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 Timişoara are: "Politehnica" University, University of Medicine and Pharmacy, Municipal Hospital of Oro-Maxillo-Facial Surgery, Departmental Hospital of Traumathology 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 destinated to be a union place for research-production and education destinated 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 patiens 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 programms* 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, ortheses 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, hardnes 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

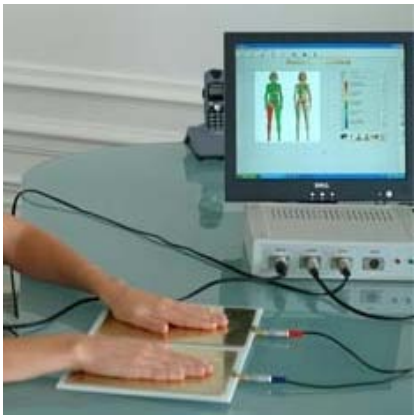
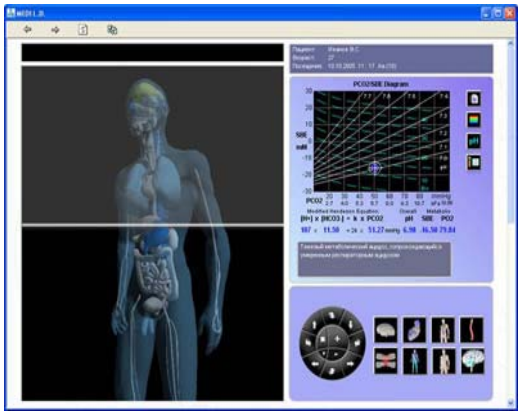
1. Contract A1/GR181/19.05.2006, CNCSIS code 655, type A, Director prof. dr. eng. Doina Drăgulescu, *Autonomous prehension system to support handicapped persons and access in dangerous areas* Beneficiary: Ministry of Education and Research, value for 2007 year: 30,000 RON
2. Contract CEEX-RENAR no. 28/7.09.2005, Director prof. dr. eng. Doina Drăgulescu, *Extension and development of CIDUCOS laboratory capacity under way to be accreditated 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 2007 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 2007 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 2007 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 2007 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 2007 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 2007: 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 2007 year: 2,880 RON

Medical imaging Laboratory



Computer tomography system Somatom Plus 4 Power, Printer AGFA

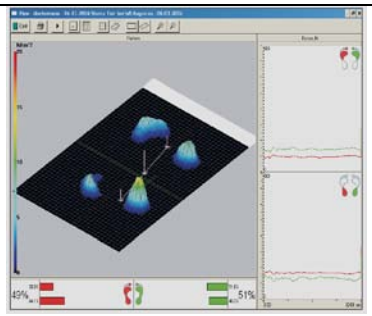
Bio resonant equipment DDFAO

Laboratory for motion analysis



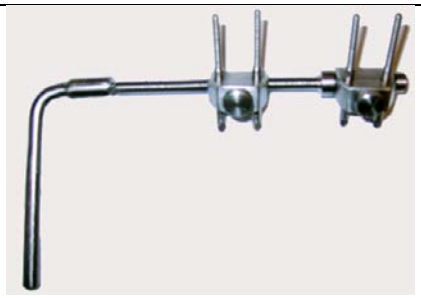
Treadmill, upright bike and body band massage device

Kit for measuring of human physiological parameters

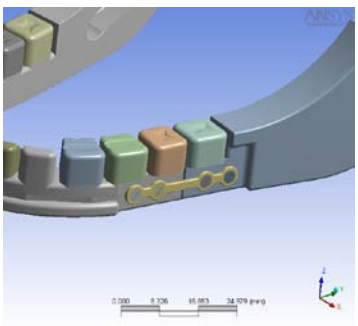
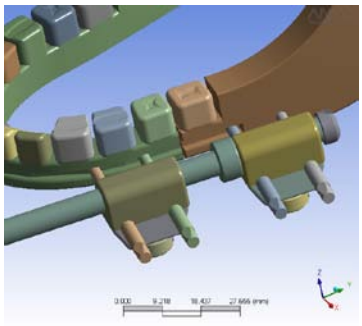




Systems for stance and gait analysis with integrated force distribution measurement

Laboratory for implants and prosthetic devices manufacturing LOPIFO

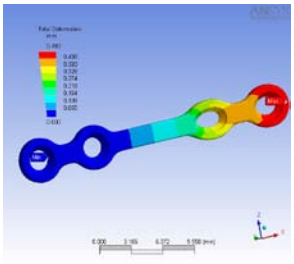
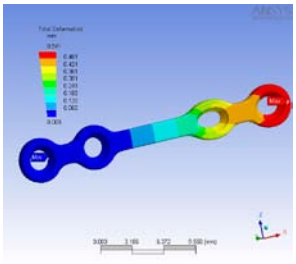
Certified set of maxilo-facial implants and external distracter

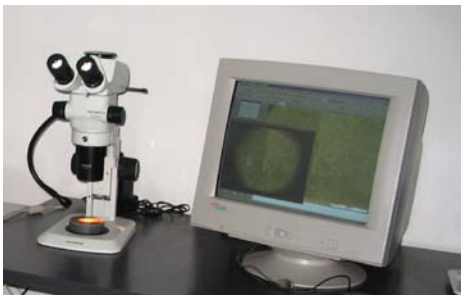
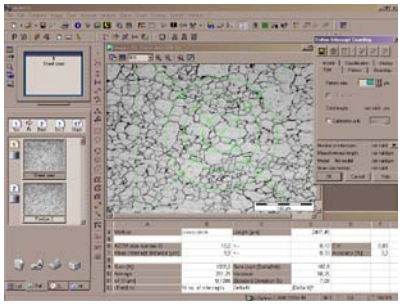
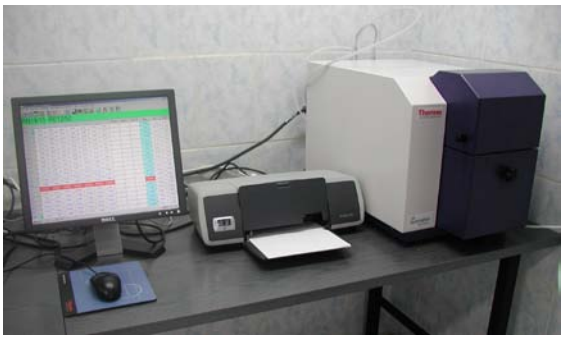
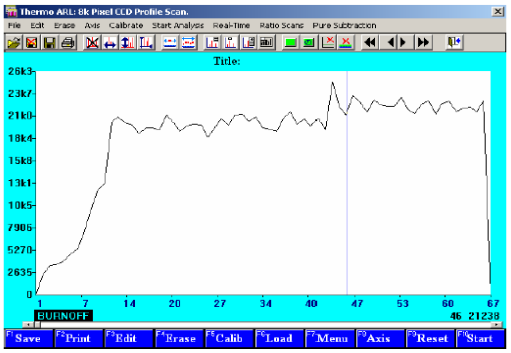
Modelling of implant and distracter use

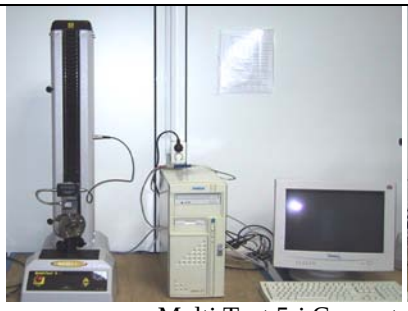
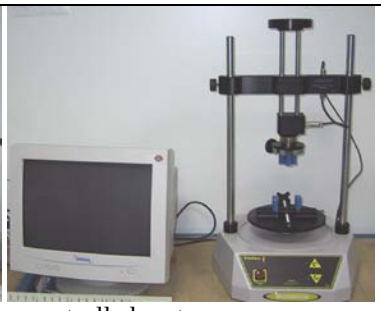


Prototyping and electro erosion equipments. Implant during manufacturing process

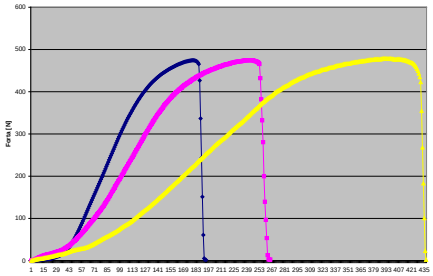




Implant manufactured using electro erosion equipment and analysed using Finite Element Method

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

PAPERS IN JOURNALS

1. V. Marinca, *An Approximate Solution for One-dimensional Weakly Nonlinear Oscilations*, International Journal of Nonlinear Science and Numerical Simulation, pp. 107-120, 2007
2. V. Marinca, N. Herişanu, *A modified iteration perturbation method for some nonlinear oscillation problems*, Acta Mechanica, Volume 184, Issue 1-4, pp. 231-242, Springer Verlag-Austria, 2007
3. N. Herişanu, V. Marinca, *Solution of a nonlinear oscillator using an iteration procedure*, WSEAS Transactions on Systems, issue 1, vol.6, pp. 156-161, 2007
4. N. Herişanu, V. Marinca, B. Marinca, *An analytic solution of some rotating electric machines vibration*, International Journal of Mechanical Engineering, vol.4, pp. 559-564, 2007
5. Lupu, I., Chiriac, A., *On the Magnetic Noise at Rotary Electric Machines*. Part I, Annals of the Univ. of Oradea, Fasc. Manag. and Techn. Engin., Vol.VI(XVI), CD Edition, pp. 342-346, 2007
6. Lupu, I., Chiriac, A., *On the Magnetic Noise at Rotary Electric Machines.* Part II, Annals of the Univ. of Oradea, Fasc. Manag. and Techn. Engin., Vol.VI(XVI), CD Edition, pp. 347-350, 2007
7. Chiriac, A., *On the Dynamic Coefficient of Working of a Carding Engine*, Studia Universitatis "Vasile Goldiş", Arad, Nr.2, pp. 206-210, 2007
8. Chiriac, A., *On the Dynamics of an Industrial Equipment with Speed Variator*, Annals of the Oradea Univ., Fasc. Manag. and Techn. Engin., Vol.VI(XVI), CD Edition, pp. 7-11, 2007
9. Lupu, I., Chiriac, A., *Optimal Regime of Steady-State Motion of an Industrial Equipment*, Studia Universitatis "Vasile Goldis" Arad, Nr. 2, pp. 218-224, 2007
10. Doina Dragulescu, Loredana Ungureanu, Karoly Menyhardt, Antonius Stanciu, *About a Dynamical Model of Human Hand*, Russian Journal of Biomechanics, vol. 11, no. 1, pp. 68-73, 2007
11. Bereteu L., Chiriac A.,Boltosi A., Nagy R., *Constructive Models for Semi-Active Dampers, Using Smart Fluids*, Proceed. of the 31st Conf. on R & D in Agric. Engin., Gödölő, Hungary, CD Edition, pp. 131-135, 2007
12. Boltosi A., Biró I., Chiriac A., Nagy R., Bereteu L, *Decreasing of Vibration Level at Self Propelled Agricultural Machines, Using Semi-Active Devices, with Magneto-Rheological Fluids*, Proceed. of the 31st Conf. on R & D in Agric. Engin., Gödölő, Hungary, CD Edition, pp. 136-140, 2007
13. M. Toth-Taşcău, D.I. Stoia, M. Dreucean, *Gait analysis using Zebris measurement system*,

Revista Fiziologia Physiology, 2007, vol. 17, nr. 3(55), ISSN 1223-2076, pp. 11-14, 2007

14. G. Tanasie, C. Tatu, C. Bunu, M.Tascau, C.Igna, *Stem Cells and Osteoarticular Regeneration*, Revista Fiziologia Physiology, 2007, vol. 17, nr. 3(55), ISSN 1223-2076, pp. 7-10, 2007

PAPERS IN PROCEEDINGS

1. D. I. Stoia, M. Toth-Tascau, C. Vigaru, *Biomechanical behavior of the lumbar spine*, 2nd International conference "Computational Mechanics and Virtual Engineering" COMEC 2007, Brasov, ISBN 978-973-598-117-7, pp. 435-438, 2007
2. M. Toth-Tascau, D. I. Stoia, M. Dreucean, *Protocol for gait analysis based on laboratory investigations*, 2nd International conference "Computational Mechanics and Virtual Engineering" COMEC 2007, Brasov, ISBN 978-973-598-117-7, pp. 527-532, 2007
3. K. Menyhardt, M. Toth-Tascau, *Estimation of robot positioning errors*, 33 Jupiter Conference, Zlatibor, Serbia, 15-17 May 2007, ISBN 978-86-7083-593-1, pp. 3.49-3.54, 2007
4. M. Toth-Tascau, D. Dragulescu, C. Vigaru, M. Dreucean, *Quality Management System of Lopifo Laboratory*, 33 Jupiter Conference, Zlatibor, Serbia, 15-17 May 2007, ISBN 978-86-7083-593-1, pp. 5.48-5.51, 2007
5. D. I. Stoia, M. Toth-Tascau, M. Dreucean, *Evaluation methods of the gait parameters*, 7th International Conference "Research and Development in Mechanical Industry" RaDMI 2007, 16-20 September 2007, Belgrade, Serbia, Proceedings on CD

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

- 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*
- Cărăbaş Ionică: *Biomechanical study of characteristic motions in running during athletic proofs and handball*
- Şimon 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*
- Ştefan Vigaru 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
- Prof. dr. eng. Mirela Toth-Taşcău
- Assoc. prof. dr. eng. Mircea Dreucean
- Lect. dr. eng. Vlad Morcovescu
- Assist. eng. Cosmina Vigaru, PhD student
- Assist. dr.eng. Lucian Rusu
- Eng. Camelia Demian, PhD
- Eng. Adrian Voicu, PhD
- Eng. Karoly Menyhardt, PhD student
- Eng. Ioan Dan Stoia, PhD student
- CMPICSU partners in Timişoara, Bucharest, Cluj-Napoca, Craiova

CONTACT

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Fax: +40-256-403637

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 turbomachinery hydrodynamics and cavitation, as well as in hydraulic and pneumatic power systems. Moreover, for the past three decades, a research group led by Acad.Prof.dr.doc.eng. Ioan Anton has developed new magnetic liquids and various technical applications.

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

BRIEF HISTORY

- In 1997 was started the first pilot program financed by WORLD BANK (25,000 USD) to set up the basic centre infrastructure;
- The main grant (317,000 USD) was finished in 2002, with the set up of the research infrastructure for the three main laboratories: magnetometry, rheology, and numerical simulation;
- A partnership with Microsoft Company allowed the continuous development and upgrade of the software infrastructure


MINISTERUL EDUCAȚIEI ȘI CERCETĂRII
CONSILIUL NAȚIONAL AL CERCETĂRII ȘTIINȚIFICE DIN ÎNVĂȚĂMÂNTUL SUPERIOR

CERTIFICAT

CNCSIS

Consiliul Național al Cercetării Științifice din Învățământul Superior
recunoaște
Centrul de Cercetare
"CENTRUL NAȚIONAL PENTRU INGINERIA SISTEMELOR CU FLUIDE COMPLEXE"
DIRECTOR: ROMEO SUSAN-RESIGA
UNIVERSITATEA POLITEHNICA DIN TIMIȘOARA

București, 12.IX.2006
Certificat nr. 13

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

MISSION

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

RESEARCH FIELDS

- Mathematical and numerical modelling of complex fluid hydrodynamics, including fluids with complex rheology, two-phase cavitating flows, turbulent 3D flows in complex geometries;
- Mathematical and numerical modelling of turbomachinery swirling flows as well as development and testing of novel flow control methodologies using magnetorheological devices;

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

KEYWORDS

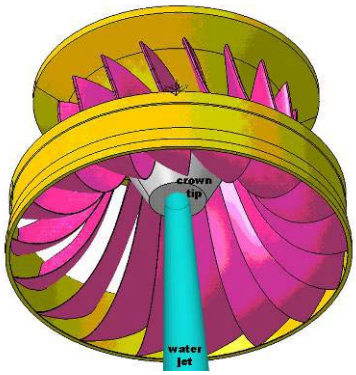
Numerical hydrodynamics, cavitation, hydraulic turbines and pumps, hydraulic drives, parallel computing, complex fluids, magnetic nanofluids, magnetorheological fluids, magnetizable nanocomposites, magnetic properties, rheological properties.

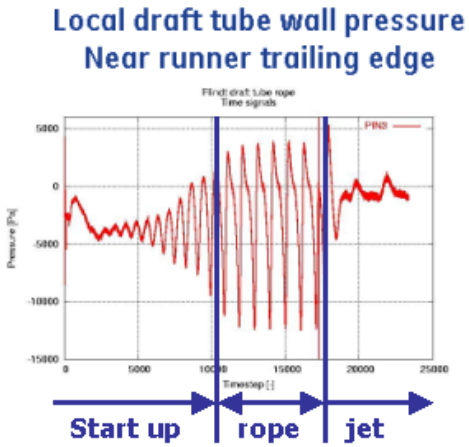
ACTIVITIES

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

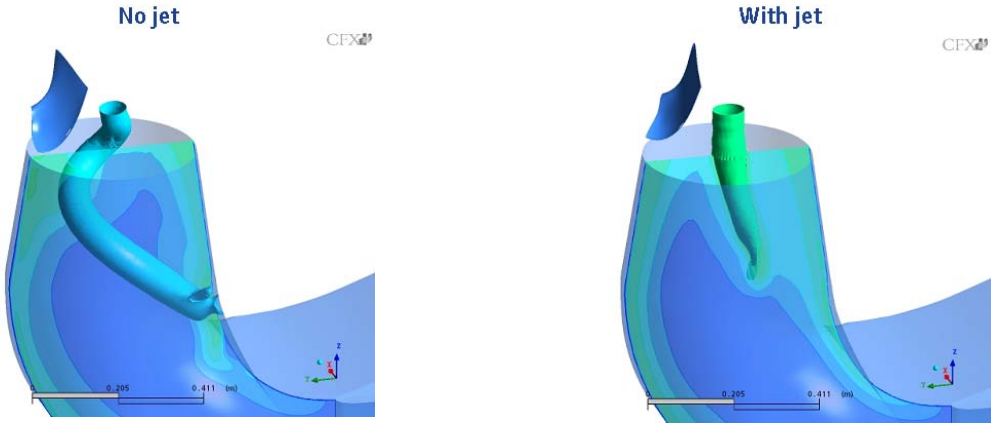
RESEARCH RESULTS

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

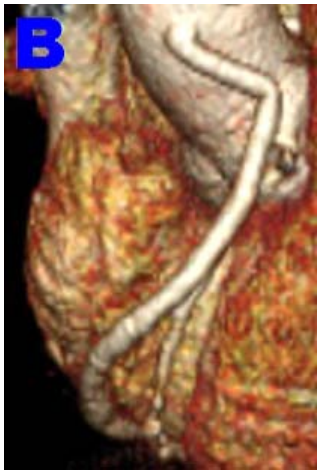




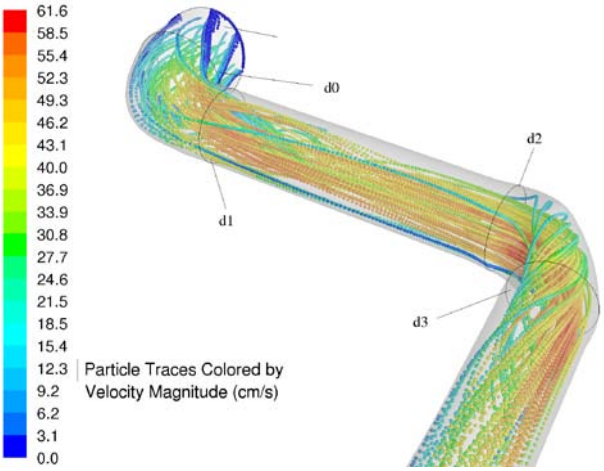
Jet control of the swirling flow downstream a Francis turbine runner and reduction in pressure fluctuations downstream in the draft tube cone



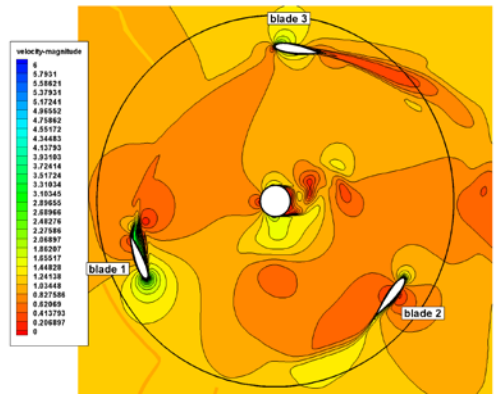
Vortex rope mitigation in the draft tube cone of a Francis turbine operating at partial discharge using the jet control technique



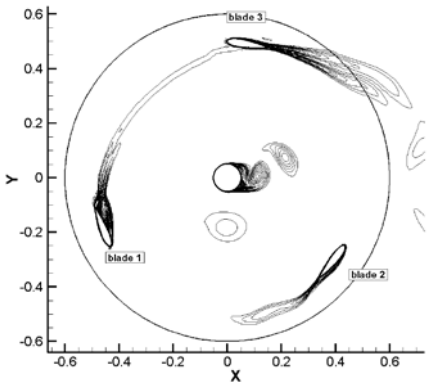
Venous bypass graft, 3D geometrical reconstruction..



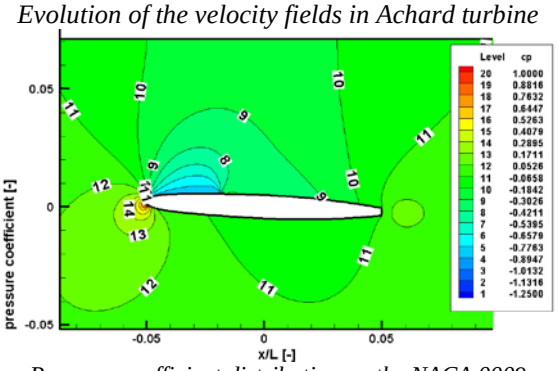
Velocity fields representations using particle traces motion



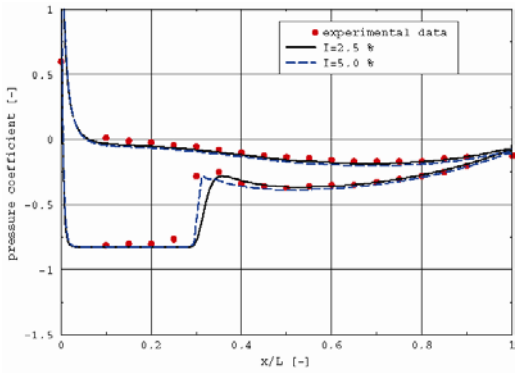
Evolution of the velocity fields in Achard turbine



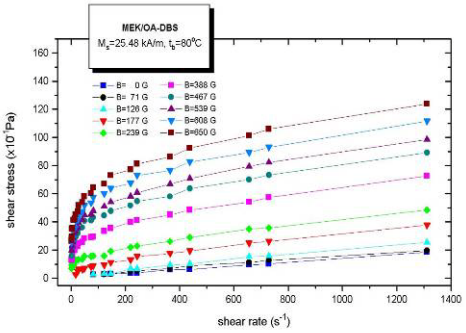
Evolution of the vorticity fields in Achard turbine



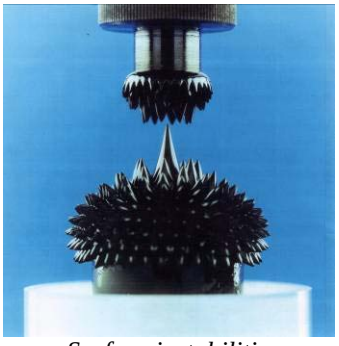
Pressure coefficient distribution on the NACA 0009 hydrofoil at 2,5 degree angle of attack and cavitation number 0.81



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



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



Surface instabilities

Magnetometry Laboratory

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

Rheology Laboratory

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

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

Numerical Simulation and Parallel Computing Laboratory

Hardware infrastructure:

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

Sofware infrastructure

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

RESEARCH CONTRACTS

1. SCOPES Joint Research Project IB7320-110942, *Turbomachinery Swirling Flow Optimization and Control with Technology of Magnetorheological Fluid Systems*, in partnership with Ecole Polytechnique Federale de Lausanne, 4,800 CHF / 2007, Director Prof.dr.eng. Romeo Susan-Resiga.
2. *Taming the Vortex Rope project – TAVORO*, contract 2214/19.04.2007 between General Electric Company – Canada and UPT, 20,000 USD, Director Prof.dr.eng. Romeo Susan-Resiga
3. Consortium Grant CNCSIS 33/2007, Contract A1/GR181, *Vortex Hydrodynamics and Applications*, Coordinator UPT, 60,000 RON, Director: Prof.dr.eng. Romeo Susan-Resiga
4. 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*, 155,960 RON / 2007, Director: Prof.dr.eng. Romeo Susan-Resiga.
5. CEEX-M1-C2-1180 (CARDIOCOMP), Contract 81/2006 VIASAN, Subcontract UPT 9229/24.07.2006, *Computer Optimized Diagnosis, Surgical Treatment and Prognosis of Cardiovascular Diseases*, 208,200 RON, Director: Prof.dr.eng. Romeo Susan-Resiga.
6. CEEX Contract X2C05/3 (TEHNOMED), Subcontract UPT 9159/21.07.2006, *Hydrodynamics and mass transfer in bubble columns with applications in advanced environment technologies*, 53,500 RON/2007, Director: Prof.dr.eng. Romeo Susan-Resiga.
7. CEEX Contract X2C16/2006 (MARGAS), Subcontract UPT 9256/20.07.2006, *Mathematical and numerical model for liquid gas transport with ship*, 107,000 RON/2007, Director Prof.dr.eng. Romeo RESIGA.
8. CEEX Contract 51/03.10.2005 (SACOS), Subcontract UPT 11755/09.10.2005, *Autonomous Advanced Systems for Structure Oscillation Control*, 60,000 RON/2007, Director Dr.fiz. Ladislau Vékás.
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10. CEEX 83/2006 (NanoMagneFluid), Subcontract 581/15.09.2007, *Magnetic nanofluids with high colloidal stability for magnetofluidic sealing systems*, 47,000 RON/2007, Director Associate prof.dr.eng. Nicolae Crainic.
11. Contract UPT 7380309/2007, *Numerical investigation of the hydropower plant*, 73,000 RON, Director Prof.dr.eng. Liviu Anton.
12. Contract UPT 771/23.10.2007, *Numerical simulation of the MP3X pump*, 10,150 RON, Director Prof.dr.eng. Romeo Resiga.
13. CNCSIS Program IDEI, *The study of hydrodynamic and cavitation phenomena in the automation, actuation and force systems*, , Contract 35/2007, 2007: 100,098 RON, 2007-2009: 965,453 RON, Contractor "Politehnica" University of Timişoara, Director: Prof.dr. eng. V. Balasoiu.
14. CNCSIS CNMP - PNCDI IV, Contract 1467 / CNMP, *Hydraulic and adaptive systems for low power wind turbines*, 2007: 34,700 RON, 2007-2010: 448,000 RON, Partner "Politehnica" University of Timişoara, Director: Prof.dr.eng. V. Balasoiu.
15. CNCSIS CNMP - PNCDI IV, Contract 1365 / CNMP, *Optimization of inteligent water transportation systems for the increase of energetic efficiency and econ energy*, Value for 2007: 60,000 RON, Value for 2007-2010: 620,000 RON, Partner P3: "Politehnica" University of Timişoara, Director: Assoc.prof.dr.eng. T. Milos
16. CNCSIS CNMP - PNCDI IV, Contract 3416 / CNMP, *Energetic service of a local comunity using air currents*, Value 2007: 100,000 RON, Value for 2007-2010: 740,000 RON, Coordinator: "Politehnica" University of Timişoara, Director: Assoc.prof.dr.eng. Milos
17. GRANT CNCSIS 76/23.05.2007 *Theoretical and experimental researches regarding the operation of turbomachines with biphasic agent applied to hydrodynamic turbotransmisions*, CNCSIS 2007, 23,500 RON, Director Prof.dr.eng. Mircea Bărglăzan.
18. *Assimilation in fabrication of some wind turbines families of low/medium* , Contract nr. 661/18.05.2007 Beneficiary: SC CLAGI SRL, Biled, Romania, Contract: 21,000 RON, 2007: 10,000 RON, Contractor "Politehnica" University of Timişoara, Director: Assoc.prof. dr.eng. Teodor MILOŞ
19. Program Idei, PN II- ID 34/77/01.10.2007 *Models Development for the Evaluation of Materials behavior to Cavitation MEdCT*, 100,000 RON, Director Prof.dr.eng. Bordeasu Ilare
20. RU 102/14.05.2007, Cod CPV 74233500-6 BC 660/15.05.2007, *The analyze regarding the solution of turbine stator reability of hydroagregates from power plants Iron Gates* I, Value 25,000 RON, Director prof.dr.eng. Bordeasu Ilare
21. CNCSIS 32/2007 – *Dynamic identification of double flux turbines*, PhD scholarship type BD, Daniel Catalin Stroita.

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2. Susan-Resiga, R. ,Bernad, S., Muntean, S., (Editors), *Proceedings of the 2nd IAHR International Meeting of the Workgroup on Cavitation and Dynamic Problems in Hydraulic Machinery and Systems*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 52(66), No. 6, 2007, ISSN 1224-6077, 322 pages.
3. Bernad, S., Muntean, S., Susan-Resiga, R., (Editors), *Proceedings of the 3rd Workshop on Vortex Dominated Flows. Achievements and Open Problems*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 52(66), No. 3, 2007, ISSN 1224-6077, 136 pages.
4. Balasoiu, V., Cristian I, Bordeasu I, *Equipment and the hydraulic systems for action and automatization, Vol. I, The volumes machine*, Orizonturi Universitare Publishing House, Timisoara, 2007, ISBN 978-973-638-313-7, ISBN 978-973-638-314-4, 303 pages.
5. Ioan Pădurean, *Hydraulics and driving systems, Applications and calculus in the fluids mechanics, hydraulic machines and driving systems*, Eurostampa Publishing House, Timişoara, ISBN 978-973-687-529-8, 2007, 588 pages

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2. D. Bica, L. Vekas, M.V.Avdeev, O. Marinica, V. Socoliuc, M. Balasoiu, V.M. Garamus *Sterically stabilized water based magnetic fluids: Synthesis, structure and properties*

Journal of Magnetism and Magnetic Materials 311 (2007) 17-21.

3. Sandor BERNAD, Romeo SUSAN-RESIGA, Sebastian MUNTEAN, Ioan ANTON, *Cavitation phenomena in hydraulic valves. Numerical modelling*, Proceedings of the Romanian Academy, Series A, Vol. 8, No. 2/2007, pp: 117-126.
4. Susan-Resiga R., Muntean S., Hasmatuchi V., Bernad S., *Development of a swirling flow control technique for Francis turbines operated at partial discharge*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 52(66), No 3, pp: 1 - 12, 12 pg., 2007, ISSN 1224-6077.
5. S. Bernad, A. M. Georgescu, S. C. Georgescu, D. Balint, R. Susan-Resiga, *2D Unsteady Flow Simulation in the Achard turbine* Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 52(66), No 3, pp: 23 - 28, 6 pg., 2007, ISSN 1224-6077.
6. Kirschner O., Muntean S., Susan-Resiga R., Ruprecht A., *Swirling Flow in a Straight Cone Draft Tube: Axi-symmetric Flow Analysis and Comparison with Circumferentially Averaged PIV Measurements.* Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 52(66), No 6 pp: 185 – 197, 2007, ISSN 1224-6077.
7. R. Susan-Resiga, S. Muntean, A. Bosioc, A. Stuparu, T. Milos, A. Baya, S. Bernad, L.E. Anton, *Swirling Flow Apparatus and Test Rig for Flow Control in Hydraulic Turbines Discharge Cone.* Scientific Bulletin of the "Politehnica" University of Timisoara, Transaction on Mechanics, Tom 52(66), No. 6, 2007, ISSN 1224-6077, pp. 203-217.
8. A. Stuparu, S. Muntean, D. Balint, L . Anton, A. Baya, *Numerical Analysis of Pump Hydrodynamics at Constant Speed*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 52(66), No 3, pp: 43-48, 2007, ISSN 1224-6077.
9. D. C. Stroita., Mircea Barglazan., - *A method for calculating the characteristic times for double-flux water turbines*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transaction on Mechanics, Tom 52 (66), Fasc 4, 2007, pp. 94-98, 2007, ISSN 1244-6077.
10. Adrian Bej., Adriana Manea., - *Some issues concerning wind turbine wake*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transaction on Mechanics, Tom 52 (66), Fasc 4, 2007, pp. 15-21, 2007, ISSN 1244-6077.
11. Victor Balasoiu, Calin Raszga, Mircea Popoviciu, Ilarie Bordeasu, *Experimental results and procedure for the analysis of flow in proportional control valve*, CIEM 2007, 3rd International Conference on Energy and Environment, Bucuresti, 22-23 nov 2007, Sect. 7, Scientific Bulletin, Series C, Vol 69, 2007, nr. 4, Univ Politehnica Bucuresti, ISSN 1454-234 X.
12. Ilare Bordeasu, Victor Balasoiu, Anton Hader, Rodica Badarau, Mircea Popoviciu, *About the brakimg of linear hydraulic motors at the end of motion*., CIEM 2007, 3rd International Conference on Energy and Environment, Bucuresti, 22-23 nov 2007, Sect. 7, Scientific Bulletin, Series C, Vol 69, 2007, nr. 4, Univ Politehnica Bucuresti, ISSN 1454-234 X.
13. Cornel Velescu, Mircea Barglazan, Catalin Daniel Stroita, *Theoretical determination of characteristic curves of first class torque converters operating with two-phase flow*, CIEM 2007, 3rd International Conference on Energy and Environment, Bucuresti, 22-23 nov 2007, Sect. 7, Scientific Bulletin, Series C, Vol 69, 2007, nr. 4, Univ Politehnica Bucuresti, ISSN 1454-234 X.
14. Teodor Milos, Mircea Barglazan, *CAD techniques used to obtain the blade surface intersections with horizontal cutting planes for Francis turbine runner*., CIEM 2007, 3rd International Conference on Energy and Environment, Bucuresti, 22-23 nov 2007, Sect. 7, Scientific Bulletin, Series C, Vol 69, 2007, nr. 4, Univ Politehnica Bucuresti, ISSN 1454-234 X
15. Eugen Dobanda, Mircea Barglazan, *Notes on the optim design of turbotransmitions, regarding a hydrodynamics torque converter of Lysholm Smith type*., CIEM 2007, 3rd International Conference on Energy and Environment, Bucuresti, 22-23 nov 2007, Sect. 7, Scientific Bulletin, Series C, Vol 69, 2007, nr. 4, Univ Politehnica Bucuresti, ISSN 1454-234 X.
16. Mircea Barglazan, Adriana Manea, Cornel Velescu, Catalin Daniel Stroita, *Experimental results of temperature variation in torque converters operating with two-phase flow*, CIEM 2007, 3rd International Conference on Energy and Environment, Bucuresti, 22-23 nov 2007, Sect. 7, Scientific Bulletin, Series C, Vol 69, 2007, nr. 4, Univ Politehnica Bucuresti, ISSN 1454-234 X.
17. Ilare Bordeasu, Victor Balasoiu, Ionel Baciu, Rodica Badarau, *About braking of big masses acting by liniar hydrostatic motors*, Annals of the University of Petrosani, Mechanical Engineering, Vol 9 (XXXVI), part I, Ed.

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18. Victor Balasoiu, Ilare Bordeasu, Mircea Popoviciu, *Studiul comportarii dinamice a unui motor pneumatic liniar*, HERVEX 2007, Editia XV a Simpozionului si Salonului de hidraulica si pneumatica, 14-16 nov, 2007, pp. 37-41, Calimanesti, Valcea.
19. T. Miloş, *Method to Smooth the 3D Surface of the Blades of Francis Turbine Runner*, International Journal of Mechanical Engineering (IREME), Accepted for publication, 2008.
20. Mitelea I., Bordeasu I., Popoviciu M., Hadar A., *Corrosion of Stainless Steels with "Soft" martensitic Structure*, Chem.Abs. RCBUAU 58(02) Revista de chimie Vol.58 Nr.2/2007, pp.254-257, ISSN:0034-7752
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22. Voda M., Bordeasu I., Mesmacque, G., Chitac V., Tabără I., *Aspects of polymer assemblies behaviour to mechanical stresses*, Chem.Abs. Materiale plastice, Vol. 44, Nr.3, MPLAAM 44(3) (2007), pp. 254-258, ISSN 0025-5289
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25. Sporea I., Nagy M., Bordeasu I., Sporea Mirela, *The Influence of Aluminiu Alloys Statuses on the Dimensions of Aluminum Piston sat Different Temperatures*, 2nd Intenational Conference on Thermal Engines and Environmental Engineering METIME 2007, Proceedings Vol. II, ISSN 1843-2794; ISBN 978-973-1724-17-1, pp. 233-236
26. M. Truşculescu, I. Pădurean, G. Demian *Influence of structural state on cavitational erosion of GX4CrNi13-4 stainless steel*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 52(66), ISSN 1224-6077 Fasc. 2, 2007, Xth Edition Timisoara Academic Days, International Symposium Engineering Materials, New Horizons and Processing Techniques, pp 1-6
27. Pădurean I., Nedelcu D., *Experimental researches upon cavitation erosion resistance of the austenitic stainless steel heat treating by solution treatment and nitriding*, Scientific Bulletin of the „Politehnica" University of Timisoara, Transactions on Mechanics, Tom 52(66), ISSN 1224-6077, Fasc. 1, pp. 77-82
28. Pădurean I., Nedelcu D., *Influence of structural state on cavitational erosion of austenitic stainless steel solution treatment and nitriding*, Scientific Bulletin of the „Politehnica" University of Timisoara, Transactions on Mechanics, Tom 52(66), ISSN 1224-6077, Fasc. 1, 2007, pp. 83-86
29. Nedelcu D., Pădurean I., *The design of an Kaplan turbine runner using autodesk inventor*, Scientific Bulletin of the „Politehnica" University of Timisoara, Transactions on Mechanics, Tom 52(66), ISSN 1224-6077, Fasc. 5, 2007
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4. A. Stuparu, S. muntean, D. Balint, L.e. Anton, A. Baya, *Numerical Investigation of a Storage Pump at Constant Speed*, In Muntean S., Ruprecht A. (Editors), Proceedings of the 3rd Romanian-German Workshop on Turbomachinery Hydrodynamics, 10th Edition of Timisoara Academic Days, May 10-12, Timisoara, 2007, ISBN 978-973-638-329-8, pp: 73-84.
5. D. Susan-Resiga, L. Vekas, Romeo Susan-Resiga, *A Rheologial Model for Magneto-Rheological Fluids*, In Muntean S., Ruprecht A. (Editors), Proceedings of the 3rd Romanian-German Workshop on Turbomachinery Hydrodynamics, 10th Edition of Timisoara Academic Days, May 10-12, Timisoara, 2007, ISBN 978-973-638-329-8, pp: 141-158.
6. Ilare Bordeasu, Mircea Popoviciu, Victor Balasoiu, Lucian Madaras, *About the fiability of the adjusting mechanism for the blades of the directing apparatus*, HERVEX 2007, Editia XV a Simpozionului si Salonului de hidraulica si pneumatica, 14-16 nov, 2007, pg. 26-30, Calimanesti, Valcea.
7. I. Bordeaşu, V. Bălăşoiu, I.D. Baciu, R. Bădărău, *About braking of big masses, acting by liniar hydrostatic motors*, Annals of the University of Petroşani, Mechanical Engineering, Vol. 9 (XXXVI), part I, pp. 59-64, Ed. UNIVESITAS, Petroşani, 2007, ISSN 1454-9166
8. I.D. Baciu, M. Bărglăzan *Calculation of ψ and φ functions, for an axial turbine cascade, by BEM*, HERVEX, hidraulica; pneumatica; mecanica fină; elemente de etanşare; scule,mecatonică; dispozitive şi echipamente electronice specifice, Ed. XV, Edited by INOE 2000 IHP, Vâlcea, nov. 2007, ISSN 1458-8003

ORGANIZED CONFERENCE

1. *3rd Romanian – German Workshop on Turbomachinery Hydrodynamics*, Timisoara, 10-12 May 2007, organized with the University of Stuttgart, Institute of Fluid Mechanics and Hydraulic Machinery, Germany.
2. *3rd Workshop on Vortex Dominated Flows. Achievements and Open Problems*, Timisoara, 1-2 June 2007.
3. *2rd IAHR International Meeting of the Workgroup on Cavitation and Dynamic Problems in Hydraulic Machinery and Systems*, Timisoara, 24-26 October 2007.

PERSPECTIVES

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

RESEARCH TEAM

- Prof.dr.eng. Romeo SUSAN-RESIGA, Director
- Dr.phys. Ladislau VEKAS, Scientific Director, head of the Rheology Laboratory
- Dr.eng. Sandor BERNAD, Executive Director
- Dr.eng. Sebastian MUNTEAN, head of the Numerical Simulation Laboratory
- Assoc.prof.dr.eng. Floriana STOIAN, head of the Magnetometry Laboratory
- Prof.dr.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
- 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
- Lect. dr. ing. Ioan PĂDUREANU
- Assist. Prof. Ionel BACIU
- Assist. Prof. Rodica BĂDĂRĂU
- Assist. Prof. Alin BOSIOC
- Assist. Prof. Daniel Catalin STROIȚĂ
- 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 Turbomachines*, 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 Turbomachinery 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.
- Ing. 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.
- Eng. Alin BOSIOC, *Control of the rotation flow in the aspiration tube cone of hydraulic turbines*, scientific advisor Prof.dr.ing. Romeo SUSAN-RESIGA.

CONTACTS

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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 Timişoara. 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, Plasturgy, Rapid prototyping and three-dimensional measurements, Cold forming, Non-traditional machining processes, Welding processes, Welding equipment, Defectology, Quality assurance, Equipment and technologies for non-conventional technological processes, Laser materials processing, Plan and equipment for food industry, Piezoceramic traductors, Degradation of materials, remaining durability of exploitation.

ACTIVITIES

- IERC assure the co-ordination and harmonization of the training programs through scientifically research (PhD. programs, post-graduated programs) for the researchers or research teams of different departments. The post-graduate program developed by IERC is: *Integrated Engineering*. The PhD. programs coordinated by IERC are in the field of Industrial Engineering.
- The research teams from IERC develop: fundamental and applicative research activities; products and technology design activities; technological development and technology transfer all attending the present industrial demands.
- IERC is involved in national and international research programs, is member of different professional and scientifically organizations and organizes different scientific meetings (seminars, conferences etc.).
- Participation to the EC Sixth Framework Program (FP6) as a partner to a network of excellence project: *Virtual Research Lab for a Knowledge Community in Production (VRL-KCiP)*, contract no. FP6-507487-2
- Participation to grant competitions through CNCSIS, 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:
  EMIRAcle – European Manufacturing and Innovation Research Association, a cluster leading experience
  AGIR – The General Association of the Engineers in Romania
  AUIF – Academic Association of Manufacturing Engineering in Romania
  ARTN – Romanian Association of Nonconventional Technologies
  ASR – Romanian Welding Society
  ACM-V – Association for Multidisciplinary Research West Zone
  AWS – American Welding Society
  ISL-FD – International Society of Lyophilization- Freeze Drying
  B.EN.A – Balkan Environmental Association

RESEARCH CONTRACTS

1. Contract NMP2-CT-2004-507487 FP6, *Virtual Research Lab for a Knowledge Community in Production*, Network of Excellence, Director: Prof. George Drăghici, Value for 2007: 8,764 €
2. Contract CEEX 243/2006-2008, *National Research Network for Integrated Product and Process Engineering*, Director: Prof. George Drăghici, Value for 2007: 76,146 Lei
3. Contract CEEX 238/2006-2008, *Research Network for a New Production Process based for on-line Failures Prediction in Integrated Maintenance and Reliability*, Director: Prof. George Drăghici, Value for 2007: 25,600 Lei
4. Contract CEEX nr. 2052/2006-2008, *Fundamental and applied researces on water jet and abrasive particles magnetic activated manufacturing – ELMAJET*, Director: Assoc. Prof. Mircea Vasilescu, Value: 1,500,000 lei
5. Contract CEEX 3091/2007, *The biocombustible obtiened on cellulose waste valorification in chemico-enzimeted integrated system*, Partner director: Prof. Ţucu Dumitru, Value: 236,160 lei
6. Contract CEEX- MIPCUC nr. 758/2006-2007, UPT 10673/11.09.06. *The method and echipment for chlorine maked and used to water chlorination with direct introduced in network used*. Partner director: Prof. Ţucu Dumitru, Value: Val. 335,000 lei
7. OSEO-ANVAR International Grant no. 2/14.02.2007, *The waved cardboard paching optimization with phactorial methode*. Director: Assoc. Prof. Eugen Cicală, Value: 23,400 EURO
8. Bourgogne Technologies, France, International Grant - no. 4/ 2007, UPT. *The hybride laser-MIG welding in Al alloys for aeronautic field*, Director: Assoc. Prof. Eugen Cicală, Value: 23,000 EURO
9. CNCSIS no. 358/2007, *The expensive national and international visibility R&D activities in range of evaluation situation high stressed parts in processed technical systems*. Director: Prof. Traian Fleşer, Value: 63,500 lei
10. CNCSIS 46 GR, 2007-200: *Dezvoltarea modelului virtual 3D al articulatiei de sold prin tehnici CAD/CAM si Rapid Prototyping*, Director: Assoc. Prof. Nicolae Crainic, Value: 200,000 lei
11. Contract CEEX nr. 2045/2006-2008: *New technologie in human implantology baseed on animals osteointegrations*, Partner director: Prof. Ghiţă Mihai
12. Marie Curie Cipru Program, *Nanocomposite Materials Manufacturing by Ultrasonic Welding (UltraNanoMan)*, Director assist. prof. Crainic N.
13. PN II/CAPACITATI, nr. 151/2007-2009 *Laboratory at europeen level for development of welding and testing termoplastics materials* Director of grant: Prof. assoc. dr. eng. Mihaela Popescu, Value (2007): 0 RON
14. Contract 649/2007, *Systematization technical documentation in order to elaborate the welding technology of stainless steel rotor*, SC Sudexpert SRL Timisoara, Director of contract: Prof. assoc. dr. eng. Mihaela Popescu, Value (2007): 3,800 RON
15. Contract 564/2007, *Drawing up the tecnical documentation (tecnical book)*, SC Sudexpert SRL Timisoara, Director of contract: Prof. assoc. dr. eng. Mihaela Popescu, Value (2007): 2,800 RON
16. Contract 583/2007, *Consulting, education and welders' examination by SR EN 287/1*, SC ATON Transilvania SRL Director of contract: Lector dr. eng. Daniel Tunea, Value (2007): 247,229 RON
17. Contract 716/2007, *Research by certification and qualification of stud welding in metallic structures and welder examination*, SC ATON Transilvania SRL Director: Prof.dr.eng. Gheorghe Glita, Value (2007): 25,000 RON

Prospective:

- Participation to the **EC Seven Framework Program (FP7)**
- Participation to grant competitions through CNCSIS, national programs

PUBLICATIONS

BOOKS

1. Herman, R., *The experimental investigations in mechanical technologies*, Politehnica Publishing House, Timisoara, 2007, ISBN 973-625-338-4, 137 pages
2. Ţucu, D.: *The integrated technological systems in millering and panification*. Orizonturi Universitare Publishing House, Timişoara, 2007, ISBN 978-973-638-304-5, 447 pages
3. Han, A., Nichici, A.: *The laser materials processing*, Politehnica Publishing House, Timisoara, 2007, ISBN 978-973-625-440-6, 150 pages
4. Slavici, T., *The PC using bases*, Eurostampa Publishing House, Timişoara, 2007, ISBN 978 – 973-687-625-7, 430 pages
5. Ţucu, D. editor: *Integrated Systems for Agri-Food Production*, Proceedings 5th Int. Conf., SIPA'07, Sibiu, 22-24.11.2007, Orizonturi Univesitare Publishing House, Timişoara, 2007, ISBN 978-973-638-348-9, 510 pages
6. Miloş, L., *Practical course for MMA welding* (published in Romanian), Tempus Publishing House, Timişoara, 2007, ISBN 10973-88147-1-5, 125 pp
7. Popescu, M., Magda, A., *Thermical coating and recondition. Aplication*, Politehnica Publishing House, Timişoara, 2007, ISBN 978-973-625-545-8, 115 pp.

PUBLISHED PAPERS

1. Drăghici G., Drăghici A. , *Romanian Research Network for Integrated Product and Process Engineering, The Future of Product Development*, Proceedings 17th 2007 CIRP Design Conference, Springer Verlag, ISBN 978-3-540-69819-7, pp. 341-350
2. Drăghici, G., Savii, G., Drăghici, A. , *Platform for Collaborative Product and Processes Development*, Annals of DAAAM for 2007 & Proceedings 18th International DAAAM Symposium, Published by DAAAM International, Vienna, Austria, ISSN 1726-9679, pp. 253-254
3. Suru P., Şoşdean D., Pămîntaş E., Dume A.-I., *Typological impression of mechanisms in Machines-Tools actuation*, Annals of the Oradea University, Fascicle of Management and Technological Engineering, Volume VI (XVI), ISSN 1583-0691, pp. 1754-1758
4. Suru P., Pămîntaş E., Şoşdean D., Dume A.-I., *Quality testing of mecanisms from machines-tool actuations under noise and vibrations*, International Conference on Manufacturing Science and Education, European Traditions and Influences in Engineering, 12-14 July 2007, Sibiu, Romania
5. Drăghici G., Brîndaşu P.D., Savii G.G., Drăghici A. , *The Need for PLM Education to Satisfy Industrial Requirements*, Proceedings 4th Balkan Region Conference on Engineering Education, Sibiu, Romania, ISSN 1843-6730, pp. 49-54
6. Drăghici A., Niemann J., Drăghici G., Banciu F., *National Virtual Team's Management and Development. The Case of Romanian Research Network – INPRO*, Review of Management and Economical Engineering, Cluj-Napoca, Vol. 6, nr. 2A(23), ISSN 1583-624X, pp. 5-18
7. Drăghici G., Brîndaşu P. D., Şerb S., Savii G. G., Drăghici A., *The Industrial Needs and INPRO Research Network's Competencies in the Field of PLM*, Academic Journal of Manufacturing Engineering, Volume 5, Number 2/2007, ISSN 1583-7904, pp. 18-24
8. Drăghici G., Savii G., Draghici A., *Building a Platform for Collaborative Product and Processes Development*, Excellence Research as a Way to ERA (Editors: N. Vasiliu, L. Szabolcs), Editura Tehnică, ISSN 1843-5904, Electronic Proceedings
9. Anghel V., Drăghici G., *A New Approach For Maintenance At Nuclear Complex Systems*, Excellence Research as a Way to ERA (Editors: N. Vasiliu, L. Szabolcs), Ed.Tehnică, ISSN 1843-5904, Electronic Proceedings
10. Drăghici G., Banciu F. , *Parallelism between alghoritmic (systematic) design and axiomatic design*, Annals of the Oradea University, Fascicle of Management and Technological Engineering, Volume VI (XVI), ISSN 1583-0691, pp. 1457-1468
11. Pămîntaş, E., Suru, P., Dumbravă, D., Botea, T., *Approaches in maintenance, since corrective throughout preventive to proactive - from prognosis to scheduling*, Annals of the University of Petroşani, Mechanical Engineering, vol. 9 (XXXVI), Ed. Universitas Petroşani, 2007, ISSN 1454-9166, pp. 63-68
12. Pămîntaş, E., Suru, P., Botea, T., *The Application Of Real-Time Adaptive Control Techniques To Industrial Processes*, Annals of the Oradea University, Fascicle of Management and Technological Engineering, Volume VI (XVI), 2007, Ed. Universitas, ISSN 1583-0721, pp. 1736-1741
13. Belgiu G., Keri D., *Tool Radius Selection in Milling Process*, Annals of the Oradea

University, Fascicle of Management and Technological Engineering, Volume VI (XVI), ISSN 1454-9166, pp. 246 (abstract), full paper on CD-ROM

14. Turc C., *Fuzzy logic algorithm for prismatic workpieces choosing in early design stage*, The 3rd VIDA Int. Conference Poznań, Poland, ISBN 83-7143-201-3, CD-ROM
15. Grozav I., Turc C., Banciu F., *The Optimization of the soldering process through experiment design*, 3rd International Conference Virtual Design and Automation, Inovation in Product and Process Development Poznan-Poland, ISBN 83-7143-201-3, CD-ROM
16. Grozav I., Nicoli T., *Software for computing the force transfer ratio*, International Conference on Manufacturing Systems, ICMaS, Bucharest, ISSN 1842-3183, pp. 85-90
17. Pircea I., Belgiu G., *Job shop scheduling. Algorithm and computing program*, Proceedings 8th International Conference Modern Technologies in Manufacturing, Cluj-Napoca, ISBN 973-9087-83-3, pp. 371-374
18. But A., Teplalexis S., But E., Radu I., *New design possibilities using ALPHACAM*, Quality and Reliability of Technical Systems. 12th International scientific symposium Nitra – Slovakia, ISBN 80-8069-707-8, pp. 105-109
19. But A., *Introduction and discussion of different concepts and strategies for producing companies*, Eighth Eastern-Europe-Conference in Timisoara
20. Pamintas E., Suru P, Dumbrava D., *Adaptive Control in Manufacturing between theory and Application*, Proceedings 23rd International Conference "Virtual Design and Automation" – New Trends in Collaborative Product Design, Poznan, Poland, ISBN 83-7143-201-3, pp. 56 and CD-Edition
21. Putz V., *Contributions regarding catastrophe surface concept for study of the worm-thread miling cutters wear in conditions of cilindrical gear weels fabrication*, International Conference on Management and Technological Engineering Oradea, ISSN 1583-0691, pp. 313
22. Tucu, D., Fleser, T.: *Optimization of soybean press cake treatments and processing*. Agriculturae Conspectus Scientificus, Vol.72, No.3, Zagreb, pp.195-198
23. Tucu, D., s.a.: *The considerations on active 5 Agglocompact effect yeast using in froth wine with "Champenoise" classical method*. Revista de Chimie nr. 10/2007, vol.58, ISSN 0034-7752
24. Tucu, D. s.a.: *Chemical and Mechanical Aspects of the Cavitation Phenomena*. Revista de Chimie, nr.12, 2007, vol.58, ISSN 0034-7752
25. Cicala, E. s.a.: *Dissimilar material joining using laser (aluminium to steel using zinc-based filler wire).* Optics & Laser Technology, 39(2007), pp. 652-661, Elsevier
26. Cicala, E. s.a.: *The application of the random balance method in laser machining of metals. Journal of Materials Processing Technology*, accepted 13.06.2007, Elsevier
27. Popescu, M., Marta, C., Magda, A., Caneparu, P., Caneparu, A., *Cored wires in the fabrication process,* 7th Conference "Research and Development in Mechanical Industry" Radmi, Serbia, 2007 ISBN 86-83803-21-X, pp. 162-167
28. Popescu, M., Argesanu, V., Magda, A., Caneparu, P., *PEHD pipe welding* 7-th Conference "Research and Development in Mechanical Industry" Radmi, Serbia, 2007, ISBN 86-83803-21-X, pp. 157-162
29. Caneparu, P., Milos, L., Popescu, M., *Experimental results on the quality of surfaces and dimensional tolerance in oxygas cutting*, International Conference on Material Science and Engineering BRAMAT 1223-9631, Romania, 2007, pp. 181-183
30. Popescu, M., Marta, C., Argesanu, V., Jula M., Tunea, D., *Problems associated with PEHD welding*, International Conference on Material Science and Engineering BRAMAT 1223-9631, Romania, 2007, pp. 183-185
31. Caneparu, P., Milos, L., Popescu, M., *Developed experimental researches on the cut surfaces using a CNC oxygas thermal cutting machine*, International Conference on Material Science and Engineering BRAMAT 1223-9631, Romania, 2007, , pp. 184-187
32. Popescu, M., Caneparu, P., Marta, C., Caneparu, A., *Thermal cutting and the ECO-conception*, International Conference on Material Science and Engineering BRAMAT 1223-9631, Romania, 2007, pp. 185-187
33. Popescu, M., Marta, C., *State of the art and future in the field of composite materials*, International Conference "Innovative technologies for joining advanced materials, Proceeding, Timisoara, 2007, ISBN 978-973-8359-49-9, pp. 235-240
34. Burcă, M., Gliţa, G., Dumbravă, D. Câneparu, P., Stoian, C., *Proceeding of stud welding with*

large diameter, International Conference on Material Science and Engineering BRAMAT 1223-9631, Romania, 2007, pp. 196

35. Petrica, A., Milos, L., *Structural transformations of the deposited layers by thermal spraying obtained by heat treating*, 13th International Symposium of Metallography", Stara Lesna, Slovakia, ISSN 1335-1532, pp. 848-852
36. Bortun, C., Milos, L., Ghiban, B., Mitelea, I., Sandu, L., Porojan, S., *Structural analysis of CoCrMo metallic alloys used in removable partial dentures technology*, 9th International Symposium Interdisciplinary Regional Research- ISIRR 2007", Hungary-Serbia-Romania, Novi Sad, Serbia, ISBN 82585-01-16, pp. 45-49
37. Caneparu, P., Milos, L., *Experimental stand and mechanized machine to implement CAD/CAM system in oxygas cutting*, Internationat Conference "IMT-Oradea 2007", ISSN 1583-0691, pp.1765-1770
38. Bortun, C., Sandu, L., Milos, L., *Dental Alloys Structural Analyses of Welded Frameworks*, "42nd Annual Meeting of IADR", Thessaloniki, Greece, 2007, ISSN 1642-1213, pp. 329-334
39. Milos, L., Salai, M., *Die Schweissnahhtqualitat thermomechanisch behandelter geschweisster Stahlrohre(X70 und X80)*, "XIII TUV Rheinland Konferenz fur Anlagentechnik", Tihany, Hungary, 2007, ISSN 1367-3295 pp. 53-60
40. Safta, V., Cojocaru, R., Radu, B., *Consideration by defectoscopy of FSW welding joint*, Proceedings Innovative Technologies For Joining Advanced Materials Timisoara, 2007, ISBN 978-973-8359-49-9, pp. 70-77
41. Safta, V., Grün, G., *Regards of imagery ultrasonic in phased array sistem*, Volumul Lucrărilor Conferinţei Internaţionale ASR, "Sudura 2007", ISSN-1843-4738, pp. 87-92
42. Glita, G., Glita, S., Magda A., Caneparu, P., Negoitescu, S., *Robot line for projection resistance welding of calorifier elements* International Conference on Material Science and Engineering BRAMAT 1223-9631, Romania, 2007, ISSN 1223-9631, pp. 188
43. Glita, G., Magda, A., Burca, M., Caneparu, P., Lucaciu, I., *Researches of the projection resistance welding of plate calorifier elements*, International Conference on Material Science and Engineering BRAMAT 1223-9631, Romania, 2007, ISSN 1223-9631, pp. 190
44. Dumbrava, D. Burca, M., Vasilcin, T., Sipetan, R., *Considerations regarding the influence of stress relioving between passes in multi-layer welding on the size of active imput energy* Annals of Oradea University, Fascicul of Management and Tehnological Engineering CD-ROM Edition Vol. VI (XVI), 2007, ISSN 1583-0691, pp. 10
45. Dumbrava, D., Pamantas, E., Suru, P., Botea, T., *Approaches in maintenance, since corrective throughaut preventive to proactive from prognosis to scheduling*, Annals of the University of Petrosani, Mechanical Engineering, Vol. 9, (XXXVI), Part II. 2007, pp. 89-96.
46. Dumbrava, D., Glita, G., Burca, M., Stoian, C., Toma, C., *Calification of stud welding method with large diameter*, Volumul simpozionului "Structuri metalice aplasate in zone seismice. Preocupari actuale". A X-a editie a "Zilelor academice timisene", Timisoara, 25 mai 2007, pp. 8.
47. Dumbrava, D., Raduta, A., Herman, M., Sipetan, R., *Method for determining the angular deformation at sheets butt welding.* Scientific bulletin of the "Politehnica" University of Timisoara Transactions on Mechanics, Tom 52 (66), Fasc. 5, ISBN 1224-6077, pp. 27-32, 2007
48. Popescu, M., Glita, G., Magda, A., *Current scenario and prospects in welding industry*, Annals of the Oradea University, Fascicle of Management and Technological Engineering, 2007, volume VI, ISSN 1583-0691, pp. 284
49. Popescu, M., Mocuta, G.E., Caneparu, P., Caneparu, A., Giula, D., *Problems in realizing the PVC joinery for thermopane*, Annals of the Oradea University, Fascicle of Management and Technological Engineering, 2007, volume VI, ISSN 1583-0691, pp. 283
50. Popescu, M., Magda, A., *Problems of PEHD welding*, Welding and Welded Structures, Serbian Society for Advacement of Welding Quarterly Review, 2007/2, YU ISSN 034-7965, pp. 5-9

AWARDS

"Toma Dragos" Award for prof.dr.eng. Tucu Dumitru: The Agriculture and Silviculture Scientific Academy

PhD THESIS

1. Suciu Lenuta, *The contribution on modelation and simulation of welding gaz processes (Ar, CO2)*, Thesis supervisor: prof.dr.eng. Nanu Aurel

2. Pernevan I., *The study and research on deformation the thin steel plates*, Thesis supervisor: prof.dr.eng. Sporea Ioan
3. Caneparu, P., *Contributions regarding the improvement of mechanized thermal cutting equipment*, Thesis superviser: Prof.dr.eng. Livius Milos
4. June, C., *Hardfacing by MAG welding with strip electrode*, Thesis superviser: Prof.dr.eng. Dorin Dehelean

PhD Students

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 Oriţa, *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 Gliţă – team leader
- Prof. dr. eng. Traian Fleşer – team leader
- Prof.dr.eng. Richard Herman – team leader
- Prof.dr.eng. Dumitru Mnerie – team leader
- Prof. dr. eng. Dumitru Ţucu – team leader
- Prof. dr. eng. Petru Suru
- Assoc. prof. dr. eng. Ion Grozav
- Assoc. prof. dr. eng. Eugen Păminţaş
- Assoc. prof. dr. eng. Viorel Putz
- Assoc. prof. dr. eng. Florin Grosu
- Assoc. prof. dr. eng. Ioan Pircea
- Assoc. prof. dr. eng. Dănuţ Şosdean
- 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 Mălai
- Lect. dr. eng. Doru Dumbravă
- Lect. dr. eng. Mircea Burcă
- Lect. Dr.eng. Daniel Ţunea
- Assist.eng. Aurelian Magda
- Eng. Eduard Berger – PhD student
- Prof. dr. eng. Aurel Mărcuşanu
- Prof. dr. eng. Mihai Ghiţă
- Prof. dr. eng. Vasile Popovici
- Prof. dr. eng. Titus Slavici
- Assoc. prof. dr. eng. Nicolae Crainic
- 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
- Assist. dr. eng. Sorin Ignat
- Eng. Alina Simoiu, PhD student
- Eng. Nicoleta Popescu, PhD student
- Eng. Adelina Han, PhD student
- Eng. Simona Achim, PhD student

CONTACT

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RESEARCH CENTRE FOR PROCESSING AND CHARACTERISATION OF ADVANCED MATERIALS

MAIN RESEARRCH FIELDS

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

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

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

FIELD DESCRIPTION

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

ACTIVITIES AND RESULTS

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

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

SHAPE MEMORY ALLOYS

FIELD DESCRIPTION

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

ACTIVITIES AND RESULTS

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

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

METAL MATRIX COMPOSITES

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.

ACTIVITES AND RESULTS

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

INCREASE OF RELIABILITY ON DIFFERENT MACHINE PARTS BY SURFACE ENGINEERING

FIELD DESCRIPTION

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

ACTIVITIES AND RESULTS

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

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

FIELD DESCRIPTION

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

ACTIVITIES AND RESULTS

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

MAIN PUBLICATIONS

BOOKS

C. Codrean, V. A. Serban, *Amorphous and nanocrystalline alloys*, Politehnica Publishing House, Timisoara, 2007, 124 pages, ISBN 978-973-625-405-5

PUBLISHED PAPERS

1. M.Liţă, N.C.Popa, C. Velescu, L. Vekas, *Investigations of a Magneto-Rheological Fluid Damper*, IEEE Transactions on Magnetics. Volume 40, No.2, pp. 469-472 , ISSN 0018-9464
2. D. Utu, G. Marginean, C. Pogan, W. Brandl, V.A. Serban, *Improvement of the wear resistance of titanium alloyed with boron nitride by electron beam irradiation*, Surface and Coatings Technology, Volume 201, Issue 14, Pages 6387-6391, ISSN 0257-8972
3. Radu Bogdan, Codrean Cosmin, Şerban Viorel-Aurel, *Mathematical Modeling of Thermal Field for Resistance Spot Brazing of Stainless Steel with Amorphous Brazing Alloy*, Welding in the World 51 pp. 693-700, ISSN 0043-2288
4. Codrean Cosmin, Mitelea Ion,. Serban Viorel-Aurel, *Structural Morphology of Transformation by Vacuum Oven Brazed Joints with Amorphous Alloys*, Advanced Materials Research, Vol.23, pp. 221-224, ISSN 1022-6680
5. Mitelea, I., Bordeasu, I., Popoviciu, M.O., Hadar, *A. Corrosion of stainless steels with "soft" martensitic structure*, Revista de Chimie 58(2), pp. 254-257, ISSN 0034-7752
6. Şerban V.A., David I., Codrean C., Vodă M., Chincea I. *Considerations of Welding Behaviour by Laser Beam of Austenitic Manganese Alloys*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 52(66), Fasc. 2, p. 95-98, ISSN 1224-6077
7. A. Bacila, G. Mesmacque, V.A. Serban, M. Voda, *Effect of Underload Applied after an Overload on Fatigue Crack Propagation for 12NC6 Steel*, Publication of Romanian Technical Sciences Academy –University of Bacău, „Modelling and Optimization in the Machines Building Field" - MOCM-13 ,Vol l4 pp.43-48, ISSN 1224-7480
8. Nicoară M., Răduţă A., Locovei C., Demian C., Roşu R., *Finite Element Analysis of the Joint Area of Brazed Aluminum Tubes*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 52(66), Fasc. 2, p. 79-82, ISSN 1224-6077
9. M. Truşculescu, I. Pădurean, G. Demian, *Influence of structural state on cavitational erosion of GX4CrNi13-4 stainless steel*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 52(66), Fasc. 2, pag 1-6, ISSN 1224-6077
10. I. Mitelea, C. Codrean, *Conventional metallic glasses and bulk amorphous alloys*, Scientific

Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 52(66), Fasc. 2, pag7-12. ISSN 1224-6077

11. V. Budau, C. Craciunescu, S. Duma, *Main factors in failure analysis cases*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 52(66), Fasc. 2, pag 23-28, ISSN 1224-6077
12. I. Mitelea, L. Udrescu, *Gas nitriding of the steels for hot metal working tools*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 52(66), Fasc. 2, p. 41 – 44, ISSN 1224-6077
13. I. Mitelea, D. Schinle, C. Craciunescu, *Betrachtungen uber das Entwerfen von Einsenlegierungen mit Formgedachtnis*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 52(66), Fasc. 2, p. 45 – 52, ISSN 1224-6077
14. C. Craciunescu, V. Budau, I. Mitelea, *Advanced composites with shape memory ribbons and embedded transformations*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 52(66), Fasc. 2, pag 53-56, ISSN 1224-6077
15. C. Craciunescu, V. Budau, I. Mitelea, *Microstructural observations of the fracture surface of shape memory alloys ribbons*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 52(66), Fasc. 2, pag 57-60, ISSN 1224-6077
16. I. Mitelea, B. Radu, R. Gugu, *Thermal field estimation for Fgn 500-7 + 17MnCr10 friction welding*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 52(66), Fasc. 2, p. 67 – 70, ISSN 1224-6077
17. S. Duma, *Study regarding the acquisition of gauge blocks for transmitting the Brinell HBW hardness scales*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 52(66), Fasc. 2, pag 93-98, ISSN 1224-6077
18. Liţă Marin, Codrean Cosmin, Opriş Carmen, *Comparative Analysis of the Dimensional, Structural and Thermostability Characteristics of the Magnetic Liquids*, Magnetorheologic Liquids and Polymeric Emulsions, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 52(66), Fasc. 2, pag. 61-66, ISSN 1224-6077
19. Codrean Cosmin, Mitelea Ion, Şerban Viorel-Aurel, *Selection Algorithms for Amorphous Alloys used in Brazing Austenitic Steels*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 52(66), Fasc. 2, pag. 13-18, ISSN 1224-6077
20. Codrean Cosmin, Şerban Viorel-Aurel, Mitelea Ion, *Process Parameters on Mechanical Characteristics of Brazed Amorphous Alloys Joints*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 52(66), Fasc. 2, pag. 19-22, ISSN 1224-6077
21. Şerban Viorel-Aurel, David Ioan, Codrean Cosmin, Vodă Mircea, Chincea Ion, *Considerations of Welding Behaviour by Laser Beam of Austenitic Manganese Alloys*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 52(66), Fasc. 8, pag. 95-98, ISSN 1224-6077
22. C. Codrean, V.A. Şerban, D. Uţu, I. Chincea, *Some Aspects Concerning Crack Sensitivity of Austenitic Manganese Steel During Laser Beam Welding*, Scientific Bulletin of the „Politehnica" University of Timisoara, Mecanica, Tom 52(66),-Fasc.8, pp 7-12, ISSN 1224-6077
23. D. Uţu, G. Mărginean, V.A. Şerban C. Codrean, *Microstructure Oxidation and Corosion Behaviour relantioships for MCrAlY Sprayed Coatings*, Scientific Bulletin of the „Politehnica" University of Timisoara, seria Mecanica, Tom 52(66),-Fasc.8, pp 61-66, ISSN 1224-6077
24. Codrean Cosmin, Şerban Viorel-Aurel, Burcă Mircea, Radu Bogdan, *Experiments Regarding Resistance Spot Brazing of Austenitic Stainless Steel With Amorphous Brazing Alloys*, Proceedigs of the IIW International Conference "Welding and Materials – Technical, Economic and Ecological Aspects", 01-08 July Dubrovnik & Cavtat, Croatia, ISBN 978-953-7518-00-4, pp. 339-345
25. Radu Bogdan, Codrean Cosmin, Şerban Viorel-Aurel, *Mathematical Modeling of Thermal Field for Resistance Spot Brazing of Stainless Steel with Amorphous Brazing Alloy*, Proceedigs IIW International Conference "Welding and Materials – Technical, Economic and Ecological Aspects", 01-08 July Dubrovnik & Cavtat, Croatia, ISBN 978-953-7518-00-4, pag. 693-700
26. C. Bălăbuc C., Răduţă A., Demian C., Cicală E., Miron M., Filip L., Todea C, *Enamel*

microhardness change after 980 nm high power diode laser irradiation, World Federation for Laser in Dentistry, European Division, First Meeting, Nice, France, 27-28th April, 2007, poster

27. L.R. Cucuruz, M. Nicoară, A. Raduţă, C. Demian, *Der Einfluss des Warmstrangpressens auf die Verteilung der Verstärkungselemente der Verbundwerkstoffe mit Aluminiummatrix*, Verbundwerkstoffe 16, Symposium Verbundwerkstoffe und Werkstoffverbunde 14-16 März 2007 Bremen, poster

PhD THESIS

1. Teodora Maghet, *Morphology and properties of MCrAlY layers deposited through HVOF thermal spray*, Scientific Coordinators: Prof. dr. eng. I. Mitelea, Prof.dr.eng. W. Brandl
2. Camelia Demian, *Researches regarding the behavior of osseous implantation materials according to quality European standards*, Coordinator Prof.dr.eng. Viorel Serban
3. Adrian Voicu, *Studies regarding the biocompatibility of surgical human implants made from titanium alloys*, Coordinator Prof. dr. eng. Viorel Serban
4. Remus Belu Nica, Contributions regarding the processing and welding joining of some thin sheets made of Al based alloys matrix composites, Coordinator Prof. dr. eng. Viorel Serban

RESEARCH CONTRACTS

1. Contract No. 46 GR/11.05.2007 T58 Grant: *Studies upon the improvement of the HVOF sprayed MCrAlY*, Director: As.dr.ing. Ion Dragos Utu, Value: 75,000 lei
2. Contract No. 606 / 21.02.2007, LIVES INTERNATIONAL – *Determination of the structural and physical-mechanical characteristics of the SILICA AEROGEL material*, Director: Assoc. prof. dr. eng. Raduta Aurel, Value: 5,100 lei
3. Contract No. 591/ 30.01.2007, *Evaluation and determination of physical and chemical characteristics of some steel verified at inspections conducted by ISIM Timisoara*, Director: Assoc. prof. dr. eng. Raduta Aurel, Value: 580 LEI
4. Contract No. 597/ 06.02.2007, *Technical assistance and consultancy in the field of product quality from the current production of Zoppas Industries Romania*, Zoppas Industries Romania SRL, Director: Assoc.prof.dr.eng. Raduta Aurel, Value 350 Lei
5. Contract No. 663/ 28.05.2007 - *Technical assistance and consultancy in the field of quality for materials, tools and semi-products in the current production line*, - S.C. Alcoa România SRL - Director: Assoc. prof. dr. eng. Raduta Aurel, Value: 3,000 LEI
6. Contract No. 722/ 30.07.2007 - *Technical assistance and consultancy in the field of materials quality* - S.C. Moticica Grup S.A- Director: Assoc. prof. dr. eng. Raduta Aurel, Value: 3,000 LEI
7. Contract No. 724/ 31.07.2007 - *Technical assistance and consultancy in the field of quality for materials, tools and half finished products* - S.C. Planar Serv SRL - Director: Assoc. prof. dr. eng. Raduta Aurel, Value: 1,000 LEI
8. Contract No. 728/ 03.08.2007 - *Analysis and tests for the verification of the stress state of the sluice gate of the Iron Gates concerning the stresses induced in the filling welding* - S.C. Institutul de Studii şi Proiectări Hidroenergetice SA - Director: Assoc. prof. dr. eng. Raduta Aurel, Value:10,948 LEI
9. Contract No. 764/ 16.10.2007 - *Technical assistance and consultancy in the field of quality for materials, tools and half finished products from the current production line* - S.C. Siemens VDO Automotive SRL - Director: Assoc. prof. dr. eng. Raduta Aurel, Value: 5,000 LEI
10. Contract No. 740/2007 - *Technical assistance and consultancy in the field of quality for materials, tools and half finished products from the current production line* - Dura Automotive Romania - Director: Assoc. prof. dr. eng. Nicoara Mircea, Value: 4,000 LEI
11. Contract No. 631/2007 - *Design and assistance for execution of heat treatment equipment* – Avangarda - Director: Assoc. prof. dr. eng. Nicoara Mircea, Value: 1,000 LEI
12. Contract. No. 634/2007 - *Technical assistance and consultancy in the field of quality for tools, equipment and products in the current production line of Continental Automotive Products* - Continental Automotive - Director: Assoc. prof. dr. eng. Nicoara Mircea, Value:2,535 LEI
13. Contract No. 723/2007 - *Technological design and technical assistance in the execution stage of heat treatment operations* – S.C. Promes S.A - Director: Assoc. prof. dr. eng. Nicoara Mircea, Value: 1,000 LEI
14. Contract No. 643/2007 - *Technical assistance and consultancy in the field of quality for tools, equipment and products in the current production line of Contitech*

Romania – S.C. Contitech Romania S.R.L. - Director: Assoc. prof. dr. eng. Nicoara Mircea, Value:10,965 LEI

15. Contract No. 625/2007 - *Technical assistance and consultancy in the field of quality for tools, equipment and products in the current production line* – S.C. Aton Transilvania - Director: Assoc. prof. dr. eng. Nicoara Mircea, Value: 3,675 LEI
16. Contract No. 782/09.11.07 – *Technical assistance and consultancy in the field of sclerometric measurements* - S.C. Barum Automotive S.R.L. - Director: Assoc. prof. dr. eng. Duma Sebastian, Value: 1,378 LEI
17. Contract No. 71-050/2007 - *Innovative technologies for the fabrication of anti corrosion and anti ware cermet composite micro layers made by thermal spraying*, Director: Prof. dr. eng. Serban Viorel, Value: 80,998 LEI
18. Contract CEEX MEC 1285/2006-2008 *Optimisation of dental-periodontal treatments using laser technologies – multidisciplinary testing* - Director: Assoc. prof. dr. eng. Raduta Aurel, Value: 185,000 LEI
19. Contract No. 41-091/2007 *Reconstruction of osseous segmentary defects using biomimetics matrix colonized with osseo genetic cells*, RECON-OS, Director: Prof. dr. eng. Cucuruz Roland, Value: 10,000 LEI
20. Contract No. 66/01.10.2007 Program IDEI, ID-18, *Bulk amorphous and nanocrystalline ferromagnetic alloys with applicability in making magnetic screens*, Director: Prof. dr. eng. Serban Viorel, Value: 90,000 LEI
21. Contract CEEX No. 266/2006 UPT 10622/2006, *Multifunctional microlayers for plating titanium alloys using advanced technologies*, Director: Prof. dr. eng. Mitelea Ion, Value: 85,000 LEI
22. Contract No. 582/2007 *Technical assistance and consultancy regarding spare parts used for tractors and agriculture machines*, Director: Prof.dr.eng. Cucuruz Roland, Value 1,870 LEI
23. Contract No. 621/2007 *Researches regarding high productivity welding processes with applications in the machine industry*, Director Prof.dr.eng.Mitelea Ion, Value 5,000 LEI
24. Contract. No. 688/2007 *Amorphous ribbons made from amorphous alloys, with 0.03X5X2000 mm size*, Director: Dr.eng. Codrean Cosmin, Value: 500 LEI
25. Contract No. 722/2007 *Means for improving mould durability* Director: Prof.dr.eng. Mitelea Ion, Value: 4,760 LEI

RESEARCH TEAM

- Prof. dr. eng. Ioan CARȚIȘ
- 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 - Director
- 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
- Lecturer dr. eng. Sebastian Titus DUMA
- Lecturer 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
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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. Inocenţiu Maniu**: 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 of 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.

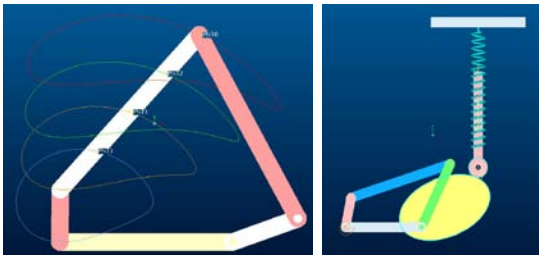
- Studies and researches in the precision mechanics field and mechatronics.
- **Keywords:** measuring devices, transducers, metrology, quality assurance and optical systems.
- CAD, artificial intelligence and virtual reality.

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

Researches in *MECHANISMS AND MECHANICAL DRIVES*

FIELD DESCRIPTION

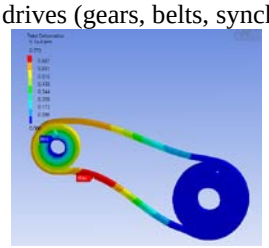
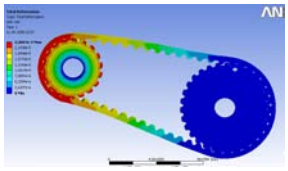
- theoretical study, design and tests of special purpose mechanisms and mechanical drives, cams and linkages, mechanical variators, behavior of machine elements and mechanisms



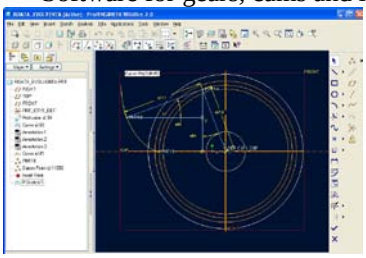
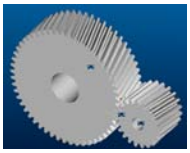
- tribological behavior of machine elements and mechanisms

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 MESAROŞ-ANGHEL
- Prof.dr.eng. Inocenţiu MANIU
- Prof.dr.eng. Arjana DAVIDESCU
- Assoc.prof.dr.eng. Francisc IOANOVICI
- Assoc.prof.dr.eng. Erwin-Christian LOVASZ
- Assoc.prof.dr.eng. Iosif CĂRĂBAŞ
- Assoc.prof.dr.eng. Mircea DREUCEAN
- Assoc.prof.dr.eng. Veronica ARGEŞANU
- Assoc.prof.dr.eng. Carmen STICLARU
- Assist.eng. Ioan COŢA
- Lect. Dr.eng. Angela DREUCEAN
- Lect. Dr.eng. Dan MĂRGINEANU
- Lect. Dr.eng. Andreea DOBRA
- Lect. Dr.eng. Rodica MILITARU,
- Lect. Dr.eng. Mihaela JULA,
- Assist.eng. Adriana TEODORESCU.

RESEARCH OFFERS

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

Researches in *ROBOTICS AND MECHATRONICS*

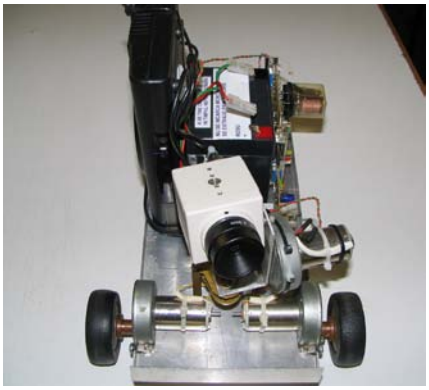
FIELD DESCRIPTION

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

ACTIVITIES AND RESULTS

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

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




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

RESEARCH TEAM
- Prof.dr.eng. Francisc KOVACS
- Prof.dr.eng. George SAVII
- Prof.dr.eng. Corneliu RĂDULESCU
- Prof.dr.eng. Valer DOLGA

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

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

Researches in *PRECISION MECHANICS*

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

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

RESEARCH BENEFICIARES
Direcţia Sanitară Judeţeană Timiş, S.C. Optica Timişoara, INCDMF Bucureşti, Ministry of National Education (CNCSIS), Siemens Automotive VDO.

RESEARCH TEAM
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- Prof.dr.eng. Ioan NICOARĂ
- Prof.dr.eng. Alfred POMMERSHEIM
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- Assoc.prof.dr.eng. Nicolae DEHELEAN
- Lect. Dr.eng. Marius MATEAŞ
- 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. Davidescu A. *Statistical process control. Matlab aplications*, 238 pages, Politehnica

Publishing House, Timisoara, 2007, ISBN 978-973-625-553-3;
2. Madaras L., Argesanu V., Luchin M., Radu A. *Machine parts*, part.3, 192 pages, Eurostampa Publishing House, Timisoara, 2007, ISBN 973-687-307-2, 978-973-687-588-5;
3. Dolga V. *Mechatronics systems design*, 472 pages, Politehnica Publishing House, Timisoara, 2007, ISBN 978-973-625-573-1;
4. Ianosi E. *Water treatment principles used in dialyses process*, 197 pages, Politehnica Publishing House, Timisoara, 2007, 978-973-625-304-1;
5. Savii G. *Evaluation of methods and tools for knowledge representation*, 130 pages, Eurostampa Publishing House, Timisoara, 2007, ISBN 978-973-687-643-1;
6. Luchin M. *Use and programming PC*, Eurostampa Publishing House, Timisoara, 2007, 330 pages, ISBN 978-973-687-601;

PUBLISHED PAPERS

1. Dolga V., Dolga L. *The principles of analitycal mechanics applied to the dynamical analysis of the mechatronic systems*, 2nd Int. Confererence Comp. Mechanics and Virtual Engineering, COMEC 2007, pp. 221;
2. Gillich G.R. Berinde F.C. Potoceanu N., Gruescu C., *Considerations regarding pollution with noise and vibration due to industrial sources*, 10th Int. Conference on Environmental Science and Technology, CEST 2007, Kos Island, Greece, pp. B-213-B220;
3. Ianosi E. *Proposal for a simplified model for project stages used in project management Interdisciplinarity in Engineering*, Inter-Ing 2007, Târgu Mures, ISSN 1843-780X, 2007, pp. II3-1 - II3-6;
4. Ianosi E. *Principles and methods for evaluation of the quality management systems Interdisciplinarity in Engineering*, Inter-Ing 2007, Târgu Mures, ISSN 1843-780X,2007, pp. II4-1 - II4-6;
5. Ianosi E. *Medical applications of ultrasound based measurement methods*, INGIMED 2007, Bucharest, ISBN 973-8408-11-3, pp. 31-34
6. Ianosi E. *Indicateurs de qualite en dialyse. Methodes de mesure*, INGIMED 2007, Bucharest, ISBN 973-8408-11-3, pp. 35-38
7. Popa M., Moica C., Popa A., Mnerie D. *Hierarchical ad hoc networks*, IEEE Region 8, International Conference on „Computer as a Tool", IEEE Catalog No. 07EX1617C, ISBN 1-4244-0813-X, pp. 223-230;
8. Popa M., Popa A., Slavici T. , L. Silaghe *On the Implementation of the OSEK/VDX Operating System On Advanced Microcontrollers*, IEEE Region 8, Int. Conference on „Computer as a Tool", IEEE Catalog No. 07EX1617C, ISBN 1-4244-0813-X, pp. 153-160;
9. Radulescu C. *The Structural Synthesis of Parallel Robots* Annual Session of Scientific Papers "IMT Oradea - 2007" Oradea, Felix SPA, Romania, pp. 785-791, ISSN 1583-0691;
10. Vatau S., Varga S., Radulescu C. *Algorithms for the quadruped mobile robot locomotion system configuration*, 2nd Int. Scientific Meeting "Optimization of the Robots and Manipulators" OPTIROB 2007, Predeal, pp. 161-167, ISBN 978-973-648-656-2;
11. Dreucean M., Stoia I. *Fabrication of Medical Devices Using Rapid Prototyping (Rp) Technologies Based on Metal Powder*, 33rd Jupiter Conference, Zlatibor, Serbia, ISBN 978-86-7083-593-1, pp. 3.100-3.105;
12. Popescu M., Marta C., Argesanu V., Jula M., Ţunea D., Câneparu P. *Problems Associated with PEHD Welding*, Internatioal Conference on Material Science and Engineering, BRAMAT 2007, Welding Engineering, pp. 13-18, ISBN 973-635-454-7;
13. Ciupe V., Maniu I. *Small Scale Stand for Testing Different Control Algorithms on Assisted Brake Systems* Proceedings 12th World Congress in Mechanism and Machine Science, IFTOMM 2007, vol.4, pp 339-343;
14. Dolga V., Dolga L. *The education in Mechatronics at the „Politehnica" University of Timişoara, between tradition and the Bologna declaration* 12th IFToMM World Congress, Besançon, France;
15. Gruescu C., Nicoara I., Popov D. *Optical Glass Compatibility for the Design of Apochromatic Systems* VIIth Physics and Technology of Materials FITEM '07, Poster Session, Čačak, Serbia, ISBN, pag. 123-130;
16. Gillich G.R., Berinde F.C., Potoceanu N., Gruescu C. *Considerations regarding pollution with noise and vibration due to industrial sources*, 10th Int. Conference on Environmental Science and Technology, 10CEST 2007, Kos Island, Greece, pp. B-213-B220;
17. Lovasz E.-C., Modler K.-H., Perju D., Neumann R., Margineanu D., Perner M. *Non-circular gear wheels in the geared-linkages mechanisms*, 12th IFToMM World Congress, Besançon, France, vol. 3, pp. 284-289;
18. Lovasz E.-C., Modler K.-H., Perju D., Neumann R., Margineanu D., Perner M. *On the 3D crawling mechanical structures* 12th IFToMM World Congress, Besançon, France, vol. 3, pp. 302-307;
19. Mateas M., Vacarescu V., Lovasz E.-C., Nemes I.D.A., Micea M. *About a new method for the 3D determination of the human spine geometry* 12th IFToMM World Congress, Besançon, France, vol. 1, pp. 300-305
20. Varga S., Radulescu C. *A New Unitary Synthesis Method of Line Generator*

Mechanisms for Flexible Manufacturing Systems Devices 12th IFToMM World Congress, Besançon, France, vol. 5, pp. 441-446;
21. Davidescu A., Sticlaru C. *Studies by Finite Element Method of some Devices for Treatment of Intertrochanteric Fractures* 12th IFToMM World Congress, Besançon, France, vol. 1, pp. 112-117;
22. Sticlaru C., Davidescu A. *Comparative Study of Fixation Devices for Intertrochanteric Fractures* 12th IFToMM World Congress, Besançon, France, vol 1, pp. 118-123;
23. Radulescu C., Varga S., Grigorescu S. *Calibrating procedure by teach-in Robotized flexible manufacturing system* 18th` International DAAAM SYMPOSIUM, "Intelligent Manufacturing & Automation: Focus on Creativity, Responsibility and Ethics of Engineers", pp. 353-360;
24. Neidenbach N., Wolf E., Savii G. *Contributions to IT Security in Outsourcing Proceedings of the 11th WSEAS International Conference on COMPUTERS*, Agios Nikolaos, Crete Island, Greece, pp. 548-551;
25. Popa M., Popa A. *Programmable Signal Generator Based on Advanced Tricore Microcontrollers*, IEEE International Conference on Signal Processing and Communications, 2007, pp. 356-360;
26. Maniu I., Ciupe V. *Robotics, directions for research, development and innovation*, Annals of the Oradea University, Fascicle Management and Technological Engineering, Vol. VI (XVI), pp. 915-920, ISBN 1583-0691;
27. Dobra A. *Software proposal for cutting corrugated boxes*, Annals of the University of Oradea, vol VI(XVI), 2007, pp. 1221-1226, ISBN 1583-0691;
28. Dobra A. *Proposal type of database for robot end effectors application and accessibility variant*, Robotica & Management vol. 11, 13-16, ISSN 1453-2069;
29. Dolga V., Dolga L. *Modelling and simulation of a magnetic levitation system* Annals of the Oradea University, Fasc. Manag. and Tech. Eng., vol. VI(XVI), pp. 1118, ISSN 1583-0691
30. Dolga V., Dolga L. *Modelling, simulation and virtual instrumentation in mechatronics* Annals of the Oradea University, Fasc. Manag. and Tech. Eng., vol. VI(XVI), pp. 1108, ISSN 1583-0691;
31. Fenchea M. *Consideration about suspension systems*, Annals of the University of Oradea, Fascicle of Management and Technological Engineering, Vol VI(XVI), CD-ROM Edition, pp. 420-422, ISBN 1583-0691;
32. Fenchea M., Fenchea S. *Informatic system of patient management of dental surgeries* Annals of the University of Oradea, Fascicle Management and Technological Engineering, Vol VI(XVI), CD-ROM Edition, pp. 2418-2422, ISSN 1583-0691;
33. Costache M., Gruescu C. *A critical view concerning image erectors*, Scientific Bulletin of UPT, Trans. on Mathematics & Physiscs, Tom 52(66), Fasc. 1, 2007, pp. 97-105, ISSN 1224-6069;
34. Bodea R., Ionescu C., Gruescu C. *Design of a co2 laser (10.6mm) optical system* Annals of the Oradea University, Fasc. of Management and Technological Engineering, vol. VI(XVI), 2007, CD-ROM edition, pp. 2657-2666, ISSN 1583-0691;
35. Ianosi E., Lovasz E.-C., Vacarescu V., Mateas M. *Proposal for force limitation system applied in the human column measurement* Acta Electrotehnica, vol 48, 2007, pp. 165-168, ISSN 1841-3323;
36. Mateas M., Ianosi E. *Proposal for an experimental stand applied in the testing process of the technical parameters in the dental interventions* Acta Electrotehnica, vol. 48, 2007, pp. 119-122, ISSN 1841-3323;
37. Mateas M., Lovasz E.-C., Vacarescu V., Ianosi E. *Proposal for a situation system for spinal column 3D geometry determination* Acta Electrotehnica, vol. 48, 2007, pp. 169-172 ISSN 1841-3323;
38. Neidenbach N., Wolf E., Savii G. *ITIL Grundstruktur und Basiselemente* Scientific Bulletin of the "Politehnica" University of Timişoara, Trans. on Management, Economic Engineering, Transportation Engineering, Tom 52(66), 2007, Fasc. 1, pp. 17-28, ISSN 1224-6050;
39. N. Norbert, Wolf E., Savii G. *Optimierung des Outsourcing* Scientific Bulletin of the "Politehnica" University of Timişoara, Trans. on Management, Economic Engineering, Transportation Engineering, Tom 52(66), 2007, Fasc. 1, pp. 29-40, ISSN 1224-6050;
40. Neidenbach N., Wolf E., Savii G. *Key Performance Indicator im IT-Servicemanagement mit ITIL*, Scientific Bulletin of the „Politehnica" University of Timisoara, Transactions on Mechanics, Tom 52(66), Fasc. 5, 2007, pp. 89-96, ISSN 1224-6077;
41. Neidenbach N., Wolf E., Savii G. *IT-Outsourcing: Strategien im Zeitalter der Globalisierung*, Scientific Bulletin of the „Politehnica" University of Timisoara, Trans. on Mechanics, Tom 52(66), Fasc. 5, 2007, pp. 139-146, ISSN 1224-6077;
42. Gruescu C., Nicoară I. *Closed-loop transmission test stands – specific parameters and optimization*, Review of mechanical engineering and electrotechnics, Sofia, Bulgaria, nr. 12, pp. 64-67, ISSN 0025-455X;

43. 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, nr. 12, pp. 68-71, ISSN 0025-455X;
44. Popa M., Popa A., Ciocarlie H. *Mobile Telephony with Pocket PC`s Phone Edition*, WSEAS Transactions on communications, Issue 1, vol. 6, pp. 125-130, ISSN 1109-2742;
45. Popa M., Popa A., Cretu V., Micea M. *Centralized Management System For Mobile Communications With Pocket PCs*, in Innovations and Advanced Techiques in Computer and Information Sciences and Engineering; Editor Tarek Sobh, pp. 327-332, indexed SpringerLink Database, Netherlands; 2007, ISBN 978-1-4020-6267-4;
46. Vatau S., Rădulescu C. *Mobile Robot - Path Planning in a Dynamic Environment*, Int. Journal Robotica & Management, Vol. 12, No. 1, June 2007, pp. 7-10, ISSN 1453-2069;
47. Vatau S. *Kinematic modelling for a walking robot's leg with pair of reference system method* Annals of the Oradea University, Fascicle of Management and Technological Engineering, Vol. VI (XVI), CD-ROM edition, May 2007, pp. 1096-1101, ISSN 1583-0691;
48. Davidescu A., Sticlaru C., Antonie S., Sinescu C., Bratu D. *The influence of the implants geometry upon stress and strain state of a prosthesis over implants* Acta electrotecnica Cluj Napoca, vol. 48, pp. 287-290, ISSN 1841-3323;
49. Sticlaru C., Davidescu A., Antonie S., Sinescu C., Bratu D. *Finite element model of prosthesis over implants* Acta electrotecnica Cluj Napoca, vol. 48, pp. 291-295, ISSN 1841-3323;
50. Vatau S., Cioi D., Radulescu C. *Mechanical design of a hip joint for an anthropomorphic leg* 18th International DAAAM Symposium "Intelligent Manufacturing & Automation: Focus on Creativity, Responsibility and Ethics of Engineers", Croatia, Zadar, pp. 801-802, ISSN 1726-9679, ISBN 3-901509-58-5;
51. Cioi D. *A Java3d Application for Visualization and Deformation of Cad Models in Virtual Reality* 18th International DAAAM Symposium "Intelligent Manufacturing & Automation: Focus on Creativity, Responsibility and Ethics of Engineers", Croatia, Zadar, pp. 153-154, ISSN 1726-9679, ISBN 3-901509-58-5;
52. Ciupe V., Maniu I. *Flow Control Capabilities of A Standard Pneumatic Vlave* Proceedings 18th International DAAAM Symposium, "Intelligent Manufacturing & Automation: Focus on Creativity, Responsibility and Ethics of Engineers", pp. 159-160, ISSN 726-9679, ISBN 3-901509-58-5;
53. Maniu I., Ciupe V. *The Department of Mechatronics at UPT. Present and Perspectives in Research, Development and Innovation* Proceedings 18th International DAAAM Symposium, "Intelligent Manufacturing & Automation: Focus on Creativity, Responsibility and Ethics of Engineers", pp. 435-436, ISSN 1726-9679, ISBN 3-901509-58-5;
54. Dolga V., Dolga L. *Design, evaluation and optimization in mechatronics* 18th Int. DAAAM Symp. „Intelligent Manufacturing & Automation: Focus on Creativity, Responsability and Ethics of Engineers", pp. 245-246, ISSN 1726-9679, ISBN 3-901509-58-5;
55. Dolga V., Dolga L. *The analysis of a magnetic levitation system* 18th Int. DAAAM Symp. „Intelligent Manufacturing & Automation: Focus on Creativity, Responsability and Ethics of Engineers", pp. 247-248, ISSN 1726-9679, ISBN 3-901509-58-5;
56. Dolga L., Dolga V., Filipescu H. *Rapid prototyping within the simulation and control platform for mechatronics* 18th Int. DAAAM Symp. „Intelligent Manufacturing & Automation: Focus on Creativity, Responsability and Ethics of Engineers", pp. 243-244, ISSN 1726-9679, ISBN 3-901509-58-5;
57. Dolga L., Dolga V., Filipescu H. *Considerations about the modelling and simulation processes for mechatronic systems* 18th Int. DAAAM Symp. „Intelligent Manufacturing & Automation: Focus on Creativity, Responsability and Ethics of Engineers", pp. 241-242, ISSN 1726-9679, ISBN 3-901509-58-5;
58. Popa M., Popa A., Patitoiu C. *A Web Connected Smart Sensor* IEEE Trans. 2007, ISBN 978-4244-1234-1;
59. Radulescu C., Varga S., Grigorescu S. *Calibrating procedure by teach-in Robotized flexible manufacturing system* 18th International DAAAM Symposium "Intelligent Manufacturing & Automation: Focus on Creativity, Responsibility and Ethics of Engineers", Croatia, Zadar, pp. 631-632, ISSN 1726-9679, ISBN 3-901509-58-5.

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 Inocenţiu, Value for 2007: 300,000 lei;
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. Savii George, Value for 2007: 130,000 RON

3. *Skill-based Inspection and Assembly for Reconfigurable Automation Systems*, FP6/ NMP2-CT-2005/017146, Director: Prof. dr. eng. Savii George, Value for 2007: 20,000 EUR;
4. *Virtual Reality For Computer Aided Design* CNCSIS 2739 / 19.05.2006 Director: dr. eng. Cioi Daniel, Value for 2007: 15,000 lei;
5. *Simulation, Control and Testing Platform with applications in mechatronics (ConMec)* 112 CEEX II 03/2007, Director: Prof.dr.eng. Dolga Valer, Value for 2007: 94,000 lei;
6. *Intelligent CAD Methods used for customized design of bone system deficiency corrections* CNCSIS 2739 /19.05.2006 Director prof. dr. eng. Davidescu Arjana, Value for 2007: 29.200 lei;
7. *Objective analyse system for locomotory handicap* CNCSIS cod 656 Director assist. prof.dr.eng. Dreucean Mircea, Value for 2007: 43.500 lei
8. *Virtual Reality Colaborative Environment for orthopedical preoperatory planning* CEEX 114 / 15.09.2006 assist. prof. dr. eng. Dreucean Mircea, Value for 2007: 49,810 lei
9. *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 2007: 380,000 lei;
10. *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 89 Director: prof.dr.eng. Maniu Inocenţiu, Value for 2007: 33,500 lei;
11. *Development of an informatics platform for potential characterization of fine mechanics, Mechatronics and automation branches, regarding the increase of competitiveness and optimization of specific activities – development of a collaborative environment* IPCPMMA CEEX 105 Director: prof.dr.eng. Maniu Inocenţiu, Value for 2007: 20,000 lei;
12. *Workplace ergoengineering – aplications in dental medicine* PNCDI Director Assist. prof. dr. eng. Argesanu Veronica, Value for 2007: 285,250 lei;
13. *Advanced design in proEnginner* contract no. 655/16.04.2007 with Siemens Automotive, Director Assist.prof.dr.eng. Sticlaru Carmen, value for 2007: 6,400 euro
14. *Assistance in advanced AutoCAD design* with Maerz Ofenbau SRL, no.713/13.07.2007, no.714/13.07.2007,795/05.12.2007, Director: drd.eng. Vatau Steliana, value for 2007: 4,800 lei
15. *Constructive-functional optimization for quadruped walking robot* 46GR/11.05.2007, drd.eng. Vatau Steliana, value for 2007: 15,000 lei;

PhD STUDENTS

1. Craciun Mihaela Daciana: *Information System for Credit Soliciting Companies Evaluation*, scientific supervisor: Prof.dr.eng. George Savi
2. Şerban 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.

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

GENERAL PRESENTATION

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

- Thermal machines and equipment
- Environmental protection
- Transport vehicles

The research team includes the members of the founding chairs:

- ✓ Chair of Thermodynamics, Thermal Machines and Road Vehicles
- ✓ Chair of Transportation Engineering,

as well as associated researchers and PhD & master students.

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

CONTACT

Director: Prof. Dr. eng. habil Ioana IONEL

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MISSION

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

Researches in *INTERNAL COMBUSTION ENGINES (ICEs) AND FUEL CELLS*

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

Activities:

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

RESEARCH PROJECTS

1. CEEX grant AMTRANS, Contr. No. X1CO1 / 2007, *The possibilities and limitations of the ecologisation of urban traffic using fuels obtained from vegetable oils*, Director UPT (Partner): Assoc.prof.dr.eng. Liviu Mihon, Value: 27,000 RON
2. Contract CEEX 108/ 10.10 2005 (EmSHIPs): *"Research regarding the control assessment systems emissions produced by naval transportation devices. Phase 2: Emission modelling and emissions analysis*. Director: Lect. Dr.eng Gelu Padure, Prof.dr.eng. Ioana Ionel, value 2007: 20,760 RON

PUBLICATIONS

PUBLISHED PAPERS

1. Pădure G., *Naval transportation and environmental protection*, Simpozionul Internaţional „Omul şi mediul" ediţia a V-a, în cadrul „Zilelor Academice Timişene – ed. A X-a, Timişoara, 24.05.2007, ISBN: 978-973-687-555-7
2. R. Thuma, G. Pădure, V.D. Negrea, *Car and the pollution standard limits*, Simpozionul Internaţional „Omul şi mediul" ediţia a V-a, în cadrul „Zilelor Academice Timişene – ed. A X-a, Timişoara, 24.05.2007, ISBN: 978-973-687-555-7
3. Pădure G., Raţiu S., *The influence of the ambient pressure on NOx emissions produced by the diesel engine*, A VII-a Conferinţă Naţională multidisciplinară cu participare internaţională „Profesorul Dorin Pavel – fonadatorul hidroenergeticii româneşti", Sebeş, 1-2 iunie 2007, Ed. AGIR, „Ştiinţă şi Inginerie" – vol. 11, pag. 459-464, ISBN: 973-8130-82-4; 978-973-720-123-2.
4. Ostoia D., Negoiţescu A. S, *The study of Radiation Transfer Process in Diesel Engines* Conferinţa Naţională de Termotehnică cu participare Internaţională, Ediţia a XVI-a, ISBN 1843-1992, Ploieşti, mai-iunie, 2007
5. Negoiţescu A. S., Ostoia D *Aspects concerning cogeneration modern methods involving gas turbines whit inverse respective indirect cycle* Conferinţa Naţională de Termotehnică cu participare Internaţională, Ediţia a XVI-a, ISBN 1843-1992, Ploieşti, mai-iunie, 2007
6. Negoiţescu A.S., Ostoia D. *Considerations Regardings the Stirling Engine in Combined Heat and Power Plants* Simpozionul Internaţional Omul şi Mediul, Ediţia a V-a, ISBN: 978-973-687-555-7, 24 mai 2007
7. V.D. Negrea. N. Uricanu, Ostoia D. *Audi Q7 Hybrid: The Clean Way to High Performance*

Simpozionul Internaţional Omul şi Mediul, Ediţia a V-a, ISBN: 978-973-687-555-7, 24 mai 2007

8. D. Iorga, I. Vrabie, L. Mihon, A. Irimescu, *Researches regarding behaviour of the nozzle's with modified holes for a high power Diesel engine* Acta Technica Napocensis, Seria Mecanica, Tom 50, Vol IV, ISSN 1221-5872, pag 102-105
9. Irimescu, D. Iorga, L. Mihon *Study of the intake air properties influence on the fuel injected mixture formation in a spark ignition engine using the i-x air-gasoline diagram* Acta Tehnica Napocensis, Seria Mecanica, Tom 50, Vol IV, ISSN 1221-5872, pag 110-113
10. L.Mihon *Modelling Elements for the Braking Systems with ABS*, Acta Tehnica Napocensis, Seria Mecanica, Tom 50, Vol IV, ISSN 1221-5872, pag 181-188.
11. D.Mihon, L.Mihon M.Jadaneant *Necessity for a sustainable transport system*, Acta Tehnica Napocensis, Seria Mecanica, Tom 50, Vol IV, ISSN 1221-5872, pag 443-448.

PhD THESIS

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

PERSPECTIVES

Development of the Laboratory for Processes in Internal Combustion Engines

Development of the Multifunctional Lab for Road Vehicles

PhD STUDENTS

PhD Superviser: Prof.dr.eng. Virgiliu Dan Negrea

1. Sandu IONESCU: *Studies and researches regarding the heat transfer enhancement in heat exchangers with discontinuous fins*
2. Liviu Mircea POINARIU: *Studies and researches regarding the conditions and accuracy of measurement of the performance parameters for electronically controlled spark-ignition engines*
3. Cristian Dumitru BOZAN: *Researches regarding the performance control level for a supercharged diesel engine by the improvement of intermediate cooler constructive and operational characteristics*
4. 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*
5. Radu THUMA BRANZEAZU: *Contributions regarding the pollutants control for very high pressure direct injection diesel engine*
6. Radu MARIAN: *Researches regarding the low power diesel engines performances with the use of double injection*
7. 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*
8. 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*
9. 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*
10. 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*
11. Adriana TOKAR: *Researches regarding the interaction between the automobile equipped with internal combustion engine and the environment*
12. Alexandra Ana GARBONI: *Researches regarding the implications of harmful factors on the environment quality in the western part of Romania*
13. Lucian Ioan RAFAN: *The phenomenon accident in correlation with the environment protection*
14. Silviu Vasile PONORAN: *Road traffic and environmental pollution*

PhD Supervisor: Prof.dr.eng. Daniel IORGA

1. Cristian NEGHINA: *Contributions regarding the optimization of the methods and techniques used to raise the quality level in the criminological activities through the thermo-mechanical control of ballistics*
2. 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. 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. Daniel PICIOREA: *Contributions to the adjustment of an injection system to use unconventional liquid fuels for a direct injection diesel engine*
5. Ludovic BAKOS: *Contributions to the analysis of the causes and effects of the road accidents from Arad county and methods of limiting it*
6. 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 Speranţa NEGOIȚESCU
- Assist. eng. Virgil STOICA, PhD student
- Assist.eng. Daniel OSTOIA, PhD student
- Eng. Lăcrămioara Suzana PETRUȚESC-BOARU, PhD student
- Eng. Adriana TOKAR, PhD student
- Eng. Ileana NEGREA, PhD student
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Researches in *COMBUSTION PROCESS & COMBUSTION FACILITIES FOR CLASSIC AND RENEWABLE FUEL SOURCES,, TECHNOLOGIES FOR THE REDUCTION OF POLLUTING IMPACT OF THE THERMAL MACHINES AND VEHICLES ON THE ENVIRONMENT, AIR QUALITY* MONITORING

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

ACTIVITIES

- Environmental on line measurements, with attested methods (emissions and air quality), in real time data acquisition for CO, SO2, NOx, 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 plats), 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. *Sampling methods for on-line analysis of the concentrations of the solid and gaseous pollutants*, SC CELROM Drobeta Turnu Severin nr. 1230/2006-2007, Director: Prof.dr.eng.habil Ionel Ioana
2. *Technologies for burning and treatment of the flue gas from the biomass incineration,*

Comunitatea Europeana CT SES6-CT-020007 Director: Prof.dr.eng.habil Ionel Ioana

3. *Sampling methods for on-line analysis of the concentrations of the solid and gaseous pollutants*, RAAN Halanga nr. 1207/2003 si nr. 6/2007 Director: Prof.dr.eng.habil Ionel Ioana
4. *Sampling methods for on-line analysis of the concentrations of the solid and gaseous pollutants*, SC BERG BANAT SRL nr.700/02.07.2007 Director: Prof.dr.eng.habil Ionel Ioana
5. *Sampling methods for on-line analysis of the concentrations of the solid and gaseous pollutants*, COCA COLA HBC Romania SRL, Timişoara 725/01.08.2007 Director: Prof.dr.eng.habil Ionel Ioana
6. *Sampling methods for on-line analysis of the concentrations of the solid and gaseous pollutants*, SC TRW Automotive Safety Systems, Timisoara 691/22.06.2007 Director: Prof.dr.eng.habil Ionel Ioana
7. *Sampling methods for on-line analysis of the concentrations of the solid and gaseous pollutants*, Alto Gradimento SRL, 664/2007 Director: Prof.dr.eng.habil Ionel Ioana
8. *Specific methods for evaluation of the gas and solid emissions*, SC Drumuri Municipale Timisoara, 1232/2007, Director: Prof.dr.eng. habil Ionel Ioana
9. *Sampling methods for on-line analysis of the concentrations of the solid and gaseous pollutants*, SC Europlastic Timisoara 1231 / 2007, Director: Prof.dr.eng.habil Ionel Ioana
10. *Theoretical and experimental research on air quality assessment in the west part of the Timisoara county*, Primaria mun. Timisoara 1233/2007, Director: Prof.dr.eng.habil Ionel Ioana
11. *Sampling methods for on-line analysis of the concentrations of the solid and gaseous pollutants*, SC Hella Electronics Timisoara 589/2007 Director: Prof.dr.eng.habil Ionel Ioana
12. *Experimental set-up for energy evaluation of the cogeneration plant*, European Community, COLL/CT/2005/012566 Director: Prof.dr.eng. habil Ionel Ioana
13. *Methods and technologies for continuous analysis of the solid and gaseous pollutants from the flue gas produced from the burning of the lignite*, C.E.T. Arad nr. 3/2007 Director: Prof.dr.eng.habil Ionel Ioana
14. *Clean technologies development for the coal based energy production*, Ministerul Educatiei, Cercetarii si Tineretului TECEBAC nr. CEEX 12233 Director: Prof.dr.eng.habil Ionel Ioana
15. *Set-up for visualization and data reduction of the pollutant measurements results*, Ministerul Educatiei, Cercetarii si Tineretului EmSHIPS nr. CEEX 12232 Director: Prof.dr.eng.habil Ionel Ioana
16. *Standard and non-standard comparative methods for major pollutant measurements in the air (CO, NOX, SO2, O3, VOC, particles)* MEdCT, CEEX 9064 Director: Prof.dr.eng.habil Ionel Ioana
17. *Investments optimization of the greenhouse through economical numerical modeling*, Ministerul Educatiei, Cercetarii si Tineretului CORINT Nr 89 Director: Prof.dr.eng.habil Ionel Ioana
18. *Sampling methods for on-line analysis of the concentrations of the solid and gaseous pollutants*, Metalimpex Arad, 717/19.07.2007 Director: Prof.dr.eng.habil Ionel Ioana
19. *Sampling methods for on-line analysis of the concentrations of the solid and gaseous pollutants*, OMV ICPET ECO Bucuresti 690, Director: Prof.dr.eng.habil Ionel Ioana
20. *Romanian network of the systems LIDAR*, Ministerul Educatiei, Cercetarii si Tineretului PN II, Parteneriate, nr. 31-002/14.09.2007 Director: Prof.dr.eng.habil Ionel Ioana
21. *Thermal measurements regarding the air pollution impact produced by the plant for asphalt mixture production*, ADP Grup Colas SA 779/02.11.2007 Director: Prof.dr.eng.habil Ionel Ioana
22. *Thermal and chemical measurements in the frame of the authorization of the SC Aquacalor Sa Brad*, Nr 792/28.11.2007 Director: Prof.dr.eng.habil Ionel Ioana
23. *Experimental study regarding esterification of the waste fat sources and the environmental impact on the urban air quality, applied to Timisoara county*, CNCSIS, tip AT 46GR/11.05.2007, Tema 1, cod 59, Director: Lect. Dr.eng Francisc Popescu.
24. *Theoretical and experimental study regarding the execution of the semi-automatic installation for biogas production from the fat sources of the animal and vegetable origins*. CEEX-M2, 1427 / 24.03.2006, 2006-2008. Director: Lect. Dr.eng Francisc Popescu.

BOOKS

Ioana Ionel, Francisc Popescu, *Introduction to the engineering thermodynamics*, Politehnica Publishing House, Timişoara, 2007, ISBN 978-973-625-540-3

PUBLISHED PAPERS

1. Ioana Ionel *Experimental research concerning co-combustion Energie- und Umwelttechnik inder lebensmittelindustrie*, VDI Fortschritt Berichte Reihe 6, Energietechnik, Nr 547, pp 280-290.
2. Ionel Ioana, Ungureanu C., Popescu Fr., Bisorca D. *New trends and technologies in monitoring of the suspended particles PM10 and PM 2,5* Rev Buletinul AGIR, ISSN 1224-7928, Vol managementul integrat calitate-mediu-sanatate, An XI, nr1-2, ian-iunie 2006, pp 172-176
3. D. Cebrucean, Ioana Ionel., Al. Savu *Carbon dioxide capture from flue gases produced by combustion of fossil fuels with biomass* Bul. St. UPT, Seria Mecanica, Fascicola 4 / 2007, tom 52(66), ISSN 1224-6077, pp. 15-23.
4. Ionel Ioana, Carmencita Constantin, *Biomass utilization as energy source. Present achievements and perspectives at Politehnica University* Bul. St. UPT, Seria Mecanica, Fascicola 4 / 2007, tom 52(66), ISSN 1224-6077, pp. 32-40.
5. Ioana Ionel, Corneliu Ungureanu, Nicolae Lontis *Alternative fuels the energy of the future* Bul. St. UPT, Seria Electroenergetica, Tom 52(66), ISSN 1582-7194, pp. 311- 314.
6. Dumitru Cebrucean, Ioana Ionel, C Ungureanu, Luisa Izabel Dungan *Carbon dioxide separation from co-combustion process of fossil fuels with biomass* Bul. St. UPB, seria C Ing electrica, Bucuresti, Vol 69, NB 4, 2007, ISSN 1454-234x, pp. 441-448.
7. Ionel Ioana, Trif Tordai G, A Tenchea, D Cebrucean, A Savu *Experimental results on co-combustion of pit coal with agricultural biomass* Bul. St. al UPB, seria C Ing electrica, Edit Politehnica Press, Bucuresti, Vol 69, NB 4, 2007, ISSN 1454-234x, pp. 453-440.
8. PD Oprisa Stanescu, Ioana Ionel, V Gruescu, G Trif Tordai, C Ungureanu *Computational case study of biomass co-combustion in a pilot fluidized bed reactor* Bul. St. al UPB, seria C Ing electrica, Edit Politehnica Press, Bucuresti, Vol 69, NB 4, 2007, ISSN 1454-234x, pp. 383-390.
9. Ioana Ionel, Popescu Fr, Trif Tordai G, C Ungureanu, Al Savu, DI Ciolea, C Constantin *Experimental results concerning flue gas cleaning technologies applying SNCR and combined methods* Bul. St. al UPB, seria C Ing electrica, Edit Politehnica Press, Bucuresti, Vol 69, NB 4, 2007, ISSN1454-234x, pp. 375-382.
10. Francisc Popescu, Ioana Ionel, Corneliu Ungureanu, Catinca Golesteanu *Impact of the point and area pollutant sources on air quality in the city of Timisoara*, Bul.St.UPT, Seria Electroenergetica, Tom 52(66), ISSN 1582-7194, pp. 535- 542.
11. Adina Cirtog, Sadanari Mochizuki, Akira Murata, Ioana Ionel, *Heat transport device with phase change using two parallel tubes*, Thermal Science and Engineering, Vol. 15, No. 4, 2007, pp. 241-244. ISSN 0918-9963.
12. Cardu M., Ionel I., Ungureanu, C. *Combined nuclear and conventional plant, operating on hydrogen, according to Rankine cycle* Revue Roumaine des Sciences Techniques Serie Electrotechnique et Energetique, 2007, VOL 52; PART 1, pages 105-120, ISSN 0035-4066.
13. Ionel I., Ionel S., Nicolae D. *Correlative comparison of two optoelectronic carbon monoxide measuring instruments* Journal of Optoelectronics and Advanced Materials 9 (11), p. 3541-3545 (ISI) 1454-4164
14. Francisc Popescu, *Biodiesel, waste fats transesterification. Reduction of the urban pollution through the use of Biodiesel* Scientific Bulletin of the „Politehnica" Univ. of Timişoara, Transactions on Mechanics, Tom 52(66), fasc. 4, ISSN 1244-6077, Timişoara, Romania, 2007.
15. Francisc Popescu, Ioana Ionel, Roland Meyer-Pittroff, *Alternative Fuel for Internal Combustion Engines. Biodiesel, Transesterification of Animal Fats with High FFA* Proceedings 15th European Biomass European Conference - From Research to Market Deployment, Berlin, Germany, 7-11 May 2007, ISBN 978-88-89407-59-X, ISBN 3-936338-21-3, pp 2031-2034.
16. Francisc Popescu, *Alternative fuels from waste fats with free fatty acid content International Conference on "Quality of life and environmental in the frame of E.U. sustainability"*, pp. 29, 15-17.11.2007, Belgrade, Serbia, ISBN 978-86-82121-46-6.
17. Popescu Francisc, *Advantages in the use of biodiesel in an urban fleet. Case study: major crossroads in Timisoara city. Sustainable Development in Balkan Area: Vision and reality*. Proceedings of the Conference B.EN.A – ICAI 2007, 18-20 july Alba Iulia, Aeternitas publishing house, ISBN 978-973-7942-88-3, Alba Iulia 2007, pp 80

PhD THESIS

Lelia DOBJANSCHI: *Contributions regarding the share of ROMAG-TERMO Turnu Severin coal Power Plant to the zonal pollution and measures*

for reducing it, PhD. supervisor: Prof.dr.eng. Corneliu Ungureanu

PhD STUDENTS

PhD supervisor: Prof.dr.eng. Corneliu Ungureanu

1. Alexandru Anghel C. GHENEA: *Contributions to the study of efficiency measures regarding the durable development of Işalniţa Power Plant*
2. Florica TUDOR: *Contributions regarding the diminution of environmental pollution due to the ash produced at the lignite combustion at Turceni Power Plant*
3. Marius MARIN: *Contributions regarding the diminution of environmental pollution due to gaseous pollutants produced due to the lignite combustion at Turceni Power Plant*
4. Vasile GRUESCU: *Contributions regarding the energo-technology of domestic and street waste*
5. Adrian Iulian TENCHEA: *Contributions regarding the research of the biomass combustion in fluidized bed*
6. Victor EBETIUC: *Studies and researches regarding the efficient production and distribution of thermal energy in Turnu Severin city*
7. Marian Gabriel MILI: *Contributions regarding the modernization of existing energetic units using the combined cycle steam-gas with parallel disposition*
8. 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*
9. Ina Liliana VODISLAV (BLIDEA): *Contributions regarding the ecological utilization of the rubber waste*

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

1. 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. Lucia VARGA: *Studies and researches regarding the air quality in Bihor county*
3. 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. 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. Adrian GOANŢĂ: *Theoretical and experimental researches regarding the thermal and gasodynamic processes from the combustion chambers*
6. Adina CÎRTOG: *Heat transport device with phase change, using one way parallel tubes*
7. Carmencita CONSTANTIN: *Contributions to the elaboration of a technical and economic strategy regarding the durable development of the urban heat generation sector*
8. Gavrilă TRIF-TORDAI: *Researches regarding the combined burning of combustible wastes with low quality coal*
9. Nicolae GIORGI: *Theoretical and experimental researches regarding the elaboration of the environment surveys for Tg. Jiu city*
10. Nicolae Stelian LONTIŞ: *Mechanical Engineering (Researches regarding the biodiesel as renewable fuel for small energy groups)*
11. Dan Simion STEPAN: *Mechanical Engineering (Researches regarding the reduction of vibrations, noise in transportation /railway vehicles)*
12. 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
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Researches in *ENHANCEMENT AND CONTROL OF HEAT AND MASS TRANSFER FOR THERMAL EQUIPMENTS AND ELECTRONIC COOLING, THERMAL NETWORKS*

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

ACTIVITIES

- researches regarding the 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
- optimization of urban thermal networks

RESULTS

RESEARCH CONTRACTS

1. *Research on performance evaluation of the circular heat exchangers made by S.C. RAAL S.A Bistrita* S.C. RAAL S.A Bistrita 756/11.10.2007 Director: Prof.dr.eng. Nagi Mihai, value: 10,000 RON.
2. *Experimental research on density changes of the LPG*, SISTEMGAS Timisoara 616/09.03.2007 Director: Prof.dr.eng. Nagi Mihai, value: 2,000 RON.
3. Contract No. A1/GR181/19.05.06, Theme 33, CNCSIS Code 665, *Researches regarding the utilization of magnetizable nanofluids as thermal fluid*, Director: Assoc.prof.dr.eng. Floriana D. Stoian, value: 18,500 RON
4. Contract No. 630/2007, *The energy analysis of the SIMCOR location of the BCA plant*, S.C. SIMCOR Oradea, value: 3,500 RON. Director: Prof.dr.eng. Mihai Jadaneant.

BOOKS

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2. D. Lelea, *Advanced numerical methods in thermal engineering*, Editura Politehnica, Editura Politehnica, 2007, 140 pages, ISBN 978-973-625-508-3.
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PUBLISHED PAPERS

1. Lelea D. *The conjugate heat transfer of the partially heated microchannels*, Heat and Mass Transfer (Springer) 44 (1), pp. 33-41, ISSN 0947-7411.
2. Gh. M. Mocuţa, M. Jădăneanţ, *Study regarding medium power boiler's energy saving potential* Scientific Bulletin of UPT, Tom 52(66), fasc.1, 2007, pp. 55-62, ISSN 1224-6077
3. Gh. M. Mocuţa, M. Jădăneanţ *Considerations regarding start sequence of independent combus-tion heaters for motor vehicles, in the scope of its automatization* Acta technica Napocensis Series: Applied Mathematics and Mecha-nics 50, Vol.IV, 2007, pp. 307-312, ISSN 1221-5872
4. D. Mihon, L. Mihon, M. Jădăneanţ, *Necessity for a sustainable transport system* Acta technica Napocensis Series: Applied Ma-thematics and Mechanics 50, Vol. IV, 2007, pp. 443-448, ISSN 1221-5872
5. M. Vartolomei, M. Jădăneanţ, *Posibilities for enhance the Romanian military transport management in OTAN context*, Scientific Bulletin of UPT, Transactions on Mechanics, Tom 52(66), fasc. 7, 2007, pp. 165-170, ISSN 1224-6077
6. M. Vartolomei, M. Jădăneanţ, *The management of quality in transport field*

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7. M. Poparad, M. Jădăneanţ, *Depolution technologies in the benefit of mankind, Exhaust gas treatment with the help of SCR system*, Scientific Bulletin of UPT, Transactions on Mechanics, Tom 52(66), fasc. 7, 2007, pp. 221-224, ISSN 1224-6077.
8. L. Călin, M. Jădăneanţ, N. Lontiş *Gasification of the wood biomass- energy source* Scientific Bulletin of UPT, Transactions on Mechanics, Tom 52(66), fasc. 7, 2007, pp. 231-234, ISSN 1224-6077.
9. Cioablă, I. Ionel, M. Jădăneanţ, F. Popescu, A. Savu , *State of the art on biogas from biomass residues at the unconventional energies laboratory at Politehnica University of Timişoara*, Scientific Bulletin of UPT, Transactions on Mechanics, Tom 52(66), fasc. 7, 2007, pp. 235-240, ISSN 1224-6077
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14. L. Călin, M. Jădăneanţ, A. Jădăneanţ, *The aspects regarding the implementation of the quality and security standards in the food industry*, Buletimul AGIR, Anul XII nr.2, apr-iunie 2007, pp. 125-128, ISSN 1224-7928
15. M. Mocuţa, C.T. Rus, D.N. Filimon, M. Jădăneanţ *Energy consumption behavior in public buildings. Case study,* Conferinţa Naţională de Termotehnică cu participare internaţională, 31.05–1.06.2007, Ploieşti, Ed. XVI-a, Vol. 2, pp. 166-171, ISSN 1843-1992
16. L. Moşteoru, M. Jădăneanţ, *Study regarding sterilization efficiency by dry heat sterilizers.* Conferinţa Naţională de Termotehnică cu participare internaţională, 31.05–1.06.2007, Ploieşti, Ed. XVI-a, Vol. 2, pp. 172-174, ISSN 1843-1992
17. M. Jădăneanţ, L. Dungan, L. Călin, *l'HACCP - analyse des dangers points critiques pour leur maitrise – la certitudine de nos developement european*, B.E.N.A – ICAI 2007, International Conference Alba Iulia, Sustainable Developement in the Balkan Area 18-20 July 2007.
18. S. Vartolomei, M. Jădăneanţ, *The management of Military Technical*, Technological and Manufacturing Systems, 4th International Conference on Economic Engineering and Manufacturing Systems, ICEEMS 2007, 25-27 oct., Braşov; publicat în RECENT, vol.8, nr.3b (21b), nov. 2007, pp. 371-374, ISSN 1582-0246
19. S. Vartolomei, M. Jădăneanţ, *Applications of Advanced Materials in Romanian Military Technology for Reducing the Armored Fighting vehicles' Vibrations*, 4th Int. Conference on Economic Engineering and Manufacturing Systems, ICEEMS 2007, 25-27 oct., Braşov; publicat în RECENT, vol.8, nr.3b (21b), nov. 2007, pp. 594-597, ISSN 1582-0246.
20. L. Călin, M. Jădăneanţ, *Consideration for drying and storage grains by cooling systems* 2nd Int. Conference on Thermal Engines and Environmental Engineering, Galaţi, 7-9.06. 2007, vol. 1, pp. 181-184, ISBN 978-973-1724-17-1.
21. M. Jădăneanţ, F. Moşteoru, L. Moşteoru, *Study regarding the energetic quality of dry heat sterilizers*, 2nd International Conference on Thermal Engines and Environmental Engineering, Galaţi, 7-9.06.2007, vol. 1, pp. 195-198, ISBN 978-973-1724-17-1.
22. L. Călin, M. Jădăneanţ, *Consideration sur les (HACCP) - Analyse des dangers points critiques pour leur maîtrise- la certi-tude de nos developement au niveau europeen*, Proceedings 5th International Conference „Integrated Systems for Agri-food Production"; SIPA 07; Nov. 22-24, 2007, Sibiu pp. 403-406, ISBN: 978-973-638-348-9
23. Fl. Mărcuţ, M. Jădăneanţ, *Advantages of using water heaters for diesel engines*, Proceedings Internat. Conf. „Research People and Actual Tasks on Multidisci-plinary Sciences", Lozenec, Bulgaria, 6-8 June 2007, Vol.2, pp. 183-187 ISBN 978-954-91147-3-7

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25. L. Călin, M. Jădăneanţ, *Consideration upon the Cooling Preservation Method of Grains Storage*, Proceedings Internat. Conf. „Research People and Actual Tasks on Multidisci-plinary Sciences", Lozenec, Bulgaria, 6-8 June 2007, Vol. 2, pp. 257-261, ISBN 978-954-91147-3-7.

26. L. Călin, M. Jădăneanţ, *Constructive solutions regarding the purification of used water coming from the beer industry*, International Conference on „Quality of Life and Environment in the Frame of E.U. Sustainability", 15-17 November 2007, Belgrade, pp. 42, ISBN 978-86-82121-46-6.

27. M. Gh. Mocuţa, M. Jădăneanţ, *On the modifications in the electrical energy production industry after the oil crisis*, Ştiinţă şi Inginerie vol. XI, 2007, pp. 53-58, A VII-a Conf Naţ „Prof. D. Pavel" ISBN 973-8130-82-4 ISBN 978-973-720-122-5

28. L. Călin, M. Jădăneanţ, *Waste water treatment released by the beer factories*, Ştiinţă şi Inginerie vol.XII, Editura AGIR, 2007, pp. 283-288, A VII-a Conf Naţ „Prof. D. Pavel" ISBN 973-8130-82-4, ISBN 978-973-720-123-2

29. M. Mocuţa, M. Jădăneanţ, C. Rus, D. Filimon, *Possibilities for energy savings through the thermal recovery of the residential sector*, Academia Română Filiala Timi-şoara, Simpozionul „Omul şi mediul" ediţia V-a, 24 mai 2007, pp. 292-297, Edit. Eurostampa, ISBN 978-973-687-555-7

30. L. Călin, M. Jădăneanţ, A. Pop, *Gasification of the wood biomass-energy source*, Academia Română Filiala Timi-şoara, Simpozionul „Omul şi mediul" ediţia V-a, 24 mai 2007, pp. 315-320, Edit. Eurostampa, ISBN 978-973-687-555-7.

31. L. Moşteoru, M. Jădăneanţ, Fl. Moşteoru, *Ecology and sterilization devices with dry hot air*, Academia Română Filiala Timi-şoara, Simpozionul „Omul şi mediul" ediţia V-a, 24 mai 2007, pp. 353-358, Edit. Eurostampa, ISBN 978-973-687-555-7

32. M. Mocuţa, M. Jădăneanţ, *Energy efficiency and renewable energy re-sources in European Union energy policy*, Conferinţa Naţională de Termo-tehnică cu participare internaţională, 31.05–1.06.2007, Ploieşti, Ediţia XVI-a,Vol. 1, pp. 121-126, ISSN 1843-1992.

33. L. Călin, M. Jădăneanţ, *New technology by cooling grain*, Conferinţa Naţională de Termo-tehnică cu participare internaţio-nală, 31.05–1.06.2007, Ploieşti, Ediţia XVI-a, Vol. 2, pp. 42-46, ISSN 1843-1992.

34. M. Jădăneanţ, A. Jădăneanţ, *New thermo-energetic concepts*, Ediţia 17-a: Instalaţii pentru construcţii şi confortul ambiental, Timişoara, 17-18 aprilie 2008, pp. 143-148, Edit. Politehnica Tmş. ISSN: 1842-9491 ISBN: 978-973-625-640-0

35. Gh. Oancea, M. Jădăneanţ, *Map drawing of the Timisoara district for thermal improvement of the buildings*, Ediţia 17-a: Instalaţii pentru construcţii şi confortul ambiental, Timişoara, 17-18 aprilie 2008, pp. 293-298, Edit. Politehnica Tmş. ISSN: 1842-9491, ISBN: 978-973-625-640-0.

36. Irimescu, L. Călin, M. Jădăneanţ, D. Iorga, *The aspects regarding the efficient management of the biogas obtained from the industrial waste water treatment*, Ediţia 17-a: Instalaţii pentru construcţii şi confortul ambiental, Timişoara, 17-18 aprilie 2008, pp. 386-394, Edit. Politehnica Tmş, ISSN: 1842-9491, ISBN: 978-973-625-640-0.

37. Holotescu S., Stoian F.D. *A theoretical study regarding the influence of leakages on the thermodynamic loss angle* Acta Tehnica Napocensis, Seria Mecanica, Tom 50, Vol IV, pp. 256-259, ISSN 1221-5872

38. M. Nagi, P. Ilies, V. *Martian Influence of the wavy amplitude in an air fin*, Acta Tehnica Napocensis, Seria Mecanica, Tom 50, Vol IV, ISSN 1221-5872, pp. 95-98.

39. D, Alexandru, M. Nagi, *Liquid petroleum gases fuel for internal combustions engines* Omul si mediul, Ed.V, Timisoara,24-25 mai, 2007, Ed. Eurostampa, ISBN 978-973-687-555-7, Ac. St. Tehn. Romania, fil Timisoara.

40. D, Alexandru, M. Nagi, *Experimental researches regarding the differential pressure in the liquefied petroleum gas pipes* Conf. nat. termo, part intern, 31-mai-01 iunie, 2007, Ploiesti, Ed Un. Petrol si gaze, ISSN 1843-1992, Vol II, pag 1-4.

41. P. Ilies, V. Martian, M. Nagi, *Influence of extended water heat surface on water coolers* Conf. nat. termo, part intern, 31 mai - 01 iunie 2007, Ploiesti, Ed Un. Petrol si gaze, ISSN 1843-1992, Vol II, pag 149-155.

42. M. Nagi P. Ilies, V. Martian, *An experimental approach for air flow inside the heat*

exchanger's wavy channel, Conf.nat. termo, part intern, 31 mai - 01 iunie, 2007, Ploiesti, Ed Un. Petrol si gaze, ISSN 1843-1992, Vol I, pag 140-143.

PhD THESIS

1. Liliana Daniela MOSTEORU: *Contributions to the improvement of thermal performances and ecology of the sterilization equipment for medical instruments*, PhD supervisor: Prof.dr.eng. Mihai JĂDĂNEANȚ
2. Gh. Marcel MOCUTA: *Theoretical and experimental contributions regarding the combustion and the heat exchange in the hot air generators used on road vehicles*, PhD supervisor: Prof.dr.eng. Mihai JĂDĂNEANȚ

PhD STUDENTS

PhD supervisor: Prof.dr.eng. Mihai NAGI

1. Catalin BOJAN: *Researches regarding the use of shell type tubes for the construction of compact heat exchangers*
2. Ovidiu SAFTOIU: *Studies and researches regarding the optimisation of the main steam condenser operation for the 350 MW steam turbine, in the conditions of the variation of the cooling fluid parameters*
3. 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. Tiberius STANCIU: *Researches regarding the use of shell type of tubes for the construction of compact heat exchangers*
5. Mihaela BUCULEI, *Studies and researches regarding the installations of unconventional liquid fuel preparation for use in compression ignition engine with direct injection*
6. Paul ILIES: *Constructive and operational optimization of the aluminum heat exchangers manufactured at S.C. RAAL S.A. Bistrita*
7. Francisc SZIKSZAI: *The control and enhancement of heat transfer in magnetizable nanofluids*
8. Mariela Augusta SPOREA: *Studies and researches regarding the recovery of exhaust gases from the cupola furnace*
9. Alexandru JĂDĂNEANȚ, *Mechanical Engineering*

PhD supervisor: Prof.dr.eng. Mihai JĂDĂNEANȚ

1. Cristian DAMIAN: *Contributions to the thermal study of the axle boxes with rolling bearing at high speed trains*
2. Sorin RUSU: *Contributions to the optimisation of the railroad traction diesel engines operation*
3. Gh.-Florin OANCEA: *Theoretical and experimental contributions regarding the thermal rehabilitation of the buildings from a headquarter in Timişoara city*
4. Doina MIHON: *Theoretical and experimental contributions regarding the optimisation of the transportation fluxes in view of reducing the pollutants produced by the vehicles driven by internal combustion engines*
5. Constantin STROIE: *Contributions to the study of the impact of railroad transportation on the environment and the railroad infrastructure*
6. Laurențiu CĂLIN, *Industrial Engineering*
7. Florin MĂRCUȚ, *Industrial Engineering*

PhD superviser: Prof.dr.eng. Gavril CREȚA

1. 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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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 Timişoara.

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 traductors, 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 CNCSIS, national programmes etc.
- Developing of fundamental and applicative research activities, technological development for the present industrial demands,
- P. T. R. G. members are part of the following professional bodies and associations:
  AGIR – The General Association of the Engineers in Romania
  AUIF – Academic Association of Manufacturing Engineering in Romania
  ARTN – Romanian Association of Nonconventional Technologies

RESEARCH CONTRACTS

1. Contract CEEX 41/2005 (Etapa 2007) – *IMAN – Innovative Manufacturing Network*, Director Professor Tudor Iclanzan.
2. 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.
3. Contract CEEX 130/2006 – *MATEPROF Materials, technologies and equipment for 2D and 3D cold forming*. Director: Professor Tudor Iclanzan.

4. Contract PN-II ESOP 71-133/2007, *Expert systems for the optimisation of technological processes*, Director Professor Tudor Iclanzan.

PUBLICATIONS

BOOKS

Valentin Seiculescu, *Computer aided design*, Editura Politehnica Timisoara, 2007, 219 pages.

PUBLISHED PAPERS

1. T. Iclanzan, D. Stan , *A possible ultrasonic thermofilm effect*, volum Sesiunea Comisiei de Acustica a Academiei Romane, SISCOM, mai 2007
2. Tulcan Aurel, Tulcan Liliana, Stan Daniel, Iclănzan Tudor, *3D measuring of injected plastic parts*, Revista de Materiale Plastice, vol. 44, nr. 4/2007, pp. 316 , ISSN 0025-5289
3. Dume A., Cosma C., Stan D., Iclanzan T., *The Machine Modela MDX 15 Integrations in Manufacturing Proceeding and Rapid Prototyping*, Academic Journal Of Manufacturing Engineering Vol. 5, No. 4/2007, pp. 34-39, 1583-7904
4. Ferician F., *Glow-discharge electron gun technology for silicon carbide synthesis*, Academic Journal of Manufacturing Engineering, Vol. 5, No. 4, 2007, pp. 46, ISSN 1583-7904

AWARDS

1. T. Iclanzan, D. Stan, *Injection mold with ultrasonic activated hot runners* A00793/2006, Catalogue Officiel, Inventions, Geneva, Nov. 2007, *Gold medal*.
2. T. Iclanzan, D. Stan, *Extrusion process and head ultrasonic activated*, A00014 / 11.01.2007, Catalogue Officiel, INNOVA Energy Bruxelles, Nov. 2007, *Silver medal*.
3. Iclanzan T, Stan D., *Method and extrusion head with ultrasonic activation*, Salonul Cercetarii INVENTIKA / TIB, Oct 2007, CBI 00014/2007 2007, *Medalie de argint*

INVENTIONS

1. T. Iclanzan, D. Stan, *Method and extrusion head with ultrasonic activation*, OSIM A/00014/11.01.2007
2. T. Iclanzan, D. Stan, *Microinjection mould*, A/00836/07.12.2007

PhD THESIS

Dana Keri, Contributions to the study of degradation of the rolling wheels, Thesis supervisor: Prof. Tudor Iclănzan

PhD STUDENTS

1. Groza Bogdan Gruia, *Optimization of the management integrated systems in industrial engineering*, Thesis supervisor: Prof. Tudor Iclănzan
2. Ferician Florin Cornel, *Researches on the technological possibilities of using the plasma electronic guns*, Thesis supervisor: Prof. Tudor Iclănzan
3. Cosma Cristian, *Quality amelioration study of products from polymeric materials in injection processes*, Thesis supervisor: Prof. Tudor Iclănzan
4. Dume Adrian-Ilie, *Rapid prototyping techniques optimizations using the milling process in the case of the removal module*, Thesis supervisor: Prof. Tudor Iclănzan
5. Tamas Marius, *The study of increased operational capacities of the rapid prototyping machines by material*, 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. dr. Cristian Cosma
- Assist. Eng. Adrian Dume
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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 ambiental and results were extra poled beginning 100 or 1000 hours to 10000 hours.

ACTIVITIES

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

- Theoretical and experimental studies of vertical long specimens under compressive loading also into account thermal effects.

RESEARCH TEAM

- Prof.dr.eng. Nicolae NEGUȚ
- Prof.dr.eng. Ion DUMITRU
- Prof.dr.eng. Nicolae FAUR
- Prof.dr.eng. Pavel TRIPA
- Prof.dr.eng. Josif HAJDU
- Prof.dr.eng. Tiberiu BABEU
- Prof.dr.eng. Constantin CRISTUINEA
- Assoc.prof.dr.eng. Dana SILAGHI PERJU
- Assoc.prof.dr.eng. Liviu MARȘAVINA
- Lect.dr.eng. Marcela SAVA
- Lect.dr.eng. Mihai HLUȘCU
- Lect.dr.eng. 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 CNCSIS COD 372/2007, *The modelling studies of the rolling way – environment of the urban traffic for passengers,* Project Manager: Neguț Nicolae, Value: 280,000 RON
5. CEEX Nr.153/2007, *Technology and ecological installation for stress-relieving of casted, forged or welded steels assemblies,* Project Manager: Pavel Tripa, Value: 5,000 RON
6. 5/12.06.2007, *Stress-Strain and Breaking load testing of ACSR conductor made IEC 61089, Construction 6x3,75 mm aluminium wires and 1x3,75 mm galvanized steel wire,* Project Manager: Liviu Marsavina, Value: 2,500 RON
7. CNCSIS 177 Tema 23 Tip A, 2007, *Implementation of probabilistic methods in fracture mechanics for durability estimation,* Project Manager: Liviu Marsavina, Value: 15,800 RON
8. PNCDI–CEEX AMCSIT Nr.202/20.07.2007, *Modelling and simulation of the composite materials from aeronautic industry at complex loads,* Project Manager: Liviu Marsavina, Value: 10,000 RON
9. PNCDI–CEEX RELANSIN Nr.255/11.09.07, *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
10. PNCDI–CEEX AMCSIT Nr.262/12.09.2007, *Hybrid assemblies with adhesives and bolts for composite materials and aluminium alloys,* Project Manager: Liviu Marsavina, Value: 20,650 RON
11. 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, Timişoara, Value: 9,600 RON
12. 48c/2007, *Compresion test on packing bins perfusabile solutions,* Project Manager: Faur Nicolae, Beneficiary: HELVETICA PROFARM SA, Timişoara, Value: 3,600 RON
13. 583/11.01.2007, *Tensile tests on 120 specimens for tensile strength determination in welding joints and bending test for cracks observation in welding joints* , Project Manager: Faur Nicolae, Beneficiary: Weld department of UPT, Value: 6,000 RON

14. 657/10.05.2007, *Technique verification for DVIA – 6 type instrumentation* , Project Manager: Faur Nicolae, Beneficiary: SC Electromontaj Carpati SA, Value: 1,000 RON
15. 675/12.06.2007, *Researches about fracture strength for tensile cables*, Project Manager: Faur Nicolae, Beneficiary: SC Hidroconstructia SA Bucuresti, Value: 2,500 RON
16. 677/13.06.2007, *Experimental researches in fatigue loadings domain* , Project Manager: Faur Nicolae, Beneficiary: University of Bacau, Value: 11,000 RON
17. 650/03.05.2007, *Pulling out test for metal insert in PAG +30%GF moulding part, detail COVER BSE 8200739388*, Project Manager: Faur Nicolae, Beneficiary: SC Plastique Forme Romania Timisoara, Value: 2,500 RON
18. 694/25.06.2007, *Determination of STRESS-STRAIN features for Al-steel conductors*, Project Manager: Faur Nicolae, Beneficiary: SC IPROEB SA Bistrita, Value: 5,000 RON

DOCTORAL STUDIES

PhD THESIS

1. Daş Doru Ioan, *Extension durability study of the pipe lines used in petroleum products transportation*, PhD coordinator: Iosif Hajdu, 22.12.2007,
2. Goia Ioan, *Study about influence of wheel-rail-truck assemblz in exploitation conditions on trollez-line structure*, PhD coordinator: Hajdu Iosif, 22.12.2007,
3. Ungureanu Loredana, *Reconstruction models for human hand and zour functions*, PhD coordinator: Nicolae Robu and Nicolae Faur, 07.12.2007

PhD STUDENTS

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_{Id} , J_{Id}

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. Dumitru, I., *Particularities of the shock loadings calculus*, Politehnica Publishing House, Timisoara, ISBN 978-973-625-464-6, 281 pages, 2007
2. Tripa, P., Hluşcu, M., *Strength of Materials. Basic Concepts and Applications, (in Romanian*), Vol. 2, Ed. Mirton, Timişoara, ISBN(10) 978-973-52-0081-7, 411 pages, 2007
3. Neguţ, N., Hluşcu, M., Bretotean, C., *Carriage bodies and structures for vehicle cars*, Vol. 2, Politehnica Publishing House, Timisoara, ISBN 978-973-625-334-8, 199 pages, 2007
4. Marsavina, L., Audenaert, K,, De Schutter, G., *Transport Mechanisms in Cracked Concrete*, Edited by Uitgeverij Acco, Leuven, Belgium, ISBN 978-90-334-6637-3, 127 pages, 2007

PAPERS

1. Marsavina, L., Nurse, A.D., *The asymptotic structure of small-scale yielding interfacial free-edge joint and crack tip fields*, Acta Mechanica, vol. 190, pp. 115-131, ISSN 0001-5970
2. Marşavina, L., Sadowski, T., *Stress intensity factors for an interface kinked crack in a bi-material plate loaded normal to the interface*, International Journal of Fracture, vol. 145, pp. 237-243, ISSN 0376-9429, 2007
3. Dumitru, I. Marsavina, L., Faur, N., *Experimental study of torsional impact fatigue of shafts*, Journal of Sound and Vibration, vol. 308, pp. 479-488, 2007
4. Sandu, Liliana, Faur, N., Bortun, Cristina, *Finite Element Stress Analysis and Fatigue Behavior of Cast Circumferential Claps*, Journal of Prosthetic Dentistry, pp.-39-44

5. Biriş, S., Maican, E., Faur, N., Vladuţ, N, Bungescu, S., *Ferm Model for Appreciation of Soil Compaction Under the Action of Tractors and Agricutural Machines* , Proceedings of the 35th International Symposium on Agricultural Engineering, Opatija, Croaţia, pp. 271-280

6. Sandu, Liliana, Faur, N., Bortun, Cristina, Porojan, S., *Finite Element Analysis of Thermal Stressesin Circumferential Claps* , Journal Advances Materials Research, vol. 23, pp. 229-232, 2007.

7. Dumitru, I., Babeu, T., Babeu, S., Marşavina, L., *Effect of prestressing on durability at repeated impacts, Dynamics of Vibro-Systems*, Springer Berlin, pp. 261-268, ISBN 3-540-65600-5, Key Engineering Materials, vol. 348-349, pp. 205-208, 2007.

8. Hluscu, M., Tripa, P., Ghita, E., *Short-time and long-time mechanical characteristics of a steel working under high temperature in function of temperature and working duration,* 33th Jupiter Conference, Zlatibor May 2007, ISBN 978-86-7083 -593-1, Vol 2, pp. 134-139

9. Tripa, P., Hluscu, M., Ghita, E., *The Influence of Temperature, Working Time and the Loading Rate about Fracture Toughness of a Thermoresistant Steel,* 33th Jupiter Conference, Zlatibor May 2007, ISBN 978-86-7083 -593-1, Vol 2, pp. 140-143

10. Dumitru, I., Sechei, R., Hluscu, M., *About some dynamic fractures particulaties of elements with cracks*, XIII-th International Conference of Fracturte Mechanics, Bacau 2007, pp. 69-74

11. P. Tripa, C. Atanasiu, V. Proca, *The influence of the fracture surface orientation to the rolling direction about the fracture toughness of a steel,* 24th DANUBIA – ADRIA. Symposium on Developments in Experimental Mechanics, sept. 2007, Sibiu, ISBN 978-973-739-456-9, pp. 257-258

12. P. Tripa, V. Rosca, R. Pascu, *The mechanical behaviour of a thermoresistant steel working under thermal circuit,* 25th DANUBIA – ADRIA. Symposium on Developments in Experimental Mechanics, sept. 2007, Sibiu, ISBN 978-973-739-456-9, pp. 259-260

13. L. Marşavina, G.D. Schutter, K. Audenaert, D. Marsavina, N. Faur, *The influence of cracks on chloride penetration in concrete structures – part II: numerical simulation,* Proceedings of the International RILEM Workshop: "Transport Mechanisms in Cracked Concrete", Acco Leuven, Belgium, 2007, pp. 35-43, ISBN 978-90-334-6637-3

14. L. Marşavina, T. Sadowski, *Fracture parameters at bi-material ceramic interfaces under bi-axial state of stress,* 17th International Workshop on Computational Mechanics of Materials, Paris, 2007, pp. 45-46

15. G.D. Schutter, K. Audenaert, L. Marşavina, *The influence of cracks on chloride penetration in concrete structures – part I: experimental evaluation,* Proceedings of the International RILEM Workshop: "Transport Mechanisms in Cracked Concrete", Acco Leuven, Belgium, 2007, pp. 35-43, ISBN 978-90-334-6637-3

16. V. Roşca, P. Tripa, M. Gheorghian, *The influence of temperature working time and the loading rate about fracture toughness of a thermoresistant steel,* 24th DANUBIA – ADRIA. Symposium on Developments in Experimental Mechanics, sept. 2007, Sibiu, ISBN 978-973-739-456-9, pp. 249-250

17. N. Negut, L. Marşavina, D. Parvulescu, *The determination of the fracture toughness for ALZn5,5MnCu alluminium alloy,* Buletinul Ştiinţific al UPT, Seria Mecanică, Tom 52 (66), Fascicola 1, pp. 71-76

18. M. Ratiu, L. Marşavina, A*nelastic analysis of nonlinear superficial stresses,* Buletinul Ştiinţific al UPT, Seria Mecanică, Tom 52 (66), Fascicola 1, pp. 87-94,

19. I. Dumitru, Gh. Cornea, A. Cernescu, *Theoretical and experimental research upon the rigidity of a machine for testing cables*, Buletinul Ştiinţific şi Tehnic al Univ. "Politehnica" Timişoara, seria Mecanica, Tom 52(66), pp. 23-26

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.

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
- Assist. Eng. Eugen ZĂBAVĂ

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 *SHAPE AND FEATURE RECOGNITION*

KEYWORDS
3D scanning, feature, feature recognition

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

RESEARCH TEAM
- Prof.dr.eng. Lia DOLGA
- Assist. eng. Hannelore FILIPESCU
- Eng. Emese TOTH, master student
- Eng. Laura LELEA, master student
- Tatiana Vionelia STEFU, 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 SIVECO 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
- Lect. Dr.eng. Mihaela CRETU-NICA
- Lect. Dr.eng. Doina SAFTENCU
- Lect. Dr.eng. Arseniu PECICAN
- Assist.eng. Ileana MLADIN
- Assist. Dr. eng. Mariana ILIE
- Assist. eng. Ladislau WALKOVSZKY
- Assist. eng. Adrian RADU
- Assist. eng. Ioan COȚA
- Assist. eng. Silviu DUMITRAŞ

ACTIVITIES AND RESULTS
The student professional contest “Student CAD” is organized annually in May, oriented on the 2D AutoCAD graphics and on the 3D Modelling and Parametric Design in CATIA, Inventor and Solid Work Environment.

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 comportment of machines during the exploitation using the CAD and FEM techniques to develop the specific software packages in this field.

KEYWORDS
Modeling software, CAD, FEM

RESEARCH TEAM
- Prof.dr.eng. Mircea VODA
- Prof.dr.eng. Viorel A.SERBAN
- Assist. eng. Hannelore FILIPESCU
- Eng. Gheorghe Pasca, master student
- Eng. Gheorghe Marinescu, master 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

BOOKS

1. Saftencu Doina: *Grafica tehnica asistata de calculator. Partea a 2-a*, Politehnica Publishing House, Timişoara, 2007, ISBN 978-973-625-425-3.

2. Voda Mircea: *Concepte de baza pentru modelarea solidelor in AutodeskINVENTOR*, Politehnica Publishing House, Timişoara, 2007, ISBN 978-973-625-507-6.

PUBLISHED PAPERS

1. Voda M., Bordeasu I., Mesmacque G., Chitac V., Tabără I. *Aspects of polymer assemblies behaviour to mechanical stresses* Chem.Abs. Materiale plastice, Vol. 44, Nr.3, MPLAAM 44(3), pp. 254-258, ISSN 0025-5289;
2. Ghita E., Gillich G. R., Bordeasu I., Voda M., Troi C. *Aspecte ale comportării polimerilor la solicitări de tracţiune*, Chem.Abs., Materiale plastice, Vol. 44, Nr. 2, MPLAAM 44(2), pp. 157-160, ISSN 0025-5289;
3. Mitelea I., Bordeasu I., Popoviciu M. Hadar A *Corrosion of Stainless Steels with "Soft" martensitic Structure*, Chem.Abs. RCBUAU 58(2), Revista de chimie, Vol. 58, Nr. 2/2007, pp. 254-257, ISSN 0034-7752;
4. M. Liţă, N.C. Popa. C. Velescu, L. Vekas *Investigations of a Magneto-Rheological Fluid Damper*, IEEE Transactions on Magnetics. Vol. 40, No. 2, pp. 469-472, ISSN 0018-9464;
5. Mariana Ilie, Jean-Christophe Kneip, Simone Mattei, Alexandru Nichici, Claude Roze, Thierry Girasole, *Laser beam scattering effects in non-absorbent inhomogenous polymers*, Optics and Lasers in Engineering, Elsevier, vol. 45, 2007, pp. 405-412, ISSN 0143-8166;
6. Mariana Ilie, Jean-Christophe Kneip, Simone Mattei, Alexandru Nichici, Claude Roze, Thierry Girasole, *Through transmission laser welding of polymers – temperature field modeling and infrared investigation*, Infrared Physics &Technology, 2007, Elsevier., vol. 54, pp. 73-79, ISSN 1350-4495;
7. Bacila A., Decoopman X., Mesmacque G., Voda M., Serban V.A. *Study of underload effects on the delay induced by an overload in fatigue crack propagation*, International Journal of Fatigue, nr. 29, pp. 1781-1788, ISSN 0142-1123;
8. Bacila A., Decoopman X., Mesmacque G., Voda M., Serban V.A. *Computer simulation of fatigue crack propagation under random loading conditions*, International Journal of Fatigue nr. 29, pp. 1772-1780, ISSN 0142-1123;
9. Voda M., Bordeasu I., Mesmacque G., Chitac V. *Aspects concerning polymer assemblages behavior at the mechanical stress*, Materiale plastice, Vol. 44, nr. 3, pp. 254-258, ISSN 0025-5289;
10. Şerban Viorel-Aurel, David Ioan, Codrean Cosmin, Vodă Mircea, Chincea Ion, *Considerations of Welding Behaviour by Laser Beam of Austenitic Manganese Alloys*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Mechanics, Tom 52(66), Fasc. 2, pp. 95-98, ISBN 1224-6077
11. Dolga Valer, Dolga Lia *Modelling and simulation of a magnetic levitation system* Annals of the Oradea University, Fasc. Manag. and Tech. Eng., vol. VI(XVI), pp. 1118, ISSN 1583-0691

GRANTS / RESEARCH PROGRAMS

Study and modeling of the fatigue behaviors for the steel and aluminum structures used in transports, in the case of the random charges , grant CNCSIS – A – theme 6, code 359, nr. GR226/14.09.2006, Director: Assist. Prof. dr. eng. Mircea Voda, Value for 2007: 25,000 lei

CONTACT

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