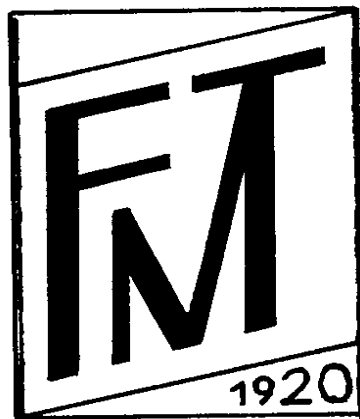


FACULTY OF MECHANICAL ENGINEERING



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

GENERAL PRESENTATION

The *Centre for Modelling the Prosthetic Appliances and Surgical Operations on Human Skeleton* is structured as a Multiple User Research Centre (MURC). The MURC connections in Timișoara are: “Politehnica” University, University of Medicine and Pharmacy, Municipal Hospital of Oro-Maxillo-Facial Surgery, Departmental Hospital of Traumatology and Orthopaedy.

The centre also supports the *Medical Engineering* specialization within the framework of the Faculty of Mechanical Engineering, in order to provide the training of engineers to design: prosthesis, implants, correcting equipment and specialized software for medical applications.

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 fields like: *acquisition and image processing, biomechanics, implant designing and manufacturing, repairing surgical techniques*. Thus, the CMPICSU MURC represents a connecting factor, oriented towards interdisciplinary research and education. Also, CMPICSU centre offers medical imaging investigations for regular patients. The CMPICSU's extensions are two laboratories: LOPIFO for implants and prosthetic devices manufacturing and CIDUCOS for control the quality of materials (metals, plastic and ceramics, etc) generally bio compatibles, focused on implants and prosthetic devices. The last one is under way to be accredited conformably to SR EN ISO/CEI 17025:2005 norm. The most recent extension of the CMPICSU MURC is the *Platform of implantology, intelligent prosthetics and biomechanical rehabilitation*. The platform is destined to be a union place for research-production and education destined both to interdisciplinary formation of specialists in Medical Engineering and to release integrated solution of diagnosis, prosthetization and mobility and functional rehabilitation.

RESEARCH FIELDS

- Fundamental and applied research in Biomechanics;

- Image acquisition and processing in order to correct congenital or accidental defects of human skeleton;
- Research on prosthetic appliances and implants optimization depending on skeleton defects;
- Complex data basis for different categories of skeleton defects and repairing surgical techniques;
- Conceiving of new surgical techniques;
- New technologies to manufacture surgical implants and prosthetic devices;
- New testing methods designed for various materials but focused on implants and prosthetic devices.

KEYWORDS

Medical imaging, implant, prosthesis, mandibular distracter, surgical technique, biocompatible material, biological structure modelling, 3D reconstruction.

ACTIVITIES

- *Image processing and interpretation* in order to correct congenital or accidental defects of the human skeleton;
- *Prosthetic appliances and implants optimization* as function of skeleton defects;
- *Complex data basis for different categories of skeleton defects and the repairing surgical techniques*;
- *New surgical techniques* to improve the skeleton structure and the sustaining demo operations;
- Development of appropriate technologies to *realize implants and prosthesis using biocompatible materials*.
- Manufacturing of *implants and external distractors for maxilla-facial surgery*, using biocompatible materials, in the LOPIFO Laboratory;
- Development of the *production capacity in the Platform laboratories*;
- *Certification* of new prototypes of *implants and prosthesis*;

- *Mobility rehabilitation* based on gait analysis for patients under recovery and also for the high performance sportsmen;
- *Implementation of quality system* in the CIDUCOS Testing Laboratory;
- *Promoting collaboration* in related fields with universities and research institutes;
- *Promoting the Medical Engineering Specialization* including master degree studies in Politehnica University of Timisoara .
- *Development of PhD programmes* in the field of *Medical Engineering*, for engineers and other specialists in the medical area of rehabilitation and motion recovery

RESEARCH RESULTS

- Biological structures reconstruction based on computed tomography;
- FE analysis of human mandible, teeth, femur/tibia and spine;
- FE analysis of facial implants;
- Certified set of maxilo-facial implants and external distracter;
- Implants for orthopaedics surgery, both for human patients and animals;
- Gait analysis of patients having different locomotors deficiencies.

CMPICSU LABORATORIES

1. *Laboratory of structures modelling*: professional software for design of both prosthetic devices, implants and surgical operations;
2. *Motion planning laboratory*: 5 mobile robot systems;
3. *Medical Imaging Laboratory*: computer tomography system, ortho-panoramic X-ray apparatus and bio resonant equipment both for diagnosis and therapy;
4. *Manufacturing Laboratory for implant devices, orthoses and prosthetic devices* LOPIFO: equipments to manufacturing prosthetic devices as prototyping and electro erosion equipments;
5. *Testing Laboratory* CIDUCOS in the final stage of accreditation conformably to *SR EN ISO/CEI 17025:2005 standard: corrosion test, hardness test, mass and density determination, metalographic analyses, mechanical tests, spectrometry test*;
6. *Manufacturing laboratories of Platform of implantology, intelligent prosthetics and biomechanical rehabilitation*;
7. *Motion analysis Laboratory*: systems for stance and gait analysis with integrated force




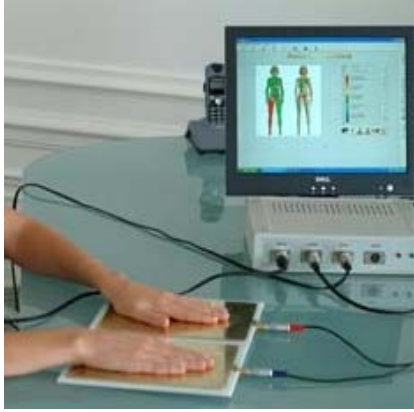
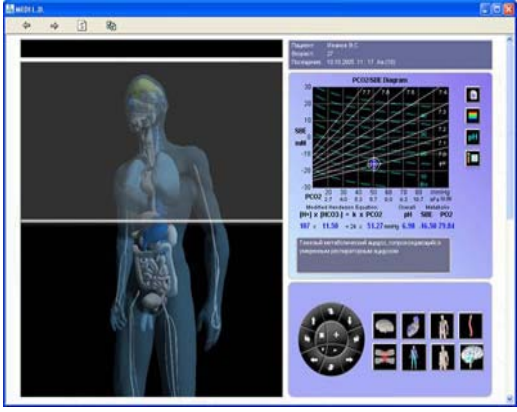


distribution measurement, body band massage device, upright bike, treadmill, and kit for measuring of human physiological parameters.

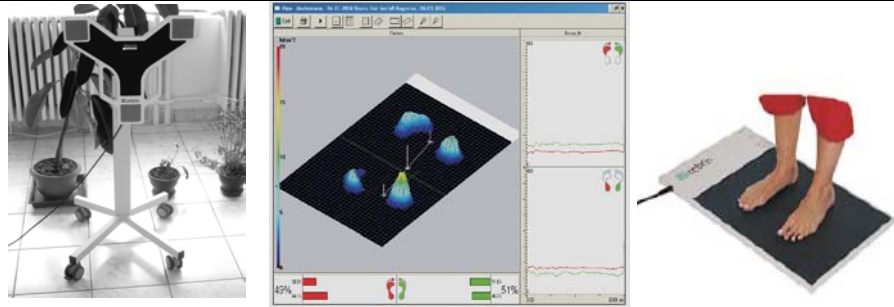
RESEARCH CONTRACTS

1. Contract A1/GR181/19.05.2006, CNCSIS code 655, type A, Director prof. dr. eng. Doina Drăgulescu, *Autonomous prehension system to support handicapped persons and access in dangerous areas* Beneficiary: Ministry of Education and Research, value for 2006 year: 30,000 RON.
2. Contract CEEX-RENAR no.28/7.09.2005, Director prof. dr. eng. Doina Drăgulescu, *Extension and development of CIDUCOS laboratory capacity under way to be accredited by RENAR conformably to conform SR EN ISO/CEI 17025:2001-EDCL_CIDUCOS* Beneficiary: Ministry of Education and Research, total value: 778,500 RON, value for 2006 year: 103,500 RON.
3. Contract CEEX-Medical Sciences Academy no.45/2005, Director prof. dr. eng. Doina Drăgulescu, *Development of innovative therapies for osteoarticular reconstruction CELL-ART*. Beneficiary: Ministry of Education and Research, total value: 200,000 RON, value for 2006 year: 11,000 RON
4. Contract CEEX-Medical Sciences Academy no.70/2006, Director prof. dr. eng. Doina Drăgulescu, *Bio-orthopedy innovative methods for osteoarticular reconstruction BIOART*. Beneficiary: Ministry of Education and Research, total value: 250,000 RON, value for 2006 year: 38,000 RON
5. Platform code CNCSIS 43, Contract MEC no 05/15.09.2006, *Platform of implantology, intelligent prosthetics and biomechanical rehabilitation*, Director prof. dr. eng. Doina Drăgulescu, total value 8,380,800 RON, value for 2006 year: 180,000 RON
6. Contract 58/GR/19.05.2006, CNCSIS code 95, type TD, Director PhD student Dan Ioan Stoia, *Research oriented to improvement of modeling and technological techniques for spine implant* Beneficiary: Ministry of Education and Research, value for 2006 year: 19,000 RON
7. Contract 58/GR/19.05.2006, 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 2006: 18,000 RON
8. Contract CNCSIS type BD, CNCSIS code 178, Director PhD student Lucian Rusu,

Precertification studies and research of implants and prosthesis, value for 2006 year:

2,880 RON.

<p>Medical imaging Laboratory</p>	   <p>Computer tomography system Somatom Plus 4 Power, Printer AGFA</p>   <p>Bio resonant equipment DDFAO</p>
<p>Laboratory for motion analysis</p>	 <p>Treadmill, upright bike and body band massage device</p>  <p>Kit for measuring of human physiological parameters</p>

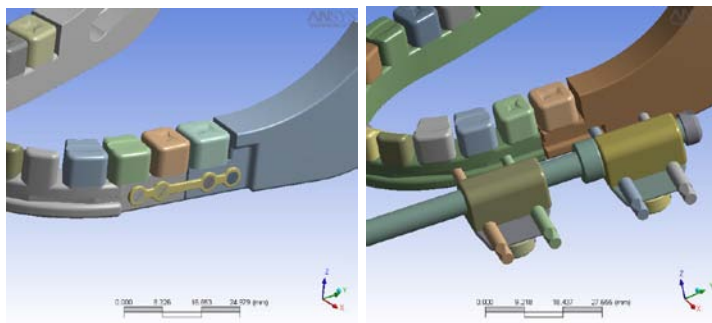


Systems for stance and gait analysis with integrated force distribution measurement

**Laboratory
for implants
and prosthetic
devices
manufacturing
LOPIFO**



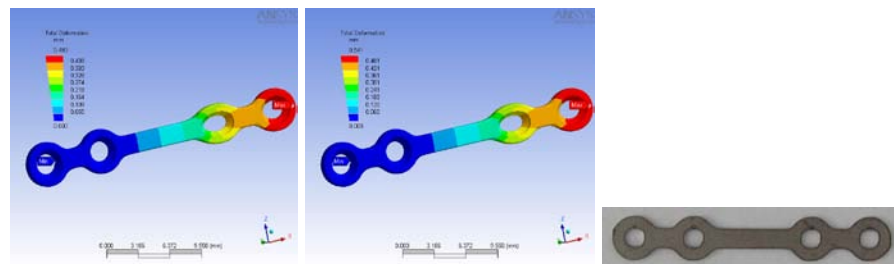
Certified set of maxilo-facial implants and external distracter



Modelling of implant and distracter use



Prototyping and electro erosion equipments. Implant during manufacturing process

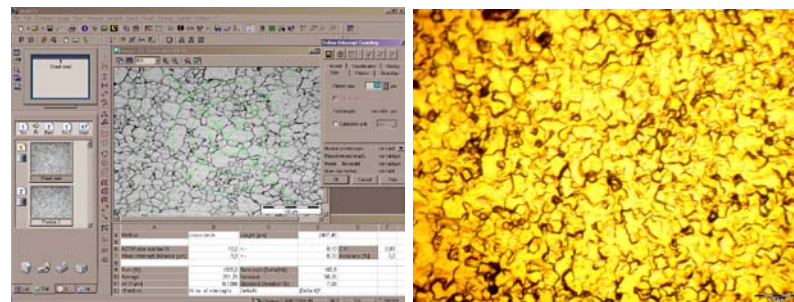


Implant manufactured using electro erosion equipment and analysed using Finite Element Method

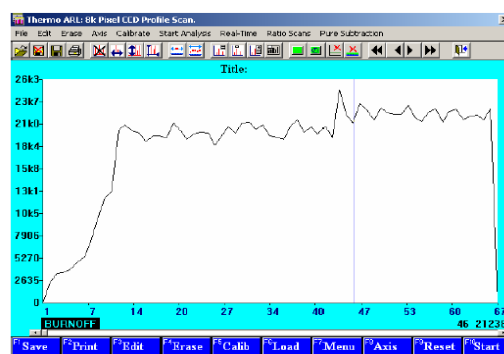
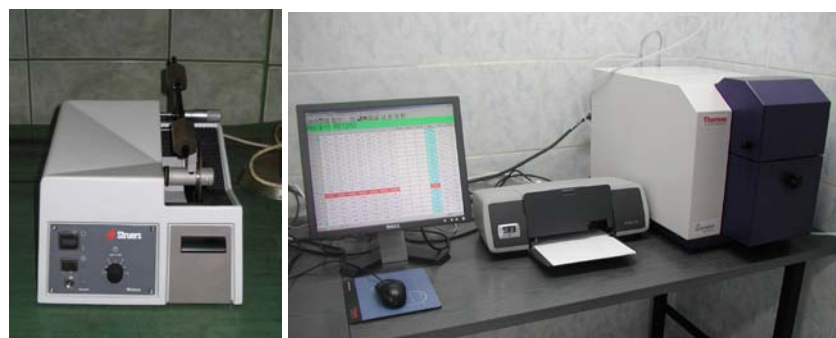
**Laboratory
for control the
quality of
implant
devices
CIDUCOS**



Microscop Olympus BX51M. Stereomicroscop Olympus SZ7X



Metallographic analyses results

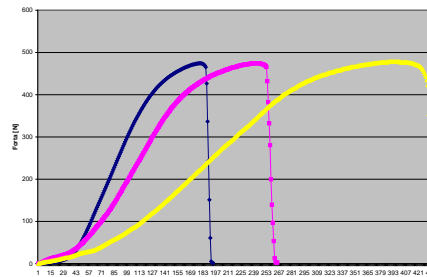


Automatic precision cut-off machine for sectioning materialographic and ceramic specimens
Minitom ISOTO

ARL QuantoDesk optical emission spectrometer for metals analysis, based on CCD



Multi Test 5-i Computer-controlled system.
Vortex (-i) Computer-controlled torque system



Extension test results for an implant

PUBLICATIONS

BOOKS

1. Lucian Rusu: *Studies and tests of implants and prosthetic devices in against homologation*, Series 9, Mechanical Engineering, No.2, Politehnica Publishing House, Timișoara, 2006, ISSN: 1842-4937; ISBN (10) 973-625-375-9; ISBN (13) 978-973-625-375-1, 202 pages
2. Doina Drăgulescu, Mihaela Popescu: *Composite Materials Enciclopedy*, Politehnica Publishing House, Timișoara, 2006, ISBN 973-625-272-8, 500 pages

PAPERS IN JOURNALS

1. D.Drăgulescu, M.Toth-Tașcău, K. Menyhardt, I. Stoia, *Simulating 3D active workspace of an anthropomorphic shaped end effector*, Spisanie Masinstroenie & Elektrotehnica, Publ. Masintelekt-Bulgaria, an LV, nr. 4-5, 2006, ISSN 0025-455X, p. 28-30.
2. M.Toth-Tașcău, D.Drăgulescu, M. Dreucean, *Improving the path planning simulation based on visibility graph method*, Spisanie Masinstroenie & Elektrotehnica, Publ. Masintelekt-Bulgaria, an LV, nr. 4-5, 2006, ISSN 0025-455X, p. 25-27.
3. D.Drăgulescu, C. Stoicănescu, M.Toth-Tașcău, M. Dreucean, *Mobile robot motion in a virtual laboratory*, Spisanie Masinstroenie &

Elektrotehnica, Publ. Masintelekt- Bulgaria, an LV, nr. 4-5, 2006, ISSN 0025-455X, p. 31-34

4. D.Drăgulescu, M. Toth-Tașcău, L. Rusu, *About mechanical behavior of a head skeleton implant*, Scientific Medicalinfo Journal, no. 1, 2006, ISSN 1847-8686, p.1-6.
5. D.Drăgulescu, L. Rusu, M. Toth-Tașcău, *Long bones implants in Titanium alloys*, Scientific Medicalinfo Journal, no. 1, 2006, ISSN 1847-8686, p.7-10.

PAPERS IN PROCEEDINGS

1. Demian C., Roșu R., Liță M., Răduță A., Cosmin Locovei - *Experimental determination of the stresses at cold working of titanium*, International Conference, Structural Integrity of Welded Structures, 08-09.11.2006, ISIM Timisoara, Romania, Edited by CENTA-ISIM, ISSN 1842-5518, p. 68-74.
2. D. Drăgulescu, C. Couturier, K. Menyhardt, *Human upper limb kinematical model in a 3D workspace*, Proceedings of 9 th Symposium on 3D analysis of human movement, Valenciennes, France, June 28-30, 2006, Proceedings on CD, paper no.31
3. V.Morcovescu, D.Drăgulescu, M.Toth-Tașcău, *The dynamic study of the human lower limb during normal gait*, Proceedings of 9th Symposium on 3D analysis of human

- movement, Valenciennes, France, June 28-30, 2006, Proceedings on CD, paper no.62
4. M.Toth-Tașcău, D.Drăgulescu, M. Dreucean, C. Vigar, *Quality management of CIDUCOS testing laboratory*, Proceedings Symposium o operacionim istrazivanjima SYM-OP-IS 2006, Banja Koviljaca, ISBN 86-82183-07-2, p. 105-108.
 5. D.Drăgulescu, C. Stoicănescu, M.Toth-Tașcău, M. Dreucean, *Path planning of a mobile robot in a virtual laboratory*, Research and Development in Mechanical Industry RaDMI 2006, Volume 1, Papers from Sessions A, B, C, D, E and F, Budva, Muntenegro, 13-17.09.2006, ISBN 86-83803-21-X, p.1-6.
 6. M.Toth-Tașcău, D.Drăgulescu, M. Dreucean, C. Vigar, *Quality management of CIDUCOS testing laboratory*, Research and Development in Mechanical Industry RaDMI 2006, Volume 1, Papers from Sessions A, B, C, D, E and F, Budva, Muntenegro, 13-17.09.2006, ISBN 86-83803-21-X, p.14-20.
 7. L.Ungureanu, D.Drăgulescu, A. Stanciu, M. Sodincă, *The dynamic study of the palm-middle finger system*, Proceedings SACI 2006, 3rd Romanian-Hungarian joint symposium on Applied Computational Intelligence, Timișoara, Romania, May 25-26, 2006, ISBN 963 7154 39 6, p. 453-459.
 8. D.Drăgulescu, L. Rusu, M. Toth-Tașcău, *About the behavior of fixation devices on the fractured mandible*, Proceedings SACI 2006, 3rd Romanian-Hungarian joint symposium on Applied Computational Inteligence, Timișoara, Romania, May 25-26, 2006, ISBN 963 7154 46 9, p. 148-153.
 9. D.Drăgulescu, L.Ungureanu, *Dynamics of the palm-middle finger system being under the exclusive active of the gravity forces*, Proceedings of the European Federation of Medical Informatics, Integrating Biomedical Information: From eCell to ePatient, April 6-8, 2006, Timișoara, Romania, ISBN 3-89838-072-6 Aka, ISBN 1-58603-614-9 IOS Press, ISBN 973-625-303-1 Ed. Politehnica, p. 203-205.
 10. A.Albu, D.Drăgulescu, L.Ungureanu, *Decision support system for liver's morphological changes detection using images processing*, Proceedings of the 7th International Conference on Technical Informatics- CONTI 2006, vol.1, Automation and Applied Informatics, Timișoara, Romania, June 8-9, 2006, ISBN (10) 973-625-320-1, p. 235-238.
 11. A.Stanciu, D.Drăgulescu, L.Ungureanu, *A hydraulic solution for implementing human's hand prehension function*, 12th Proceedings of International Symposium for design and technology of electronic packaging, SIITME 2006, Iași, septembrie 2006, ISBN 978-973-8961-23-4, p.207-210.
 12. D.Drăgulescu, L.Rusu, M.Toth-Tașcău, E.Urtilă, *Study of a custom implant for maxillofacial surgery*, Proc. International Conference Biomaterials & Medical Devices BiomMedD'2006, November 9-11, 2006, ISBN 973-718-566-8, ISBN 978-973-718-566-2, p.97.
 13. D. Drăgulescu, C.Demian, I.Vida Simiti, A.Răduță, R.Prejbeanu, *Some defects in an ortopedic implant*, Proc. International Conference Biomaterials & Medical Devices BiomMedD'2006, November 9-11, 2006, ISBN 973-718-566-8, ISBN 978-973-718-566-2, p.176.
 14. M.Toth-Tașcău, C.Vigar, D.Drăgulescu, M.Dreucean, *Testing system for maxilofacial surgical implants*, Proc. International Conference Biomaterials & Medical Devices BiomMedD'2006, November 9-11, 2006, ISBN 973-718-566-8, ISBN 978-973-718-566-2, p.287
- PhD THESIS** - Scientific coordinator prof. dr. eng. Doina Drăgulescu
- Rusu Lucian: *Studies and tests of implants and prosthetic devices in against homologation*, November 2006
- PhD STUDENTS** - Scientific coordinator prof. dr. eng. Doina Drăgulescu
- Demian Camelia: *Researches about behavior of materials designed to realize bones implants conformably European quality standards*
 - Voicu Adrian: *Biocompatibility study between surgical implants in Titanium alloys and human body*
 - Menyhardt Karoly: *Intelligent prosthetic system for human upper limb*
 - Stoia Dan Ioan: *About modeling and setting the appropriate technology for spinal implants*
 - Dragomir Lavinia; *Contributions to mathematical modeling of spaces with obstacles to plan the motion*
 - Belu Nica Remus: *Considerations about welding technologies of thin plates in metallic composite*

- Albu Adriana Nicoleta: *About expert systems for the diagnose of liver diseases*
- Cărăbaș Ionică: *Biomechanical study of characteristic motions in running during athletic proofs and handball*
- Șimon Andreea Anca: *Contributions to the conceiving of a virtual mannequin to model fashion clothes*
- Gherghel Daniela: *Contribution to prosthetic replacing of mechanical functions of human upper limb*
- Bianu Arcadie: *Biomechanical studies for improving physical performances of sport-beginners*
- Ștefan Vișaru Cosmina: *Theoretical and experimental studies about vibration sources and levels produced by some types of looms*
- Ungureanu Loredana: *Models of human hand rebuilding and its functions*

PERSPECTIVES

- Manufacturing new implants models and prosthetic devices in order to be certified conformably to European standards;
- Motion analyzes for lower and upper limb as well as the global static posture of the human body;

- Extention of testing methods for medical devices;
- Further research in the field of 3D reconstruction of human body elements.

RESEARCH TEAM

- Prof. dr. eng. Doina Drăgulescu – Director
- Prof. dr. eng. Mirela Toth-Tașcău
- Assoc. prof. dr. eng. Mircea Dreucean
- Lect. dr. eng. Vlad Morcovescu
- Assist. eng. Cosmina Vișaru, PhD student
- Assist. dr.eng. Lucian Rusu
- Eng. Camelia Demian, PhD student
- Eng. Adrian Voicu, PhD student
- Eng. Karoly Menyhardt, PhD student
- Eng. Ioan Dan Stoia, PhD student
- CMPICSU partners in Timișoara, Bucharest, Cluj-Napoca, Craiova

CONTACT

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HYDRAULIC MACHINERY DIVISION and the 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 turbo machinery 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 Centre 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, and 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 centre 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 Centre 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, hydromechanics equipments, and 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 turbo machinery 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, turbo machineries, hydro mechanical equipment;
- Analysis and optimization of hydraulic turbo machines, 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.

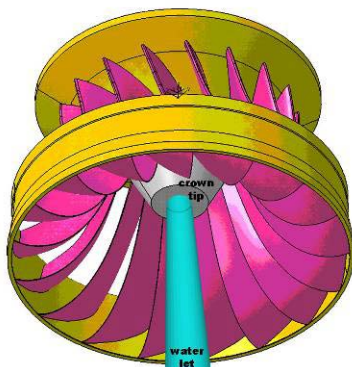
ACTIVITIES

- *Numerical Simulation* in hydrodynamics of turbo machinery and hydraulic equipment and development of software bases for intelligent machines and installations
- *Development of numerical methods* to simulate the flow in turbo machines, cascades and development of complex models to determine the universal characteristics of cascades and turbo machines
- *Constructive solutions* for turbines and micro-turbines and research and design of turbo machines

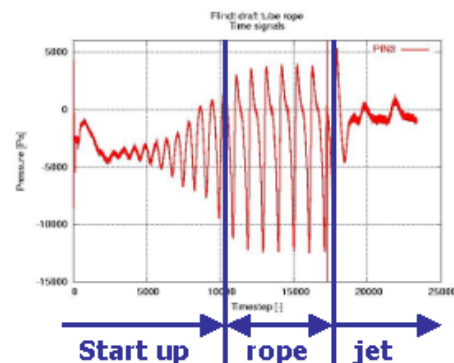
- *Optimization of hydraulic machinery* using modern numerical methods
- *Cavitation* in turbo machinery with application to Francis and Kaplan turbines, cavitation erosion of materials used for hydraulic machines.
- *Design* of hydraulic drive systems for several industrial applications, modular optimization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

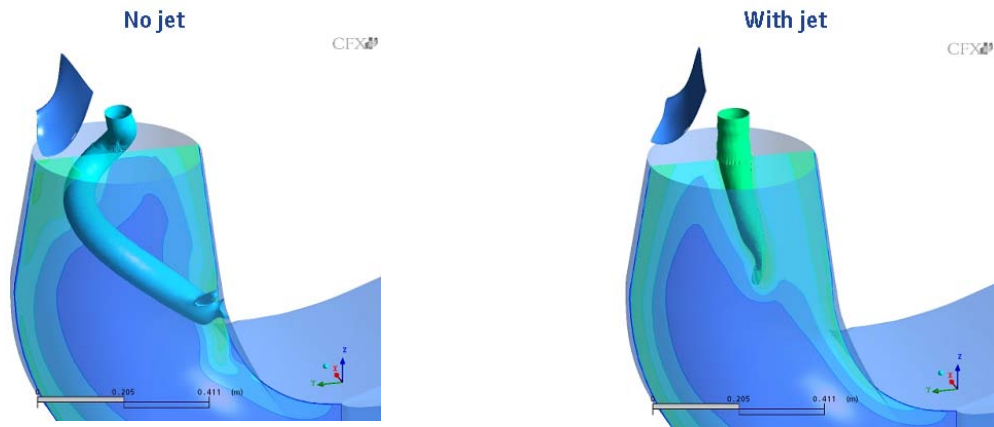
- Numerical analysis and stability analysis of decelerated swirling flows in hydraulic turbine draft tube; development of novel flow control techniques for Francis turbines operated at partial discharge.
- Full three-dimensional flow simulation and analysis in Kaplan and Francis hydraulic turbines;



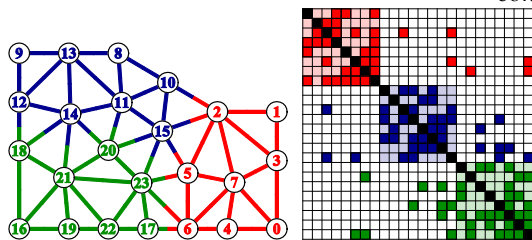
Local draft tube wall pressure Near runner trailing edge



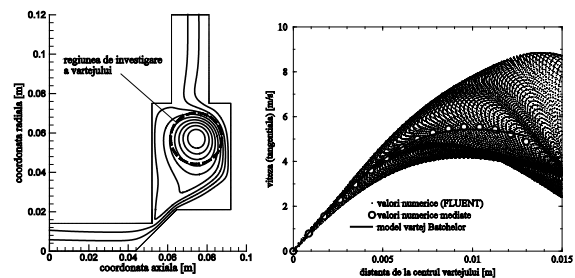
Jet control of the swirling flow downstream a Francis turbine runner and reduction in pressure fluctuations downstream in the draft tube cone.



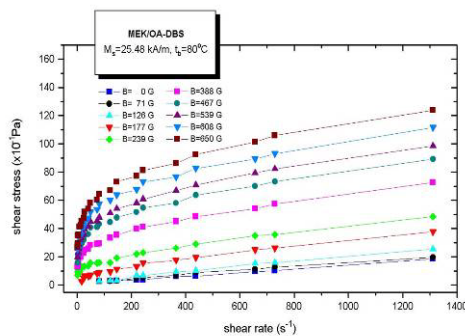
Vortex rope mitigation in the draft tube cone of a Francis turbine operating at partial discharge using the jet control technique.



Graph partitioning for minimizing the interprocessor communication for parallel computing



Numerical simulation of flow in poppet valves and analytical vortex modelling



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).

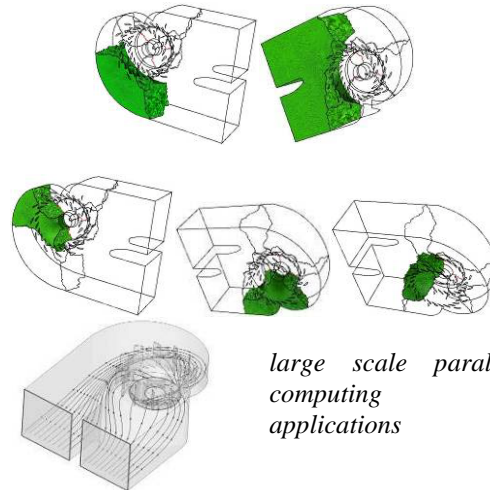
Numerical Simulation and Parallel Computing Laboratory

Hardware infrastructure:

- 14 workstations computer cluster, PIII, 1 GHz, 1 GB RAM
- IBM X225 Windows server
- Dual PIII, 2GB RAM Linux server
- 5 workstations, DUAL INTEL XEON 3 GHz, 4 GB RAM.

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.



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4. CNCISIS grant 145, theme 4, Contract 27238/05.05.2006, *Theoretical and experimental investigations regarding the hydro-mechanical equipments for driving and power system*. 27,450 RON, Director: Prof. Dr. eng. Victor Bălăşoiu.
5. CNCISIS 2738/19.05.2006, *Theoretical and experimental research regarding the turbomachineries function with biphasic medium applications to turbotransmission hydrodynamics*, 40,000 RON/2006, Director: Prof. Dr. eng. Mircea Bărglăzan.
6. CEEX-M1-C2-1185 (iSMART-flow), Contract 64/2006 MATNANTECH, Subcontract UPT 9226/24.07.2006, *Integration of Special Magnetorheological Technologies and Advanced Flow Control in Industrial Applications*, 130,000 RON / 2006, Director: Prof.dr. Eng. Romeo Susan-Resiga.
7. CEEX-M1-C2-1180 (CARDIOCOMP), Contract 81/2006 VIASAN, Subcontract UPT 9229/24.07.2006, *Computer Optimized*
8. CEEX Contract X2C05/3 (TEHNOMED), Subcontract UPT 9159/21.07.2006, *Hydrodynamics and mass transfer in bubble columns with applications in advanced environment technologies*, 16,500 RON / 2006, Director: Prof.dr. Eng. Romeo Susan-Resiga.
9. CEEX Contract 51/03.10.2005 (SACOS), Subcontract UPT 11755/09.10.2005, *Autonomous Advanced Systems for Structure Oscillation Control*, 100,000 RON /2006, Director Dr.fiz. Ladislau Vékás.
10. CEEX F2C8/03.10.2005 (FeMANANOF), Subcontract UPT 11711/05.10.2005, *Nanoparticles from Iron and Oron Oxides for Magnetic Nanofluids: Preparation, Characterization and Applications*, 34,000 RON/ 2006, Director Fiz. Oana Marinică.
11. PNCDI – AEROSPAȚIAL Contract 114/02.11.2004 (HIPOUV), Subcontract UPT 13512/01.11.2004, *Researches on the genetic and epigenetic activity procarote and eucariote biological systems in simulated hypogravity conditions, in the presence of magnetic nanoparticles and UV radiation*,

- 3,143 RON / 2006, Director Fiz. Oana Marinică.
12. PNCDI - AEROSPAȚIAL Contract 173/01.11.2004 (TRAMAG), Subcontract UPT 15062/29.11.2004, *Magnetically controllable transporters of medical/active substances*, 13,000 RON/2006, Director Fiz. Oana Marinică.
 13. PNCDI - AEROSPAȚIAL, Contract 111/01.10.2004 (OALM), *Researches on the construction of adaptive mirrors with magnetizable complex fluids, with application to space telescopes*, Subcontract UPT 111.2/01.10.2004, 18,000 RON / 2006, Director Fiz. Oana Marinică.
 14. PNCDI - CERES, Contract 4-186/2004 (AREFIN), *Absorption of electromagnetic radiation in nanofluids with applications in cancer thermotherapy*, Subcontract 14269/12/11/2004, 3,500 RON/2006, Director Dr.fiz. Ladislau Vékás.
 15. Contract UPT 462/2006, *Numerical Simulation and Analysis of the Flow with Heat Convection and Radiation for Four Versions of the Heating Element of an Electrical Drying System*, 17,500 RON/2006, Director Dr.eng. Sandor Bernad.
 16. Contract UPT 380/20.12.2005, *Numerical Simulation of Water Flow Through the Refurbished Kaplan Turbine from Iron Gates I Hydro Power Plant*, 15,000 RON/2006, Director Prof.dr.eng. Romeo Susan-Resiga.
 17. Contract 572/2006, *Numerical Simulation and Analysis of Air Flow with Heat Convection and Radiation for an Electrical Heating System*, 5,000 RON, Director Assist.Prof. Adrian Stuparu.

PUBLICATIONS

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2. Bărglăzan, M., Velescu., - *The Couplings, the Transformers and the Hydrodynamic Brakes*, (in Romanian) Editura Politehnica, Timisoara/2006, 190 pages, ISBN 973-625-287-6.
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5. Bernad, S., Muntean, S., Susan-Resiga, R., (Editors), *Proceedings of the 2nd Workshop on Vortex Dominated Flows. Achievements and Open Problems*, Scientific Bulletin of the Politehnica University of Timisoara, Transactions on Mechanics, Tom 51(65), Fasc. 3, Special Issue, 2006, ISSN 1224-6077, 162 pages.

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1. Susan-Resiga R., Vu T.C., Muntean S., Ciocan G.D., Nennemann B., *Jet Control of the Draft Tube Vortex Rope in Francis Turbines at Partial Discharge*, Proceedings of the 23rd IAHR Symposium on Hydraulic Machinery and Systems, Yokohama, Japan, 2006, paper 192 (on CD-ROM, ISBN 4-8190-1809-4).
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 4. Susan-Resiga R., Muntean S., Anton I., Avellan F., *Analysis and Control of Decelerated Turbulent Swirling Flow in Francis Turbine Draft Tube Cone*, Proceedings of the IAHR International Meeting of the Workgroup on Cavitation and Dynamic Problems in Hydraulic Machinery and Systems, Barcelona, 2006, p. 1-24, on CD-ROM, ISBN 4-8190-1809-4.
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 6. Balint D., Susan-Resiga R., Muntean S., Anton I., *Numerical Study of the Cavitation Phenomenon in Hydraulic Turbines*, in Lajos T., Vad J., Schilling R., (Eds.) : Proceedings of the 13th International Conference on Modelling Fluid Flow CMFF'06, Budapest, 2006, Vol. II, ISBN 963-06-0382-9, pp. 980-987.
 7. Bernad S., Irrera A., Susan-Resiga R., Anton L.E., *Numerical Analysis of the Three-Dimensional Unsteady Free Convection and Radiation in an Electrical Heating Element*, in Lajos T., Vad J., Schilling R., (Eds.) : Proceedings of the 13th International Conference on Modelling Fluid Flow CMFF'06, Budapest, 2006, Vol. I, ISBN 963-06-0361-6, pp. 464-469.
 8. Bărglăzan, M., Guzun, B.D., Mucichescu, C., Grigoriu, M.,-*Remote pumped-storage system back-to-back variable speed operated*, World Energy Systems Conference WESC 2006 Torino, ITALY ed. G.Chicco, Section A.9, Article 9.4, ISBN 10-88-87380-51-1, ISBN 13- 978-88-87380-51-1, pp. 340-344.
 9. Bordeasă I., Sporea I., Popoviciu M., Balaşoiu V.,- *Effect of the Hardening Heat Treatment by Precipitation of Aluminum Alloys Used in Casting Pistons for Internal Combustion Engine*, The 4-th International Symposium "KOD 2006", Shape, Mechanical and Industrial Design of productions in mechanical Engineering 30-31.05.2006, Palić, Serbia & Montenegro, ISBN: 86-85211-92-1, pp.337-340.

10. Popoviciu M., Bordeasu I., Balaşoiu V.,- *The Chalange of New European Trends in Academic Education in Timisoara Mechanical Faculty*, Trans & MOTAUTO'06- Proceedings Vol.5, Technics and technologies, 25-28.10.06, Varna, Bulgaria, ISBN 954-9322-10-6, pp.19-21.
11. Popoviciu M., Bordeasu I., Balaşoiu V.,- *Implementation of new European trends in Timisoara Mechanical Faculty*, The 10-th International Conference on Fire and Explosion protection, Novi Sad, 10-20.10.2006, ISBN 86-84853-07-5, pp.420-430,
12. N. Crainic, Doina Bica, A. Torres Marques, N. C. Popa, P. J. Novoa, N. Correa, Oana Marinica, C. P. Moreira de Sa, L. Vékás, *Magnetic Nanocomposites Obtained Using High Vapor Pressure Magnetic Nanofluids*, Proceedings of the 4th International Symposium on Nanomanufacturing, ISNM2006, Cambridge, November 1 - 3, 2006, MA USA, pp. 70 – 75.

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1. Stuparu A., Muntean S., Balint D., Anton L.E., Baya A., *3D Numerical Investigation of the Flow in a Centrifugal Pump*, Proceedings of the Romanian FLUENT Users Group Meeting, Sinaia, 2006, pp. 43-49, ISBN 9737184432 (on CD-ROM, ISBN 9789737184436).
2. Balint D., Muntean S., Susan-Resiga R., *Advanced CFD Analysis of the Cascade Flow Hydrodynamics*, Proceedings of the Romanian FLUENT Users Group Meeting, Sinaia, 2006 pp. 100-105 ISBN 9737184432 (on CD-ROM, ISBN 9789737184436).
3. Bărglăzan, M., Dobândă, E., Miloş, Th.,- *Modelisation of liquid-gas flows in torque converters*, Hervex 2006, The XIV-th edition, Râmnicu Vâlcea, ISSN 1454-8003, pp. 74-82.
4. Bărglăzan, M., Velescu, C., Manea, A.,- *Experimental analysis of liquid-gas flows in torque converters*, Hervex 2006, The XIV-th edition, Râmnicu Vâlcea, ISSN 1454-8003, pp. 41-47.
5. Catanase, A., Bărglăzan, M., - *Dynamic behaviours of Pelton turbines*, Hervex 2006, The XIV-th edition, Râmnicu Vâlcea, ISSN 1454-8003, pp. 25-32.
6. Baci, I.D., Bărglăzan, M., - *About finite cascade of profiles with reversible operation*, Hervex 2006, The XIV-th edition, Râmnicu Vâlcea, ISSN 1454-8003, pp. 95-102.
7. Sporea I., Bordeasu I., Olariu M., Cicala E., Sporea M., Uibar E., Dîrlea A.,- *Contribution to the Study of the Time and Temperature Influences of Thermic treatment upon the*

Mechanic properties of Alloy ATSi5Cu7Mg used to cast the Thermic Motor Pistons, Proceedings 1-st International Conference on Motor Vehicle and Transportation MVT2006, Section 3 materials and technologies, 15+17 nov.2006, Timisoara, ISBN-10:973-638-284-2; ISBN-10:978-973-638-284-0; pp.27-32.

8. Mandek Fr., Sporea I., Bordeasu I., Nagi M.,- *The Casting of dacia 1300 Cars Pistons in Laboratory Conditions*, Proceedings 1-st International Conference on Motor Vehicle and Transportation MVT2006, Section 3 materials and technologies, 15-17 nov.2006, Timisoara, ISBN-10:973-638-284-2; ISBN-10:978-973-638-284-0; pp.27-32, pp.71-74.

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.

RESEARCH TEAM

- Prof.dr.eng. Romeo SUSAN-RESIGA, Director
- Dr.phys. Ladislau VEKAS, Scientific Director, head of the Rheology Laboratory
- Dr.eng. Sandor BERNAD, Executive Director
- Dr.eng. Sebastian MUNTEAN, head of the Numerical Simulation Laboratory
- Assoc.prof.dr.eng. Floriana STOIAN, head of the Magnetometry Laboratory
- Prof.dr.eng. Liviu EUGEN ANTON, Head of the Fluid Mechanics Laboratory
- Prof.dr.eng. Alexandru BAYA, Head of the Hydraulic Turbines Laboratory
- Assoc. prof. dr. eng. Theodor MILOŞ, Head of the Pump Laboratory
- Assoc. prof. dr. eng. Ilare BORDEAŞU, Head of the Cavitation Laboratory
- Prof. dr. eng. Victor BĂLĂŞOIU, Head of the Power Systems Laboratory
- Acad. prof. dr. doc. eng. Ioan ANTON
- Prof. dr. eng. Iosif PREDA
- Prof. dr. eng. Francisc GYULAI
- Prof. dr. eng. Mircea POPOVICIU
- Prof. dr. eng. Mircea BĂRGLĂZAN
- Lect. dr. eng. Adriana SIDA MANEA
- Lect. dr. eng. Eugen DOBÂNDĂ
- Lect. dr. eng. Corneliu VELESCU
- Lect. dr. eng. Adrian BEJ
- Lect. dr. eng. Dorin GALERIU
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- Assist. Prof. Rodica BĂDĂRĂU
- Assist. Prof. Ioan PĂDUREANU
- Assist. Prof. Daniel BALINT
- Assist. Prof. Adrian STUPARU
- Phys. Oana MARINICĂ
- George GIULA

- Florica BALANEAN
- Mariana TODIRUȚĂ
- Ioan POTORAC
- Delia BOLOJAN
- Angela VATAU
- Pavel POBEGA
- Petru IGNEA

PhD STUDENTS

- Lecturer Mircea IVANOIU, *Analysis and Optimisation of Hydrofoil Cascades for Efficiency and Cavitation*, scientific advisor Acad.Prof.dr.doc.eng. Ioan ANTON.
- Assist. Prof. Daniel BALINT, *Numerical Computing Methods for Three-Dimensional Flows in the Distributor and Runner of Kaplan Turbine*, scientific advisor Acad.Prof.dr.doc.eng. Ioan ANTON.
- Assist. Prof. Adrian STUPARU, *Numerical and Experimental Investigation of the Flow in Centrifugal Pumps*, scientific advisor Acad.Prof.dr.doc.eng. Ioan ANTON.
- Inf. Teodora FRUNZA, *Methods of the Real Flow Simulation in Hydrofoil Cascades*, scientific advisor Acad. Prof. dr. doc. eng. Ioan ANTON
- Assist.Prof. Rodica BADARAU, *Contributions to the Study of Axial Turbo machines*, scientific advisor Prof.dr.eng. Francisc GYULAI.
- Eng. Adrian SIMEDRU, *Optimisation of an Axial Hydraulic Turbine Operation*, scientific advisor Prof.dr.eng. Mircea BARGLAZAN.
- Assist.Prof. Adriana CATANASE, *Dynamic Identification of a Tangential Hydraulic Turbine of Pelton Type*, scientific advisor Prof.dr.eng. Mircea BARGLAZAN.

- Assist.Prof. Ionel BACIU, *Reversible, Axial Hydrodynamic Profile Cascades Applied to Turbo machinery Design*, scientific advisor Prof.dr.eng. Mircea BARGLAZAN
- Eng. Walter SWOBODA (Germany), *Contribution to the Design and Operation Optimisation of the Silica-Chip Wafers Cleaning Equipment used in Semiconductor Technology*, scientific advisor Prof.dr.eng. Mircea BARGLAZAN.
- Eng. Ilie Florin SILION, *Aerosol Particle Dynamics Applied to the Design of Noxa Washing Machine from Ventilated Air*, scientific advisor Prof.dr.eng. Mircea BARGLAZAN.
- Eng. Maria PERNEVAN, *Dynamic Identification and Optimisation of the Hydraulic Dampers*, scientific advisor Prof.dr.eng. Mircea BARGLAZAN.
- Eng. Catalin STROITA, *Dynamic Identification of Cross-Flow Hydraulic Turbines*, scientific advisor Prof.dr.eng. Mircea BARGLAZAN.

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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 CNCSIS, 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. CNCSIS Project 32940/2004, addendum 2006 theme 6, *Dynamics and optimization of work of roto-percussive and percussive drilling equipment*, Director: Prof. dr. eng. Adrian Chiriac, Value: 15.000 RON
2. CNCSIS Project 2738/19.05.2006, theme 18, *Nonlinearity effects in the study of continue media vibrations*, Director: Prof. dr. Vasile Marinca, Value: 22.500 RON
3. CNCSIS Project 27688/14.03.2005, addendum 2006 theme 4, *Researches concerning vibrations of vehicle equipped with semi-active dampers with magnetorheological fluids*. Director: Prof. dr. eng. Liviu Bereteu, Value: 10.000 RON

4. CNCSIS Project 58/19.05.2006, theme 1, *Noises investigation and reduction in urban environment with application at Timisoara city*. Director: Prof. dr. Vasile Bacria, Value: 17.000 RON
5. S.C. Coca Cola S.R.L. Timisoara Project 459/2006, *Noises measurements in the S.C. Coca Cola HBC Romania S.R.L. Timisoara enclosure*. Director: Prof. dr. Vasile Bacria, Value: 3.500 RON
6. CNCSIS Project 2739/19.05.2006, *Experimental studies concerning dynamic effects that appear in multiphase fluids transportation through pipeline networks*, Director: PhD stud. Eng. Alexandru Tocarciuc, Value: 11.700 RON

PUBLICATIONS

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6. Herisanu N., Bacria V., Toader M., Popa Radovan S., *Investigation of noise pollution in an urban area*, WSEAS Transaction System, Issue 7, Volume 5, July 2006, ISSN 1109-2777 pp 1647-1653
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9. Becheru, G., Babeu, T., Chiriac, A., *On the Power Circulation in Longitudinal Plan at a Four Wheel Drive Vehicle*, Annals of the Univ. of Oradea, Fasc. Manag. and Techn. Engine., Vol.V(XV), 2006, p.237-240, ISSN 1583-0691
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PhD THESIS

Stavrat Laurențiu, *Study of sonorous pollutions of urbane centers*, 12 January, 2006, PhD coordinator: Brîndeu Liviu

Costea Gabriela, *Researches concerning the collision of mechanical systems taking into account the local contact deformations*, 20 February, 2006, PhD coordinator: Cioară Titus

Hule Hora Voichița, *Dynamic systems with percussive interaction in the hypothesis of local contact deformations*, 28 Sept 2006, PhD coordinator: Cioară Titus

PhD THEMES

Scientific supervisor: Prof. dr. eng. Doina Drăgulescu

1. Nagy Ramona, *Researches concerning the nonlinear behavior of some mechanical systems with discontinuities due to impacts*

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. Oprețescu Cristina, *Numerical simulation for the motions with mechanical constraints and collisions*
9. Palincaș Gabor Romeo, *Researches concerning the work of attachment - detachment device of an airbag*
10. Roșoga Daniela Lucia, *Mathematical models in the study of cylindrical sieves*.
11. Simoiu Dorin, *Theoretical and experimental studies concerning the loads, induced by the wind on a mechanical structure. Applications to a structure of parabolic aerial*

12. Țirdea Amalia, *Methods and equipment for vibration isolation for the mechanical pressing machines*
13. 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 BRÎNDEU
- Prof. dr. Vasile BACRIA
- Prof. dr. eng. Liviu BERETEU
- Prof. dr. eng. Adrian CHIRIAC
- Prof. dr. eng. Titus CIOARĂ
- Prof. dr. Vasile MARINCA
- Prof. dr. eng. Ioan SMICALĂ
- Prof. dr. Mihai TOADER

- Assoc. prof. dr. Pantele CHELU
- Assoc. prof.dr. Gheorghe DRĂGĂNESCU
- Assoc. prof. dr. eng. Nicolae HERIȘANU
- Lect. dr. Valeriu ANGHELESCU
- Lect. dr. eng. Alexandru DĂNOIU
- Lect. eng. Nicolae FĂNTÂNĂ
- Lect. dr. eng. Gheorghe LUCA
- Lect. dr. eng. Smaranda POPA-RADOVAN
- Assist. eng. Ramona NAGY
- Eng. Adriana BALTĂ, PhD student
- Eng. Cristina BASARABĂ-OPRIȚESCU, PhD student
- Econ. Dănuț BIRCEANU, PhD student
- Phys. Alexandru BOLTOSI, PhD student
- Eng. Gabor Romeo PALINCAȘ, PhD student
- Eng. Alexandru TOCARCIUC, PhD student

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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 transducers, 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.
 - Developing of fundamental and applicative research activities, technological development for the present industrial demands, welders' education and qualification according to EN 287, welding procedures qualification according to EN 288-3 and AD-Mblt. HPO, welders' certification, according to TÜV requirements, technical supervision of the pressure vessels, tanks and complete projects according to TÜV requirements.
- IERC 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
 - 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: Professor George Drăghici, Value for 2006: 28476€
2. Contract CEEX 243/2006, *National Research Network for Integrated Product and Process Engineering*, Director: Professor George Drăghici, Value for 2006: 102000 RON
3. Contract CEEX 238/2006, *Research Network for a New Production Process based for on-line Failures Prediction in Integrated Maintenance and Reliability*, Director: Professor George Drăghici, Value for 2006: 25600 RON
4. CNCISIS 34/638/2006, *New approach on decreasing noises and vibrations level from main functioning of machine tools and machineries*, Director: Professor Petru Suru, Value: 19360 RON
5. Contract C463/2006 ARIS S.A. Arad, *Researches upon decreasing of noises and vibrations level of in lather transmission drives*, Director: Professor Petru Suru, Value: 10000 RON
6. CNCISIS A1/GR 181, T7/19.05.2006, *Researches about systemic approach and mathematical modeling of the will's cylinders overhaul through inductive preheating turning*, Director: Conf.dr.eng. Cicală Eugen Florin, Value: 7450 RON
7. CNCISIS nr.70 GR, T4/17.05.2006, *New technologies in oral implantology based on*

- animal osteo-integration*, Coordinator prof.dr.eng. Ghiță Mihai, Value: 10000 RON
8. Contract CEEEX nr.2052/2006, *Fundamental and applied researches on water jet and abrasive particles magnetic activated manufacturing – elmajet*, Director: Conf.dr.eng Mircea Vasilescu, Value: 1,5 mil RON
 9. CEEEX contract 282 / 2006, *Optimizing the recovery of energy potential of wastes in order to obtain clean pover energy in Romania – OVAPED*, Director UTS: Prof.dr.eng Livius Milos, Value: 5000 RON
 10. Contract INCERC Timisoara, 394/2006, *Research for the certification of arc drawn welding procedure on compouse structure steel-concrete*, Director: prof.dr.eng. Gheorghe GLITA, Value: 7936 RON
 11. Contract ASTRA Vagoane S.A.Arad, 529/2006: *The determination of arc welding technologie for the truck edgewise wall SSDT*, Director: lecturer.dr.eng. Mircea BURCA, Value: 1400 RON
 12. Contract Sudexpert Timisoara 564/2006, *Technical documentation for the welding column CRC3 and the rolling block BR 10*, Director: assoc.prof.dr.eng. Mihaela Popescu, Value: 2000 RON
 13. CNCISIS 744/2006 *Studies and researches for optimizing the design of removable partial dentures by informatic systems for analysis and interpretation in order to implement new technologies*, Director: prof.dr.eng. Livius Milos, Value: 5000 RON

Prospective:

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

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4. Fleser, T., *Inspection and maintenance of industrial technical systems*, Sudura Publishing House, Timișoara, 2006, ISBN (10)973-8359-45-7, ISBN (13)978-973-8359-45-7, pp.490.
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4. Drăghici G., *National Research Network for Integrated Product and Process Engineering*, Research of Excellence Conference, 22-24 October, Brașov, 2006, Vol. II, L4-12, Printech Publishing House, Bucharest, ISBN (10) 973-718-552-8, ISBN (13) 978-973-718-552-5, pp.1-9

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- PRIZES**
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- PhD THESIS**
1. Aurelia Marşieu, *Evaluation and Management Competencies in the Context of the Integrated Engineering*, Thesis supervisor: Prof. George Drăghici
 2. Emil Cupşa, *Methods and Tools for Quality Assurance and Management in Masse Production*, Thesis supervisor: Prof. George Drăghici
 3. Tulvan Dan Florin, *Systems for active control for discountinuous surfaces rectification*, Thesis supervisor: Prof.dr.eng. Aurel Dreucean
 4. Rusan Tiberius, *Experimental study on phase transformation of Ni-Cr-Co super alloys, following post welding heat treatments*, Thesis supervisor: Prof.dr.eng. Voicu Safta
- In course PhD THEMES**
1. Sorin Lemac, *Mathematical Models Entities for Manufacturing*, Thesis supervisor: Prof. George Drăghici (2001)
 2. Lidia Dejeu, *Product Modeling for the First Design Stages*, Thesis supervisor: Prof. George Drăghici (2002)
 3. Felicia Banciu, *Developing of a Innovative, Collaborative Product Design Platform*, Thesis supervisor: Prof. George Drăghici (2002)
 4. Vasile Anghel, *Researches Regarding Industrial Maintenance’s Models, Methods and Tools for The Nuclear Field*, Thesis supervisor: Prof. George Drăghici (2002)
 5. Ana-Andreea Mihărtescu, *Customer Requests Integration in the Product Design Stage*, Thesis supervisor: Prof. George Drăghici (2003)
 6. Alin Schmidt, *Product Model Development in the Integrated Engineering Context*, Thesis supervisor: Prof. George Drăghici (2004)

7. Adrian Orița, *Functional Design for Product*, Thesis supervisor: Prof. George Drăghici (2005)
8. Milenco-Sava Mânzat, *Product Data Management and Product Lifecycle Management*, Thesis supervisor: Prof. George Drăghici (2006)

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
- Prof. dr. eng. Livius Milos – team leader
- Prof. dr. eng. Gheorghe Gliță – team leader
- Prof. dr. eng. Traian Fleșer – team leader
- Prof.dr.eng. Richard Herman – team leader
- Prof.dr.eng. Dumitru Mnerie – team leader
- Prof. dr. eng. Dumitru Țucu – team leader
- Prof. dr. eng. Petru Suru
- 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
- Assist. Eng. Lidia Dejeu
- Eng. Alin Schmidt, PhD student
- Prof. dr. eng. Voicu Safta, Academic of European Science and Arts, Academic of Technical Science from Romania
- Assoc. prof. dr. eng. Mihaela Popes
- Lect. Dr.eng. Dan Mălăi
- Lect. dr. eng. Doru Dumbravă
- Lect. dr. eng. Mircea Burcă
- Lect. Dr.eng. Daniel Țunea
- Assist.eng. Aurelian Magda
- Eng. Eduard Berger – PhD student
- Prof. dr. eng. Aurel Mărcușanu
- Prof. dr. eng. Mihai Ghiță
- Prof. dr. eng. Vasile Popovici
- Prof. dr. eng. Titus Slavici
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- Assoc. prof. dr. eng. Mircea Olariu
- Assoc. prof. dr. eng. Eugen Cicală
- Assoc. prof. dr. eng. Antoniu-Levay Reviczky
- Assoc. prof. dr. eng. Mircea Vasilescu
- Lect. dr. eng. Traian Botea
- Lect. dr. eng. Ioan Groza
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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, micro structural investigations, mathematical modeling
- 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, pseudo elastic 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

FIELDS DESCRIPTION

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

ACTIVITIES AND RESULTS

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

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

TECHNOLOGY AND EQUIPMENT FOR INDUCTION HARDENING

FIELD DESCRIPTION

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

ACTIVITIES AND RESULTS

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

INCREASE OF RELIABILITY ON DIFFERENT MACHINE PARTS BY SURFACE ENGINEERING

FIELD DESCRIPTION

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

ACTIVITIES AND RESULTS

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

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

FIELD DESCRIPTION

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

ACTIVITIES AND RESULTS

The improvement of the investigation equipment and the image acquisition and processing methods lead to the increase of the metallographic

investigations results (image quality, measurements precision).

MAIN PUBLICATIONS

BOOKS

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5. M. Liță, C.F. Opris, L.R. Cucuruz *Quantitative Analysis of Austenite Transformation in a Stainless Steel Syringe Cannule Weld* MP Materialprüfung-Werkstoffe und Bauteile, Technologien und Anwendungen. Jahrg.48 (2006) 10, I.S.I., ISSN 0025-5300 pp. 504-509
6. Dehelean, D., Oancă, O., Budău, V., Şerban, V., Codrean, C., Crăciunescu, M., *Ultrasonic Welding of Advanced Biocompatible and Shape Memory Alloys*, The 1st South-East

- European Welding Congress – Welding and joining technologies for a sustainable development and environment, Timisoara, Romania, 2006 May 24-26, ISBN (10) 973-8359-40-6, pp.255-262.
7. C.Crăciunescu, V.Budău, V.A.Serban, C.Codrean, S.Duma, , *Shape Memory Effect in Cu – based Ribbons Produced by Melt-Spinning*, Scientific Bulletin of the “Politehnica” University of Timisoara , Transaction on mechanics Tom 51(65) Fascicola 4, 2006, ISSN 1224-6077 pp. 69-74
 8. C.Crăciunescu, V.Budău, V.A.Serban, C.Codrean, S.Duma , *Micro structural Observations of Copper -Based Shape Memory Alloys Produced by Melt – Spinning*, Scientific Bulletin of the “Politehnica” University of Timisoara , Transaction on mechanics Tom 51(65) Fascicola 4, 2006, ISSN 1224-6077 pp. 63-68
 9. C.Codrean, V.A.Serban, I.Mitelea, *Specific Problems in Vacuum Brazing Austenitic Stainless Steels Using Amorphous Alloys*, Proceedings of 4th International Conference on Materials and manufacturing Technologies „MATEHN’06”, Cluj-Napoca , 2006, ISBN 973-751-300-2, p.117 (Poster).
 10. C.Codrean, I.Mitelea, V.A.Serban, *The Morphology of Formation and Transformation of Structure in Vacuum Oven Brazed Joints with Amorphous Alloys*, Proceedings of 4th International Conference on Materials and Manufacturing Technologies „MATEHN’06”, Cluj-Napoca, 2006, ISBN 973-751-300-2, p.118 (Poster).
 11. M. Nicoară *Les Mousses Métalliques (Metallic Foams) Ingénierie assistée par ordinateur et nouveaux matériaux*, Ecole d’été, 28 aout – 3 septembre 2006, Timisoara – Roumanie, Ed. Orizonturi Universitare, Timisoara, ISBN: (10) 937-638-266-4; (13) 978-973-638-266-6, pp. 159-175
 12. A. Răduță, C. De mian, C. Locovei, M. Nicoară, R. Cucuruz *Inter-crystalline Cracking in Tubes Fabricated from Aluminum Alloys* International conference *Structural Integrity of Welded Constructions*, 8 - 9 November 2006, Institute of Welding and Materials Testing (ISIM) Timisoara, Romania, edited by CENTA-ISIM, ISSN 1842-5518, pp. 48-54
 13. C. Locovei, C. Demian, Răduță M. Nicoară *Increasing the Fatigue Resistance of Some Casting Parts Belonging to Railway Chassis* International conference *Structural Integrity of Welded Constructions*, 8 - 9 November 2006, Institute of Welding and Materials Testing (ISIM) Timisoara, Romania, edited by CENTA-ISIM, ISSN 1842-5518, pp. 75-84
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 15. C. Demian, R. Rosu, Mă, LĂ. Răduță *Experimental Determination of Stresses During Plastic Deformation of Titan* International conference *Structural Integrity of Welded Constructions*, 8 - 9 November 2006, Institute of Welding and Materials Testing (ISIM) Timisoara, Romania, edited by CENTA-ISIM, ISSN 1842-5518, pp. 68-74
 16. D. Dăgulescu, C Demian, I.Vida Simiti, A. Răduță, R. Prejbeanu *Some Defects in an Orthopedic Implant* International Conference on Biomaterials & Medical Devices, BimMed’2006, Conference proceeding, Abstract Volume, November, 9-11th, 2006, Iasi, Romania, ISBN 973-718-566-8; 987-973-718-566-2, pp. 177-187
 17. I. Mitelea, A. Moșilă, B. Radu *The Role of axial pressure for friction welding of QT heat treated components*, Annals of the Oradea University, Fascicle of Management and Technological Engineering, 2006, ISSN 1583-0691, CNCSIS accredited, pp. 1049-1056
 18. I. Mitelea, Gh. Găvănescu *EDX and X-Ray diffraction investigations on deposited metal with SAW 2 wires TWIN-ARC* Annals of the Oradea University, Fascicle of Management and Technological Engineering, 2006, ISSN 1583-0691, CNCSIS accredited, pp. 1057-1066
- PhD THESIS – oncoming**
1. Spornic Luminita *Studies upon structures in the binding area and upon materials’ mechanical properties electrically welded by pressure on which thermo-mechanical treatments are imposed*, scientific supervisor: prof. dr. eng. Ioan Carțiș
 2. Firu Carmen, *Methods of improving the characteristics of composites with a metal matrix*, scientific supervisor: prof. dr. eng. Ioan Carțiș
 3. Popa Dorel, *Methods of improving the characteristics and fiability of railway*

- springs.*, scientific supervisor: prof. dr. eng. Ioan Cartiș
4. Igrat Sorin, *Methods of increasing the fiability of components used for cars*, scientific supervisor: prof. dr. eng. Ioan Cartiș
 5. Roșu Radu, *Methods of acquiring and processing of biomatreials for human prosthesis*, scientific supervisor: prof. dr. eng. Ioan Cartiș
 6. Popescu Diana – Carmen, *The prediction of structural and mechanical properties of concentrated energy treated steels*, scientific supervisor: prof. dr. eng. M. Trusculescu

RESEARCH CONTRACTS

1. Contract No. 255(408) / 2004, Matnantech, *Microsensors and actuators for micro-opto-electro-mechanical systems manufactured by shape memory ally nanoengineering*, Consortium director: Assoc. prof. dr. eng. Marius Crăciunescu, UPT director assoc, prof. dr. eng. Viorel Șerban Value (2006): 25,000 RON
2. Contract No. no. 470/ 12.06.2006 – S.C. ContiTech Romania S.R.L. *Analysis and Testing Activities Regarding the Materials Quality Used in Current Production of ContiTech Romania* Director: Assoc. prof. dr. eng. Mircea Nicoară, Value: 3,400 EURO
3. Contract No. 425/ 2006 - S.C. Promes S.A. *Design of the Technology for Superficial Hardening of Railway Bogies* Director: Assoc. prof. dr. eng. Mircea Nicoară, Value: 10,948 RON
4. Contract No. 480 /2006 - S.C. Solectron Romania S.R.L. *Technical Assistance and Consulting for Flow of Materials Used in Current Production of S.C. Solectron Romania S.R.L.* Director: Assoc. prof. dr. eng. Mircea Nicoară, Value: 2,150 RON
5. Contract No. 421 /2006 – S.C. Zoppas Industries Romania SRL *Consulting Activities Regarding the Design of Heating Elements Currently Produced at Zoppas Industries Romania* Director: Assoc. prof. dr. eng. Mircea Nicoară, Value: 26,941 RON
6. Contract No. 224 /2005 – 2006 S.C. Arsat KN SRL *Studies and Experimental Researches Regarding the Technology of Inductive Hardening for Parts Currently Produced at S.C. Arsat KN SRL* Director: Assoc. prof. dr. eng. Mircea Nicoară, Value: 22,765 RON
7. Contract CNCSIS 32940/2004, theme no. 16, code CNCSIS 182, 3rd phase, 2006 „*Aluminum-Based Metallic Foams Fabricated by Mean of Powder Metallurgy – Processing and Characterization*” Director: Assoc. prof. dr. eng. Mircea Nicoară, Value: 12,000 RON
8. Contract No. 63 16PS546/2005 - Agency universitaire de la Francophonie, Project of inter-universities scientific cooperation between POLITEHNICA University of Timisoara, University of Reims Champagne-Ardenne and University of Québec at Trois-Rivières, 2005-2006 *Study of Phase Transformation in Non-Ferrous Parts Fabricated by Mean of Rapid Prototyping in Order to Increase the Mechanical Properties* Director: Assoc. prof. dr. eng. Aurel Răduță, Value(2006): 15,000 EURO
9. Contract No. 507 /2006 – S.C. A&D Technologies SRL *Activities of Consulting, Technical Expertise and Services Regarding Materials and Parts Used for Current Production at A&D Technologies* Director: Assoc. prof. dr. eng. Mircea Nicoară, Value: 706 RON
10. Contract No. 400/ 17.02.2006 - Zoppas Industries Romania SRL *Technical Tests and Interpretation Reports Regarding the Results of Metallographic Analyses, Hardness Measurements and Determinations of Composition for Parts Belonging to Current Production of Zoppas Industries Romania* Director: Assoc. prof. dr. eng. Aurel Răduță, Value: 2,080 EURO
11. Contract No. 465/ 25.05.2006 - S.C. MEVA S:A. *Technical Tests and Interpretation Reports Regarding the Technological Optimizations and Quality Control of Product Belonging to MEVA Comp.* Director: Assoc. prof. dr. eng. Aurel Răduță, Value: 4 ,661 RON
12. Contract No. 506/ 21.08.2006, Lives International, France, *Characterization of Materials Used for Fabrication of Data Logger Probes. 1st Phase: Studies and Experimentations on Thermal Insulations type Silica Aerogel* Director: Assoc. prof. dr. eng. Aurel Răduță, Value: 1 ,500 EURO
13. Contract No. 408/ 06.03.2006 – S.C. ICPV SA Arad *Technical Tests and Interpretation Reports Regarding the Quality of Materials Used for Fabrication of Railways Tanks.* Director: Assoc. prof. dr. eng. Aurel Răduță, Value: 1,410 RON
14. Contract Code CEEX MEC 1285/2006-2008 *Optimization of Dento-Parodontal Treatments Using the Laser Technology – Multidisciplinary Tests - OTDP-LAS-TEST*

- Director: Assoc. prof. dr. eng. Aurel Răduță, Value: 570,000 RON
15. Contract No. 486/2006 *The chemical composition, metalographic analysis and hardness measurements HV5*. Director: Assoc. prof. dr. eng. Lău Marin, Value: 1,600 RON
 16. SCOPES Project IB 7420-110981/1 –(2005-2008) , *Southern Nanoengineering Network (international partnership)* , Director: Assoc. prof. dr. eng. Marius Crăciunescu, Value: 31,950 CHF
 17. Contract CEEX No. 7/2005, *Nanocontrol and Multifunctionality in Shape Memory Materials, Microlayers and Architectures*, Consortium director: Assoc. prof. dr. eng. Marius Crăciunescu, UPT director assoc. prof. dr. ing Budau Victor Value (2006): 73,000 RON
 18. Contract No. 27668/2005, Grant CNCSIS, *The production and characterization of ferromagnetic nanostructural alloys out of the Fe-Cr-(Nb, Mo)-P-Si-B family*, Director: prof. dr. eng. Viorel Aurel Șerban, Value for 2006: 11,000 RON
 19. Contract CEEX No. 221/2006 *New materials with amorphous structure for brazing meant for special industrial applications-NOVABRAZ* Director: prof. dr. eng.. Viorel Aurel Șerban, Value: 40,000 RON

RESEARCH TEAM

- Prof. dr. eng. Ioan CARTIȘ – Director
- Prof. dr. eng. Marin TRUȘCULESCU
- Prof. dr. eng. Ion MITELEA
- Prof. dr. eng. Victor BUDĂU
- Prof.dr.eng. Roland Laurențiu CUCURUZ
- Prof. dr. eng. Viorel Aurel ȘERBAN
- Prof. dr. eng. Livius UDRESCU
- Assoc. prof. dr. eng. Aurel RĂDUȚĂ
- Assoc. prof. dr. eng. Mircea NICOARĂ
- Assoc. prof. dr. eng. Bogdan RADU
- Assoc. prof. dr. eng. M. CRĂCIUNESCU
- Lecturer dr. fiz. Marin LIȚĂ
- Assist. dr. eng. Sebastian Titus DUMA
- Assist. Dr.eng. Cosmin CODREAN
- Assist. eng. Carmen OPRIȘ
- Assist. eng. Cosmin LOCOVEI
- Dr. eng. Dragoș UȚU
- Drd. eng. Diana Carmen POPESCU
- Drd. eng. Radu Alexandru ROȘU
- Eng. Angela ZIMCEA
- Eng. Miron GAVRILONI

Contact

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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 CNCSIS as a C type centre with certificate number 71/CC-C/11.05.2001. From 2002, the research centre belongs to the Mechatronics' Department from „Politehnica” University of Timisoara.

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

The major research domains are:

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

The main research topics are:

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

The research centre was founded in order to:

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

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

MAIN RESEARCH FIELDS

- Theoretical and experimental research of mechanisms and mechanical drives.

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

- Robotics

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



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

Researches in MECHANISMS AND MECHANICAL DRIVES

FIELD DESCRIPTION

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



ACTIVITIES AND RESULTS

- Collective competence used in computer aided design for general purpose or special mechanical drives (gears, belts, synchronic - belts etc.)
- Software for gears, cams and linkages design
- Improvement of mechanisms and machine elements standardization. Studies for service life increase and reducing of wear

RESEARCH TEAM

- Prof.dr.eng. Dan PERJU
- Prof.dr.eng. Francisc KOVACS
- Prof.dr.eng. Octavian GLIGOR
- Prof.dr.eng. Lucian MĂDĂRAS
- Prof.dr.eng. Voicu MESAROȘ-ANGHEL
- Prof.dr.eng. Inocențiu MANIU
- Prof.dr.eng. Adjani DAVIDESCU
- Assoc.prof.dr.eng. Francisc IOANOVICI
- Assoc.prof.dr.eng. Stefan VARGA
- Assoc.prof.dr.eng. Erwin-Christian LOVASZ
- Assoc.prof.dr.eng. Iosif CĂRĂBAȘ
- Assoc.prof.dr.eng. Mircea DREUCEAN
- Assoc.prof.dr.eng. Veronica ARGÊȘANU
- 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.

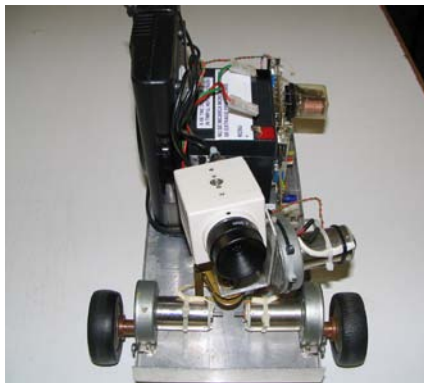


ACTIVITIES AND RESULTS

- 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. Ștefan VARGA
- 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. Mogan, Talaba, Dolga, V., Dobra A., Jula M.s.a. ECOMECA – *ECO mechanical engineering*, Editura Universității Transilvania,

BRAȘOV, 2006, ISBN: (10) 973-635-839-9; (13) 978-973-635-839-5, 450 pp.;

2. Endre Ianoși - *Principles of water treatment in the dialysis process*, Ed. Politehnica Timișoara, 2006 (ISBN 973-625-304-X), 190 pp.;
3. Madaras L., Argesanu. V. Milenco L., Radu A. – *Machine parts* vol.II, Ed. Eurostampa, Timisoara, 2006, 350pp.;
4. Nicoara, I., Gruescu, C., Sticlaru, C. - *Reliability and Terotechnics*, Politehnica Publ. House, 2006, ISBN 973-625-288-4, 340 pages
5. Dan Perju - *Mechanical measurements*, Ed. Politehnica, 2006, ISBN (10) 973-625-397-X 978-973-625-244-0621.38 (075.8), 470 pp.;
6. Popa Anca - *Mechatronic Components and Systems*, Editura Politehnica, 2006, ISBN (10) 973-625-244-2; (13) 978-973-625-244-0621.38 (075.8), 162 pp.;
7. Rădulescu C., Varga S, Vela I. Vela D. – *Design of robotic devices*, Vol 1+Vol 2, Editura Didactică și Pedagogică, 2006, ISBN (10)973-30-1635-7; ISBN (13) 978-973-30-1635-9, 447 pp.;
8. Văcărescu, Valeria: *Aparatură și instrumentar stomatologic*, Ed. "Orizonturi Universitare", Timișoara, ISBN 973-8391-62-8. / 2006, 200 pp.

PUBLISHED PAPERS

1. Alba L., Diaconu A. *Smart House and Domestic Robots*, Buletinul Intitutului Politehnic din Iași (Robotica 2006, The 3rd International Conference on Robotics) 7-9 Septembrie 2006, ISSN 1011-2855, pages. 17-20
2. Cioi D., Vatau S., Maniu I. - *Virtual Reality Laboratory for Robot Systems*. Proceedings of SACI 2006, 3rd Romanian-Hungarian Joint Symposium on Applied Computational Intelligence (Timisoara May 26-26, 2006, ISBN: 963-7154-46-9): pp 634-641.
3. Cioi D. *Robot Simulation using Java 3D* Proceedings of OPTIROB 2006, 1st International Scientific Meeting "Optimization of the Robots and Manipulators" (Predeal May 26-28, 2006, ISBN: 973-648-572-3): pp 57-59
4. Cioi D. - *Comparison of 3D Stereoscopic Visualization Devices*, Proceedings of COMEFIM'8, the 8th International Conference on Mechatronics and Precision Engineering (Cluj-Napoca June 8-10, 2006, ISSN: 1221-5872): pp 669-674.
5. Cioi D. *Haptic Devices for Computer Aided Design* Proceedings of COMEFIM'8, 8th International Conference on Mechatronics and Precision Engineering (Cluj-Napoca June 8-10, 2006, ISSN: 1221-5872): pp 883-888.
6. Cioi D. - *Collision Detection in Virtual Reality* Proceedings of ROBOTICA 2006, 3rd

- International Conference on Robotics (Iasi September 07-09, 2006, ISSN 1011-2855): pp 151-154.
7. Cioi D. - *Interchanging Three-Dimensional Models Between CAD and VR System*, Proceedings of PRASIC'06, Simpozionul national cu participare internationala Proiectarea Asistata de Calculator, Vol. III – Desing de Prodis (Brasov, 9-10 Nov, 2006): pp 61-64, ISBN (10)973-635-826-7.
 8. Ciupe V., Maniu I., Dolga V., Radulescu C. *Redesign of the Control Stage for an Obsolete Hydraulic Robot* 15th International Workshop on Robotics in Alpe-Adria-Danube Region, RAAD 2006, June 15-17, 2006, Balatonfüred, Lake Balaton, Hungary ISBN 963-7154-48-5, pp. 115-119.
 9. Maniu I., Ciupe V., Dolga V., Radulescu C. *Functional Modeling and Simulation of a Rotary Hydraulic Actuator Controlled by a Servovalve* 15th International Workshop on Robotics in Alpe-Adria-Danube Region, RAAD 2006, June 15-17, 2006, Balatonfüred, Lake Balaton, Hungary ISBN 963-7154-48-5, pp. 104-107
 10. Dolga V., Maniu I., Radulescu C., Ciupe V. *Mechatronic Design for Autonomous Mobile Systems* 15th International Workshop on Robotics in Alpe-Adria-Danube Region, RAAD 2006, June 15-17, 2006, Balatonfüred, Lake Balaton, Hungary ISBN 963-7154-48-5, pp. 189-194
 11. Rădulescu C., Maniu I., Dolga V., Ciupe V. *Spherical Mechanisms Used in Industrial Robot Designing* 15th International Workshop on Robotics in Alpe-Adria-Danube Region, RAAD 2006, June 15-17, 2006, Balatonfüred, Lake Balaton, Hungary ISBN 963-7154-48-5, pp. 170-175
 12. Ciupe V., Maniu I. *Scaled Model For Testing Different Control Methods On Assisted Brake Systems* A Treia Conferinta Internationala de Robotica, Robotica 2006, 07 – 09 Septembrie 2006, Iasi, Romania ISSN 1011-2855, pp. 155-162
 13. Maniu I, Ciupe V., Joni N. *Reconfiguring The Robotics Laboratory Of The „Politehnica” University Of Timisoara* A Treia Conferinta Internationala de Robotica, Robotica 2006, 07 – 09 Septembrie 2006, Iasi, Romania ISSN 1011-2855, pp. 47-52
 14. Sticlaru C., Davidescu A. *Modeling a dental bridge using finite element method* Acta Technica Napocensis, Series : Applied Mathematics and Mechanics, nr.49,vol.II, p.427-432, ISSN 1221-5872, 2006
 15. Davidescu A., Savii G., Sticlaru C. *Graphical User Interface for Processing Computed Tomography Images* Acta Technica Napocensis, Series : Applied Mathematics and Mechanics, nr.49, vol.II, pp.251-255, ISSN 1221-5872, 2006
 16. Sticlaru C., Davidescu A., *Studies on Complex Mechanisms in ProEngineer* Bul. Inst.Polit. Iași, Tom LII(LVI),vol. II, Fasc.7B, Section: Machine Parts, pp.213- 219, 2006, ISSN 1011-2855.
 17. Davidescu A., Sticlaru C., *Graphical User Interface (GUI) for Processing Univariate Data for Exploratory Data Analysis Approach* PRASIC'06, 2006, vol.III, pag, 65-70, ISBN (10)973-635-826-7
 18. Sticlaru C., Davidescu A. *Parametric Design and Finite Element Analysis of Rolling Bearings* PRASIC'06, 2006, vol.II, pag, 145-148, ISBN (10)973-635-826-7, Brasov
 19. Dehelean N. *A Minimal System for Human Trait-Detection* *Proceedings of the 7th Conference on Technical Informatics – CONTI'2006*, vol.2, pp.101, ISBN (10) 973-625-321-X, (13) 978-973-625-321-8, Editura Politehnica, Timișoara.
 20. Dehelean N. *Overview on Hydro Pump Working* PRASIC'06, vol.II Machine parts pp.245, ISBN (10)973-635-825-9; (13)978-973-635-825-8, Brașov
 21. Dehelean L. *On Matrix Sensor Category Dedicated to a Gait Detection System* Buletinul Institutului Politehnic din Iași, Tomul LII (LVI), fascicula 7A, Section: Machine Parts ISSN 1011-2855, pp.189, Universitatea Tehnică ‘Gh.Asachi’, Iași.
 22. Dobra A. *VBE variant software to plan and control manufacturing activities* COMEFIM 2006, ISSN 1221-5872 P.741.
 23. Dobra A, Gligor O. *About dissipative process in commanded and automatic gearbox* COMEFIM 2006, ISSN 1221-5872 P.825
 24. Dobra A *Parametrical software to establish a geometrical outline for an involve roller to frontal pieces processing* PRASIC 2006, vol.II, ISBN (10)973-635-825-9 p.195
 25. Dolga V., Dolga L. *Design and evaluation in mechatronics* Acta Technica Napocensis, S. Applied Mat. And Mechanics, 49, vol.II, ISSN 1221-5872, p.269-275, 2006, Cluj-Napoca
 26. Dolga V. *About intelligent movement of a mobile robot adapted for cross-country driving* Buletinul Inst. Politeh. Iași, tom LII, fasc. 7A, Constr. de Mașini, ISSN 1011-2855, p.201-206, 2006
 27. Dolga V. *Analyze and experiments of an intelligent mobile system* PRASIC'06, vol.III, Design de produs, ISBN (10) 973-635-826-7; (13)978-973-635-826-5, p.187 – 192, Brasov
 28. Dreucean M. Drăgulescu D. Toth-Tașcău M. *Computing the uncertainty in spectrometric determination* 6th International Conference Research and Development in Mechanical Industry RaDMI 2006, Papers from Sessions

- A,B,C,D,E, Budva, Montenegro, 13-17 September 2006, ISBN 86-83803-21-X (HTMS), pp. 1-4
29. Dreucean M. Drăgulescu D. Toth-Taşcău M. *Simulation in Evaluation and Control of Manufacturing Systems* MECHANICAL ENGINEERING TECHNOLOGIES`06, V International Congress, 20-23.09.2006 Varna, BULGARIA Section I Virtual Engineering. Automation. Management and engineering, Volume 5/88 September 2006, ISSN 1310-3946, pp. 64-67
 30. Dreucean M. *Gait Analyze Based on Image Processing* 8th International Symposium, PRASIC`06, 2006, vol.III, pag. 71-74, ISBN (10)973-635-826-7
 31. Gruescu C. Nicoară I. *Closed-loop transmission test stands – specific parameters and optimization* Review of Mechanical Engineering and Electrotechnics, Sofia, Bulgaria, ISSN 0025-455X, nr. 12/2005, p.64-67;
 32. Gruescu C. Nicoară I. *Energetic Optimization of closed-loop transmission test stands using the multicriteria method Electre III* Review of Mechanical Engineering and Electrotechnics, Sofia, Bulgaria, ISSN 0025-455X, nr. 12/2005, p.68-71
 33. Herbai A. *Determination of the motor speed trough the computer* ROBOTICA & MANAGEMENT 2006 pp. 52-54, ISSN 1453-2069;
 34. Endre I. *The artificial blood a solution in emergency cases?* INGIMED 2006, Bucureşti, 9-10 Nov. 2006, ISBN 973-8408-11-3, pp.
 35. Mateaş M., Ianoşi E. *Proposal for a multifunctional stand for determination of some behavior indicators of human subjects in specific conditions* COMEFIM 8, Cluj-Napoca 8-10 Iunie 2006, Acta Technica Napocensis Vol. II, ISSN 1221-5872, pp.343-348.
 36. Mărgineanu D. Modler Karl-Heinz Perju D. Lovasz E. *Movement capability of the mechanical crawling structure* The 8-th International Conference on Mechatronics and Precision Mechanics, COMEFIN-8", Acta Technica Napocensis, Series: Applied Mathematics and Mechanics, 2006, 49 vol. I, pp.93-97, ISSN 1221-5872
 37. Perju D. Modler Karl-Heinz Mateaş M. Lovasz E. *On the compensatory mechanisms of the archimedean effect* The 8-th International Conference on Mechatronics and Precision Mechanics, COMEFIN-8", Acta Technica Napocensis, Series: Applied Mathematics and Mechanics, 2006, 49 vol. III, pp.607-610, ISSN 1221-5872
 38. Hufenbach W., Modler Karl-Heinz, Täger O., Modler N., Lovasz E. *Design and Manufacturing of Smart Textile Compliant Hinges* The 8-th International Conference on Mechatronics and Precision Mechanics, COMEFIN-8", Acta Technica Napocensis, Series: Applied Mathematics and Mechanics, 2006, 49 vol. IV, pp.831-836, ISSN 1221-5872
 39. Modler Karl-Heinz Lovasz E. Perju D. Mărgineanu D. *Allgemeine Berechnungsgrundlagen für Unrundzahnäder* Proceedings of the VIII-th National Symposium for Computer Aided Design of Mechanisms PRASIC`06, Brasov, Rumänien, 08-10.11.2006, Vol I, pp. 95-100, ISBN (10)973-635-826-7;
 40. Lovasz E.. Perju D. Modler Karl-Heinz Zăbavă E. Hotea A. *Some considerations regarding the cam Mechanism's size* Proceedings of the VIII-th National Symposium for Computer Aided Design of Mechanisms PRASIC`06, Brasov, Rumänien, 08-10.11.2006, Vol.I, pp. 85-90, ISBN (10)973-635-826-7;
 41. Perju D. Modler Karl-Heinz Lovasz E. Zăbavă E. *Synthesis of a Linkage on the Efficient Forces Transmission's Basis* Proceedings of the VIII-th National Symposium for Computer Aided Design of Mechanisms PRASIC`06, Brasov, Rumänien, 08-10.11.2006, Vol.I, pp. 125-130, ISBN (10)973-635-826-7;
 42. Modler Karl-Heinz, Lin Song, Klemm Sven, Lovasz E. *Digitale Mechanismen- und Getriebebibliothek DMG-Lib* Proceedings of the VIII-th National Symposium for Computer Aided Design of Mechanisms PRASIC`06, Brasov, Rumänien, 08-10.11.2006, Vol.III pp. 97-104, ISBN (10)973-635-826-7;
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 44. Gruescu C., Nicoară I., Eftimie M. *Optimization Of Closed-Loop Transmission Test Stands* 2nd International Conference "Power Transmissions `06", Novi Sad, Serbia&Montenegro, 2006, ISBN 0025-445, pp.101-106.
 45. Popa M. Popa A. Cretu V. Micea M. *Monitoring Serial Communications in Microcontroller Based Embedded Systems* IEEE Intl. Conference on Computer Engineering & Systems, Egipt, 2006, IEEE Catalog No. 06-EX-1338C, Library of Congress: 2006921894; ISBN 1-4244-0272-7, pp.251-256
 46. Popa M. Popa A. Ciocarlie H. *Software Interface for Pocket PC Based Mobile*

- Telephony 4th WSEAS Int. Conference on Applied Electromagnetics, Wireless and Optical Communications (Electroscience '06), Italy; 2006; ISBN 960-8457-56-4, pp.257-262.*
47. Radu A. G. *A Case Study Of Reverse Engineering Through Rapid Prototyping* Proceedings of COMEFIM'8, The 8th International Conference on Mechatronics and Precision Engineering (Cluj-Napoca June 8-10, 2006, ISSN: 1221-5872), pp.611-616
 48. Radu A. G. *Analysis Of A Rotary Table Positioning Device As a Mechatronic System* Proceedings of COMEFIM'8, The 8th International Conference on Mechatronics and Precision Engineering (Cluj-Napoca June 8-10, 2006, ISSN: 1221-5872) pp. 391-396
 49. Diaconu A., Radu A. G., Maniu I., Joni N. *Research and Training in Robotized Welding Roboti Industriali*, Buletinul Inst. Politeh. Iași, tom LII, fasc. 7A, Constr. de Mașini, ISSN 1011-2855, p.195-200, 2006

GRANTS / RESEARCH PROGRAMS

1. *Researches on using the robotic systems for the enhancement of the technical and economical competitiveness in Romanian industry*, 21 CEEX I 03 / 07.10.2005, Director: Prof.dr.eng. Maniu Inocențiu, Value for 2006: 630.000 RON;
2. *Nanomaterials with controlled porosity and magnetic & optical properties, obtained by sol-gel and sono-synthesis method, with potential applications in environment protection, biology and medicine*, CEEX P-CD/98-9-11750/2005, Director: Prof.dr.eng. Savi George, Value for 2006: 70.000 RON
3. *Skill-based Inspection and Assembly for Reconfigurable Automation Systems*, FP6 / NMP2-CT-2005/017146, Director: Prof.dr.eng. Savi George, Value for 2006: 80.000 EUR;
4. *Virtual Reality For Computer Aided Design* CNCISIS 2739 / 19.05.2006 Director: dr. Eng. Cioi Daniel, Value for 2006: 7500 RON;
5. *Simulation, Control and Testing Platform with applications in mechatronics (ConMec) 112* CEEX II 03 / 2006 _P2 Director: Prof.dr.eng. Dolga Valer, Value for 2006: 25.000 RON;
6. *Mechatronics & Robotics Laboratory* MEC Director: Prof.dr.eng. Dolga Valer, Value for 2006: 500.000 RON;
7. *Intelligent CAD Methods used for customized design of bone system deficiency corrections* CNCISIS 2739/19.05.2006 Director prof. dr. eng. Davidescu Arjana Value for 2006: 21.800;
8. *Objective analyse system for locomotory handicap* CNCISIS cod 656 Director assist. prof. dr. eng. Dreucean Mircea, Value for 2006: 45.000 RON;
9. *Virtual Reality Colaborative Environment for orthopedical preoperatory planificatoin* CEEX 114 / 15.09.2006 assist. prof. dr. eng. Dreucean Mircea, - responsabil partener UPT Value for 2006: 73017 RON
10. *Development and implementation of performant rehabilitation and investigation systems for human spine deformation at school aged people and sedentary professional* CEEX 1612 Director Assist. prof. dr. eng. Lovasz Erwin Value for 2006: 200.000;
11. *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)* CEEX Director Partner: prof. dr. eng. Maniu Inocențiu, Value for 2006: 8.000 RON;
12. *Development of an informatic 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 IPCPMA* CEEX Director Partner: prof. dr. eng. Maniu Inocențiu, Value for 2006: none
13. *Virtual reality laboratory setup UPT – own founds* Director Partner: prof. dr. eng. Maniu Inocențiu, Value for 2006: 55.000.

PhD THESIS

1. Ostoia Daniel *Studies about forming of mixture and afterburning control upon working behaviour in burning chamber in correlation with emission controlled engine regime for Diesel motor*, scientific supervisor: prof. dr. eng. Lucian Mădăras;
2. Costache Marius *Contributions on optimal synthesis of lenticular systems*, scientific supervisor: prof. dr. eng. Ioan Nicoară;
3. Dumache Constantin *Contributions on finding position of infrared radiation source based on incident radiant flux*, scientific supervisor: prof. dr. eng. Ioan Nicoară;
4. Ardelean Flavius *Contributions on gear harmonic drives used in airtight placement*, scientific supervisor: prof. dr. eng. Ioan Nicoară;

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. Cioi Daniel: *Virtual Reality for Computer Aided Design*, scientific supervisor: prof.dr. eng. George Savii
6. Uruioc Constantin: *Information System for Efficient Knowledge Transfer*, scientific supervisor: Prof.dr.eng. George Savii
7. Penteliuc-Cotosman Dumitru: *Information System for Distance Learning*, scientific supervisor: Prof.dr.eng. George Savii
8. Mioc Mirella: *Medical Applications Oriented Knowledge Bases*, scientific supervisor: prof. Dr.eng. George Savii
9. Hoanca Radu: *Information System for Integrated Production Management*, scientific supervisor: Prof.dr.eng. George Savii
10. Gyiman Carmen: *Expert System for Production Management*, scientific supervisor: Prof.dr.eng. George Savii
11. Alba Lavinia: *Teleoperated service robot over Internet*, scientific supervisor: prof.mhc.dr. eng. Francisc Kovacs
12. Vatau Steliana: *Optimizing functional construction of quadruped walking robot*, scientific supervisor: prof.mhc.dr.eng. Francisc Kovacs
13. Dragotoiu Oana: *Optimal solution to finance robotics flexible manufacturing systems investments*, scientific supervisor: prof.mhc.dr. eng. Francisc Kovacs
14. Ursu Gabriel Vasile, *Contributions at elastic joint parameters optimization and the influence of elastic joint upon turn running of locomotive articulate bogie*, prof. dr. eng. Lucian Mădăras
15. Rusu Octav, *Studies about performance of railway apparatus for high speed trains*, prof. dr. eng. Lucian Mădăras;
16. Dungan Luiza, *Contributions at study and research upon flexi coil spring from electrical locomotive CFR 060-EA 5100 kW*, prof. dr. eng. Lucian Mădăras;
17. Vela Daniel Gheorghe, *Contributions at functional and constructional development of harmonic drive*, prof. dr. eng. Lucian Mădăras;
18. Olaru Mihai, *Contributions concerning risk improvement stabilization in traffic safety*, prof. dr. eng. Lucian Mădăras;
19. Marinca Petru, *Contributions concerning functional and constructional development of direction and brake mechanisms for vehicles*, prof. dr. eng. Lucian Mădăras;
20. Hotea Adriana, *Contributions to optimal synthesis of cams mechanisms*, prof. dr. eng. Dan Perju;
21. Zăbavă Eugen Sever, *Contributions to synthesis of cam mechanisms with tangential follower*, prof. dr. eng. Dan Perju;
22. Moldovan Cristian, *Study of centroidal type mechanisms*, prof. dr. eng. Dan Perju;
23. Ciorogar Ciprian Alin, *Contributions to improving the quality of the measuring instruments/apparatus of register type*, prof. dr. eng. Dan Perju;
24. Lupa Florin Sebastian, *Contributions to optimum synthesis of linkage and cam mechanisms*, prof. dr. eng. Dan Perju;
25. Raicov Radoslav, *Study of laser cutting processes for improving their quality and of the products*, prof. dr. eng. Dan Perju;
26. Pop Ioan Adrian, *Special mechanical transmissions*, prof. dr. eng. Dan Perju;
27. Herbai Alexandru *Modelling techniques for automatic reconfiguration of production systems*, Prof.dr.eng. George Savii.

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

GENERAL PRESENTATION

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

- Thermal machines and equipment
- Environmental protection
- Transport vehicles

The research team include 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)	1	1	2	11	3	8
Research personnel (part-time) from RO/ from abroad	2/-	8/-	1/-	1/-	-/-	1/-

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Web page:

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

MISSION

- To promote its main expertise fields, by means of research projects & university curricula, by fundamental & applied, industrial, lab scaled & numerical simulations research, by offering expertise & consultancy, by performing educational activities at undergraduate & graduate level, doctoral training, and post-university or expert training;
- To develop a self-financement budget by applying for research fundings, completion of basic equipment and additional activities (conferences, publications);
- To organize workshops, conferences, summer schools and other training modalities.
- To penetrate in the european research network and establish/apply/receive dissemination of high level curricula and R&D fields.
- To enlarge the thematic offer and activities.

Researches in INTERNAL COMBUSTION ENGINES (ICEs) AND FUEL CELLS

Keywords: *spark-ignition engine, diesel engine, heat flow, carburettor 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. CEEEX grant AMTRANS, Contr. No. X1CO1 / 2006, *The possibilities and limitations of the ecologisation of urban traffic by using fuels obtained from vegetable oils*, Director UPT (Partner): Assoc.prof.dr.eng. Liviu Mihon, Value: 27,000 RON

PUBLICATIONS

BOOKS

1. Liviu Mihon, Ioana Ionel, Gheorghe Pop, Virgiliu Dan Negrea, *Measurements of the nonoelectrical quantities* (published in Romanian), "Orizonturi Universitare" Publishing House, Timișoara, ISBN (10) 973-638-258-3; ISBN (13) 978-973-638-258-1, 2006, 210 pages
2. Gelu Padure, *Road Vehicles. Design and Computation* (published in Romanian), Vol.1 (second edition), ISBN 973-625-136-5, „Politehnica” Publishing House, Timișoara, 2006, 250 pages (20 new pages)
3. Dănilă Iorga, Gelu Padure, Daniel Ostoia, *Internal Combustion Engines – Fuel Systems & Control – (practical works)*, Solness Publishing House, Timișoara, 2006, ISBN 973-729-085-2, 118 pages

PUBLISHED PAPERS

1. Negrea, V.D., Forțofoi, M.D., Rafan, L.I., Negrea, I., *Sixth environment action programme Environment 2010: Our future, Our choice*, Environmental Engineering and Management, International Conference ICEEM/2, Iasi, May 24-26, 2006, Environmental Engineering and Management Journal, ISSN 1582-9596, pp.1379-1386
2. Negrea, V.D., Dragomir, G., Blaga, L., Georgescu, L., *Studii si cercetari privind evaluarea termogazodinamica a unui motor diesel cu admisiune normala în corelatie cu Interpretarea datelor prin functii fuzzy – partea I*, Annals of the Oradea University, Fascicle of Management and Technological engineering, Vol.V (XV) 2006, ISSN 1583-0691, pp.511-516
3. Negrea V.D., Bocce, D., Gombos, D., Durgau, M., Danciu, B., *Aspecte economice privind modernizarea Punctului termic de la Universitatea din Oradea*, Annals of the Oradea University, Fascicle of Management and Technological engineering, Vol.V (XV) 2006, ISSN 1583-0691, pp.403-406
4. Negrea V.D., Bococi, D., Gombos, D., Durgau, M., Danciu, B., *Analiza posibilăților de modernizare a Punctului termic de la Universitatea din Oradea*, Annals of the Oradea University, Fascicle of Management and Technological engineering, Vol.V (XV) 2006, ISSN 1583-0691, pp.407-412
5. Negrea V.D., Blaga, V., *The variation of the effective power, moment of the couple, hour and specific consumption with the speed and the temperature of the environment*, The 1st International Conference Motor Vehicle and Transportation - MVT2006-01, Timișoara, Nov. 15-17, 2006, "Orizonturi Universitare" Publishing House, ISBN (10) 973-638-284-2, ISBN (13) 978-973-638-284-0, pp.77-82
6. Negrea V.D., Drugă, F., *Reduction of exhaust gas emissions of a 10 liter volume diesel engine*, The 1st International Conference Motor Vehicle and Transportation - MVT2006-01, Timișoara, Nov. 15-17, 2006, "Orizonturi Universitare" Publishing House, ISBN (10) 973-638-284-2, ISBN (13) 978-973-638-284-0, pp.95-100
7. Negrea V.D., Blaga, V., *The mathematical modelling at engines with spark ignition electronic injection*, The 1st International Conference Motor Vehicle and Transportation - MVT2006-01, Timișoara, Nov. 15-17, 2006, "Orizonturi Universitare" Publishing House, ISBN (10) 973-638-284-2, ISBN (13) 978-973-638-284-0, pp.131-138
8. Negrea V.D., Blaga, F., Dragomir, G., *Research concerning the performance evolution of a normal admission diesel engine, by means of fuzzy functions*, International Congress MVM-06, Kragujevac (Serbia), Oct.4-6, 2006, ISBN 86-80581-95-X, Paper MVM 20060031, Sect. A, pp.1-5
9. Iorga, D., Mihon, L., Padure, G., Vrabie, I., Henriot, M., *Recherche concernant les modifications des performances d'un moteur Diesel à injection directe par la variation de la viscosité du combustible à l'aide d'une aiguille rotative*, COFRET'06, Timișoara, June 15-17, 2006, Special Issue of the Sci. Bull. UPT, Transactions in Mechanics, ISSN 1224-6077, Tom 51(65), No.1, pp.165-170
10. Mihon, L., *Modelling elements for the auxiliary systems which work on road vehicles*, Proceedings of the 11th Symposium of Mathematics and its Applications, Timisoara 2006, Scientific Bull. UPT, Transactions on Mathematics and Physics, Tom 52(66), Fasc.2, 2006, ISSN 1224-6069, pp.85-92
11. Iorga, D., Vrabie, I., Padure, G., Mihon, L., *Influence on the direct injection diesel engine performances of the spraying characteristics by modifying the injection pressure*, The 1st International Conference Motor Vehicle and

- Transportation MVT2006, "Orizonturi Universitare" Publishing House, Nov. 15-17, 2006, ISBN (10) 973-638-284-2, ISBN (13) 978-973-638-284-0, pp. 91-94
12. Iorga, D., Vrabie, I., Padure, G., Mihon, L., *The influence of spraying characteristics by modification of injection nozzle holes number on direct injection diesel engine performances*, The 1st International Conference Motor Vehicle and Transportation MVT2006, "Orizonturi Universitare" Publishing House, Nov. 15-17, 2006, ISBN (10) 973-638-284-2, ISBN (13) 978-973-638-284-0, pp. 129-134
 13. Mihon, D., Pap, P., Mihon, L., *Advanced public transport systems for reducing environmental pollution*, The 1st International Conference Motor Vehicle and Transportation MVT2006, "Orizonturi Universitare" Publishing House, Nov. 15-17, 2006, ISBN (10) 973-638-284-2, ISBN (13) 978-973-638-284-0, pp. 235-238
 14. Mihon, L., Ostoia, D., *Studies concerning the dynamics of the vehicle equipped with ABS*, The 1st International Conference Motor Vehicle and Transportation MVT2006, "Orizonturi Universitare" Publishing House, Nov. 15-17, 2006, ISBN (10) 973-638-284-2, ISBN (13) 978-973-638-284-0, pp.53-62
 15. Negrea V.D., Mihon, L., Holotescu, S., *Determinarea prin calcul a pierderilor pentru traseele de admisiune ale motoarelor cu ardere internă în vederea evaluării termogazodinamicii acestor masini*, Symposium „30 de ani de existență a Institutului de Motoare Termice – Master S.A. – Tendințe actuale și strategii de cercetare în domeniul motoarelor termice”, Bucharest, „Printech” Publishing House, Bucharest, 2006, ISBN(10) 973-718-493-9, ISBN(13) 978-973-718-493-1, pp.58-63
 16. Negrea V.D., Padure, G., Negrea, I., *Cu privire la stabilirea coeficienților de debit pentru tubulatura de evacuare a motoarelor cu ardere internă*, Symposium „30 de ani de existență a Institutului de Motoare Termice – Master S.A. – Tendințe actuale și strategii de cercetare în domeniul motoarelor termice”, „Printech” Publishing House, ISBN(10) 973-718-493-9, ISBN(13) 978-973-718-493-1, Bucharest, 2006, pp.64-72
 17. Holotescu, S., Stoian, F.D., *Analysis methods of the real compression process for a diesel engine*, COFRET'06, Timișoara, June 15-17, 2006, Special Issue of the Sci. Bull. UPT, Transactions in Mechanics, ISSN 1224-6077, Tom 51(65), No.1, pp.159-164
 18. Negoîtescu, A.S., Ostoia, D., Nagi, M., *The determination of the criterial equation in graphic form for fluid flow perpendicular on a staggered bank of tubes of ALCO 18 m³ oil cooler*, COFRET'06, Timișoara, June 15-17, 2006, Special Issue of the Sci. Bull. UPT, Transactions in Mechanics, ISSN 1224-6077, Tom 51(65), No.1, pp.71-74
 19. Ostoia, D., Negoîtescu, A.S., *Modellation possibility of losses through diesel engine piston rings leakiness*, COFRET'06, Timișoara, June 15-17, 2006, Special Issue of the Sci. Bull. UPT, Transactions in Mechanics, ISSN 1224-6077, Tom 51(65), No.1, pp.151-154
 20. Phillip, A., Negrea, V.D., *Evaluation through calculation using the method of the real cycle of functioning of diesel engine for the evolution of the gases temperature in its cylinder*, COFRET'06, Timișoara, June 15-17, 2006, Special Issue of the Sci. Bull. UPT, Transactions in Mechanics, ISSN 1224-6077, Tom 51(65), No.1, pp.145-150
 21. Grigore, L., Negrea, V.D., Mihon L., *Modellation of the fuel pipe-injector assembly with finite element method*, International Conference ACME-02, May 16-17, 2006, Sci.Bull. of Technical University of Iași, Vol.L (LIV), No.6, ISSN 1011-2855, pp.35-43
 22. Grigore, L., Negrea, V.D., Padure, G., *Analysis of the diesel injection pump elements with finite element method*, International Conference ACME-02, May 16-17, 2006, Sci.Bull. of Technical University of Iași, Vol.L (LIV), No.6, ISSN 1011-2855, pp.43-49
 23. Phillip, A., Negrea, V.D., *Materials obtained through sinterisation of nanometric powders used at components and sub-assemblies for Internal combustion engines*, Annals of the Oradea University, Fascicle of Management and Technological engineering, Vol.V (XV) 2006, ISSN 1583-0691, pp.7-14
 24. Dragomir, G., Negrea, V.D., Georgescu, L., Blaga, L., *Case study related to thermogazdynamics for a diesel engine with normal admission in correlation with data processing by fuzzy functions - part II*, Annals of the Oradea University, Fascicle of Management and Technological engineering, Vol.V (XV) 2006, ISSN 1583-0691, pp.205-208
 25. Phillip, A., Negrea, V.D., *Experimental methods achieved in order to establish the structural characteristics and the physical properties of the materials for the internal combustion engines, obtained by sintering from atomic clusters*, The 1st International Conference Motor Vehicle and Transportation - MVT2006-

01, Timișoara, Nov. 15-17, 2006, "Orizonturi Universitare" Publishing House, ISBN (10) 973-638-284-2, ISBN (13) 978-973-638-284-0, pp.1-10

26. Vrabie, I., Iorga, D., Padure, G., *Cercetări experimentale privind îmbunătățirea caracteristicilor pulverizării la un motor diesel cu injecție directă de mare putere prin mărirea numărului orificiilor pulverizatorului, corespunzător cu micșorarea diametrului acestora*, Symposium „30 de ani de existență a Institutului de Motoare Termice – Master S.A. – Tendințe actuale și strategii de cercetare în domeniul motoarelor termice”, „Printech” Publishing House, ISBN(10) 973-718-493-9, ISBN(13) 978-973-718-493-1, Bucharest, 2006, pp. 82-91

PhD THESIS

1. Eng. Dan GOMBOS: *Studies and researches regarding the use of waste heat of geothermal water*, PhD supervisor: Prof.dr.eng. Virgiliu Dan Negrea
2. Eng. Lăcrămioara Suzana PETRUȚESCU-BOARU: *Studies and researches regarding the pollutants control for an internal combustion engine in interaction with the automobile which is equipped with it*, PhD supervisor: Prof.dr.eng. Virgiliu Dan Negrea
3. Eng. Florean DRUGA: *Contributions regarding the constructive and operational optimisation of medium and large power engines for road vehicles*, PhD supervisor: Prof.dr.eng. Virgiliu Dan Negrea
4. Eng. Ion VRABIE: *Contributions regarding the improvement of the energetic performances and pollution limitation for a medium-high power direct injection diesel engine, through the improvement of the injection quality*, PhD supervisor: Prof.dr.eng. Dănilă Iorga
5. 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*
6. Eng. Virgil STOICA: *Studies regarding the vaporization of hydrocarbons*
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. Mariana Dora FORTOFOI: *Researches regarding the systemic-cybernetic approach of the traffic on public roads, in correlation with the civil, criminal and administrative responsibility*
16. Eng. Liviu Mircea POINARIU: *Studies and researches regarding the conditions and accuracy of measurement of the performance parameters for electronically controlled spark-ignition engines*
17. Alexandra Ana GARBONI: *Researches regarding the implications of harmful factors on the environment quality in the western part of Romania*

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

5. Eng. Sandu IONESCU: *Studies and researches regarding the heat transfer enhancement in heat exchangers with discontinuous fins*
6. Eng. Liviu Mircea POINARIU: *Studies and researches regarding the conditions and accuracy of measurement of the performance*

19. Lucian Ioan RAFAN: *The phenomenon accident in correlation with the environment protection*
20. Eng. Silviu Vasile PONORAN: *Road traffic and environmental pollution*
21. 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. Daniel IORGA

1. Cristian NEGHINA: *Contributions regarding the optimisation 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
- Assist. eng. Virgil STOICA, PhD student
- Assist.eng. Daniel OSTOIA, PhD student
- Eng. Lăcrămioara Suzana PETRUTESCU-BOARU, PhD student
- Eng. Adriana TOKAR, PhD student
- Eng. Ileana NEGREA, PhD student
- Eng. Adrian IRIMESCU, PhD student

CONTACT PERSONS

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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, SO₂, NO_x, C_mH_n, combustion quality, including meteorological data
- Hg measurements
- Waste management (combustion) and flue gas cleaning
- Optical & classical methods for air quality investigation
- Optimization of energy production & transmission (power plants), using fossil and renewable fuels
- Numerical simulation of the pollutant dispersion, using various statistical methods, regarding the stationary combustion installations (boilers, furnaces etc.) and mobile combustion installations (vehicles equipped with ICES: ISC3 View, Caline 3, Emisfac, Cal3qhcr
- Numerical experiments regarding the optimization of combustion installations by modelling of the velocity, temperature and concentration fields in the furnaces of boiler using the FLUENT program package
- The ecological evaluation (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.

RESULTS

RESEARCH PROJECTS / CONTRACTS

1. Contract No. P137 *Experts in Balkan region - CETEOR*, Director: Prof.dr.eng.habil Ioana Ionel, Value for 2006: 1, 200 USD
2. Contract No. COLL CT 2005 012566, 2005-2007, *GREENENERGY (Energy optimisation in European greenhouses)*, Director: Prof.dr.eng. habil Ioana Ionel, Value for 2006: 21, 000 EUR
3. Contract-No. CT SES6-CT-020007 2005-2006, *NETBIOCOF (Network of biomass co firing)*, Director: Prof.dr.eng.habil Ioana Ionel, Value for 2006: 16,000 EUR
4. CNCSIS Research Fellowship no. 176/2003-2006, *Contributions to the determination of the combustion quality of waste and methods of reduction the pollutant emissions concentrations*, Eng. Claudiu Gruescu, PhD Student, Value: 246 RON/month
5. National Research Program MENER, Contract No. 410 / 20.09.2004 (continued in 2006), *Researches regarding the combined combustion of urban waste or biomass with coal and flue gas cleaning*, Director: Prof.dr. eng. habil Ioana Ionel, Value for 2006: 34,000 RON
6. National Research Program MENER, Contract No. 461/20.09.2004, *New technology of the valorification of biomass by combustion in fluidized bed*, Director: Prof.dr.eng.habil Ioana Ionel, Value for 2006: 12,500 RON
7. National Research Program CORINT, Contract No.89, *Energy optimization in European Greenhouses*, Director: Prof.dr. eng. habil Ioana Ionel, Value for 2006: 13,871 EUR
8. National Research Program CORINT, Contract No.90, *European integrated network for biomass incineration*, Director: Prof.dr.eng. habil Ioana Ionel, Value for 2006: 13,871 EUR
9. CEEX Program, Contract No. 12233 / 12.10.2005, *Development of clean technologies to produce energy based on coal- TECEBAC*, Director: Prof.dr.eng.habil Ioana Ionel, value for 2006: 115,000 RON
10. CEEX Program, Contract No. 12232/2005, *Researches regarding the control systems and evaluation of emission level in naval transportation - EMSHIPS*, Director: Prof.dr.eng.habil Ioana Ionel, value for 2006: 27,720 RON
11. CEEX Program, Contract No.9064/20.07.2006, *Optical teledetection in the integrated study of the pollution in the urban planetary boundary layer - TOP*, Director: Prof.dr.eng.habil Ioana Ionel, value for 2006: 22,000 RON
12. CEEX Program, Contract No. 10247/05.09.2006, *Optimisation of waste energetic potential utilization to obtain clean energy in Romanian industrial installations – OVAPED*, Director: Prof.dr.eng.habil Ioana Ionel, value for 2006: 32,000 RON
13. Contr. No.2/2006 with BENA (BALKAN ENVIRONMENTAL ASSOCIATION), *Technology to esterifies animal and vegetable waste fats with high free fatty acid content. Pilot installation for Bio diesel production*, Director: Assist. dr. eng. Francisc Popescu, Value for 2006: 3,000 RON
14. CEEX Program, M2, 1427 / 24.03.2006, 2006-2008, *Theoretical and experimental study regarding the fabrication of a semi-automatic installation for producing Biodiesel from waste grease, of animal and vegetal origin*, Director: Assist. dr. eng. Francisc Popescu, Value for 2006: 38,600 RON
15. CNCSIS grant, CNCSIS Code 54, *Simulation in FLUENT Code of the temperature and velocity fields in a furnace for simultaneous burning of the wastes and powder coal*, Director: Eng. Vasile GRUESCU, PhD Student, Value for 2006: 9,580 RON
16. Contract No. 1207/2003, AD no.5/2006, with Halanga Power Plant, *Determination of gaseous and solid emissions at the two smoke channels of the 420 t/h boilers, no. 1,2, and 3, from Halanga Power Plant*, Director: Prof.dr. eng. habil Ioana Ionel, Value for 2006: 17,280 USD
17. Contract No. 1215/2003, AD 2/2006, with Arad Power Plant, *Thermotechnic measurements regarding the exhaust gases analysis at the 420 t/h boiler working on lignite*, Director: Prof.dr. eng. habil Ioana Ionel, Value for 2006: 2,400 EUR

18. Contract No. 278/15.06.2005 with Detergenti S.A. Procter&Gamble Timisoara, 2005-2006, *Measurement of pollutant emissions at 4 installations and 10 points and evaluation of dispersion*, Director: Prof.dr.eng. Corneliu Ungureanu, value 490,81 RON
19. Contract No. 1217 / 2005-2006 with SOLECTRON, *Measurement of emissions in order to evaluate the impact on the environment*, Director: Prof.dr.eng.habil Ioana Ionel, Value for 2006: 250 EUR
20. BC 462-31.03.06, with SC ALCOA-FUJIKURA SRL, *Flue gas measurements - CO₂, CO, NO_x, SO_x and other thermodynamic parameters needed to analyse the results for different installations (boilers and blowers), as follows: 15 stacks at Nădab, Arad county and 12 stacks at Caransebes*, Director: Prof.dr.eng.habil Ioana Ionel, Value for 2006: 1080 EUR
21. Contract No. 4883/19.04.06, with Timișoara City Hall, *Online measurements for air quality and traffic. Main characteristics of the state of the environment in the city. Trends and perspectives*, Director: Prof.dr.eng.habil Ioana Ionel, Value for 2006: 10,000 RON
22. Com. BC 1222/02.03.2006 with UCM Resita, *Thermotechnic measurements to determine the pollutants and particles emissions at the test benches for diesel engines*, Director: Assist. dr. eng. Francisc Popescu, Value: 973.44 RON
23. Com. BC 1220/28.02.2006, with MASCHIO GASPARD, *Performing flue gas and powders analyses at the production unit in Chisinau Cris*, Director: Prof.dr.eng.habil Ioana Ionel, Value 1253.3 RON
24. Com. BC 1221/28.02.2006 with Tehnoinstrument, *Gravimetric determination of powders emissions at boiler no.3 from Timisoara Sud Power Plant*, Director: Prof.dr.eng.habil Ioana Ionel, Value 876.45 RON
25. Com. BC 1223-15.05.06 with SC Sorocam SRL, *Study of powders dispersion and determination of emissions for environment Balance, level 2*, Director: Prof.dr.eng.habil Ioana Ionel, Value 600 EUR
26. Com. BC 1224-30.5.06 with SC AZUR Timisoara, *Flue gas analysis, 3 points*, Director: Prof.dr.eng.habil Ioana Ionel, Value 240 EUR
27. Contract BC 1228-20.06.06, with Refraceram SRL BARU Hunedoara, *Thermotechnic measurements, in view of obtaining the environment authorisation*, Director: Prof.dr.eng.habil Ioana Ionel, Value 480 EUR
28. Contr.nr. 1227/13.06.2006 with DUNAV International construct Sa Lugoj, *Thermotechnic measurements of emissions and imissions, in view of obtaining the environment authorisation*, Director: Prof.dr.eng.habil Ioana Ionel, Value 500 EUR
29. Contr. nr.1225/08.06.2006 with COCA COLA HBC Romania SRL, Timișoara, *Thermotechnic measurements of emissions and imissions, in view of obtaining the environment authorisation*, Director: Prof.dr.eng.habil Ioana Ionel, Value 1000 EUR
30. Com. BC 454 -12.05.06 with AEM TIMISOARA, *Thermotechnic measurements of emissions and imissions, in view of obtaining the environment authorisation*, Director: Prof.dr.eng.habil Ioana Ionel, Value 600 EUR

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2. Corneliu Ungureanu, Nicolae Panoiu, Vasile Zupcu, Ioana Ionel, *Fuels, Burning Installations, Steam Boilers* (published in Romanian), "Politehnica" Publishing House, Timișoara, 2006, ISBN 973 9389 21 0, 500 pages
3. Corneliu Ungureanu, Ioana Ionel, Paul Dan Oprisa-Stanescu, Vasile Gruescu, *Integrated administration of the municipal waste* (published in Romanian), "Politehnica" Publishing House, Timișoara, 2006, ISBN (10) 973 625 386 4, (13) 978 973 625 386 7, 280 pages

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2. Ionel, I., Trif Tordai, G., Gruescu, S., Tenchea, A., *Biomass utilisation in Romania*, Scientific Bulletin. of UPT, Transactions on Mechanical Engineering, Vol. 51(65), Fasc. 2, 2006, ISSN 1224 6077, "Politehnica" Publishing House, Timișoara, Editors: V. Bălășoiu, Ioana Ionel, pp.371-376

3. Ionel, I., Popescu, Fr., Ungureanu, C., Trif Tordai, G., *Biomass as a renewable energy resource in Romania*, Scientific Bulletin. of UPT, Transactions on Mechanical Engineering, Vol. 51(65), Fasc. 2, 2006, ISSN 1224 6077, "Politehnica" Publishing House, Timișoara, Editors: V. Bălășoiu, I. Ionel, pp. 377-380
4. Ionel, I., Savu, A., Gruescu, V., Trif Tordai, G., Tenchea, A., Ungureanu, C., *Co-combustion of biomass in a fluidised bed combustion facility*, Scientific Bulletin. of UPT, Transactions on Mechanical Engineering, Vol. 51(65), Fasc. 2, 2006, ISSN 1224 6077, "Politehnica" Publishing House, Timișoara, Editors: V. Bălășoiu, I. Ionel, pp.381-386
5. Popescu, Fr., Ionel, I., Ungureanu, C., *New Technologies for PM10 and PM2.5 AQM Monitoring*, Scientific Bulletin. of UPT, Transactions on Mechanical Engineering, Vol. 51(65), Fasc. 2, 2006, ISSN 1224 6077, "Politehnica" Publishing House, Timișoara, Editors: V. Bălășoiu, I. Ionel, pp. 307-312
6. Cotescu, S., Bunea, M., Popescu, C., Vatra, C., Pasat, S., Merla, S., Ionel, I., Popescu, Fr., *Research concerning development of new technologies for air quality monitoring and noxes impact on human health and environment*, Scientific Bulletin. of UPT, Transactions on Mechanical Engineering, Vol. 51(65), Fasc. 2, 2006, ISSN 1224 6077, "Politehnica" Publishing House, Timișoara, Editors: V. Bălășoiu, I. Ionel, pp.283-286
7. Ionel, I., Oprisa-Stanescu, P.D., Gruescu, Cl., Savu, A., Ungureanu, C., *Integrarea unui incinerator de deșeuri la un cazan de abur funcționând cu cărbune*, Rev. de chimie, Bucuresti, ISSN 0034-7752, 2006, Vol 57, Nr 12, pp. 1306
8. Chelici, G., Ionel, I., Maier, J., Dhungel, B., *Enhanced fossil fuel combustion. Actual state of art*, Scientific Bulletin. of UPT, Transactions on Mechanical Engineering, Vol. 51(65), Fasc. 2, 2006, ISSN 1224 6077, "Politehnica" Publishing House, Timișoara, Editors: V. Bălășoiu, I. Ionel, pp.15-23
9. Ionel, I., Savu, A., Ungureanu, C., Trif-Tordai, G., Gruescu, V., Tenchea, A., Lontis, N., Bulz, C., *Co-combustion of biomass in a Romanian fluidised bed combustion facility*, Fluidised bed combustion, Vienna (Austria), May 2006, ISBN 13 978 88 87380 51 4, Vol. 1, pp 100-109
10. Ungureanu, C., Ionel, I., Oprisa-Stanescu, P.D., Gruescu, V., Gruescu, Cl., *O noua tehnologie de coincinerare a deșeurilor municipale*, Nat. Conference with international participation "Installations for buildings and ambiental comfort", 15th Edition, April 2006, Timisoara, "Politehnica" Publishing House, ISBN (10) 973 625 305 8, (13) 978 973 625 305 8, pp. 313-320
11. Oprisa Stanescu, P.D., Ionel, I., *Fluidised bed biomass combustion in an experimental furnace*, Romanian FLUENT users meeting, March 30-31 2006, Sinaia, Printech Publishing House, Bucharest, ISBN 973 718 443-2, pp. 49-54
12. Bisorca, D., Ionel, I., Popescu, Fr., *Numerical experimental study of the traffic induced pollutants' dispersion in a cross road*, Environmental/ Transports, Rheims, 12-14 June, 2006, Editeur R Joumard, ISBN 2 8578286397, ISSN 07690266, pp 276-281
13. Cirtog, A.P., Mochizuki, S., Murata, A., Ionel, I., *Heat transport device with boiling-driven recirculating flow*, The 17th Int. Symposium on Transport Phenomena, 4-8 September, 2006, Toyama, Japan, ISBN 1 930746 03 2, Paper 3EI2, pp. 165 -169
14. Ionel, I., Oprisa-Stanescu, D. P., Ungureanu, C., Mochizuki, S., Cirtog, A.P., *Numerical modelling as analysing tool of the possibility of coupling of a waste incinerator to an existing lignite fired boiler*, The 17th Int. Symposium on Transport Phenomena, 4-8 September, 2006, Toyama, JAPAN, ISBN 1 930746 03 2, Paper 1D IV 5, pp. 90-94
15. Ionel, I., Bisorca, D., Popescu, Fr., Ionel, S., *Conclusion versus best practice of optical and point measuring air quality measuring instruments under traffic conditions*, The 1st International Conference Motor Vehicle and Transportation - MVT2006-01, Timișoara, Nov. 15-17, 2006, "Orizonturi Universitare" Publishing House, ISBN (10) 973-638-284-2, ISBN (13) 978-973-638-284-0, Paper MVT20064001, pp. 99-95
16. Ionel, I., Savu, A., Ungureanu, C., Gruescu, C., Trif-Tordai, Tenchea, A., Lontis, N., Bulz, C., Savu, B., *Co-combustion of Waste in a Romanian Fluidized Bed Combustion Facility*, World Renewable Energy Congress -WREC 2006, Edited by Ali A.M. Sayigh, Elsevier Publishing House, ISBN -13:978-0-08-045056-8; 10:0-08-045056-3, Florenta (Italia) 2006, pp. 269-275
17. Ionel, I., Savu, A., Gruescu, C., Negrea, P., Popescu, F., *Technology for mercury and other metals' retention from waste flue gases*, The Sixth World Energy System Conference (WESC 2006), Torino, Italy, Editor G.

Chicco, July 10-12, 2006 ISBN (10): 88-87380-51-1 and ISBN (13): 978-88-87380-51-4, pp. 759-763

18. Ionel, I., Savu, A., Tenchea, A., Ungureanu, C., Trif-Tordai, G., Lontiș, N., *Experimental achievements concerning the biomass co-combustion in an experimental test facility*, The Sixth World Energy System Conference (WESC 2006), Torino, Italy, Editor G. Chicco, July 10-12, 2006 ISBN (10): 88-87380-51-1 and ISBN (13): 978-88-87380-51-4, pp.753-758

PhD THESIS

1. Eng. Aurel MATEI: *Contributions to the reduction of pollutant emissions as a result of the operation of Timisoara Power Plant*, Prof.dr.eng. Corneliu Ungureanu
2. Eng. Claudiu GRUESCU, *Contribution to reduction of the mercury concentration's emissions emitted by municipal solid waste incineration*, PhD supervisor: Prof.dr.eng.habil Ioana Ionel

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. Lelia DOBJANSCHI: *Contributions regarding the share of ROMAG-TERMO Turnu Severin coal Power Plant to the zonal pollution and measures for reducing it*
3. Eng. Florica TUDOR: *Contributions regarding the diminution of environmental pollution due to the ash produced at the lignite combustion at Turceni Power Plant*
4. Eng. Marius MARIN: *Contributions regarding the diminution of environmental pollution due to gaseous pollutants produced due to the lignite combustion at Turceni Power Plant*
5. Eng. Vasile GRUESCU: *Contributions regarding the energo-technology of domestic and street waste*
6. Eng. Adrian Iulian TENCHEA: *Contributions regarding the research of the biomass combustion in fluidized bed*
7. Eng. Victor EBETIUC: *Studies and researches regarding the efficient production and distribution of thermal energy in Turnu Severin city*
8. Marian Gabriel MILI: *Contributions regarding the modernization of existing*

energetic units using the combined cycle steam-gas with parallel disposition

9. 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*

10. Eng. Ina Liliana VODISLAV (BLIDEA): *Contributions regarding the ecological utilization of the rubber waste*

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. Adina CÎRTOG: *Heat transport device with phase change, using one way parallel tubes*
7. Eng. Carmencita CONSTANTIN: *Contributions to the elaboration of a technical and economic strategy regarding the durable development of the urban heat generation sector*
8. Eng. Gavrilă TRIF-TORDAI: *Researches regarding the combined burning of combustible wastes with low quality coal*
9. Eng. Nicolae GIORGI: *Theoretical and experimental researches regarding the elaboration of the environment surveys for Tg. Jiu city*
10. Eng. Nicolae Stelian LONTIȘ: *Mechanical Engineering (Researches regarding the biodiesel as renewable fuel for small energy groups)*
11. Eng. Dan Simion STEPAN: *Mechanical Engineering (Researches regarding the*

reduction of vibrations, noise in transportation /railway vehicles)

12. Eng. Diana SILAGHI: *Researches regarding the utilization of solar energy*

RESEARCH TEAM

- Prof.dr.eng. Corneliu UNGUREANU
- Prof.dr.eng.habil Ioana IONEL
- Assoc.prof.dr.eng. Dan OPRISA-STANESCU
- Lect. Dr.eng. Dorin LELEA
- Assist. dr. eng. Francisc POPESCU
- Eng. Daniel BISORCA, PhD student
- Eng. Adrian GOANTA, PhD student
- Eng. Lucia VARGA, PhD student
- Eng. Aristică BABUCEA, PhD student
- Eng. Claudiu GRUESCU, PhD student
- Eng. Vasile GRUESCU, PhD student
- Eng. Florin IACOBESCU, PhD student
- Eng. Adrian MAGDA, PhD student
- Eng. Adrian ŢENCHEA, PhD student
- Eng. Gavrilă TRIF-TORDAI, PhD student
- Eng. Lelia DOBJANSCHI, PhD student
- Eng. Aurel MATEI, PhD Student
- Eng. Florica TUDOR, PhD Student
- Eng. Alexandru Anghel C. GHENEA, PhD Student
- Eng. Marius MARIN, PhD Student
- Eng. Victor EBETIUC, PhD Student
- Eng. Marian Gabriel MILI, PhD Student
- Eng. Marian DOBRIN, PhD Student
- Eng. Ina Liliana VODISLAV (BLIDEA), PhD Student
- Eng. Adina CÎRTOG, PhD Student
- Eng. Carmencita CONSTANTIN, PhD Student
- Eng. Nicolae GIORGI, PhD Student
- Eng. Nicolae Stelian LONTIŞ, PhD Student
- Eng. Casian Petru BULZU, PhD Student
- Eng. Dan Simion STEPAN, PhD Student
- Eng. Diana SILAGHI, PhD Student
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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

ACTIVITIES

- researches regarding the optimisation 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
- optimisation of urban thermal networks

RESULTS

RESEARCH CONTRACTS

1. Contract No. 319/09.09.2005, AD 2006, with S.C. RAAL Bistrița, *Researches regarding the performances of shell type heat exchangers realised by S.C. RAAL Bistrita*, and Director: Prof. Dr.eng. Mihai Nagi, value: 8,000 RON
2. Contract No. A1/GR181/19.05.06, Theme 33, CNCIS Code 665, *Researches regarding the utilization of magnetizable nanofluids as thermal fluid*, Director: Assoc.prof.dr.eng. Floriana D. Stoian, value: 18,500 RON

BOOKS

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2. Mihai Jădăneanț, Mihai Nagi, Floriana D. Stoian, Ioana Ionel, Ioan Laza, Dorin Lelea, Liviu Mihon, Paul Dan Oprișă-Stănescu, *Basic thermoenergetics* (published in Romanian), Orizonturi Universitare Publishing House, Timișoara, 2006, ISBN (10) 973-638-257-5, 293 pages
3. Mihai Nagi, Dănilă Iorga, Ioan Laza, Liviu Mihon, Daniel Ostoia, *Heat exchangers* (published in Romanian), Mirton Publishing House, 2006, ISBN (10) 973-52-0000-7, 307 pages

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2. Jădăneanț, M., *Thermodynamics and human society*, COFRET'06, Scientific Bulletin. of UPT, Transactions on Mechanical Engineering, Vol. 51(65), Fasc. 2, 2006, ISSN 1224 6077, "Politehnica" Publishing House, Timișoara, Editors: V. Bălăsoiu, I. Ionel, pp. 23-26
 3. Călin, L., Jădăneanț, M., *Consideration upon the cooling preservation method of grains storage*, COFRET'06, Scientific Bulletin. of UPT, Transactions on Mechanical Engineering, Vol. 51(65), Fasc. 2, 2006, ISSN 1224 6077, "Politehnica" Publishing House, Timișoara, Editors: V. Bălăsoiu, I. Ionel, pp. 257-261
 4. Moșteoru, L.D., Jădăneanț, M., Moșteoru, Fl., *Sterilization of medical supplies by dry heat, theory and practice*, COFRET'06, Scientific Bulletin. of UPT, Transactions on Mechanical Engineering, Vol. 51(65), Fasc. 2, 2006, ISSN 1224 6077, "Politehnica" Publishing House, Timișoara, Editors: V. Bălăsoiu, I. Ionel, pp.303-306
 5. Oancea, Fl., Jădăneanț, M., *Despre reabilitarea termică a blocurilor de locuințe*, Nat. Conference with international participation "Installations for buildings and ambient comfort", 15th Edition, April 2006, Timișoara, "Politehnica" Publishing House, ISBN (10) 973 625 305 8, (13) 978 973 625 305 8, pp. 44-51
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 9. Alexandru, D., Nagi, M., *Critical consideration regarding the fuelling of automobiles with auto gas*, The 1st International Conference Motor Vehicle and Transportation - MVT2006-01, Timișoara, Nov. 15-17, 2006, "Orizonturi Universitare" Publishing House, ISBN (10) 973-638-284-2, ISBN (13) 978-973-638-284-0, Paper MVT 20061037
 10. Ilies, P., Martian, V., Nagi, M., *Experimental research on shell construction oil coolers*, The 1st International Conference Motor Vehicle and Transportation - MVT2006-01, Timișoara, Nov. 15-17, 2006, "Orizonturi Universitare" Publishing House, ISBN (10) 973-638-284-2, ISBN (13) 978-973-638-284-0, Paper MVT 20061042
 11. Ilies, P., Martian, V., Nagi, M., *Circular Coolers*, 1st International Conference Motor Vehicle and Transportation - MVT2006-01, Timișoara, Nov. 15-17, 2006, "Orizonturi Universitare" Publishing House, ISBN (10) 973-638-284-2, ISBN (13) 978-973-638-284-0, Paper MVT20061044
 12. Martian, V., Ilies, P., Nagi, M., Boldor, G. *Experimental researches regarding transient heat rejection of aluminium heat exchangers*, 1st International Conference Motor Vehicle and Transportation - MVT2006-01, Timișoara, Nov. 15-17, 2006, "Orizonturi Universitare" Publishing House, ISBN (10) 973-638-284-2, ISBN (13) 978-973-638-284-0, Paper MVT20061030
 13. Ferencz, A., Laza, I., *Compresoare ALUP soluție pentru mărirea eficienței energetice*, National Conference of Installations of Buildings and ambient Comfort, Ed. XV, Politehnica Publishing House, Timișoara, 6-7-April 2006, ISBN (10)973-625-305-8, pp. 186-195
 14. Laza, I., Ferencz, A., *Compresoare ALUP produse, concepte, solutii*, National Conference of Installations of Buildings and ambient Comfort, Ed. XV, Politehnica Publishing House, Timișoara, 6-7-April 2006, ISBN (10)973-625-305-8, pp. 196-205
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 16. Laza, I., Ferencz, A. *Compresoare ALUP*, The 41-th National Conference of Installations, Sinaia, 19-21-October 2006, MATRIX ROM

- Publishing House, ISBN (10)973-755-096-X, pp. 195-201
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 18. Laza, I., Ferencz, A. *Soluții pentru marirea eficienței energetice cu compresoarele ALUP*, The 41-th National Conference of Installations, Sinaia, 19-21-October 2006, MATRIX ROM Publishing House, ISBN (10)973-755-096-X, pp. 209-215
 19. Laza, I., Lelea, D., *The key to increase the compressors energy efficiency*, The 19-th Conference of Industrial Processes, Paragon Publishing House, Belgrad, 14-16-June 2006, pp. 55
 20. Lelea, D., Laza, I., Popescu, F., *The possibilities of laptop chip cooling*, The 19-th Conference of Industrial Processes, Paragon Publishing House, Belgrad, 14-16-June 2006, pp. 30
 21. F.D. Stoian, S. Holotescu, *Theoretical analysis of volume fraction variations on the thermal properties of water based magnetizable nanofluids*, COFRET'06, Scientific Bulletin. of UPT, Transactions on Mechanical Engineering, Vol. 51(65), Fasc. 2, 2006, ISSN 1224 6077, "Politehnica" Publishing House, Timișoara, Editors: V. Bălășoiu, I. Ionel, pp.57-62
- 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*

PhD supervisor: Prof.dr.eng. Mihai JĂDĂNEANȚ

1. Eng. Liliana Daniela MOSTEORU: *Contributions to the improvement of thermal performances and ecologisation of the sterilisation equipment for medical instruments*
2. Eng. Cristian DAMIAN: *Contributions to the thermal study of the axle boxes with rolling bearing at high speed trains*
3. Eng. Sorin RUSU: *Contributions to the optimisation of the railroad traction diesel engines operation*
4. Eng. Gh.-Florin OANCEA: *Theoretical and experimental contributions regarding the thermal rehabilitation of the buildings from a headquarter in Timișoara city*
5. 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*

PhD STUDENTS

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 SAFOIU: *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*
6. Eng. Gh. Marcel MOCUTA: *Theoretical and experimental contributions regarding the combustion and the heat exchange in the hot air generators used on road vehicles*
 7. Eng. Constantin STROIE: *Contributions to the study of the impact of railroad transportation on the environment and the railroad infrastructure*
 8. Eng. Laurențiu CĂLIN, *Industrial Engineering*
 9. Eng. Florin MĂRCUȚ, *Industrial Engineering*

PhD supervisor: Prof.dr.eng. Gavril CREȚA

1. Eng. Ion Cornel LUPUT: *Researches regarding the possibility of reduction the fuel consumption in large cities around the country, with reference to Timisoara city*

RESEARCH TEAM

- Prof.dr.eng. Mihai NAGI

- Prof.dr.eng. Mihai JĂDĂNEANȚ
- Prof.dr.eng. Gavril CREȚA
- Assoc.prof.dr.eng. Floriana D. STOIAN
- Assoc.prof.dr.eng. Liviu MIHON
- Assoc.prof.dr.eng. Ioan LAZA
- Lect. Dr.eng. Gheorghe POP
- Lect. Dr.eng. Dorin LELEA
- Lect. Dr.eng. Arina NEGOIȚESCU
- Assist.eng. Virgil STOICA
- Eng. Paul ILIEȘ, PhD Student
- Eng. Vlad MARȚIAN, PhD Student
- Eng. D. ALEXANDRU, PhD Student
- Eng. Mariela SPOREA, PhD Student
- Eng. Francisc SZIKSZAI, PhD Student
- Eng. Cătălin BOJAN, PhD Student
- Eng. Ovidiu SAFTOIU, PhD Student
- Eng. Ciprian CAIA, PhD Student
- Eng. Tiberiu STANCIU, PhD Student
- Eng. Mihaela BUCULEI, PhD Student
- Eng. Liliana MOSTEORU, PhD Student
- Eng. Cristian DAMIAN, PhD Student
- Eng. Sorin RUSU, PhD Student
- Eng. Gh.-Florin OANCEA, PhD Student
- Eng. Doina MIHON, PhD Student
- Eng. Gh.-Marcel MOCUȚA, PhD Student
- Eng. Constantin STROIE, PhD Student
- Eng. Laurențiu CĂLIN, PhD Student
- Eng. Florin MĂRCUȚ, PhD Student
- Eng. Ion Cornel LUPUT, PhD Student
- Jurist Alexandru JĂDĂNEANȚ, PhD Student

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

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

ACTIVITIES

- Estimation of combustible and electric energy consumption and the influences of parameters

such as: profile of wheel and rail, constructive and functional characteristics of locomotives and wagons, train driving type and others

- Design of railway parts: bogies, wheel sets, 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

BOOKS

1. Eugen Ghita, Gheorghe Turoș, *Dynamics of railway vehicles* (published in Romanian), "Eurostampa" Publishing House, Timișoara, ISBN (10) 973-687-400-1, (13) 978-973-687-400-0, 2006, 204 pages
2. Eugen Ghita, Gheorghe Turoș, *Dynamics of railway vehicles* (published in Romanian), "Politehnica" Publishing House, Timișoara, ISBN (10) 973-625-354-6, (13) 978-973-625-354-6, 2006, 170 pages
3. Gabriel V. Ursu-Neamt, Gheorghe Turoș, *Electric locomotives and trains-DC vehicles-Design work-book*, (published in Romanian), "Politehnica" Publishing House, Timișoara, ISBN (10) 973-625-312-0,(13) 978-973-625-312-6,2006, 2006, 120 pages

PUBLISHED PAPERS

1. Stud. Zetil, G., Toth, I., Coord. Ghita, E., *Proiect de modificare a unei macarale tip Pioneer*, Sesiune de comunicări științifice studențești HD-36-STUD,Hunedoara,CD-rom Proceedings, 2006, 5pp.(varianta CD)
2. Stud. Zetil, G., Toth, I., Coord. Ghita, E., *Aspecte privind eficiența catalizatorilor în reducerea poluării la funcționarea vehiculelor cu motoare termice*, Buletinul Sesiunii de comunicări științifice studențești, ISSN 1583-6088, CD-rom Proceedings , Alba-Iulia, 2006
3. Drăgănescu, O., Ghita, E., *Aspecte ale stadiului actual în estimarea fotoelastică a stărilor de tensiuni în probleme de contact local*, Vol.

- Conferinței Internaționale” Dorin Pavel – Fondatorul Hidroenergeticii românești” Editura Fundației Științifice Europene, ISBN 973-8130-82-4, Sebeș, 2006, pp.615-620, republicată în Buletinul AGIR Nr.1/2006
4. Ghita, E., Ursu, G., Stepan, D., *Theoretical and Experimental Aspects Concerning the Wheel-Rail Contact Analysis in the Railway Transport*, Buletin științific al Universității ”Politehnica” Timișoara, Seria Mecanică, Tom 50(64), Fasc. 2, 2006, ISSN 1224-6077, pp.95-100
 5. Ghita, E., Goia, I., Stepan, D., *A Computational Analysis of a Railway Wheel set*, First South-East European Conference on Computational Mechanics, ISBN 86-81037-13-7, Kragujevac, Serbia, SEECCM 06, 2006, pp.493-497
 6. Goia, I., Ghita, E., *Researches about the evolution of the wheel profiles and materials for the city railway transportation*, The 10-th Conference on “Vehicle System Dynamics, Identification and Anomalies”, Budapesta, november, 2006
 7. Goia, I., Ghita, E., *Technological aspects regarding the geometry and materials of the elastic tram wheel and urban rail*, The 10-th Conference on “Vehicle System Dynamics, Identification and Anomalies”, Budapesta, november, 2006
 8. Mocuța, G.E., Ostoia, D., Căneparu, P., “Quality management system in a transport organisation and its place in the logistic chain” Proceedings of the 1st International Conference on motor vehicle and transportation, MVT 2006, November 15-17th, 2006, Timisoara, Romania, Section 3, MATERIALS AND TECHNOLOGIES, 2006 Editura ORIZONTURI UNIVERSITARE Timisoara, ISBN - 10: 973 - 638 - 284 2, ISBN - 13: 978 - 973 - 638 - 284 0, pp. 93-98
 9. Herman ,M., Herman ,R.- “Analiza factorilor de risc proprii executantului in sectoare ale transportului feroviar”, Proc. of the 1-th International Conference “Systems for Health and Work Security”, Young workers-“Start safe”,2006,Timisoara,ISBN (10) 973-638-274-5,(13) 973-638-274-1,pp.55-59
 10. Herman ,M., Herman ,R.- *Consideratii privind optimizarea activitatii de prevenire a accidentelor de munca si imbolnavirilor profesionale in sistemul feroviar*, Proc. of the 1-th International Conference “Systems for Health and Work Security”, Young workers-“Start safe”,2006,Timisoara,ISBN (10) 973-638-274-5,(13) 973-638-274-,pp.59-62
 11. Mocuta, G. E., *Railways as interfering element in goods trains traction*, Third edition of the French-Romanian colloquium energy - environment - economy and thermodynamics COFRET™06, under the auspices of the France-PECO and Balkan Environmental Association B.EN.A, 15-17 June 2006, Timisoara, Scientific Bulletin of the POLITEHNICA University of Timisoara, Romania, Transactions on MECHANICS, Tom 51(65), Fascicola 2, 2006, ISSN 1224-6077, Editura Politehnica, pp. 107-112.
 12. Mocuța, G. E., “Study of the optimum way in the working space that equips a flexible fabrication cell for the carrying structure components of a railway vehicle”, Third edition of the French-Romanian colloquium energy environment - economy and thermodynamics COFRET™06, under the auspices of the France-PECO and Balkan Environmental Association B.EN.A, 15-17 June 2006, Timișoara, Scientific Bulletin of the POLITEHNICA University of Timișoara, Romania, Transactions on MECHANICS, Tom 51(65), fascicola 2, 2006, ISSN 1224-6077, Politehnica Publishing House, pp. 113-116.
 13. Dungan L.I., Pap P., Catrina M. “Simulation assiste par l’ordinateur de mecanisme de protection contre le choc entre 2 voies ferroviares”, COFRET 06, Third edition french-roumanian colloquium Energy-Environment-Economy Thermodynamics, Timisoara, 17-17.06.2006, “Politehnica” Publishing House, ISSN 1224-6077, pp.101-106.
 14. Pap P.Dungan L.I. “Modelling braking regime of the high speed goods train”, COFRET 06,Third edition french-roumanian colloquium Energy-Environment-Economy Thermodynamics ,Timisoara,17-17.06.2006, “Politehnica” publishing house, ISSN 1224-6077,pp.117-120.

RESEARCH TEAM

- Assoc.prof.dr.eng. Eugen GHITA
- Assoc.prof.dr.eng. Georgeta Emilia MOCUȚA
- Lect. Dr.eng. Petru PAP
- Lect. Dr.eng. Mihaela HERMAN
- Assist.eng. Gabriel URSU-NEAMT, PhD student
- Assist.eng. Luiza-Izabel DUNGAN
- Ph.D.student Dan STEPAN
- Cătălin TROI, graduate student

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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

CEEX Nr. X2C25/5 din 11.09.2006, P-CD (AMTRANS) 2006 Advanced information and route guidance system for vehicle drivers and travellers using digital maps –SAIGHID, Director, Assoc.prof.dr.eng. Dumitru IANCULUI, total value 2006-2008: 130,778 RON (Phase 1, 12,588).

BOOKS

1. Ionel Vandici, *Road Safety* (published in Romanian), Eurobit Publishing House, Timisoara 2006 ISBN(10) 973-673-055-2, 136 pages
2. Ionel Vandici, *Road Vehicles*, Eurobit Publishing House, Timisoara 2006, ISBN(11) 978-973-673-066-5, 84 pages
3. Ionel Vandici, *The vehicles driving technique*, Eurobit Publishing House, Timisoara 2006, ISBN 973-8181-56-9, 56 pages
4. Adrian Cipleu, *Shock Behaviour of Surface treated Steels*, Eurobit Publishing House, Timisoara 2006, ISBN(10) 973-620-229-1, ISBN(13) 978-973-620-229-2, 201 pages

PUBLISHED PAPERS

1. Gonczi A, Iancului D, 006. *Romania at the Gates of the EU – a Road Safety Policy Assessment*, 2In “On Safe Roads in the XXth Century”. 25-27 October, 2006. Budapest
2. Gonczi A, Iancului D, *An Assessment of the Road Safety Policies in Romania*, Proceeding of the 1st Inter-national Conference on Motor Vehicle and Transportation MVT 2006, 15-17 Nov.2006 Timisoara, Romania, ISBN -10: 973-638-284-2; ISBN-13: 978-638-284-2, Sec.4, pp 19-24;

3. Cipleu A, Vandici I, *Regards on spur gear behaviour under dynamic loads*, Bulletin Scientific al UPT Tom 51(65) 2006, ISSN 1224-6077, pp.120-126
4. Cipleu A, *On the study of tire-hard pavement static interaction (I), theoretical approach*, Proceeding of the 1st Inter-national Conference on Motor Vehicle and Transportation MVT 2006, 15-17 Nov.2006 Timisoara, Romania, ISBN -10: 973-638-284-2; ISBN-13: 978-638-284-2, Sec.1, pp. 19-26;
5. Cipleu A, Minca Cr, Vandici I, Draghici A, *On the study of tire-hard pavement static interaction (II), experimental and modelling approach*, Proceeding of the 1st Inter-national Conference on Motor Vehicle and Transportation MVT 2006, 15-17 Nov.2006 Timisoara, Romania, ISBN -10: 973-638-284-2; ISBN-13: 978-638-284-2, Sec.1, pp 27-36;
6. Minca Cr, Cipleu A, Vandici I, Draghici A, *Regards on dynamic steady-state tire-pavement interaction*, Proceeding of the 1st Inter-national Conference on Motor Vehicle and Transportation MVT 2006, 15-17 Nov.2006 Timisoara, Romania, ISBN -10: 973-638-284-2; ISBN-13: 978-638-284-2, Sec.1, pp 37-44;
7. Stefanescu W, *Road activity and the Risk Factors*, Bul. St. UPT, Tom 51(65) 2006, Fasc.1,2, ISSN 1224-6050, pp.18-24
8. Stefanescu W, Pugna A, Stefanescu P, *The Road Transport and the Environment*, Bul. St. UPT, Tom 51(65) 2006, Fasc.1,2, ISSN 1224-6050, pp.104-117

PhD THESIS

Caba Ioan Ladislau - *Contributions regarding the improvement of the designing and working parameters of the machine parts belonging to the gathering and transportation fibers fodder machines*, PhD Supervisor Prof.dr.eng. Ioan DANILA

PhD STUDENTS

PhD Supervisor Prof.dr.eng. Ioan DANILA

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

PhD Supervisor Prof.dr.eng. Constantin STEFAN

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*
4. Ion ON *Research on the usage of solar energy for hay drying;*
5. Florin PAVEL, *Implementing the transversal fan in hay drying using normal temperature air*

RESEARCH TEAM

- Prof.dr.eng. Ioan DANILA- cons.prof
- Prof.dr.eng. Constantin STEFAN- cons.prof.
- Assoc.prof.dr.eng. Dumitru IANFULUI

- Lect.sr.eng. Attila GONCZI
- Lect.dr.eng. Werner STEFANESCU
- Assit.dr.eng. Ionel VANDICI
- Assist. dr.eng. Adrian CIPLEU
- Assist.eng. Petre PADUCEL
- Assist. eng. Remus URSULESCU
- Eng. Lucian IRIMIE

CONTACT

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

RESEARCH AREAS

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



KEYWORDS

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

FIELD DESCRIPTION

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

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

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

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

There is analysed the influence of working life-time of different types of steel belonging, of minning equipments being out of working life-time. There were performed some researches regarding the behaviour at variable loads, impacts and also fracture mechanics analysis.

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

ACTIVITIES

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

RESEARCH TEAM

- Prof.dr.eng. Nicolae NEGUȚ
- Prof.dr.eng. Ion DUMITRU
- Prof.dr.eng. Nicolae FAUR
- Prof.dr.eng. Pavel TRIPA
- Prof.dr.eng. Josif HAJDU
- Prof.dr.eng. Tiberiu BABEU
- Prof.dr.eng. Constantin CRISTUINEA
- Assoc.prof.dr.eng. Dana SILAGHI PERJU
- Assoc.prof.dr.eng. Liviu MARȘAVINA
- Lect.dr.eng. Marcela SAVA
- Lect.dr.eng. Mihai HLUȘCU
- Lect.dr.eng. Nicolaie CIOBOTARU
- Assist.eng. Iuliu SISAK
- Assist.eng. Radu NEGRU
- Eng. Herman SEGAL
- Eng. Laurentiu CULEA
- Eng. Claudia SECRIERU
- Eng. Maria SECHEI

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. PNCDI CEEX nr.147/1.08.2006, *The participation and integration promotion of the Romanian Scientific Research at the 7th main programme concerning the mechanisation of the agricultural works, production and durable management of the resources of agricultural soil*, Project Manager: Faur Nicolae, Value: 25,000 RON
2. PNCDI CEEX nr.128/1.08.2006, *The participation and integration promotion the 7th main programme and development of the National Network of Excellency in the field of surety and the security in transport*; Project Manager: Faur Nicolae, Value: 25,000 RON
3. PNCDI CEEX nr.228/1.08.2006, *The development and promotion of Excellency Romanian Research for surface traffic and the safety of traffic by connecting at the European programs (pc7)*, Project Manager: Faur Nicolae, Value: 25,000 RON

4. GRANT CNC SIS COD 372/2006, *The modelling studies of the rolling way – environment of the urban traffic for passengers*, Project Manager: Neguț Nicolae, Value: 280,000 RON
5. CEEEX Nr.153/2006, *Technology and ecological installation for stress-relieving of casted, forged or welded steels assemblies*, Project Manager: Pavel Tripa, Value: 5,000 RON
6. CNC SIS 177 Tema 23 Tip A, 2006, *Implementation of probabilistic methods in fracture mechanics for durability estimation*, Project Manager: Liviu Marsavina, Value: 15,800 RON
7. PNCDI–CEEEX AMCSIT Nr.202/20.07.2006, *Modelling and simulation of the composite materials from aeronautic industry at complex loads*, Project Manager: Liviu Marsavina, Value: 10,000 RON
8. PNCDI–CEEEX RELANSIN Nr.255/11.09.06, *Technological platform of electrochemical surface engineering for advanced materials: with applications in structural integrity and reliability evaluation of structures*, Project Manager: Liviu Marsavina, Value: 5,000 RON
9. PNCDI–CEEEX AMCSIT Nr.262/12.09.2006, *Hybrid assemblies with adhesives and bolts for composite materials and aluminium alloys*, Project Manager: Liviu Marsavina, Value: 20,650 RON
10. 497/26.07.2006, *Tests on aluminium and steel conductors with round wires, cabled in concentric layers, in concordance with IEC 61089 and EN 50182*, Project Manager: Dumitru Ion, Beneficiary: SC. PRYSMIAN, Slatina, Value: 5,600 RON
11. 562/29.11.2006, *Measure the remanent deformations at compression static test with $F_{max} = 2000N$, on hinge mark*, Project Manager: Dumitru Ion, Beneficiary: S.C. FRIGOGLAS SRL Moravita, Value: 1,600 RON
12. BC 548/02.11.2006, *Tensometric measures and principal deformationd measures for passengers scale tractable and manageable s-ro1, concordant with point 3.15 chapter 3 in testing programm*, Project Manager: Faur Nicolae, Beneficiary: SC SAERO SRL, Timișoara, Value: 9,600 RON
13. 48c/2006, *Compresion test on packing bins perfusabile solutions*, Project Manager: Faur Nicolae, Beneficiary: HELVETICA PROFARM SA, Timișoara, Value: 3,600 RON
14. 432/2006, *Study of stress and strain state in a plate for sustaining a cooling aggregate*, Project Manager: Liviu Marșavina, Timișoara, Value: 350 RON

DOCTORAL STUDIES

PhD THESIS

1. Branzan Ovidiu, *Extension durability study of the pipe lines used in petroleum products transportation*, PhD coordinator: Iosif Hajdu, 28.11.2006,
2. Sisak Iuliu, *Creep study contributions concerning aerial high voltage steel-aluminium electrical cables*, PhD coordinator: Hajdu Iosif, 23.02.2006

PhD THEMES

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

1. Cernescu Anghel Vasile, *Studies about expert systems use for evaluating integrity structures*,
2. Branzei Nelu Florin, *Some research regarding the durability of a coupling system for railway wagons*,
3. Cornea Gheorhe, *Some research regarding the stiffness of a test machine for cables and conductors with lengths over 10 m*,
4. Secrieru Claudia, *Applications of Fractal Analysis in the case of dynamic fracture*,
5. Sechei Ramona Maria, *Technical and experimental research regarding dynamic toughness K_{Ia} , J_{Ia}*

Scientific supervisor: Prof.dr.eng. Iosif Hajdu:

6. Culea Laurentiu, *Crack initialization in copper based blades used in electrical motors collector parts*,
7. Negru Radu, *Studies of stress concentrations in biaxial stress and strain states*,

PUBLICATIONS

BOOKS

1. Faur, N., *Mechanics of Materials*, (in Romanian), Politehnica Publishing House, Timisoara, ISBN 973-625-011-3, 300 pages
2. Tripa, P., Hlușcu, M., *Strength of Materials. Basic Concepts and Applications*, (in Romanian), Vol.1, Ed.Mirton, Timișoara, ISBN(10) 973-661-934-6, 395 pages
3. Marșavina, L., *Experimental methods for determining the fracture toughness*, (in Romanian), Ed.Politehnica, ISBN 973-625-934-6, pages 205
4. Neguț,N., *Automotive Bodies with Frames*, (in Romanian), Ed. Politehnica, ISBN: 973-625-334-1, pages 210

PAPERS

1. Dumitru,I.,Marsavina,L., Faur, N., *Researches Regarding Impact Fatigue*, Journal of Sound

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2. Dumitru, I., *Some consideration on SINTAP PROGRAMME*, Revue of Fracture Mechanics, Nr.1/2006, ISSN (10) 973-7616-48-0, ISBN (13) 978-973-7616-48-7, pag.13-20,
 3. Dumitru, I., Cipleu, A., *Some Consideration on Dynamic Fracture*, Revista de Mecanica Ruperii Nr.1/2006, ISSN (10) 973-7616-48-0, ISBN (13) 978-973-7616-48-7, pag.27-32
 4. Secrieru, C., Dumitru, I., *Some Consideration Regarding the Application on Fractal Analysis in the Study on Materials Fracture*, Buletinul stiintific si Tehnic al Universitatii "Politehnica" Timisoara Tom 51(65) Fas.4/2006, ISSN 1224-6077, pag.7-14
 5. Dumitru, I., Faur, N., Cipleu, A., *Impact Fatigue Research for Futher Development*, Proceedings of the 5th International Congress of Croatian Society of Mechanics Trogir, Croatia, sept. 21-23/2006, ISBN 953-96243-8-9, pag.1-8
 6. Dumitru, I., Faur, N., *Characteristics Regarding the Durability Assessment at Impact Fatigue Tests pI-II*, 11th International Symposium on Expert. Stress Analysis, and Testing Material, Bacau, 2006, MOCM 12 Volume 3-Romanian Technical Sciences Academy 2006 ISSN 1224-7480, pag.77- 84
 7. Faur, N., Dumitru, I., Marsavina, L., *Researches Regarding the Behaviour under Compression of the Boxes Made of a Single Cornugated Board*, 11th International Symposium on Expert. Stress Analysis, and Testing Material, Bacau, 2006, MOCM 12 Vol.3 ISSN 1224-7480, pag.85-88
 8. Sandu, L., N., Faur, Bortun, C., *Three dimensional finite element analysis on preferable cast circumferential claps arms design*, Quitessenz Zahntech 32, nr.4, 2006, ISSN 0340-4641, pg. 372-381
 9. Dumitru, I., Faur, N., *Characteristics regarding the durability assessment at impact fatigue tests*, 11th International Symposium on Expert. Stress Analysis, and Testing Material, Bacau, 2006, MOCM 12 Vol.3 ISSN 1224-7480, pag.77-80
 10. Sava, M., *Analysis, evaluation and implementation of an associative model for metal powders*, Buletinul Stiintific Seria Mecanică al Universitatii "Politehnica" Timisoara, Tom 51(65) Fas.4/2006, ISSN 1224-6077, pag.1-6
 11. Marsavina, L., Faur, N., Culea, L., *Study of the cracks initiation in the copper commutator bars*, Proceedings of the XII National Symposium of Mechanical Fracture, 3-4 November 2006, Targoviste, ISBN (10) 973-7616-48-0 ISSN (13) 978-973-7616-48-7, pag.33-40
 12. Negruțiu, M., Sinescu, C., Negru, R., Românu, M., Haiduc, C., *Bone degradation due to the tensions generated by fixed partial prosthesis. A three-dimensional photo elastic approach*, 12th Swiss Conference on Biomaterials, SSB 10 May 2006, European Cells and Materials Vol.11, Suppl.2, 2006, ISSN 1473-2262, pag.24-29
 13. Hluscu, M., *Mechanical characteristics of a ferritic steel utilized in central heating-and-power plants, with temperature and the operating time*, Conference of Energetical Engineering CIE Oradea 2006, ISSN 1583-0691, pag.189-194
 14. Sinescu, C., Hluscu, M., Negruțiu, M., Românu, M., *Teeth preparations degradation due to the tensions generated by adhesive fixed partial prosthesis on the prosthetic field. A numerical simulation approach*, 12th Swiss Conference on Biomaterials SSB 10 May 2006, European Cells and Materials Vol.11, Suppl.2, 2006, ISSN 1473-2262, pag.30-35
 15. Sinescu, C., Hluscu, M., Negruțiu, M., Românu, M., *Numerical investigation of the strength behaviour for a adhesive fixed partial prosthesis*, Revue "Tehnica Dentară", anul V, Nr.20, 2006, ISSN 1583-2937, pag.34-39
 16. Tripa, P., *Creep influence on the life-time of a cracked steam pipe*, Conference of Energetical Engineering CIE Oradea 2006, ISSN 1583-0691, pag.183-188
 17. Hluscu, M., Tripa, P., *Mechanical tests to estimate the behaviour of A42C steel function of temperature*, ȘTIINȚĂ ȘI INGINERIE, Sebeș 2006, Vol. 9, ISBN-10 973-8130-82-4, page. 553-558
 18. Secrieru, C., Dumitru, I., *Considerations concerning the application of the fractals in fracture mechanics*, Revue of Fracture Mechanics, Nr.1/2006, ISSN (10) 973-7616-48-0, ISBN (13) 978-973-7616-48-7, pag.49-57,
 19. Tripa, P., Hluscu, M., *Assessment procedure of life-time on the basis of creep crack growth*, ȘTIINȚĂ ȘI INGINERIE, Sebeș 2006, Vol. 9, ISBN-10 973-8130-82-4, page. 559-564
 20. Glevitykz, M., Silaghi-Perju, D., Perju, D., *Mathematical modelling of carbon dioxide variation regarding the main parameters which ensure the quality of cola- type soft drinks*,

Analele Univ. Ovidius, vol. XVII, 2006, ISSN 1223-7221, pag.168-173

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 GROUP IN PLASTICS MANUFACTURING *R.G.P.M.*

GENERAL PRESENTATION AND MISSION

The *Research Group in Plastics Manufacturing (R.G.P.M)* is organized in the Department of Manufacturing Engineering (TCM) as 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 programmes CEEX, RELANSIN, AMTRANS, INFRAS, MATNANTECH 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

14. Contract CEEX 41/2005 – *IMAN – Innovative Manufacturing Network*, Director Professor Tudor Iclanzan. Value: 135.000 RON
15. Contract CEEX 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 . Value: 206.300 RON
16. Contract CEEX 130/2006 – *MATEPROF Materials, technologies and equipment for 2D and 3D cold forming*. Director: Professor Tudor Iclanzan. Value: 340.000 RON
17. Contracts nr. 434/2006/ ESSER, nr. 435/2006/ ELBA, nr. 436/2006/ SOLPLUS, nr. 437/2006/ SALOMON, nr. 493/2006/ LEMAN, nr. 552/2006/ YAZAKI, *Technical assistance for master level training in the field of polymeric and composite materials products re-engineering*. Director Professor Tudor Iclanzan. Value: 36.000 RON (cumulated)
18. CNCISIS A1/GR181/2006, *The reverse engineering concept by using the rapid prototyping technologies with the three-dimensional measurements techniques*, Director: Lecturer dr. eng. Aurel Tulcan, Value:10.000 lei
19. CNCISIS TD58GR/19.05.2006, Theme 5, code CNCISIS 85 - *An experimental study on improving the quality of products from polymeric materials using de reverse engineering process*, Director: Assist. Eng. Cristian Cosma, Value:18.000 lei

PUBLICATIONS

BOOKS

9. Iclănzan T., Stan D., *Valuation of patented invention* (published in Romanian), Politehnica Publishing House, Timișoara, 2006, ISBN: 973-625-203-5, 250 pages
10. Iclănzan T., *Manufacturing technology for plastic and composite materials* (published in Romanian), Politehnica Publishing House, Timișoara, 2006, ISBN:(10)973-625-372-4 (13)973-625-372-0, 352 pages
11. Tulcan A., Iclănzan T., Tulcan L., *Control systems* (published in Romanian), Politehnica Publishing House, Timișoara, 2006, ISBN: (10)973-625-373-2, (13)978-973-625-373-7, 323 pages

PUBLISHED PAPERS

81. Tulcan A, Seiculescu V., Iclănzan T., Stan D., Bernath A., *Virtual simulation of a coordinate measuring machine behaviour for high-speed measurement*, The 5-th International Conference FOCOMP'06, Krakow, Poland, 22-24 Nov, 2006, Published by AGH University of Science and Technology, Krakow, ISBN 83-88309-41-2, pp.167-175
82. Dume, A. I., Stan, D., Cosma, C., Faur, N., *The contact scanning application for dental prosthesis*, Academic Journal of Manufacturing Engineering, vol. 4, no. 2/2006 ISSN 1583-7904, pp. 29-35
83. Dume, A. I., Cosma, C., Stan, D., Iclanzan, T. *The study of the rapid prototyping technique on the MODELA MDX 15 machine*, Academic Journal of Manufacturing Engineering, vol. 4, no. 3/2006, ISSN 1583-7904, pp. 32-38
84. Stan D., Iclănzan T., Abadie J.H. – L'effet thermo – peliculaire de surface de l'activation ultrasonique des polymeres fondus sous pression – CAE and new materials – Summer school, 2006 Timișoara – Romanie. Ed. Orizonturi Universitare, ISBN (10)973-638-266-4, pp. 175-194
85. Groza B., Iclănzan T., Dumitrescu C., Tăroată A. – *Neural network framework for optimization of enterprise resource planning* – IEEE Canada, Canadian Conference on Electrical and Computer Engineering,

- CCEGE+CCGEI Ottawa 2006, ISBN (13) 978-973-638-266-6, pp. 66-73
86. Tamas M.I., Iclănzan T. – *New Methods in Rapid Prototyping Using Open Source* – Academic Journal of Manufacturing Engineering, vol. 4, no. 4/2006, ISSN 1583-7904, pp.52-62.
 87. Cosma C., Iclănzan T., Dume A.I., Tulcan A., *Rapid prototyping for reverse engineering*, Academic Journal of Manufacturing Engineering, vol.4, no2/2006, ISSN 1583-7904, pp. 17-22
 88. Cosma C., Dume A., Pamintas E., Iclănzan T., *Machining improvement of milling rapid prototyping processes*, Proceedings of the International Conference on Manufacturing Systems ICMaS, 26-27 October 2006, Bucharest, Romanian Academy Publishing House, ISSN 1842-3183, pp. 255-260

PhD THESIS

2. Chirilă Valentin, *Researches regarding the properties improvement of the injection composites from polypropylene with VGCNF₃*, Thesis supervisor: Prof. Tudor Iclănzan
3. Lațcu Petru, *Theoretical and experimental research on the pin-tool used in the autofrettage process of the artillery barrels*, Thesis supervisor: Prof. Tudor Iclănzan

In course PhD THEMES

4. Groza Bogdan Gruiă, *Optimization of the management integrated systems in industrial engineering*, Thesis supervisor: Prof. Tudor Iclănzan
5. Ferician Florin Cornel, *Researches on the technological possibilities of using the plasma*

electronic guns, Thesis supervisor: Prof. Tudor Iclănzan

6. Cosma Cristian, *Quality amelioration study of products from polymeric materials in injection processes*, Thesis supervisor: Prof. Tudor Iclănzan
7. Dume Adrian-Ilie, *Rapid prototyping techniques optimizations using the milling process in the case of the removal module*, 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
- Lect. dr. eng. Aurel Tulcan
- Assist. Eng. Florin Ferician
- Assist. Eng. Cristian Cosma
- Assist. Eng. Adrian Dume
- Eng. Alin Sirbu, PhD student

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RESEARCH GROUP IN ROBOTICS

RESEARCH FIELDS

Trajectory generation and motion planning are major problems in the creation of autonomous robots. These problems interact with other important problems, including geometric, kinematic and dynamic modelling, real-time motion control, sensing and task planning. Workspace modelling offers knowledge about the environment where the robot has to accomplish its task.

KEYWORDS

Robot, modeling, path planning, motion generation, trajectory, workspace

ACTIVITIES

Robot's mechanics, dynamic modeling, robot path planning, robot motion generation, workspace modeling, robot-workspace complex system modeling.

PROJECTS

Contract A1/GR181/19.05.06, Theme 37, CNCISIS code 198, *Knowledge based system for developing of assisted learning technology*, Value for 2006: 20100 RON

PUBLICATIONS

1. Drăgulescu D., Stoicănescu C., Toth-Tașcău M., Dreucean M., *Path planning of a mobile robot in a virtual laboratory*, 6th International Conference Research and Development in Mechanical Industry RaDMI 2006, Papers from Sessions A, B, C, D, E, Budva, Montenegro, 13-17 September 2006, ISBN 86-83803-21-X (HTMS), pp. 1-6
2. Drăgulescu D., Stoicănescu C., Toth-Tașcău M., Dreucean M., Stoia I., *Mobile Robot Motion Simulation In A Virtual Laboratory*, Mechanical Engineering Technologies`06, V International Congress, 20-23.09.2006 Varna, BULGARIA, Section I Virtual Engineering. Automation. Management and engineering, Volume 5/88 September 2006, ISSN 1310-3946, pp. 71-74
3. Toth-Tașcău M., Drăgulescu D., Dreucean M., *Improving the Path Planning Simulation Based on Visibility Graph Method*, Mechanical Engineering Technologies`06, V International Congress, 20-23.09.2006 Varna, BULGARIA,

Section I Virtual Engineering. Automation. Management and engineering, Volume 5/88 September 2006, ISSN 1310-3946, pp. 68-70

PERSPECTIVES

Modelling of a vehicle-workspace system, in order to optimize the typical activities, will allow experiments using virtual spaces, created by the user, available for any application, reducing the cost price and allowing an assisted learning both in education and healthcare.

RESEARCH TEAM

- Prof.dr.eng. Doina Drăgulescu,
- Prof.dr.eng. Mirela Toth-Tașcău,
- Assoc.prof.dr.eng. Mircea Dreucean,
- Asist.dr.eng. Lucian Rusu

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RESEARCH GROUP IN MECHANICS AND VIBRATIONS OF TEXTILE MACHINES

RESEARCH FIELDS

- Study of acoustic field (noise level, frequency spectra) of weaving machines
- Study of dynamics of motion of knitting machines

KEYWORDS

Vibrations, weaving machine, knitting machine

ACTIVITIES

- Experimental determinations of vibration and noise level
- Modelling of mechanisms of weaving machines
- Study of dynamics of rotary knitting machines

RESULTS

- Determination of resonance angular vibrations of rotary knitting machines
- Determination of acoustic field of weaving-mills and elaboration of methods of reduction of the noxious effects

PUBLICATIONS

1. Balta, A., Balta, H., Chiriac, A., *Determination of Error Probability Concerning the Study of Vibration of the Rotary Knitting Machine with two Cylinders, of MATEC Type*, Scientific Bull. Of the "Politehnica" Univ. of Timișoara, Transact. on Electronics and Communications, Tom 51(65), Fasc.1, 2006, p.74-78, ISSN 1583-3380
2. Balta, A., Chiriac, A., Balta, H., *Study on the Vibrations of the Matec-Silver Rotary Knitting Machine*, Proceed. Of Papers of the 20th Intern. Conf. on Noise and Vibration, Tara, Serbia and Montenegro, 2006, p.1-6, ISBN ID 20-43
3. Chiriac, A., Luca, G., Vigar, C., *Sur l'Équation de Mouvement d'une Machine à Tricoter Circulaire Spéciale*, Studia Universitatis "Vasile Goldiș", Arad, 2006, p.164-171, ISSN 1842-0508

4. Luca, G., Vigaru, C., Chiriac, A., *Experimental and Theoretical Contributions Concerning the Critical Number of Rotations of Spindles at Spinning Machines*, Studia Universitatis "Vasile Goldis", Arad, 2006, p.147-152, ISSN 1842-0508
5. Vigaru, C., Luca, G., Chiriac, A., *Study of Vibration at the Launching Mechanism of the Sulzer Weaving Machine*, Studia Universitatis "Vasile Goldis", Arad, 2006, p.172-178, ISSN 1842-0508

PhD THESIS

Baltă Adriana Elena, *Working improvement of system of knitting machines by realizing of mechanisms that eliminate the shocks and vibrations and, also, by optimizing the commands*, 28 Sept 2006, PhD coordinator: Cioară Titus

RESEARCH TEAM

- Prof. dr. eng. Adrian Chiriac

- Lect. dr. eng. Gheorghe Luca
- Assist. eng. Cosmina Vigaru, PhD. student
- Eng. Adriana Baltă, PhD. student
- Assoc. prof. dr. eng. Nicolae Herişanu

PERSPECTIVES

- Study of vibrations and noises at knitting rotary machines
- Experimental determinations concerning the level of vibrations at classical weaving machines and new generations of weaving machines

CONTACT

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RESEARCH GROUPS IN THE DEPARTMENT OF DESCRIPTIVE GEOMETRY AND ENGINEERING GRAPHICS

Researches in THE PARAMETRIC MODELLING IN ACCORDANCE TO THE ISO STANDARDS "STEP" AND "PLIB" USED FOR MODEL DESCRIPTION AND EXCHANGE OF PRODUCT DATA

KEYWORDS: ISO standardization, products

FIELD DESCRIPTION

The research theme will develop the necessary knowledge base and create appropriate conditions for the implementation in the Romanian industry of the current ISO elements regarding a unitary, standardized description and exchange of the product model data, starting from the design stage, and continuing all along the product life cycle. The research team aims to aware the Romanian economical environment about the necessity of a continuous adjustment to the world market and the concurrence requirements in manufacturing and selling industrial products. The team cooperates with the Romanian National Standardizing Authority in adopting and applying the "STEP" and "PLIB" ISO standards.

RESEARCH TEAM

- Prof.dr.eng. Lia DOLGA
- Assist.eng. Mihai REVENCU
- Lect. Dr.eng. Doina SAFTENCU
- Eng. Gheorghe PASCA, master student

ACTIVITIES AND RESULTS

- The parametric and feature-based modelling it is the main subject of the discipline "The ISO modelling of the advanced mechanical systems", taught to the students of the master specialization *Computer Aided Design of the Advanced Mechanical Systems*. The applications were realized in the MDT and Inventor and CATIA design environments.
- A special chapter regarding the STEP and PLIB standards was created within the course.
- The problem regarding the importance of ISO standards was broadly developed at the disciplines taught by the team members.
- A debate about the STEP and STEP-NC standards was organized with the master students in CAD specialization. A master dissertation including appropriate STEP subjects was sustained in 2006.

Researches in E-LEARNING IN COMPUTER AIDED DESIGN

KEYWORDS

Interactive educational instruments, CAD technique

FIELD DESCRIPTION

The main goal of this program consists in creating and developing more adaptive and flexible

educational instruments. New interactive learning and teaching methods were studied and experimented. Based on the integration of the individual instructional methods and the group training procedures, more software packages were developed to help students of different ages in learning CAD techniques.

RESEARCH TEAM

- Prof.dr.eng. Lia DOLGA
- Assist.eng. Mihai REVENCU
- Eng. Gheorghe PASCA, master student

ACTIVITIES AND RESULTS

- The electronic support was developed for the CAD disciplines taught by the team members to be used in the Intranet and Internet networks
- Some team members graduated a training course organized by SIVICO and became AEL instructors, within the SEI project regarding the Development of the Romanian Education System.

Researches in NEW METHODS, PROCEDURES AND PROGRAMS TO EDUCATE THE THREE-DIMENSIONAL VISION OF THE STUDENTS

KEYWORDS

Descriptive geometry, 3D vision, technical representation

FIELD DESCRIPTION

Beginning from the first study year, the preoccupation to develop the 3-dimensional vision holds a principal function, because of its importance in training many other engineering disciplines. The education of the student's 3D vision is a complex and long-standing process and needs many exercises, diversified methods, ample teaching experience. The activity uses descriptive geometry methods and representations to develop the space vision and the ability to imagine and understand three-dimensional objects. New methods were developed to test students' abilities in imaging and representing different technical parts.

RESEARCH TEAM

- Prof.dr.eng. Iulia VOIA
- Prof.dr.eng. Lia DOLGA
- Assoc.prof.dr.eng. Mircea VODA
- Lect.dr.eng. Mihaela CRETU-NICA
- Lect. Dr.eng. Doina SAFTENCU
- Lect. Dr.eng. Arseniu PECICAN
- Assist.eng. Ileana MLADIN
- Assist.eng. Petrica M. DANAIATA
- Assist.eng. Silviu DUMITRAS
- Assist.eng. Mariana ILIE
- Assist. eng. Mihai REVENCU
- Assist. eng. Ladislau WALKOVSKY

ACTIVITIES AND RESULTS

- XI-th student professional contest "Student CAD" was organized in May, oriented on the 2D AutoCAD graphics and on the 3D Modelling and Parametric Design in Inventor Environment and CATIA Environment
- A initiation presentation 3D Modelling for the Mechanic Engineering profile was organized in co-operation with Autodesk Centre assignee from the UST Lille during the month of November 2006

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

FIELD DESCRIPTION

The main goal of this program consists in modeling of the mechanical parameters dependence in compartment 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

- Assoc.prof.dr.eng. Mircea VODA
- Prof.dr.eng. Viorel A.SERBAN
- Assist.eng. Marian DĂNĂIAȚĂ
- Assist.eng. Hannelore FILIPESCU
- Eng. Adriana BACILA, PhD student

ACTIVITIES AND RESULTS

- The co-operation agreement with the Mechanic Laboratory of Lille, France, in the field of *Study and modeling fatigue* was pursued.
- Financing for PhD study was obtained from ALSTOM and LML France, for eng. Adriana Bacila, having as a subject the *Crack simulations system for am metallic elements under a charge*. The PhD thesis will be stand in 2007.
- A poster was presented in the *International Congress on Fatigue Damage of Structural Materials VI*, Hyannis, USA, and September 17 – 22, 2006 by Bacila, Voda, Serban, and Mesmacque.

PUBLICATIONS

PUBLISHED PAPERS

1. Ilie, M., Kneip, J-C., Mattei, S., Nichici, A., *Through-transmission welding of polymers: Effects of particles on laser beam scattering*, 25th International Congress on Applications of Lasers & Electro-Optics, 30 octomber-2 November 2006, Scottsdale, AZ USA, LIA Pub:599, ISBN 0-912035-85-4, Vol. 99, pp 355-361 (CD-ROM)

2. Ilie, M., Speka, M., Kneip, J-C., Mattei, S., Nichici, A., *Soudage laser par transparence des thermoplastiques: Effets des charges sur le procédé*, Matériaux 2006, 13-17 november, Dijon, France, ISBN 978-2-9528-1400-3, pp210-217 (CD-ROM)
3. Voia, I., *The professor's role in the Rumanian education reform*. The VI th multidisciplinary conference – Professor Dorin Pavel – founder of Rumanian hydro energetic, Sebes 2006 AGIR Publishing House, ISBN 973-720-029-2, pp 95-101

GRANTS / RESEARCH PROGRAMS

14. *Study and modeling of the fatigue behaviors for*

the steel and aluminum structures used in transports, in the case of the random charges, grant CNC SIS – A – theme 6, code 359, nr. GR226/14.09.2006, Director: Assist.Prof. dr. eng. Mircea Voda, Value for 2006: 25.000 RON

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