internal combustion engine and the environment*
15. Alexandra Ana GARBONI: *Researches regarding the implications of harmful factors on the environment quality in the western part of Romania*
16. Lucian Ioan RAFAN: *The phenomenon accident in correlation with the environment protection*
17. Eng. Silviu Vasile PONORAN: *Road traffic and environmental pollution*

*PhD Supervisor: Prof.dr.eng. Daniel IORGA*

1. Cristian NEGHINA: *Contributions regarding the optimization of the methods and techniques used to raise the quality level in the*

*criminological activities through the thermo-mechanical control of ballistics*

2. 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*
3. 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*
4. Eng. Daniel PICIOREA: *Contributions to the adjustment of an injection system to use unconventional liquid fuels for a direct injection diesel engine*
5. Eng. Ludovic BAKOS: *Contributions to the analysis of the causes and effects of the road accidents from Arad county and methods of limiting it*
6. Eng. Adrian IRIMESCU: *Mechanical Engineering*

#### RESEARCH TEAM

- Prof. dr.eng. Virgiliu Dan NEGREA
- Prof. dr.eng. Daniel IORGA
- Prof. dr.eng. Traian RAICA
- Assoc.prof.dr.eng. Liviu MIHON
- Lect. dr.eng. Andrei FERENCZ
- 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,
- Eng. L.S. PETRUȚESC-BOARU, PhD student
- Eng. Adriana TOKAR, PhD student
- Eng. Ileana NEGREA, PhD student
- Eng. Adrian IRIMESCU, PhD student

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**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, SO<sub>2</sub>, NO<sub>x</sub>, C<sub>m</sub>H<sub>n</sub>, VOC 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, Cal3qhr
- 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 CO<sub>2</sub> capture

### RESULTS

#### RESEARCH PROJECTS / CONTRACTS

1. *GREENENERGY (Energy optimisation in European greenhouses)*, Proposal NB 012566-2, Contract COLL CT 2005 012566, FP6 ComisiaEuropeana, FP6, Valoare: 48.295 EURO, Director: Ioana Ionel.
2. *Neighbourhood program Romania – Serbia 2002-2008*, Phare project, “Banat regions’ sustainable development academic camp”, 06SER02/03/006, Coordinator: Ioana Ionel
3. *Experimental study regarding the esterification of waste fats and the impact of using the resulted biocombustible on the quality of air in urban environment, with application in the Timisoara city*; 98GR/11.06.2008, Tema 1, cod 59, AT CNCSIS, Director: Gruescu Vasile. Value: 23.000 RON.
4. *Theoretic and experimental study regarding the manufacturing of a semiautomated equipment for making biodiesel from waste animal and vegetal origin fats*, 1427/24.03.2006, Modul II, cod 4, CEEEX - P-RES, CNCSIS. Director: Gruescu Vasile. Value: 6.900 RON.
5. *Energy optimisation in European greenhouses*, Contractul no 89/2006 CORINT CNMP. Director: Ioana Ionel. Value: 47.000 RON.
6. *OVAPED-Optimization of the energetical capitalization of the waste in order to obtain the clean energy from Romanian industrial facilities*, Nr. inreg. UPT 10247/05.09.2006, Contract CEEEX No. 28, Excelenta CEEEX, MEdC, Director: Ioana Ionel, Value: 79.000.
7. *TOP-Optical detection of the planetar boundary layer*, Contract 9064/20.07.2006, Nr UPT 734/2006, Excelenta CEEEX, MEdC. Director: Ioana Ionel, Value: 178.000.
8. *ROLINET-Romanian Network of LIDAR Systems 31 – 002 / 14.09.2007*, Parteneriate II, MEdC. Director: Ioana Ionel, Value: 6.240 RON.
9. *EPOC – Energy for clean city*, Contract gen 22131/2008, Parteneriate II MEdC, Director: Ioana Ionel, Value: 43.900 RON.



10. *Research in environmental protection, Analysis of air quality in Timisoara, CO2 measurements* 1235/03.04.2008 Primăria Timișoara, Value: 33000 lei, Director: Popescu Francisc.
11. *Sampling methods for on-line analysis of the concentrations of the solid and gaseous pollutants at COCA-COLA HBC România, location Timișoara*, 136/26.09.2008 COCA-COLA HBC România, Value: 1.000 euro, Director: Padure Gelu.
12. *Measurements of the gaseous and solid concentrations, six samples*, 155/27.10.2008 SC DETERGENȚI SA, SC Detergents Procter & Gamble SA Timisoara, Value: 900 euro, Director: Ioana Ionel
13. *Thermal and chemical measurements for the determination of COV gaseous emissions at the exhaustion stack of the thermal regenerative equipment in the adhesive application hall, PM10 la locația Caransebeș*, 156/27.10.2008 SC TMD FRICTION SRL, Valoare: 600 euro, Director: Ioana Ionel.
14. *Emissions analyses at 4 stacks*, 1/3.09.08 la ctr. 700/02.07.07 SC BERG BANAT SRL, Value: 2170.56 RON, Director: Ioana Ionel.
15. *Specific methods for evaluation of the gas and solid emission*, 1234/01.04.2008 SC DRUMURI MUNICIPALE SA Timișoara, Value: 2.607,73 RON, Director: Ioana Ionel.
16. *Thermotechnical measurements to determin the impact of the asphaltic mixtures station on the air in Chișinău Criș*, ctr. 779/02.11.2007, SC ADP GRUP COLAS, Value: 1.313,76, Director: Ioana Ionel.
17. *Thermotechnical measurements for the thermal balance sheet for three thermal power stations in Sannicolaul Mare*, S.C. GOSAN SRL, Sanicolaul Mare, Contract Nr. BC/179, 08.12.2008, Value: 3.037 euro, Director: Oprisa Paul Dan.
18. *Thermotechnical measurements for the roast gas analysis at the burning tank ERESAN*, 1230/02.10.2006 SC CELROM Drobeta Turnu Severin, Act additional Nr 1/2008 Sc CELROM SA Drobeta Turnu Severin, Value: 3.118,58 RON, Director: Ionel Ioana.
19. *Thermotechnical measurements of the flue gases analysis from boiler 420 t/h*, Nr 1215/15.12.2003/CET Arad, Act additional Nr 4/2008 CET Arad, Value: 4.960,86 RON, Director: Ionel Ioana.
20. *Measurements of the gaseous and solid concentrations at two channels of the 420 t/h Nr 1, 2 si 3 din CET Halanga, RAAN Drobeta Turnu Severin* Contr. 1207/2003, Act additional Nr 8/2008, Value: 52.338,08 RON, Director: Ionel Ioana.
21. *Thermotechnical and chemical measurements for the credit of the unit*, Nr. 792 din 28.11.2007 SC ACVACALOR SA BRAD, Sediul Gura Barza, Value: 22.550 RON, Director: Ionel Ioana.

### BOOKS

1. Francisc Popescu, Ioana Ionel, *Alternative fuels. Biodiesel, speciality treaty*, Politehnica Publishing House Timisoara, Romania, 200, ISBN 978-973-625-726-1.
2. Francisc Popescu, Ioana Ionel, *Management of the air quality and environmental protection*, students book, Politehnica Publishing House Timisoara, Romania, 264, ISBN 978-973-625-727-8.
3. Corneliu Ungureanu, Ioana Ionel, P.D. Oprea-Stănescu, Francisc Popescu, *Combustion facilities. Design basis, monography*, Politehnica Publishing House Timisoara, Romania, 216, ISBN 978-973-625-735-3.
4. Trif Tordai Gavrilă, *Research on combine combustion of biofuels and coal*, PhD thesis, Politehnica Publishing House Timisoara, Romania, pp. 222, 2008, ISBN 978-973-625-713-1.
5. Laurențiu Călin, *Optimization of the dry process of cereals*, PhD thesis, Politehnica Publishing House Timisoara, Romania, 2008, UPT PhD thesis, Series 8, Nr. 10, , pp. 260, ISBN 1842-8967.
6. Lontis Nicolae, *Researches regarding the biodiesel as renewable fuel for small energy groups*, PhD thesis Politehnica Publishing House Timisoara, Romania, 2008, Seria 9, Nr. 11, pp. 304, ISBN 1842-4937.
7. Eng. Adina CÎRTOG: *Heat transport device with phase change, using one way parallel tubes*, PhD thesis, Politehnica Publishing House Timisoara, Romania.
8. Eng. Nicolae GIORGI: *Theoretical and experimental researches regarding the elaboration of the environment surveys for Tg. Jiu city*, PhD thesis Politehnica Publishing House Timisoara, Romania.
9. Liliana VÎLCEANU, *Contributions to managing industrial waste in the frame of the sustainable development of Gorj county*, PhD thesis Politehnica Publishing House Timisoara, Romania
10. Daniela GHERGHEL, *Contribution to prosthetic recovery of the mechanical functions of the human superior parts*, PhD thesis

Politehnica Publishing House Timisoara, Romania

11. Eng. Diana SILAGHI: *Researches regarding the utilization of solar energy*, PhD thesis Politehnica Publishing House Timisoara, Romania

#### PUBLISHED PAPERS

1. Ioana Ionel, S. Ionel, F. Popescu, G. Pădure, Luisa Dungan, D. Bisorca, *method for determination of an emission factor for a surface source*, Journal of Optoelectronics and Advanced Materials-rapid communications, Vol. 2, Nr. 12, 2008 pp. 851-854.
2. Ioana Ionel, Sabin Ionel, Francisc Popescu, Gelu Padure, Luisa Isabel Dungan, Daniel Bisorca, *Method for determination of an emission factor for a surface source*, JOAM Rapid Communications JOAM-RC, Vol. 2, Nr. 12, 2008 pp. 851-854.
3. Francisc Popescu, *Advantages in the use of biodiesel in an urban fleet. Case study: major crossroads in Timisoara city*, Journal of Environmental Protection and Ecology, 1150/26.07.06, book 4, vol. 9, 2008.
4. Adrian – Eugen Cioablă, Ioana Ionel, Jadaneant M., Francisc P., Dungan L., Trif G.T., Savu A., *Preliminary results concerning the characteristic parameters in the process of biogas production*, Scientific Bulletin of the “Politehnica” University of Timisoara, Transactions on Mechanics, Tom 53 (67), Fascicola 2 pp. 293 – 296.
5. Laurentiu Călin, Lontis N., Jadaneant M., Cioabla A., Irimescu A., *Consideration sur l'echange de chaleur et de masse pendant le stockage des cereals*, Scientific Bulletin of the “Politehnica” University of Timisoara, Transactions on Mechanics, Tom 53 (67), Fascicola 2 pp. 293 – 296.
6. Ionel Ioana, Trif Tordai Gavril, Corneliu Ungureanu, Francisc Popescu, Adrian Tenchea, Nicolae Lontis, *Experimental approach concenring a clean combustion technology of waste biomass*, Scientific Bulletin of the “Politehnica” University of Timisoara, Transactions on Mechanics, Tom 53 (67) Special issue 2008, pp 485-492.
7. Lontis Nicolae, Ionel Ioana, Francisc Popescu, Gelu Padure, *Alternative fuels. The energy of the future*, Scientific Bulletin of the “Politehnica” University of Timisoara, Transactions on Mechanics, Tom 53 (67) Special issue 2008, ISSN 1224-6077, pp 493-498.
8. G Schories L Lopez, H Marees, H Petz, M Sadowski, Ionel Ioana D Cebrucean, *Investigation on energy savings potential in pot plant greenhouses*, Scientific Bulletin of the “Politehnica” University of Timisoara, Transactions on Mechanics, Tom 53 (67) Special issue 2008, ISSN 1224-6077, Edit Politehnica Timisoara, pp 545-549.
9. Adrian Cioabla, Ioana Ionel, Mihai Jadaneant, Francisc Popescu, Alex. Savu, *State of art on biogas from biomass residues at the Unconventional energy lab at UPT*, Scientific Bulletin of the “Politehnica” University of Timisoara, Transactions on Mechanics, Tomul 52 (66) Fac 7, 2008, pp 235-240.
10. Ionel Ioana, Corneliu Ungureanu, Nicolae Lontis, *Biodiesel used in Timisoara’s public transportation*, Scientific Bulletin of the “Politehnica” University of Timisoara, Transactions on Mechanics, Tomul 52 (66) Fac 7, 2008, ISSN 1224-6077, pp 246—241.
11. Diana Silaghi, Ioana Ionel, *The night time temperature variation in a solar thermal system*, Scientific Bulletin of the “Politehnica” University of Timisoara, Transactions on Mechanics, Tom 53 fasc S2, 2008, Editor sef E Mocuta, pp 301-304.
12. Adrian Cioabla, Ioana Ionel, Mihai Jadaneant, Francisc Popescu, Luisa-Izabel Dungan, Gavril Trif Tordai, Alex. Savu, *Preliminary results concerning the characteristic parametrers in the process of biogas production*, Buletin Stiintific, Transaction of Mechanics Tom 53 fasc S2, 2008, Editor sef E Mocuta , pp. 293-296.
13. Ioana Ionel, Francisc Popescu, D.I. Iancului, L. I. Dungan, G-V Ursu-Neamț, *Experimental research concerning the air quality in the industrial urban area of Timisoara*, Buletinul AGIR anul XIII, nr. 1-2, ianuarie – iunie 2008, pp. 182 – 192.
14. Cioablă A., Ionel I., Jădăneant M., Tenchea A., Popescu Fr., Savu A, *Preliminary data regarding the production of biogas from agricultural residues*, 4-eme edition du Colloque Frabcophone en Energie, Environnement, Economie et Thermodyna-mique, 11-13 Juin 2008, Ecole des Mines de Nantes, Vol 1, 5 pp.
15. Adrian – Eugen Cioablă, Ionel I., Jadaneant M., Savu A., *Study regarding the production of biogas using biomass resulting from agricultural residues at the at Politehnica University of Timisoara*, 21st Conference on Industrial Processes, Subotica (Serbia) 4-6 iunie 2008, CD 200-205.
16. Ioana Ionel, Francisc P., Cioabla A., Trif-Tordai G., Cebrucean D., Savu A.,

- Experimental results concerning the biogas support and CO<sub>2</sub> capture*, Proceedings of the 16th European Biomass Conference & Exhibition, Feria Valencia, CD 156-165.
17. Ioana Ionel, Gavril Trif-Tordai, Corneliu Ungureanu, Francisc Popescu, Nicolae Lontis, *Results concerning a clean co-combustion technology of waste biomass with fossil fuel, in a pilot fluidised bed combustion facility*, Colloque Francophone en Energie, Environnement, Economie et Thermodynamique, COFRET '08, Franta, pag. 250-261.
  18. Ioana Ionel, Fr Popescu, P Sturm, Catinca Golesteanu, Dungan Luisa Izabel, *Two cities different results, same Europe, Facts concerning air quality monitoring*, 17th International Symposium „Transport and Air Pollution“ on June 16-17, 2008, VKM Mitteilungen TUGraz, Publisher H Eichlseder, Heft/Volume 91, 2008, pp. 256-269.
  19. Ionel Ioana Gavril Trif Tordai Corneliu Ungureanu Fr Popescu Nicolae Lontis, *Results concerning a clean Co-combustion technology of waste biomass with fossil fuel, in a pilot fluidised bed combustion facility*, 40. Kraftwerkstechnisches Kolloquium 2008, 14-15 Oct, Tagungsband, Vol 2, TUDresden, Technische Univ Dresden, Institut fuer Energietechnik, P45-pp. 368-377.
  20. Ioana Ionel, Liliana Badea, *Experimental and numerical results concerning the co-combustion of waste in a fluidised bed*, The 32nd ARA Congress, Boston, 2008, July 22-26,, Wentworth Institute of Technology, Boston, MA, USA, ARA 32 Proceedings, Scientific Editor M Simion, Ilie Talpasanu, Polytechnical International Press, Montreal, Quebec, 2008, Ecole Polytechnique de Montreal, pp. 111-115.
  21. A Cioabla, Ionel Ioana, M Jadaneant, A Tenchea, Popescu Fr., Savu Alex, *Preliminary data concerning biogas production from agricultural residues*, 4-eme edition du Colloque Francophone en Energie, Environnement, Economie et Thermodynamique COFRET'08, 11 – 13 June 2008, Nantes – France, Section Nouvelle Resources, COFRET08 CD-Proceedings, pp 1-8, Paper NR5.
  22. Ionel Ioana, Dumitru Cebrucean, Francisc Popescu, Viorica Cebrucean Harea, Luisa Dungan, Gelu Padure, *Removal of carbon dioxide from flue gases with an aqueous solution of monoethanolamine*, 4-eme edition du Colloque Francophone en Energie, Environnement, Economie et Thermodynamique COFRET'08, 11 – 13 June 2008, Nantes – France, Section Nouvelle Resources, pp 1-8, Paper NR6.
  23. Ionel Ioana Popescu Francisc, Trif Tordai Gavril, Cebrucean D-tru, Cioabla Adrian, Constantin Carmencita, Savu Alex., *Experimental results concerning the CO<sub>2</sub> combustion of biomass in a stationary fluidised bed pilot, with biogas support and CO<sub>2</sub> capture*, Valencia, 16-th European Biomass Conference, 2-6 June, Valencia, pp 1342, paper VP2.4.23,
  24. Ioana Ionel, Sabin Ionel, Francisc Popescu, Gelu Pădure, Luisa Dungan, Daniel Bisorca, *Method for determination of an emission factor for a surface source*, INDLAS 2008 – 2nd Indlas International Conference, Bran, 20-23.05.2008, Vol. 1.
  25. Camelia Talianu Doina Nicolae, Livio Belegante, Cristina Raicu, Francisc Popescu, Cecilia Roman, *Optical Remote Sensing for Investigations of Urban Planetary Boundary Layer Pollution - Objectives And Results* Conferința Națională de Fizică CNF 2008, pp. 110-116.
  26. Livio Belegante, Francisc Popescu, Cristina Raicu, Cristian Necula, Maria Tandrau, Cecilia Roman, *Urban PBL Pollution using Remote and In-situ Instruments*, Conferința Națională de Fizică CNF 2008, pp. 245-251.
  27. Ionel Ioana, Popescu Fr, Trif Tordai G., Tenchea A, Dungan Luisa Padure G, Cebrucean Dumitru, Savu Alex., *Low CO<sub>2</sub> emission combustion technology by using waste biomass and flue gas cleaning*, CEEX Conference 2008, Excellence Research a way to innovation., Conference Proceedings, Vol 3, section Energy, editat Nicolae Vasiliu Lanyi Szabolcs, Editura Tehnica, 2008 pp. 282-1/282-6.

#### PhD THESIS

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

1. Eng. Adina CÎRTOG: *Heat transport device with phase change, using one way parallel tubes*
2. Eng. Nicolae GIORGI: *Theoretical and experimental researches regarding the elaboration of the environment surveys for Tg. Jiu city*
3. Liliana VÎLCEANU, Contributions to managing industrial waste in the frame of the sustainable development of Gorj county.
4. Daniela GHERGHEL, Contribution to prosthetic recovery of the mechanical functions of the human superior parts.

5. Eng. Gavrilă TRIF-TORDAI: *Researches regarding the combined burning of combustible wastes with low quality coal*
6. Eng. Diana SILAGHI: *Researches regarding the utilization of solar energy*
7. Eng. Nicolae Stelian LONTIȘ: *Mechanical Engineering (Researches regarding the biodiesel as renewable fuel for small energy groups)*

*PhD supervisor: Prof.dr.eng. Corneliu Ungureanu*

1. Eng. Ina Liliana VODISLAV (BLIDEA): *Contributions regarding the ecological utilization of the rubber waste*
2. Eng. Adrian Iulian TENCHEA: *Contributions regarding the research of the biomass combustion in fluidized bed*

### PHD STUDENTS

*PhD supervisor: Prof.dr.eng. Corneliu Ungureanu*

1. Eng. Alexandru Anghel C. GHENEA: *Contributions to the study of efficiency measures regarding the durable development of Ișalnița Power Plant*
2. Eng. Florica TUDOR: *Contributions regarding the diminution of environmental pollution due to the ash produced at the lignite combustion at Turceni Power Plant*
3. Eng. Marius MARIN: *Contributions regarding the diminution of environmental pollution due to gaseous pollutants produced due to the lignite combustion at Turceni Power Plant*
4. Eng. Vasile GRUESCU: *Contributions regarding the energy-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. Adrian MAGDA: *Thermal and gasodynamic optimization study for the processes in the steam boilers, in view of*

*reduction the fuel consumption and the level of pollutants*

2. Eng. Lucia VARGA: *Studies and researches regarding the air quality in Bihor county*
3. Eng. Aristica BABUCEA: *Studies and researches regarding the evaluation of dispersion of pollutant resulted from the combustion process in industrial thermal installations existing in Gorj county*
4. 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*
5. Eng. Adrian GOANȚĂ: *Theoretical and experimental researches regarding the thermal and gasodynamic processes from the combustion chambers*
6. Eng. Dan Simion STEPAN: *Researches regarding the reduction of vibrations, noise in transportation /railway vehicles*
7. Eng. Cebrucean Dumitru, *Theoretical and experimental studies of the CO<sub>2</sub> capture from the flue gases from the stationary facilities*
8. Eng. Balog Ramon, *NO<sub>x</sub> reduction applied to diesel engines with co-combustion from railway vehicles.*
9. Eng. Veters Ioan, *Atmospherically investigations with Lidar systems.*
10. Eng. Cioabla Adrian, *The biogas production from waste biomass.*
11. Apostol Gabriel, *Theoretical and experimental studies on air quality of the airport Traian Vuia Timisoara.*
12. Rosca Ciprian, *Ecological aspect of the transportation and sustainable development.*
13. Badescu Dorel, *Impact of the scheme EU ETS on Romanian industrial sector.*
14. Tomescu Claudia, *Implementation of the pollution legislation upon the energy production of Romania.*

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

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

### ACTIVITIES

- researches regarding the optimization of heat exchangers
- theoretical studies concerning the heat transfer enhancement by means of numerical simulations
- researches regarding the mechanism of multi-phase heat transfer control by applying a magnetic field to a magnetizable nanofluid
- theoretical studies concerning the behaviour thermodynamic systems by molecular dynamics and Monte Carlo simulations

- electronic equipment cooling
- optimization of urban thermal networks
- Numerical modeling in heat transfer
- Micro- and nano-scale heat transfer and fluid flow

### RESULTS

#### RESEARCH CONTRACTS

1. *Integral systems for risk management of the industrial facilities*, 22-099/2008, PN II Ministerul Educatiei si Cercetarii, Director: Ioan Laza, Valoare: 30.000 RON.
2. *Polymer nanostructure and nano-composites*, Contr.UPT nr. 12811/ 08.10.2006, Act ad. 1/2008, CEEC MEC – ANCS, Director: Stoian Floriana, Valoare: 122.000 RON.
3. *Energy balance 2163 / 21.03.2008 S.C. COCA – COLA HBC S.R.L. S.C. COCA – COLA HBC S.R.L.*, Valoare: 3630,22, Director: Ioan Laza.
4. *Study on industrial combustion gases, r combustibile*, 3/22,01,2008 S.C SISTEMGAS TIMISOARA, Valoare: 2.380 RON, Director: Nagi Mihai.
5. *Risk study management at GPL SISTEMGAS*, 71/05,05,2008 S.C SISTEMGAS SRL TIMISOARA, Valoare: 2.975 RON, Director: Nagi Mihai.

#### BOOKS

1. Lelea D., Laza I., Mihon L., Nagi M., Oprisa P.D., Stoian F., Ionel I., Jadaneant M., *Basis of thermo-energetics, treaty*, Editura Orizonturi Universitare, CNCSIS 294 ISBN 978-973-638-378-6.
2. Laza I., Lelea D., Mihon L., Nagi M., Oprisa P.D., Stoian F., Ionel I., Jadaneant M., *Thermal and energy balances, treaty*, Editura Orizonturi Universitare, CNCSIS, 208, ISBN 978-973-638-380-9.
3. Laza I., Lelea D., Mihon L., Nagi M., Oprisa P.D., Stoian F., *Installations and equipments in thermal industry, treaty*, Editura Orizonturi Universitare Editura nationala, CNCSIS, 132, ISBN 978-973-638-175-7.
4. Jădăneant M., Vătău D., Laza I., Borlea I., *Efficiency and energy utilisation*, ediția 2-a, manual pt studii postuniversitare, Orizonturi Universitare Timisoara Edit. Națională recunoscută CNCSIS, 196, ISBN 978-973-638-369-4.
5. Plesa, A., Grieb C., Nagi, M., *Thermal equipment. Vol I. Plate heat axchangers*,

*Students book*, MEDIAMIRA, Cluj-Napoca, nat 162, ISBN 978-973-713-210-9.

#### PUBLISHED PAPERS

1. F.D. Stoian, S. Holotescu, V. Stoica, D. Bica, L. Vekas, *Comparative study of convective heat transfer in water and water based magnetizable nanofluid for thermal applications*, Journal of Optoelectronics and Advanced Materials, Vol. 10(4).
2. Vartolomei Mihaiel, Jădăneant Mihai, Vartolomei Mihaela, Popescu Mihaela, Drăghia M., *Quality and Cost Improvement in Specific Vehicles Manufacturing*, Annals of DAAAM for 2008 & Proceedings of the 19th International DAAAM Symposium, Vienna 2008, 723, 2 pp.
3. Ioan LAZA, Adrian Eugen CIOABLĂ, *Study regarding the reduction of the energetic consumption for the compressed air networks*, Journal of Environmental Protection and Ecology, 7 pp.
4. M. Nagi P., Ilies, A.S. Negoitescu, *The determination of the optimal circulation fluids speeds through the heat Exchangers*, DAAAM International, VIENA, AUSTRIA.2008, 0943-0944.
5. Negoitescu A. S. Nagi M. Ostoia D. *Experimental Researches on the Thermal Transfer of fluids Flowing through ALCO 18 Oil Cooler*, Proceedings of the 6th International Conference of DAAAM Baltic "INDUSTRIAL ENGINEERING", pp. 111-117, 6 pp, 2008.
6. Ostoia D. Negoitescu A. S. Tokar A., *The Determination of the Optimal Circulation Fluids Speeds through the Heat Exchangers* Proceedings of the 19th DAAAM International Symposium, Intelligent Manufacturing & Automation: Focus on Next Generation of Intelligent Systems and Solutions, 22-25th, Trnava, Slovakia, pp. 0999-1001, 2008.
7. Dorin Lelea, *The Thermodynamic Analysis of the Swirl Flow Applied to Micro-Heat Sink*, The Open Thermodynamics Journal, Bentham Science Publishers, Vol 2, pp.66-70 (5), 2008.
8. F.D. Stoian, *Magnetizable nanofluids: progresses and prospects on their use in thermal applications (invited lecture)*, Thermophysical properties 29 (The 29th Japan Symposium 2008), Vol. 29, pp. 300 2008.
9. S. Holotescu, F.D. Stoian, *A study of the influence of filler dimensional distribution on the polymer composite effective thermal conductivity*, Thermophysical properties 29 (The 29th Japan Symposium 2008) Vol. 29, pp. 318.
10. Vartolomei Mihaiel Draghici A, Jadaneant Mihai, Vartolomei Mihaela, *Management of energy sources in eco-efficiency and sustainable development conditions*, Annals of the Oradea University. Fascicle of Management and Technological Engineering, Vol. VII (XVII), P.480/485.
11. Calin Laurentiu, Jadaneant Mihai, Irimescu Adrian, *Reduction of nitrate concentration in waste water discarded by the beer industry in the Timis hydrological area*, Scientific Bulletin of UPT, Transaction on Mechanics, Tom 53 (67), fasc. 2, pp. 61/64.
12. Laurentiu Călin, Lontis N., Jadaneant M., Cioabla A., Irimescu A., *Consideration sur l'echange de chaleur et de masse pendant le stockage des cereals*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 53 (67), Fascicola 2 pp. 293 – 296.
13. Ioan Laza, Cioabla A., Vetres I., *Pneumatic conveying. Dense phase characteristics and types*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 53 (67), Fascicola 2.
14. Laza Ioan, Vetres I., Laza I. Jr., *Pneumatic conveying*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, 4 pages.
15. V. Stoica, M. Ilie, F.D. Stoian, S. Holotescu, *Microregion theory versus microlayer theory – Experimental investigation*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 53(67), Fasc.1, 4 pages, 2008.
16. V. Stoica, M. Ilie, F.D. Stoian, S. Holotescu, *Temperature measurement by means of single interferogram analysis*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 53(67), Fasc.1, 4 pages, 2008.
17. M. Nagi P. Ilies, M. Sucila, *Research regarding the utilisation of aluminum heat exchangers in exhaust gas recirculation systems*, Buletin IP IASI, Tom LIV (LVIII) Fasc.2 , 2008, pp. 297-302.
18. M. Nagi, C. Caia, C. Moldovan, P. Ilies, *Theoretical researchs regarding biodiesel usage on an engine equipped with commonrail ijection system*, Buletin IP IASI, Tom LIV (LVIII) Fasc.2 , 2008, pp. 303-308.
19. Negoitescu A. S. Tokar A., Ostoia D., Hamat C., *Studies Regarding Two Applications of*

- Trigeneration Systems*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 53(67), Fascicola 2, 4 pp, 2008.
20. Negoitescu A. S., Nagi M., Tokar A., Ostoia D., *The Diesel Power Station as a Socio-Political and Technical Challenge*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tomul 53(67), Fascicola S2, 4 pp 2008.
  21. Ostoia D., Mihon L., Tokar A., Negoitescu A. S., *Studies regarding the Truck Accident Causation in European Union*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tomul 53(67), Fascicola S2, 4 pp, 2008.
  22. Mosteoru L.D., Jadaneant M., Mosteoru S., *Optimization of temperature for medical devices such as dry heat sterilizers*, Analele Universitatii din Oradea, Fascicola Energetică, Nr.14, p.172/175, 2008.
  23. Călin L., Jădăneant M., Pop A., *Conserving cereal products – one of the conditions in respecting food safety norms*, Buletinul AGIR Anul XII, nr.1-2, pp. 91/96, 2008.
  24. Vartolomei M. S., Jădăneant M., *Improvement strategies of the military technical parameters*, Buletinul AGIR, Anul XII, nr.1-2, pp. 158/162 2008.
  25. Vartolomei M. S., Jădăneant M., *Usage of advanced materials in the military industry*, Buletinul AGIR Anul XII, nr.1-2, pp. 163/168, 2008.
  26. Călin L., Jădăneant A., Jădăneant M., *Consideration regarding the epuration of the used water from the beer industry*, Buletinul AGIR Anul XII, nr.1-2, pp. 218/223, 2008.
  27. Poparad M., Jădăneant M., *Catalytic collective research – principal method for pollution combating in merchandise transportation*, Buletinul AGIR Anul XII, nr.1-2, pp. 230/233 2008.
  28. Mărcuț Fl., Jădăneant M., *Combustion researches in burner with fuel distribution on standing vaporizer for combustion heaters*, 4-eme edition du Colloque Frabcophone en Energie, Environnement, Economie et Thermodyna-mique, 11-13 Juin 2008, Ecole des Mines de Nantes, Vol 1, 7 pp.
  29. Vartolomei M.S., Vartolomei M., Jădăneant M., *Energy optimization in some technique according to the sustainable development requirements*, 4-eme edition du Colloque Frabcophone en Energie, Environnement, Economie et Thermodyna-mique, 11-13 Juin 2008, Ecole des Mines de Nantes, Vol 1, 7 pp.
  30. Dorin Lelea, *The Swirl Flow Heat Transfer Applied to Electronics Cooling*, 21st Conference on Industrial Processes, Subotica (Serbia) 4-6 iunie 2008, CD, pp. 148-157.
  31. Ioan Laza, Vetres I., Cioabla A., *Pneumatic conveying deferences between dense and diluted phase*, Scientific conference with international participation „Durabilitatea și fiabilitatea sistemelor mecanice”, 13th edition, Tg Jiu, Volum conferință pp. 221 – 226.
  32. Morega, M. Morega, F.D. Stoian, S. Holotescu, *Numerical Simulation of an Experimental Apparatus for the Evaluation of Physical properties of Magnetic Fluids*, COMSOL Users Conference Budapest, November 24, 2008, Proceedings of the COMSOL Users Conference Budapest, 4 pp.
  33. Morega, M. Morega, F.D. Stoian, S. Holotescu, *Heat transfer processes in magnetic fluid confined to a cylindrical enclosure*, 6th International Symposium on Advanced Topic on Electrical Engineering ATEE 2008, Bucuresti, 20-21 nov. 2008, Symposium Proceedings, 4 pp.
  34. M. Nagi P. Ilies, D. Iorga, K. Uzuneanu., *Compact systems for cooling groups designed and manufactured At RAAL Bistrita*, 4-eme edition du Colloque Frabcophone en Energie, Environnement, Economie et Thermodyna-mique COFRET ,08 Nantes-France, Symposium Proceedings, 6 pag.
  35. Dan ALEXANDRU, Mihai NAGI, Arina NEGOITESCU, *Equilibrium relations liquid-vapours for the liquefied petroleum gas* Intern Congres SMAT 2008, Edit. Universitaria Craiova, Tome II, 2 pp.
  36. M. Nagi P. Ilies, Sucila, M, Enera, M, *The effect of the separation zone on the performance of a compressed air dryer*, Intern Congres SMAT 2008, Edit. Universitaria Craiova, Tome II, pp. 184-188.
  37. M., NAGI, . C., CAIA, C., MOLDOVEANU, *Study on vegetal oils characteristics*, Intern Congres SMAT 2008, Edit. Universitaria Craiova Tome II, pp. 189-192.
  38. M., NAGI, . D, S, MOTANTAU, T. Stanciu, *Studies on heat exchanges with field tubes*, Intern Congres SMAT 2008, Edit. niversitaria Craiova pp. 193-196.
  39. Jădăneant M., Jădăneant A., *New concepts in thermoenergetics*, Conferinta cu participare internațională AIIR Timișoara 17-18 aprilie 2008, Instalații pentru construcții și confortul

- ambiental - Lucrările conferinței, Politehnica Publishing House Timisoara, Romania, pp.143/148, 6 pages.
40. Oancea Gh., Jădăneant M., *Map drawing of a district from Timisoara city for the study of thermal rehabilitation*, Conferinta cu participare internațională AIIR Timișoara 17-18 aprilie 2008, Instalații pentru construcții și confortul ambiental - Lucrările conferinței, Politehnica Publishing House Timisoara, Romania, pp.293/298, 6 pages.
  41. Irimescu A., Călin L., Jădăneant M., Iorga D., *Considerations regarding the efficient usage of biogas obtained from the epuration of used industrial waters*, Conferinta cu participare internațională AIIR Timișoara 17-18 aprilie 2008, Instalații pentru construcții și confortul ambiental - Lucrările conferinței, Politehnica Publishing House Timisoara, Romania, pp.386/394, 6 pages.
  42. Jădăneant A., Jădăneant M., *Past and present in thermotechnics*, A VIII-a conferință națională multidisciplinară -cu participare internațională- "Profesorul Dorin PAVEL - fondatorul hidroenergeticii românești" Sebeș 2008, Știință și Inginerie, vol. 13 Editura AGIR pp. 45/52, 8 pages.
  43. Mosteoru L.D., Jădăneant M., Mosteoru S., *Researches regarding the energetic analysis of the sterilizing equipment with dry hot air*, A VIII-a conferință națională multidisciplinară -cu participare internațională- "Profesorul Dorin PAVEL - fondatorul hidroenergeticii românești" Sebeș 2008, Știință și Inginerie, vol. 13 Editura AGIR pp. 327/332, 6 pages.
  44. Călin L., Jădăneant M., *Consideration regarding the composition of the used waters from the beer industry*, A VIII-a conferință națională multidisciplinară -cu participare internațională- "Profesorul Dorin PAVEL - fondatorul hidroenergeticii românești" Sebeș 2008, Știință și Inginerie, vol. 14 Editura AGIR, pp.185/192, 8 pages.
  45. Mărcuț Fl., Jădăneant M., *Constructive types of combustion aerotherms*, A VIII-a conferință națională multidisciplinară -cu participare internațională- "Profesorul Dorin PAVEL - fondatorul hidroenergeticii românești" Sebeș 2008, Știință și Inginerie, vol. 14 Editura AGIR pp. 283/290 8 pages.

#### **PhD THESIS**

1. Laurențiu CĂLIN, Optimization of the dry process of cereals, *PhD supervisor: Prof.dr.eng. Mihai JĂDĂNEANȚ*

*PhD supervisor: Prof.dr.eng. Mihai NAGI*

1. Eng. Catalin BOJAN: *Researches regarding the use of shell type tubes for the construction of compact heat exchangers*
2. 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*
3. Eng. Ciprian CAIA: *Studies and researches regarding the correlation between the intake air in a direct injection compression ignition engine, the engine performances and the pollution level*
4. Eng. Tiberius STANCIU: *Researches regarding the use of shell type of tubes for the construction of compact heat exchangers*
5. Eng. Mihaela BUCULEI, *Studies and researches regarding the installations of unconventional liquid fuel preparation for use in compression ignition engine with direct injection*
6. Eng. Paul ILIES: *Constructive and operational optimization of the aluminum heat exchangers manufactured at S.C. RAAL S.A. Bistrita*
7. Eng. Francisc SZIKSZAI: *The control and enhancement of heat transfer in magnetizable nanofluids*
8. Eng. Mariela Augusta SPOREA: *Studies and researches regarding the recovery of exhaust gases from the cupola furnace*
9. Jurist Alexandru JĂDĂNEANȚ, Mechanical Engineering
10. Eng. Carabas Ioan Daniel, *Heat exchangers*

*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. Sorin RUSU: *Contributions to the optimisation of the railroad traction diesel engines operation*
3. Eng. Gh.-Florin OANCEA: *Theoretical and experimental contributions regarding the thermal rehabilitation of the buildings from a headquarter in Timișoara city*
4. Eng. Doina MIHON: *Theoretical and experimental contributions regarding the optimisation of the transportation fluxes in view of reducing the pollutants produced by the vehicles driven by internal combustion engines*



5. Eng. Constantin STROIE: *Contributions to the study of the impact of railroad transportation on the environment and the railroad infrastructure*

6. Eng. Florin MĂRCUȚ, *Industrial Engineering*

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 Web Page: [www.mec.upt.ro/~tmtar](http://www.mec.upt.ro/~tmtar)

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

**Keywords:** *railway traction, traction estimation, combustible and electric energy consumption, energy saving, pollution, multimodal transport, freight terminals, RO – LA transport, FERRY –*

*BOAT, containers special train, railway conveyance of material.*

#### ACTIVITIES

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

#### RESULTS

##### RESEARCH CONTRACTS

1. Research contract on development and consultancy nr. 97/11.06.2008, "*Training of 15 employers of Local Transport Company Timisoara on environmental problems in accordance with ISO 14001:2004 and own management system requests*", Contract managers: E.Ghita, G.E. Mocuta
2. *Research, development and consultancy contract on welding of the rolling stock* nr.183/15.12.2008, M. Popescu, G.E.Mocuta

##### BOOKS

- Dungan, L., Contributions to analysis and research of the behaviour of the flexicoil springs belonging to the CFR 060-EA 5100 kW electric locomotive, Monography, "Politehnica" Publishing House, Timișoara, ISBN 978-973-625-599-1, 223 pages
- Dungan,L., Herman,M., Balogh,R., Stepan, D., *Transport systems. Transport devices. Transport and manipulation Technologies. Problems*, "Mirton" Publishing House Timisoara, ISBN978-973-52-0499-0, 156 pages
- Mocuta, G.E., Potoceanu, A., *The monography of the Rolling Stock Department*, Tempus Publishing House, Timisoara, ISBN-10973-88147-5-8, ISBN -978-973-88147-5-2, 75 pages

- Gabriel URSU-NEAMȚ - *Contributions regarding the optimization of the elastic connection between wagons and their influence about the circulation in a curved line of a locomotive with multiple bogies* ISBN 978-973-625-602-8, 191 pages

#### PUBLISHED PAPERS

1. E.Ghita, I. Bordeasu, A. Cernescu, V. Balasoiu, I. Ciuca, *On the Behavior of Elastic Elements Belonging to the Elastic Tram Wheels at Particular Loading*, Rev. Materiale Plastice nr.1, vol.45 (1), pp. 97-101, ISSN 0025-5289, ISI Paper
2. L. Vilceanu, V. Putan, A. Josan, E. Ghita, *Sterngth of steel wires ropes in contact*, Rev. Metalurgia International nr.8, vol. XIII, pp. 34-37, ISSN 1582-2214, ISI Paper
3. M. Herman, R. Herman, *The structural integrity of products welded constructions, a traffic safety condition*, www.ndt.net, ISI Paper
4. Mocuta, G.E., *The Role Map of Processes in the Logistic Audit of a Transport Service Organization*, The 5th International Symposium, KOD 2008, Novi Sad, Serbia, Faculty of Technical Sciences, ISBN 978-86-7892-104-9, pp. 381-384
5. Mocuta, G.E., Popescu, M., Raduta, A., Belu-Nica, R., Groza, D., *TOPTIG-new robotic TIG welding*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Fasc. 2, 2008, Tom 53(67), ISSN 1224-6077, pp. 37-42
6. Mocuta, GE, Popescu, M., Raduta, A., Belu-Nica, R., *Toptig – State-of-the-Art Engineering Exceptional Performance for Applications in the Automotive Industry*, The 8<sup>th</sup> International Conference "Research and Development in Mechanical Industry" RaDMI 2008, Užice, Serbia, Radmi 2008 proceedings, A 26, pp. 159-161
7. Mocuța, G.E., Popescu, M., *Sound pollution consequence of the transport development*, Proceedings of XII International Conference on Mechanical Engineering, Bratislava, Slovakia, ISBN 978-86-7892-104-9, pp. 381-384
8. Dungan, L., Bocai, L., *Analisi del sistema de conexión entre caja y bogies de la locomotora electrica CFR 060 EA de 5100 kW*, Proceedings of Conference „Problemas dinamicos en trenes de alta velocidad”, Zaragoza, Spain, iunie 2008, 6 pages.
9. D. Stepan, G.E. Mocuta, E. Ghita, *Railway operation laboratory for transportation sciences*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Fasc. S2, 2008, Tom 53(67), ISSN 1224-6077, pp. 309-314
10. G.V. Ursu-Neamt, L. Madaras, D.S. Stepan, *Dynamic circulation in curve with R = 170 m radius for CFR 060-EA 5100 kW electric locomotive*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Fasc.S 2, 2008, Tom 53(67), ISSN 1224-6077, pp. 121-128
11. G.V. Ursu-Neamt, *Aspects regarding the determination of friction coefficient at wheel-rail contact for CFR 060-EA 5100 kW electric locomotive*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Fasc.S 2, 2008, Tom 53(67), ISSN 1224-6077, pp. 129-134
12. E. Ghita, L. Vilceanu, *The analysis of the influence of the railroad irregularities about the dynamic loading on the upper-hanged elements of railway vehicles*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Fasc.S 2, 2008, Tom 53(67), ISSN 1224-6077, pp. 117-120
13. M. Herman, R. Herman, D. Iovan, *Aspects of load influence over the resistance of the vat of the freight wagons*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Fasc.S 2, 2008, Tom 53(67), ISSN 1224-6077, pp. 135-138
14. R. Herman, M. Herman, S. Sarca, *The utilization of industrial robots management in the bilding of railway vehicles*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Fasc.S 2, 2008, Tom 53(67), ISSN 1224-6077, pp. 139-142
15. L. Laboureau, M. Herman, *The land carriage, cell connector between universities*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Fasc.S 2, 2008, Tom 53(67), ISSN 1224-6077, pp. 327-328
16. G. Tuton, M. Herman, *Transport et environnement*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Fasc.S 2, 2008, Tom 53(67), ISSN 1224-6077, pp. 323-326
17. D. Mnerie, M. Herman, D. Țucu, F. Rossi, A. Marri, *Multimodal freight transport chains optimization*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Fasc.S 2, 2008, Tom 53(67), ISSN 1224-6077, pp. 155-158

18. L. Dungan, M. Dungan, *Verifying entry of the locomotive into vehicle's cinematic gauge*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Fasc.S 2, 2008, Tom 53(67), ISSN 1224-6077, pp. 95-102
19. L. Dungan, M. Dungan, C. Sticlaru, *The analasys of the flexicoil spiral spring's behavior under load using finite elements method*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Fasc.S 2, 2008, Tom 53(67), ISSN 1224-6077, pp.103-110
20. L. Oltenacu, G.E. Mocuța, *Development and improvement of railway safety on the romanian railways by applying the law 55/2006 related to the railway safety*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Fasc.S 2, 2008, Tom 53(67), ISSN 1224-6077, pp. 233-236
21. M. Popescu, G. E. Mocuța ș.a., *Recent Advances in Cold Metal Ttransfer for Transportation Vehicle*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Fasc.S 2, 2008, Tom 53(67), ISSN 1224-6077, pp. 167-175
22. M. Popescu, G. E. Mocuța ș.a., *Materiaux composites - innovations dans le domaine des transports*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Fasc.S 2, 2008, Tom 53(67), ISSN 1224-6077, pp.181-185
23. M. Popescu, G. E. Mocuța, I. Mitelea ș.a., *Les materiaux composites et leur comportement au feu dans application aux vehicule ferroviaire*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Fasc.S 2, 2008, Tom 53(67), ISSN 1224-6077, pp.185-192
24. R. Balogh L. Dungan „*The modernization of the locomotives-request of the railway transport quality*, Romanian Engineers Association Bulletin, Nr.1-2, january-june, 2008, 4 pp., ISSN 1224-7928
25. A.Ciortea, C.Popăți, M.Herman, *The necessity of the rolling stock modernization in order to increase the quality of the transport*, Romanian Engineers Association Bulletin, Nr.1-2, January-june, 2008, pp. 118-121, ISSN 1224-7928
26. L.M. Butaș, M. Herman, *The development of the quality of the goods railway transport technological processes by the modernization of the hoisting methods*, Romanian Engineers Association Bulletin, Nr.1-2, January-june, 2008, pp. 122-124, ISSN 1224-7928
27. S.Sarca, Z.Suto-Egeressy, M.Herman, *The quality of the railway vehicles-request of the safety circulation*, Romanian Engineers Association Bulletin, Nr.1-2, January-june,2008, , pp., 125-129, ISSN 1224-7928
28. G.E.Mocuta, F. Jujescu, A. Don, L. Radu, *Phonic pollution in crowded urban cities*, Romanian Engineers Association Bulletin, Nr.1-2, January-june (SINGRO 2008), nr. 3/2008, ISSN 1224-7928

#### PHD STUDENTS

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

1. Ph.D.student Dan STEPAN-*Researches regarding the reduction of vibrations, noise in transportation /railway vehicles*
2. Ph.D.student Ramon BALOGH-*The analysis of the NOx emanations and the use of the alternative fuel (biodiesel) for the railway Diesel locomotives*

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

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

#### RESEARCH TEAM

- Assoc.prof.dr.eng. Eugen GHITA
- Assoc.prof.dr.eng. Georgeta Emilia MOCUȚA
- Lect.dr.eng. Mihaela HERMAN
- Assist.dr.eng. Gabriel URUSU-NEAMT
- Assist.dr.eng. Luiza-Izabel DUNGAN
- Ph.D.student Dan STEPAN
- Ph.D.student Mircea MATEI
- Ph.D.student Ramon BALOGH

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**Researches in URBAN TRANSPORTATION, ROAD TRAFFIC SAFETY, ROAD TRAFFIC CONTROL, INTELLIGENT TRANSPORT SYSTEMS AND ENVIRONMENTAL PROTECTION**

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

#### ACTIVITIES

- Road traffic management

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

## RESULTS

### RESEARCH CONTRACTS

1. CEEEX Nr. X2C25/5 P-CD ( AMTRANS) 2006-2008) *Advanced information and route guidance system for vehicle drivers and travellers using digital maps –SAIGHID*, Phase 5/2008; Director, Assoc.prof.dr.eng. Dumitru IANCUŁUI, value 130.778 RON (Phase 5: 32.500 RON).
2. PN II Nr. D 21-018/2007 (2007-2010) *Energy optimized electrical systems for land transport using batteries and supercapacitors „TRANS-SUPERCAP”* Phase3/2008. Director, Assoc. prof.dr.eng. Dumitru IANCUŁUI; Value 360.000 RON (Phase 3: 60.000 RON ).

### BOOKS

1. W. Ștefănescu, *Transportul si protectia mediului* (published in Romanian), Eurobit Publishing House, Timisoara 2008, ISBN978-973-620-411-1, 216 pp.

### PUBLISHED PAPERS

1. W. Ștefănescu, L. Irimie, *Study concerning the phonic pollution generated by the urban traffic in the town of Timisoara II* , Revista Journal of Environmental Protection and Ecology, RE No 1225 / 03.03.2008, pp. 8, ISSN 1311-5065; ISI Paper
2. W.Ștefănescu,L.Irimie,*Solutions for limitation of urban phonic pollution using the road traffic fluidization methods*, Revista Journal of Environmental Protection and Ecology, RE No 1317 / 27.06.2008, pp. 10 ,ISSN 1311-5065; ISI Paper
3. D. Bolcu, M.Stanescu, I.Ciuca, G.Jiga, D. Iancului, *The experimental Validation of the Analitical Model, Used Study the Dinamic Behaviour of a Multiplayer Composite structure*, Rev. Materiale Plastice nr.2, vol. 45(2), 6 pp, ISSN 0025-5289.; ISI Paper
4. Gh. Amza, D. Dobrota, A.Semenescu, D.Iancului,*Research Concerning the Ultrasonic Energy"sInfluence Over the Resistance at Extraction of the Metallic Insertion from the Rubber Matrix*,Rev. Materiale Plastice nr. 4, vol. 45(4), 4 pag,

ISSN 0025-5289; ISI Paper

5. A. Cipleu, L. Irimie, W.Stefanescu, *ETA – Elastic tire approach (I) Static analysis*, Scientific Bulletin of the “Politehnica” University of Timisoara., Tom 53(67) , pp. 23-28, pp. 6, ISSN 1224-6077
6. A.Cipleu, L.Irimie, W.Stefanescu, *ETA – Elastic tire approach (II) Static analysis*, Scientific Bulletin of the “Politehnica” University of Timisoara., Tom 53(67) , pp. 29-34, pp .6, ISSN 1224-6077
7. A.Cipleu, *ETA – Elastic tire approach dynamic steady-state analysis*, Scientific Bulletin of the “Politehnica” University of Timisoara., Tom 53(67) , pp. 35-38, pp. 4, ISSN 1224-6077.
8. L. Irimie, W.Stefanescu, A. Cipleu, *The traffic flows analysing for road services organizing on the national roads*, Scientific Bulletin of the “Politehnica” University of Timisoara, Tom 53(67) , pp. 53-62, pp. 10, ISSN 1224-6077.
9. W. Stefanescu, L. Irimie, A. Cipleu, *The analysis of uncomfortable index generated by urban trafic*, Scientific Bulletin of the “Politehnica” University of Timisoara, Tom 53(67) , pp. 63-70, pp. 8, ISSN 1224-6077.
10. W. Stefanescu, L. Irimie, *Air traffic – an environment polluting factor*, Scientific Bulletin of the “Politehnica” University of Timisoara., Tom 53(67) , pp. 75-80, pp. 6, ISSN 1224-6077.
11. W.Stefanescu, L.Irimie, D. Iancului, *The acoustic comfort in the vehicles*, Scientific Bulletin of the “Politehnica” University of Timisoara, Tom 53(67) , pp. 247-250, pp. 4, ISSN 1224-6077.
12. L. Irimie, W. Stefanescu, D. Iancului, *Methods for increasing the public transport's attractiveness*, Scientific Bulletin of the “Politehnica” University of Timisoara, Tom 53(67) , pp. 251-256, pp. 6, ISSN 1224-6077.
13. L. Irimie, W. Stefanescu, *The intelligent transport system utilization for management for urban public transportation*, Scientific Bulletin of the “Politehnica” University of Timisoara, Tom 53(67) , pp. 257-260, pp. 4, ISSN 1224-6077.
14. M. Raicevic, Z. Milic, P.Milenkovic, A. Cipleu, *Correlations in different brake system configurations during straight-line braking performed by an ABS equiped vehicle*, International Congress Motor Vehicles & Motors, Kragujevac, ISBN-978-86-86663-38-2

15. L. Irimie, W. Ștefănescu, *Decrease of urban pollution by increasing the mobility and accessibility to the participants in the road traffic*, International Conference . BENA ,, Balkan Collaboration: The Must for Better Life and Environment in SE Europe”, Florina-Grecia,
16. M. Buzerea, G. Proștean, C. Ștefan , *Assesmen techniques of products on the basis of shape analysis*, 19th DAAAM International Symposium, Intelligent Manufacturing & Automation, Trnava, Slovakia.
17. A. Gönczi, D. Iancului. *An assessment of the main road safety improvement actions in Romania in the last decades. National Road Safety Simposium* 5th edition, november 2008, Cluj-Napoca, Romania, UTPress, CD-ROM, pp. 8, ISBN 978-973-662-408-7.
18. M. Buzerea, V. Balas, C. Ștefan, *New Techniques of Products Analysis on the Basis of Colour and Shape*, The 5th European Conference on Intelligent Systems and Technologies ECIT 2008, Iași, Romania, Revista Fuzzy Systems & A.I., pp. 8, ISSN 1016-2127

#### 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: *Research on the improvement of the functioning of urban signalised intersections.*

6. Eng. Culiță CHIȘ: *Study on the optimal usage of modern control systems of the signalised intersections for capacity maximization.*
7. Eng. Ovidiu RĂDULESCU: *Study concerning the improvement of the functional quality of signalized traffic control systems in urban areas.*
8. Eng. Alexandru TRĂISTARU: *Research on the improvement of control and command systems in railway traffic.*

*Phd Supervisor Prof.dr.eng.Constantin ȘTEFAN*

1. Eng. Marius BUZEREA: *Research on automation of fruit and vegetable primary processing;*
2. Eng. Radu TARCAET; *Research on pre-cleaning and pre-drying of cereal grains with normal temperature air;*
3. Eng. Ioan INDRE: *Research on factors which influence the capacity of the transversal fan.*

#### RESEARCH TEAM

- Prof.dr.eng. Ion DANILA- cons.prof
- Prof.dr.eng. Constantin ȘTEFAN- cons.prof.
- Assoc.prof.dr.eng. Dumitru IANCULUI
- Lect.dr.eng. Attila GONCZI
- Lect.dr.eng. Werner ȘTEFANESCU
- Lect.dr.eng. Ionel VANDICI
- Lect. dr.eng. Adrian CIPLEU
- Assist.eng. Petre PADUCEL
- Assist. eng. Remus URSULESCU
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# RESEARCH GROUP IN PLASTICS MANUFACTURING

## R.G.P.M.

### GENERAL PRESENTATION AND MISSION

The *Research Group in Plastics Manufacturing (R.G.P.M)*, organized in the Department of Manufacturing Engineering (TCM), is a research unit and transfer of technology of the "Politehnica" University of Timișoara.

R.G.P.M mission is to coordinate teams of researchers from the Department of Manufacturing Engineering (TCM), Faculty of Mechanical Engineering, 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

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

- R.G.P.M. is involved in national and international research programs and organizes different scientific meetings (seminars, conferences etc.).
- Participation to grant competitions through CNCISIS, national programs etc.
- Developing of fundamental and applicative research activities, technological development for the present industrial demands,
- P. T. R. G. 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 CEEEX 41/2005 –*IMAN, Innovative Manufacturing Network*, Director Professor Tudor Iclanzan.
2. Contract CEEEX 265/2006–*ULTRATECH Virtual research center for integrated technologies with applications of the electro-acoustic energy in the advanced materials engineering*. Director: Professor Tudor Iclanzan.
3. Contract CEEEX 130/2006–*MATEPROF Materials, technologies and equipment for 2D and 3D cold forming*. Director: Professor Tudor Iclanzan.
4. Contract PN-II ESOP 71-133/2007, *Expert systems for the optimisation of technological processes*, Director Professor Tudor Iclanzan.

### PATENTS

1. Stan D., Tulcan A., Cosma C., patent RO-121874/2008, Drying device for extruded electric polymer coated cable

### PUBLICATIONS

#### BOOKS

1. Seiculescu V., *Computer aided design*, Editura Politehnica Timisoara, 2008, 219 pp., ISBN 978-973-625-276-0
2. Cosma C., *Studii privind optimizarea tehnicii de Reverse Engineering la realizarea produselor injectate din materiale polimeric - Doc. thesis*,

Ed. POLITEHNICA, Timisoara, 162 pp., ISBN 978-973-625-612-7

#### PUBLISHED PAPERS

1. Stan D., Tulcan A., Tulcan L., Iclănzan T., *Dimensional variances and tolerances of the injected plastic parts*, Revista de Materiale Plastice ISSN 0025-5289, vol. 45, nr.1/2008, pp. 119 /6 pages.
2. Cosma C., Dume A., Tulcan A., Iclănzan T., *Reverse engineering for injection parts*, Revista de Materiale Plastice, ISSN 0025-5289, vol. 45, nr.2/2008, pp. 208/6 pages.
3. Iclănzan T., Stan D., *A possible new ultrasonic thermo-pellicular effect*, International journal of material forming, Springer Paris, 2008, ISSN 1960-6214 (online), lucrarea nr. 170, 4 pages., <http://www.springerlink.com/content/120979>
4. Seiculescu V., Tulcan A., Stan D., *Virtual 3d-Cad Model Of Complex Bodies Realized Under Solid Works Environment*, Academic Journal of Manufacturing Engineering – AJME, vol. 6, supl.nr.2/2008, pp. 156-162, ISSN 1583-7904
5. Dume A., Cosma C., Stan D., Tulcan A., Iclănzan T., *Methodology Of Obtaining A Solid Model For Injected Part Using The Reverse Engineering Technique*, Academic Journal of Manufacturing Engineering – AJME, vol. 6, supl.nr.1/2008, pp. 84-89, ISSN 1583-7904
6. Cosma C., Tulcan A., Dume A., Iclănzan T., *Reverse Engineering For Active Mould Parts*, Academic Journal of Manufacturing Engineering - AJME , vol. 6, supl.nr.1/2008, pp. 50-55, ISSN 1583-7904
7. Cosma C., Dume A., Rotar D., Iclănzan T., *The Methodology Of Obtaining Postprocessor For Isel Milling Machine*, Scientific Bulletin of the „Politehnica” University of Timisoara/Romania, Fasc. 2, 2008, pp. 100-105, ISSN 1224-6077
8. Dume A., Cosma C., Rotar D., Iclănzan T., *Algorithm For Obtaining A Piece On Cnc With A Surface Scanned By The Modela MdX 15*, Scientific Bulletin of the „Politehnica” University of Timisoara, Romania, Fasc. 2, 2008, pp. 93-98, ISSN 1224-6077
9. Rotar D., Cosma C., Dume A., Seiculescu V., Iclănzan T., *Optimization Algorithm For Flow Plastics Materials In Case Of Parts With Thin Walls Obtained By Microinjection-Molding*, Scientific Bulletin of the „Politehnica” University of Timisoara/Romania, Fasc. 3, 2008, pp. 82-90, ISSN 1224-6077
10. Rotar D., Cosma C., Stan D., Seiculescu V., Iclănzan T., *The Methodology Of Obtaining Micromold Cavity For Part Whith Thin Walls*, Scientific Bulletin of the „Politehnica” University of Timisoara/Romania, Fasc. 4, 2008, pp. 60-64, ISSN 1224-6077
11. Tulcan A., Seiculescu V., Cosma C., Tulcan L., Bernath A., *Virtual Simulation of a Coordinate Measuring Machine Behavior at Accelerations and Variable Thermal Field*, 3<sup>rd</sup> International Conference on Manufacturing Engineering ICMEN and EUREKA Brokerage Event, Kallithea of Chalkidiki, Greece,/ 2008, conference volum, ISSN 978-960-243-649-3, pp. 715-720
12. Cosma C., Tulcan A., Dume A., Stan D., Iclănzan T., *A methodology for developing new products using reverse engineering and digital prototyping techniques*, 3<sup>th</sup> International Conference on Manufacturing Engineering ICMEN and EUREKA Brokerage Event, Kallithea of Chalkidiki, Greece/2008, conference volum, ISSN 978-960-243-649-3, pp. 775-782
13. Iclănzan T., Stan D., *Applications of the thermo-pellicular effect at the manufacturing of polymeric and composites materials*, 4eme Salon Europeen de la Recherche & de l’Innovation, Paris, 5-7 june 2008, [www.citicpe.ro/paris%2D2008/](http://www.citicpe.ro/paris%2D2008/), [www.citicpe.ro/paris%2D2008/](http://www.citicpe.ro/paris%2D2008/)
14. Iclănzan T., Stan D., Abadie J.M., *The ultrasonic thermo-pellicular effect and applications*, STEPI 8 – Polymides and high performace polymers, Montpellier, France, 9-11 juin 2008, Conference volum, Session 5 - Simulation/ Tool, 6 pp. + poster (P45)

#### PhD THESIS

1. Cosma Cristian, *Quality amelioration study of products from polymeric materials in injection processes*, Thesis supervisor: Prof. Tudor Iclănzan
2. Dume Adrian-Ilie, *Rapid prototyping techniques optimizations using the milling process in the case of the removal module*, Thesis supervisor: Prof. Tudor Iclănzan
3. Tamas Marius, *The study of increased operational capacities of the rapid prototyping machines by material*, Thesis supervisor: Prof. Tudor Iclănzan

#### PhD STUDENTS

1. Groza Bogdan Gruia, *Optimization of the management integrated systems in industrial engineering*, Thesis supervisor: Prof. Tudor Iclănzan
2. Ferician Florin Cornel, *Researches on the technological possibilities of using the plasma electronic guns*, Thesis supervisor: Prof. Tudor Iclănzan

3. Sirbu Alin Nicusor, Theoretical and experimental research regarding the ultrasonic activation of the polymeric materials flow processes, Thesis supervisor: Prof. Tudor Iclănzan
4. Stancau Adelina, Studies for the applicability of the QFD techniques in polymeric material parts design, Thesis supervisor: Prof. Tudor Iclănzan
5. Rotar Ioan Daniel, Studies of the polymeric materials flow processes through the interstices of the forming devices, Thesis supervisor: Prof. Tudor Iclănzan
6. Serban Iancu, Study of microinjection and injection of thin wall products, Thesis supervisor: Prof. Tudor Iclănzan
7. Tut Vlad Adrian, Research regarding the expert system for injection moulds conception, Thesis supervisor: Prof. Tudor Iclănzan

#### RESEARCH TEAM

R.G.P.M. consists of research teams with common research projects, in the Department of Manufacturing Engineering. The human resources

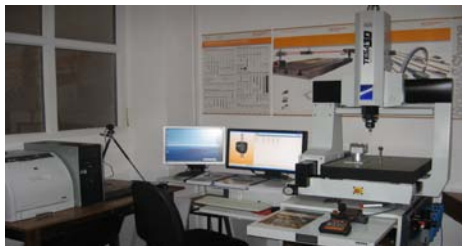
consist of researchers which are doctor degree graduates or which leads post-graduates programs. Also, in the team are working post-graduates and master students. The management is assured by the team leader and the scientific board.

The members of the research team are:

- Prof. dr. eng. Tudor Iclănzan – 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. Adrian Dume
- Eng. Daniel Ioan Rotar, PhD student
- Eng. Serban Iancu, PhD student
- Eng. Tut Vlad Adrian, PhD student

#### CONTACT

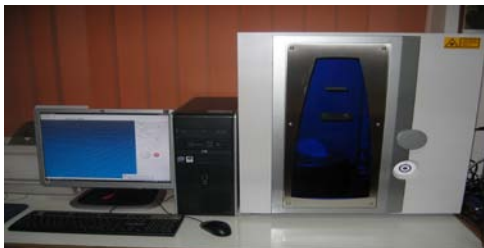
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3D measuring machine TESA MicroMs 343 DCC



Experimental ultrasonic devices



Roland Picza 3D scanner laser LPX – 600



Krauss-Maffei experimental injection machine and mould



Conference room and CAD/CAM laboratory



# 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 ambiental 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. Nicolae CIOBOTARU
- Assist.eng. Iuliu SISAK
- Assist.eng. Radu NEGRU
- Eng. Herman SEGAL
- Eng. Laurentiu CULEA
- Eng. Claudia SECRIERU
- Eng. Maria SECHEI
- Eng. Anghel CERNESCU
- Eng. Cristian NEȘ
- Eng. Emanoil LINUL

#### 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. 48c/2008, *Compression test on packing bins perfusabile solutions*, Project Manager: Faur Nicolae, Beneficiary: HELVETICA PROFARM SA, Timișoara, Value: 480 RON
2. 185/18.12.2008, *Technical verification at measurement devices DVIA-6, utilised for LEA anchors strengthening*, Project Manager: Nicolae Faur. Beneficiary: SC ELMO srl Constanța. Value: 2000 RON.

3. BC 164/13.11.2008, *Compression diagrams drawing for N-204-00-38-017 springs of the platform AAE TWIN*. Project Manager: Nicolae Faur. Beneficiary: ASTRA VAGOANE ARAD. Value: 2975 RON.
4. 52/03.04.2008, *Compression tests on corrugate boards for DAB and PAB airbag*, Project Manager: Nicolae Faur. Beneficiary: SC TRW Automotive Safety Systems SRL, Timisoara. Value: 1190 RON.
5. 46/28.03.2008, *Compression test on packing bins perfusabile solutions*, Project Manager: Nicolae Faur. Beneficiary: SC ZLOOP srl Timisoara. Value: 1785 RON.
6. 657/15.05.2008, *Technical verification at measurement devices DVIA-6, utilised for LEA anchors strengthening*, Project Manager: Nicolae Faur. Beneficiary: SC Electromontaj Carpati SA Sibiu. Value: 2000 RON.
7. 694/25.06./2008, *Determination of STRESS-STRAIN features for Al and Al-steel conductors*, Project Manager: Nicolae Faur. Beneficiary: SC IPROEB SA Bistrita Value: 2500 RON.
8. 599/08.02.2008, *Mechanical characteristics certification for compression of corrugate boards*, Project Manager: Nicolae Faur. Beneficiary: SC SCA Packaging srl Timisoara. Value: 2856 RON.
9. 173/25.11.2008, *Noise measurements at the vicinity of company SC COCA COLA HBC ROMANIA, Location TIMISOARA*, Project Manager: Nicolae Faur. Beneficiary: SC COCA COLA Timisoara. Value: 7140 RON.

#### DOCTORAL STUDIES

##### PhD THESIS

1. Cornea Gheorghe, *Study about hardness of the testing machine of Steel Aluminium Conductors*, PhD coordinator: Ion Dumitru, 09.05.2008
2. Nagy Ramona, *Researches concerning the nonlinear behaviour of mechanical systems with discontinuity due collision*, PhD coordinator: Nicolae Faur, 09.05.2008
3. Stoia Ionut Dan, *Modelling, Developing and Testing of the Human Spine Implants*, PhD coordinator: Nicolae Robu and Nicolae Faur.

##### PhD THEMES

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

1. Cernescu Anghel Vasile, *Researches about the effect of mean stress and stress ratio in fatigue crack growth for an alloy steel*.

2. Branzei Nelu Florin, *Fatigue analysis study of steel railway couplings used for transportation.*
3. Secieru Claudia, *Applications of Fractal Analysis in the case of dynamic fracture.*
4. Sechei Ramona Maria, *Experimental and theoretical aspects regarding material dynamic toughness.*
5. Cotuna Emil, *Study of stability elastic elements of the traducers of load.*

### PUBLICATIONS

#### BOOKS

1. Sava Marcela, *Strength of Materials fundamental notions*, Editura Politehnica, ISBN 978-973-625-733-9, pages 204, 2008.
2. Dumitru Ion, *Basics calculation of fatigue*, Editura Eurostampa, ISBN 978-973-687-820-6, pages 350, 2008.
3. Neagu Nicolae, *Machines and Equipments for continuous conveying-Vol.I*, Editura Politehnica Timisoara, ISBN 978-973-625-671-1, pages 220, 2008.

#### PAPERS

1. Marsavina, L., T.Sadowski, *Asymptotic Stress Field at the tip of an inclined crack terminating to an Interface*. Budownictwo i Architektura, Vol. 2 (1), pp.111-124, 14. ISSN 1899-0665, 2008.
2. Marsavina,L., Sadowski,T, Negru,R., Constantinescu,D.M., *Failure of polyurethane foams under different loading conditions*, Key Engineering Materials, Vols. 385-387.pp. 205-208, Iunie 2008, ISSN 1013-9826
3. Negru R., Marsavina L., Faur N., Caplescu Cristiana, *Analysis and Design of Adhesive-Bonded Corner Joints*, The e-Journal & Database of Nondestructive Testing, Vol. 13, april 2008, ISSN 1435-4934.
4. Pirlea H, Brusturean G.A, Silaghi-Perju D., Perju D., *Simulation of NO<sub>2</sub> Emission Dispersion in Timisoara City, in a Certain Reference Point in Relation with a Stationary Source*, Chem. Bull. "Politehnica" Univ. Timisoara, 53(67), 1-2, pp. 244-247, 4 pag., 2008, ISSN 1224-6018.
5. Dumitru I., Cernescu A., *Fatigue Crack Growth under Variable Amplitude Loadings, A Theoretical Study*, Advances in Strength of Materials, Key Engineering Materials, pp. 21-26, 2008, ISSN 1013-9826.
6. SecieruC., Dumitru I., *Fractal Analysis of Fracture Surfaces of Steel Charpy Specimens*, Advances in Strength of Materials, Key

Engineering Material, pp. 43-50, 2008, ISSN 1013-9826.

7. Faur N., Goia I., Culea L., Cernescu A., Negru R., *Stress-strain analysis for the wheel railtrack assembly at urban passenger transport*, The e Journal & database of Nondestructive Testing, pp. 1-6, 2008, ISSN 1435-4934.
8. Bortun C., Faur N., Cernescu A., Sandu L., *Numerical analysis with finite elements non invasive experimental testing method for removable partial denture framework*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 53(67), Fasc.2 2008, ISSN 1224-6077.
9. Tripa P., Hluscu M., Cernescu A., *The Steam Pipe Durability Subjected at Internal Pressure*, Buletinul Științific al Institutului Politehnic "Gheorghe Asachi", Iași, Tom LIV (LVIII), fasc. 1, Secția: Construcții de mașini, Tom LIV (LVIII), fasc. 1, pp. 343-350, 8 pages., 2008, ISSN 1011-2855.
10. Marsavina L., Sadowski T., *Dynamic Fracture toughness of Polyurethane Foam*, Polymer Testing, Vol. 27 (8), pp. 941-944, 4, 2008, ISSN 0142-9418.
11. Marsavina L., Craciun E.M., Tomlinson R.A., *Combining Thermo-Photo Elasticity for Analysis of Cracked Bodies*, Journal of Optoelectronics and Advanced Materials, Vol. 10 (11), pp. 2876 - 2881, 6, 2008, ISSN 1454 - 4164.
12. Peride N., Craciun E.M., Carabineanu A., Marsavina L., *Mixed mode Crack Propagation in Advanced Materials*, Journal of Optoelectronics and Advanced Materials, Vol. 10 (11), pp. 2870 - 2875, 6, 2008, ISSN 1455 - 4164.
13. Dumitru I., Marsavina L., Faur N., *Estimating durability of steels at repeated bending impacts*, International Journal of Fracture, DOI:10.1007/s10704-008-9295-2, 2008, ISSN 0376-9429.
14. Stoia I.D., Faur N., Toth-Tașcău M., Culea L., *In Vitro Experimental Testing of a Cervical Implanted Unit*, Advances in Strength of Materials, Trans Tech Publications Ltd Switzerland, Key Engineering Materials, Vol. 399, pp. 205, 6, 2008, ISSN 1013-9826.

### 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 CNCSIS 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.



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## RESEARCH GROUPS IN THE DEPARTMENT OF *DESCRIPTIVE GEOMETRY AND ENGINEERING GRAPHICS*

### Researches in *SHAPE ACQUISITION, RECOGNITION, PROCESSING, MODELLING AND PROTOTYPING*

#### KEYWORDS

Parametric and feature-based modelling, 3D scanning, feature design, feature recognition, rapid prototyping, integrated design, socialized design

#### FIELD DESCRIPTION

The research activities aim defining an optimized method to obtain feature-based models for real objects and parts using three dimensional scanning environments and appropriate data processing tools. The correlation of the shape and the scanning parameters is envisaged together with the shape reconstruction and the standardized feature recognition. The team investigates optimal shape

design, associated with realistic and reliable rapid prototypes.

#### RESEARCH TEAM

- Prof. Dr. eng. Lia DOLGA
- Assist.Eng. Hannelore FILIPESCU
- Assist.Eng. Mihai REVENCU
- Assist. Eng. Eugen ZĂBAVĂ
- Stud. Darius BOGDĂNESCU
- Stud. Marius OPRIȘA
- Stud. Florin BOGHIAN
- Stud. Sorin ANDREI
- Eng. Radu BOTINEȘTEANU, master student

#### ACTIVITIES AND RESULTS

- The parametric and feature-based shape modelling is the main subject of the courses “Parametric and feature-based modelling of the mechanical parts” and “Assembly

modelling and project management”, taught to the students of the master specialization *Computer Aided Design of the Advanced Mechanical Systems*.

- A research work is running oriented on 3D scanning optimization for free shape bodies, in correlation with the stuff properties. Two master theses on this subject yielded in 2008.
- Apply design principles to solve problems using the integration of construction, design, analysis and simulation means not only experience and knowledge in the field, but also the engineering “feeling” and talent to create and generate material and scientific outcomes. This is briefly the guideline for the current and future activities of the permanent and temporary researchers.
- Topics like integrated design and socialized design are subjects for in progress- or further study.

**Researches in NEW METHODS TO EDUCATE STUDENTS’ COMPETENCES IN ENGINEERING GRAPHICS AND CAD**

**KEYWORDS**

Engineering education, competence, engineering graphics, descriptive geometry, engineering graphical model, computer graphics, geometric model, feature-based model

**FIELD DESCRIPTION**

Admission procedure in the faculty accepts students in an engineering study programme without prerequisite graphical knowledge and skills. However, understanding and using of basic and advanced elements of graphics and CAD defines a fundamental competence for any future engineer. Education in this field has to start with basic and simple elements and to be developed and improved all along the study period.

Traditional and up to date methods mix in the task that became not only an educational charge, but also a set of research topics for the team.

**RESEARCH TEAM**

- Prof. Dr. Eng. Mircea VODĂ
- Prof. Dr. Eng. Lia DOLGA
- Lect. Dr. eng. Mihaela CRETU-NICA
- Lect. Dr. eng. Doina SAFTENCU
- Lect. Dr. eng. Arseniu PECICAN
- Assist. Dr. eng. Mariana ILIE
- Assist. eng. Ileana MLADIN
- Assist. eng. Ladislau WALKOVSKY
- Assist. eng. Adrian RADU
- Assist. eng. Ioan COȚA
- Assist. eng. Silviu DUMITRAȘ

**ACTIVITIES AND RESULTS**

Team members defined the levels of competence in the field of engineering graphics and CAD until

receiving the engineer diploma. On the first level, the student must:

1. Demonstrate understanding of the core knowledge in the discipline,
2. Identify the applications of computer graphics in industry and business,
3. Describe the history of engineering graphics technology and its evolution within and outside engineering, computer science, art, web,
4. Identify the components and functions of a computer graphic technology system,
5. Apply available resources for development of graphical models for simple parts and products,
6. Generate graphical documentation and reports accordingly with adopted standards,
7. Deale with ethics, patents, copyright as well as team working and networking,
8. Demonstrate comprehension of graphical language and communicate through it.

For the next level, the team considers an engineering student must be able to:

9. Prove a basic understanding of the shape design principles and elements,
10. Explore and create several solutions to a single shape design problem, proving problem-solving capacity,
11. Apply design principles to solve problems using the integration of knowledge and methods,
12. Understand the hierarchy of products structure in correlation with shapes interdependences and matches,
13. Demonstrate creative potential in the shape design field,
14. Visually imagine and interpret engineering shape design elements.

A third level of competence enables students (usually, master students) to:

15. Recognize, demarcate and work on opportunities that influence their potential for personal and public realizations.
16. Work in an association to create or improve products shape supporting their professional interest.
17. Join within an expanded work environment to groups that (re)define shape and size for various industrial products.

Courses taught at the first and second year students educate students to achieve the first level of aptitudes. Facultative courses of CATIA and parametric design are offered with the aim of educating the second level of competency, while master courses in shape modeling and CAD aim to educate the third level of proficiency.

The student professional contest “Student CAD” is organized annually in May, oriented on the 2D AutoCAD graphics and on the 3D Modelling and Parametric Design in CATIA, Inventor and Solid Work Environments. The new section of team competition challenges students to prove skills

corresponding to the second level. Asking master students to take part in research activities and to publish the results can confirm third level competency.

More published papers outline distinctive results, while a recognition by means of a special scholarship, "FESTO Young Researchers and Scientists Support Scholarship" (H. FILIPESCU) adds value to the activity.

#### **Researches in THE DEVELOPMENT OF THE PARAMETRIC MODELS IN RELIABILITY OF MECANIC COMPONENTS**

##### **FIELD DESCRIPTION**

The main goal of this program consists in modelling of the mechanical parameters dependence in comportment of machines during the exploitation using the CAD and FEM techniques to develop the specific software packages in this field.

##### **KEYWORDS**

Modeling software, CAD, FEM

##### **RESEARCH TEAM**

- Prof.dr.eng. Mircea VODA
- Prof.dr.eng. Viorel A.SERBAN
- Assist. eng. Hannelore FILIPESCU
- Eng. Costel NICOLAIE, preparator
- Eng. Gheorghe Pasca, doctoral student

##### **ACTIVITIES AND RESULTS**

- The co-operation agreement with the Mechanic Laboratory of Lille, France, in the field of *Study and modelling fatigue* was pursued. An international bilateral grant, "Optimisation de la fiabilité, aide au dimensionnement sécuritaire et à l'allègement des structures ferroviaires", financed by EGID Franta and MECT Romania, synthesises the effort in this field.
- More master dissertation theses were achieved in this field and new teaching problems were elaborated in common by research team members and master students.

#### **PUBLICATIONS**

##### **PUBLISHED PAPERS**

1. DOLGA, L., DOLGA, V., *The tensometric force sensor. Design, evaluation and optimal selection*, Annals of DAAAM for 2008& Proceedings of 19th International DAAAM Symposium, Published by DAAAM International, Vienna, Austria 2008
2. MARIN, Gh, PETRESCU, L.C.M., DOLGA, L., *New Strategies for Designing Assemblies*, Annals of DAAAM for 2008& Proceedings of 19th International DAAAM Symposium, Published by DAAAM International, Vienna, Austria 2008
3. MARIN, Gh, PETRESCU, L.C.M., DOLGA, L., *The cylinder intersections visualization in teaching descriptive geometry*, Annals of DAAAM for 2008& Proceedings of 19th International DAAAM Symposium, Published by DAAAM International, Vienna, Austria 2008

##### **PUBLISHED BOOKS**

Ilie M., Voda M., Walkovszky L., *Engineering graphics; fundamental elements and applications, in Romanian, Students handbook*, "Politehnica" Publishing house, Timisoara, ISBN 978-973-625-699-8

#### **GRANTS / RESEARCH PROGRAMS**

"Brâncuși" research grant "*Optimisation de la fiabilité, aide au dimensionnement sécuritaire et à l'allègement des structures ferroviaires*", financed by EGID Franta and MECT Romania, Director: Prof. dr. eng. Mircea Voda, Value for 2008: 12.000 lei

#### **CONTACT**

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