

# FACULTY OF AUTOMATION AND COMPUTERS



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## RESEARCH GROUP IN AUTOMATION AND COMPUTERS

### GENERAL PRESENTATION

The main aim of the group is to develop high-level research in the fields of automatic control, computer and software engineering and information technology. It offers the research results in these fields to interested companies and organizations all over the world.

Head of the Research Group: **Prof. Dr. Eng. Stefan PREITL**, recipient of the *Grigore Moisil* Prize of the Romanian Academy for his contribution on fuzzy control.

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The group is organized in two research divisions:

- *Research Division in Automation and Applied Informatics*

Head of division: **Prof. Dr. Eng. Radu-Emil PRECUP**

- *Research Division in Computer Science and Engineering*

Head of division: **Assoc. Prof. Dr. Eng. Mihai V. MICEA**

### RESEARCH DIVISION IN AUTOMATION AND APPLIED INFORMATICS

#### CONTACT

**Prof. Dr. Eng. Radu-Emil PRECUP**, recipient of the *Grigore Moisil* Prize of the Romanian Academy for his contribution on fuzzy control.

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### Research in *PROCESS CONTROL*

#### RESEARCH TEAM

- Prof. dr. eng. Stefan Preitl, head of the team
- Prof. dr. eng. Radu-Emil Precup
- Eng. Claudia-Adina Dragoș, PhD student
- Eng. Mircea-Bogdan Rădac, PhD student
- Eng. Daniela Bărbulescu, PhD student
- Eng. Alexandra Iulia Sfînean, PhD student

#### RESEARCH FIELDS

- Conventional control system structures

- Advanced control systems.

#### KEYWORDS

Fuzzy logic control; iterative methods; data-based control; sliding mode control; intelligent systems; optimization; nature-inspired algorithms; 2-DOF control; stability analysis; sensitivity analysis; robustness; convergence; mobile robots; servo systems; mechatronics applications; embedded systems; signal processing.

#### MAIN ACTIVITIES

- Development of conventional and advanced control systems
- Signal processing in control systems
- Optimization based on nature-inspired algorithms
- Soft computing in industrial applications
- Development of control systems for servo systems
- Development of control systems for mechatronics and mobile robots

### RESULTS

#### PUBLISHED PAPERS

1. Precup R.-E., Preitl S., Rădac M.-B., Petriu E.M., Dragoș C.-A., Tar J.K., *Experiment-Based Teaching in Advanced Control Engineering*, IEEE Transactions on Education, ISSN 0018-9359, vol. PP, no. 99, Dec. 2010, pp. 1-11. (IF = 0.822)
2. Pozna C., Precup R.-E., Tar J.K., Škrjanc I., Preitl S., *New Results in Modelling Derived from Bayesian Filtering*, Knowledge-Based Systems (Elsevier Science), ISSN 0950-7051, vol. 23, no. 2, March 2010, pp. 182-194. (IF = 1.308)
3. Precup R.-E., Tomescu M.L., Preitl S., Petriu E.M., *Fuzzy Logic-Based Stabilization of a Magnetic Ball Suspension System*, International Journal of Artificial Intelligence (Indian Soc. for Development & Environment Research), ISSN 0974-0635, vol. 5, no. A10, Autumn 2010, pp. 56-66.
4. Precup R.-E., Tomescu M.L., Petriu E.M., Preitl S., Fodor J., Bărbulescu D., *Stability Analysis of a Class of MIMO Fuzzy Control Systems*, Proc. IEEE International Conference on Fuzzy Systems (FUZZ 2010), Barcelona, Spain, ISBN 978-1-4244-6919-2, July 2010, pp. 2885-2990.
5. Precup R.-E., Spătaru S.V., Petriu E.M., Preitl S., Rădac M.-B., Dragoș C.-A., *Stable and Optimal Fuzzy Control of a Laboratory*

- Antilock Braking System*, Proc. IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM 2010), Montreal, Canada, ISBN 978-1-4244-8031-9, July 2010, pp. 593-598.
6. Precup R.-E., Dioanca L.-T., Petriu E.M., Rădac M.-B., Preitl S., Dragoş C.-A., *Tensor Product-Based Real-time Control of the Liquid Levels in a Three Tank System*, Proc. IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM 2010), Montreal, Canada, ISBN 978-1-4244-8031-9, July 2010, pp. 768-773.
  7. Precup R.-E., Borchescu C., Rădac M.-B., Preitl S., Dragoş C.-A., Petriu E.M, Tar J.K., *Implementation and Signal Processing Aspects of Iterative Regression Tuning*, Proc. IEEE International Symposium on Industrial Electronics (ISIE 2010), Bari, Italy, ISBN 978-1-4244-6390-9, June 2010, pp. 1657-1662.
  8. Precup R.-E., Spătaru S.V., Rădac M.-B., Petriu E.M., Preitl S., Dragoş C.-A., *Model-based Fuzzy Control Solutions for a Laboratory Antilock Braking System*, Proc. 3rd International Conference on Human System Interaction (HSI 2010), Rzeszow, Poland, ISBN 978-1-4244-7560-5, May 2010, pp. 133-138.
  9. Dragoş C.-A., Preitl S., Precup R.-E., Petriu E.M., *Magnetic Levitation System Laboratory-based Education in Control Engineering*, Proc. 3rd International Conference on Human System Interaction (HSI 2010), Rzeszow, Poland, ISBN 978-1-4244-7560-5, May 2010, pp. 496-501.
  10. Dragoş C.-A., Precup R.-E., Preitl S., Petriu E.M., Rădac M.-B., *Simulation and Experimental Results for a Magnetic Levitation Laboratory System*, Proc. 7th EUROSIM Congress on Modelling and Simulation (EUROSIM 2010), Prague, Czech Rep., ISBN 978-80-01-04589-3, vol. 2: (CD), paper index 155, Sep. 2010, 8 pp.
  11. Dragoş C.-A., Preitl S., Precup R.-E., Bulzan R.-G., Petriu E.M., Tar J.K., *Experiments in Fuzzy Control of a Magnetic Levitation System Laboratory Equipment*, Proc. 8th IEEE International Symposium on Intelligent Systems and Informatics (SISY 2010), Subotica, Serbia, ISBN 978-1-4244-7394-6, Sep. 2010, pp. 601-606.
  12. Dragoş C.-A., Preitl S., Precup R.-E., Pîrlea D., Neş C.-S., Petriu E.M., Pozna, C., *Modeling of a Vehicle with Continuously Variable Transmission*, Proceedings of the 19th International Workshop on Robotics in Alpe-Adria-Danube Region (RAAD 2010), Budapest, Hungary, ISBN 978-1-4244-6885-0, June 2010, pp. 441-446.
  13. Preitl S., Precup R.-E., Dragoş C.-A., Rădac M.-B., *Tuning of 2-DOF Fuzzy PI(D) Controllers. Laboratory Applications*, Proc. 11th IEEE International Symposium on Computational Intelligence and Informatics (CINTI 2010), Budapest, Hungary, ISBN 978-1-4244-9279-4, Nov. 2010, pp. 237-242.

## RESEARCH GRANTS AND PROJECTS

### National grants and projects

1. Research Grant of the National Centre for Programme Management (CNMP), Type PN2 Partnerships in Priority R&T Domains Programme (2008-2011), no. 12100 / 01.10.2008. Title: *Real-Time Informatics Technologies for Embedded-System-Control of Power-Train in Automotive Design and Applications (SICONA)*, Partners: “Politehnica” University of Timisoara (PUT) – P2, “Gh. Asachi” Technical University of Iasi (TUI) – coordinator, Politehnica University of Bucharest – P1, SC Siemens VDO Automotive – P3. Director: Prof. dr. eng. Corneliu Lazăr (TUI), director of PUT partner (P2): Prof. dr. eng. Radu-Emil Precup (granted value in 2010: 15.642 LEI)

Research team: Prof. Radu-Emil Precup – director of PUT partner (P2), Prof. Stefan Preitl, Assoc. Prof. Florin Drăgan, Lect. Dan Ungureanu-Anghel, Assist. Prof. Daniel Iercan, Assist. Prof. Emil Voişan, PhD student Mircea-Bogdan Rădac, PhD student Claudia-Adina Dragoş, Teaching Assist. Lucian-Ovidiu Fedorovici.

The main objective of the project consists in developing new informatics technologies for improving the performances of the embedded systems controlling the power train of cars equipped with automated gearboxes. The project applies modern modeling and control strategies to the power-train and its subsystems. On these bases, real-time software modules are developed for the embedded systems, yielding much better operation performances than ensured by the currently used solutions (meaning PID regulation).

Several nonlinear and linearized models and low-cost control solutions have been proposed and tested in 2009 by the research team at the P2 partner. They include Tensor Product-based models, S functions and original design methods dedicated to fuzzy control systems. The digital simulation results show the control-system performance enhancement. Ten papers were presented and/ or published in journals and conference proceedings.

### PERSPECTIVE DOMAINS

- Methods for the algorithmic design of conventional and intelligent controllers (fuzzy, neural, genetic, sliding mode)
- Methods for signal processing and computer-aided design of control systems
- Analysis and development of intelligent systems
- Solutions for the automatic design of model-free control structures
- Iterative data-based control and nature-inspired optimization
- Control solutions for mechatronics, power systems, electrical drives, general industrial automation, mobile robots

### STRATEGIC PRIORITIES

- Control systems with imposed sensitivity
- Tools for computer-aided design of 2-DOF controllers
- Computer-aided techniques in iterative data-based control
- Low cost solutions for control problems dedicated to mechatronics and mobile robots
- Derivative-free optimization in modeling and control design
- Methods and tools to enable the systematic development of fuzzy control systems



### CONTACT

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### Researches in RENEWABLE ENERGY, SENSOR NETWORKS, SYSTEM IDENTIFICATION, ADAPTIVE SYSTEMS

#### RESEARCH TEAM

- Prof. dr. eng. Octavian Proștean, head of team
- Prof. dr. eng. Nicolae Budișan
- Prof. dr. eng. Ioan Filip
- Assist. dr. eng. Iosif Szeidert
- Assist. dr. eng. Cristian Vașar
- Lecturer dr. eng. Dan Ungureanu
- Assist. eng. Andreea Robu, PhD student
- Assist. eng. Radu Boraci, PhD student
- Eng. Cosmin Koch-Ciobotaru, PhD student
- Eng. Gelu Ovidiu Tirian, PhD student

#### RESEARCH FIELDS

- Unconventional energetic
- Wireless sensor networks
- System modeling, identification and simulation
- Neural networks and fuzzy systems
- Adaptive control systems
- Distributed databases

#### KEYWORDS

Renewable energy; wireless sensor networks; modeling; identification and simulation of systems; neural networks and fuzzy systems; wind energy conversion systems; unconventional energetic; adaptive control; self-tuning; databases.

#### MAIN ACTIVITIES

- Modeling, simulation and development of wind energy conversion systems (WECS)
- Identification and parameter estimation of electrical machines (asynchronous and synchronous)
- Development of new enhanced electrical machines types
- Development of control systems for WECS
- Control software development in industrial applications
- Modeling and simulation of systems with neural networks
- Development of WECS software
- Development of adaptive control structures
- Applications based on wireless sensor networks
- Development of applications based on distributed databases

#### RESULTS

##### PUBLISHED PAPERS

1. Koch-Ciobotaru C., Boraci R., Filip I., Vasar C., Proștean G., *Control Strategy for a Variable-Speed Wind Turbine Using DC Bus Measurements*, Proceedings 8th International Symposium on Intelligent Systems and

- Informatics (SISY 2010), Subotica, Serbia, ISBN 978-1-4244-7394-6, Sep. 2010, pp. 329-334.
2. Szeidert I., Prostean O., Filip I., Vasar C., *Determination of Synchronous Generator's Efficiency and of Wind Turbine's Mathematical Models based on the Usage of Regression Functions*, Proc. 8th International Symposium on Intelligent Systems and Informatics (SISY 2010), Subotica, Serbia, ISBN 978-1-4244-7394-6, Sep. 2010, pp. 325-328.
  3. Budisan N., Prostean O., Boraci R., Koch-Ciobotaru C., *Single-Phase Two Stator Windings Induction and Permanent Magnet Synchronous Generators*, Proc. 6th WSEAS International Conference on Energy, Environment, Ecosystems & Sustainable Development (EEESD 2010), Timisoara, Romania, ISBN 978-960-474-239-1, ISSN 1792-5924, Oct. 2010, pp. 433-438.
  4. Budisan N., Prostean O., Boraci R., Szeidert I., Muller V., *The Dual Induction Generator for Renewable Energy Conversion Systems. Experimental Results, Problems and Solutions*, Proc. IEEE International Joint Conferences on Computational Cybernetics and Technical Informatics (ICCC-CONTI 2010), Timisoara, ISBN 978-1-4244-7432-5, May 2010, pp. 445-450.
  5. Szeidert I., Filip I., Vasar C., Prostean G., *Wind Aggregate's Mathematical Modeling Method based on Wind Tunnel Test Results and Regression Functions*, Proc. IEEE International Joint Conferences on Computational Cybernetics and Technical Informatics (ICCC-CONTI 2010), Timisoara, ISBN 978-1-4244-7432-5, May 2010, pp. 451-454.
  6. Budisan N., Muntean N., Boraci R., Cornea O., Koch-Ciobotaru C., Petrila D., *Electronic Conversion System and Speed-Control Strategy for Small Wind Generators*, Proc. IEEE International Joint Conferences on Computational Cybernetics and Technical Informatics (ICCC-CONTI 2010), Timisoara, ISBN 978-1-4244-7432-5, May 2010, pp. 455-458.
  7. Filip I., Szeidert I., Mihet-Popa L., Vasar C., *On-line Tuning Procedure of a Recursive Parameter Estimator Used for a Synchronous Generator Adaptive Control*, Proc. IEEE International Joint Conferences on Computational Cybernetics and Technical Informatics (ICCC-CONTI 2010), Timisoara, ISBN 978-1-4244-7432-5, May 2010, pp. 459-463.
  8. Mihet-Popa L., Filip I., *Modeling and Simulation of a Soft-Starter for Large Wind Turbine Induction Generators*, Proc. IEEE International Joint Conferences on Computational Cybernetics and Technical Informatics (ICCC-CONTI 2010), Timisoara, ISBN 978-1-4244-7432-5, May 2010, pp. 465-470.
  9. Budisan N., Boraci R., Koch-Ciobotaru C., Prostean G., Musca C., *On Permanent-Magnet Synchronous Generator Current Harmonics, due to Rectifier at the Generator End of the Variable Speed Generator Sets Converter Systems*, Proc. IEEE International Joint Conferences on Computational Cybernetics and Technical Informatics (ICCC-CONTI 2010), Timisoara, ISBN 978-1-4244-7432-5, May 2010, pp. 471-474.
  10. Babescu M., Boraci R., Chioreanu C. H., Koch-Ciobotaru C., Gana O., *On Functioning of the Electric Wind System at its Maximum Power*, Proc. IEEE International Joint Conferences on Computational Cybernetics and Technical Informatics (ICCC-CONTI 2010), Timisoara, ISBN 978-1-4244-7432-5, May 2010, pp. 475-480.
  11. Babescu M., Boraci R., Gana O., Koch-Ciobotaru C., *The Control of the Diesel-Synchronous Generator Electro-Energetic System*, Proc. IEEE International Joint Conferences on Computational Cybernetics and Technical Informatics (ICCC-CONTI 2010), Timisoara, ISBN 978-1-4244-7432-5, May 2010, pp. 581-584.
  12. Vasar C., Filip I., Szeidert I., Borza I., *Fault Detection Methods for Wireless Sensor Networks Using Neural Networks*, Proc. IEEE International Joint Conferences on Computational Cybernetics and Technical Informatics (ICCC-CONTI 2010), Timisoara, ISBN 978-1-4244-7432-5, May 2010, pp. 295-298.
  13. Sasu E. C., Prostean O., *Using Constant Traffic to Specific IP Destinations for Detecting Spoofed MAC Addresses in Local Area Networks*, Proc. IEEE International Joint Conferences on Computational Cybernetics and Technical Informatics (ICCC-CONTI 2010), Timisoara, ISBN 978-1-4244-7432-5, May 2010, pp. 677-681.
  14. Sasu E. C., Prostean O., Groza V., *Proving the Efficiency of DTF Method in a Local Area Network*, Proc. IEEE International Joint Conferences on Computational Cybernetics and Technical Informatics (ICCC-CONTI 2010), Timisoara, ISBN 978-1-4244-7432-5, May 2010, pp. 683-687.
  15. Cristea A.D., Prostean O., Muschalik T., Tirian O., *The Advantages of Using SAP Netweaver Platform to Implement a Multidisciplinary Project*, Proc. IEEE International Joint Conferences on Computational Cybernetics and Technical Informatics (ICCC-CONTI 2010), Timisoara, ISBN 978-1-4244-7432-5, May 2010, pp. 383-386.

16. Madescu G., Biriescu M., Proștean O., Mișuț T., Greconici M., Moș M., Augustinov L., *Low Speed Synchronous Generator with PM Excitation*, Proc. 19th IEEE International Conference on Electrical Machines (ICEM 2010), Rome, Italy, ISBN 978-1-4244-4175-4, Sep. 2010, CD-ROM: 5 pp.
17. Koch-Ciobotaru C., *Data Acquisition System for a Vertical Axis Wind Turbine Prototype*, Proc. 6th WSEAS International Conference on Energy, Environment, Ecosystems & Sustainable Development (EEESD 2010), Timisoara, Romania, ISBN 978-960-474-239-1, ISSN 1792-5924, Oct. 2010, pp. 422-428.
18. Gana O., Babescu M., Boraci R., Greconici M., *The Influence of Wind Speed Variation on Maximum Power of a Wind Turbine System*, Proc. 6th WSEAS International Conference on Energy, Environment, Ecosystems & Sustainable Development (EEESD 2010), Timisoara, Romania, ISBN 978-960-474-239-1, ISSN 1792-5924, Oct. 2010, pp. 428-432.

## RESEARCH GRANTS AND PROJECTS

### National grants and projects

1. EEA research grant "*Improvement of the Structures and Efficiency of Small Horizontal Axis Wind Generators with Non-Regulated Blades*", Grant Type EEA, Contract no. RO0018, Director: Prof. Octavian Proștean, Financial value: 1,200,000 EUR

The proposed project has the research theme, goal and objectives associated to the priority research domains at international level, regarding new small wind generators structures. Thus, the presented project is under the following priority sector: "Protection of the environment, including the human environment, through, inter alia, the reduction of pollution and the promotion of renewable energy", having the focus area on "Developing renewable energy sources, including geothermal energy and hydropower".

Recent documents issued by national and international organizations promote the usage of renewable energy resources Directives of the European Parliament of the Council of the Promotion of Electricity from Renewable Energy Sources in the Internal Electricity Market, Romanian Government Decisions regarding the approval of the renewable energy resources strategies, et. al.

The project has the focus area of developing renewable energy sources, which promote the protection of the environment, by reducing of pollution.

The overall objectives concern the increase of the usage degree of wind-energy conversion systems as

a non-pollutant energy source, conducting to the reducing of carbon and pollution, in concordance to the global trend of ecologic energy production.

The project aims the realization of new/improved small wind generators having presently, high cost price of produced energy in comparison with medium and high power aggregates. This is the reason why USA elaborated (by American Wind Energy Association) the "ROADMAP 20-year industry plan for small wind turbine technology" that aims the drastically reduction of the present energy cost. The project has in view all elements of small wind generators. The project's beneficiary is able to organize the research and implementation of the project that will certainly lead to the efficientization and to the reducing of the cost of such types of wind generators. The beneficiary has relevant experience in the field, and the human resources are specialized in all required domains: wind turbines, mechanical systems, electrical generators, power electronic converters, control systems, project management.

"Politehnica" University of Timisoara has a long-term experience inclusively in the domain of small power wind generators: for a Canadian corporation (vertical axis wind turbine) and for Romanian users (horizontal axis wind turbines). In Timisoara there are factory equipped with necessary technologies for such aggregates.

## PERSPECTIVE DOMAINS

- Real time control of induction and synchronous machines using LabView (LabWindowsCVI), the National Instruments Data Acquisition Systems and DSpace hardware
- Advanced control of wind aggregates
- Neural network control systems

## STRATEGIC PRIORITIES

- Study of innovative control systems for wind aggregates: MPPT methods, genetic algorithms
- Tools for statistical wind measurement related data, for short-term forecasting used in wind speed prediction based windmill control systems and for simulation of autonomous wind farms aggregates



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### Researches in HEALTHCARE NETWORKS AND eHEALTH

#### RESEARCH TEAM

- Prof. dr. eng. Lăcrămioara Stoicu-Tivadar, coordinator
- Prof. dr. eng. Vasile Stoicu-Tivadar,
- Lect. dr. eng. Dorin Berian
- Assist. eng. Romina Pinteaa, PhD student,
- Assist. eng. Raul Robu, PhD student
- Assist. eng. Andreea Robu, PhD student
- Eng. Vasile Topac, PhD student
- Eng. Mihaela Vida, PhD student
- Eng. Valentin Gomoi, PhD student
- Eng. Norbert Gal, PhD student

#### RESEARCH FIELDS

- Health Information Systems, E-Health, Telemedicine
- Software architectures
- Distributed and Mobile Applications

#### KEYWORDS

Distributed medical informatics; applied informatics; telemedicine; e-Health

#### MAIN ACTIVITIES

- Development of mobile applications in medical informatics
- Study and development of different solutions for integrated healthcare networks
- Implementation of standards in healthcare

### RESULTS

#### PUBLISHED PAPERS

1. Stoicu-Tivadar V., Stoicu-Tivadar L., Berian D., Topac V., *WebService-based Solution for an Intelligent TeleCare System*, Proc. 14th International Conference on Intelligent Engineering Systems (INES 2010), Las Palmas, Spain, ISBN 978-1-4244-7650-3, May 2010, pp. 313-316.
2. Pinteaa R., Vida M., Stoicu-Tivadar L., Moga V.D., Moga M., *Interoperability Solution for an EMR System Applied in a Cardiology Department Supported by Mobile Communication*, Proc. IEEE International Joint Conferences on Computational Cybernetics and Technical Informatics (ICCC-CONTI 2010), Timisoara, ISBN 978-1-4244-7432-5, May 2010, pp. 219-224.
3. Robu A. P., Neagu A., Stoicu-Tivadar L., *A Computer Simulation Study of Cell Seeding of a Porous Biomaterial*, Proc. IEEE International Joint Conferences on Computational Cybernetics and Technical Informatics (ICCC-CONTI 2010), Timisoara, ISBN 978-1-4244-7432-5, May 2010, pp. 225-229.
4. Giurgiu L., Stoicu-Tivadar L., *An Information Management System Supporting Academic Activity*, Proc. IEEE International Joint Conferences on Computational Cybernetics and Technical Informatics (ICCC-CONTI 2010), Timisoara, ISBN 978-1-4244-7432-5, May 2010, pp. 231-234.
5. Berian D., Stoicu-Tivadar V., Gomoi V., *Technical Aspects of Implementing a Telecare System*, Proc. IEEE International Joint Conferences on Computational Cybernetics and Technical Informatics (ICCC-CONTI 2010), Timisoara, ISBN 978-1-4244-7432-5, May 2010, pp. 237-241.
6. Gomoi V., Stoicu-Tivadar V., *A New Method in Automatic Generation of Medical Protocols Using Artificial Intelligence and Data Mining Tools*, Proc. IEEE International Joint Conferences on Computational Cybernetics and Technical Informatics (ICCC-CONTI 2010), Timisoara, ISBN 978-1-4244-7432-5, May 2010, pp. 243-246.
7. Robu R., Stoicu-Tivadar V., *Arff Convertor Tool for WEKA Data Mining Software*, Proc. IEEE International Joint Conferences on Computational Cybernetics and Technical Informatics (ICCC-CONTI 2010), Timisoara, ISBN 978-1-4244-7432-5, May 2010, pp. 247-251.
8. Stoicu-Tivadar L., Stoicu-Tivadar V., Berian D., *Tele-Assistance for Discharged Patients Supporting Continuity of Care*, Proc. EFMI STC 2010 Special Topic Conf., Reykjavik Island; Studies in Health Technology and Informatics, ISBN 978-1-60750-562-4, vol. 155, June 2010, pp. 170-175.
9. Vida M., Gomoi V., Stoicu-Tivadar L., Stoicu-Tivadar V., *Generating Medical Computer - Based Protocols Using Standardized Data Transmission*, Proc. 4th International Workshop on Soft Computing Applications (SOFA 2010), Arad, Romania, ISBN 978-1-4244-7985-6, July 2010, pp. 155-158.
10. Gal N., Stoicu-Tivadar V., *Computer Assisted Medical Image Interpretation Using Fuzzy Logic*, Proc. 4th International Workshop on Soft Computing Applications (SOFA 2010),



- Arad, Romania, ISBN 978-1-4244-7985-6, July 2010, pp. 159-163.
11. Gal N., *Choosing Suitable Algorithms for Low Level Image Processing in Mobile Equipments*, Proc. 8th International Conference on Information Communication Technologies in Health (ICICTH 2010), Samos, Greece, ISBN 978-960-466-059-9, July 2010, pp. 52-61.
  12. Vida M., Stoicu-Tivadar L., *Interoperability Study in an Obstetrics Hospital*, Proc. 8th International Conference on Information Communication Technologies in Health (ICICTH 2010), Samos, Greece, ISBN 978-960-466-059-9, July 2010, pp. 81-91.
  13. Gomoi V., Stoicu-Tivadar V., *Evaluation of Computer-Based Medical Protocols and Guidelines Approaches*, Proc. 8th International Conference on Information Communication Technologies in Health (ICICTH 2010), Samos, Greece, ISBN 978-960-466-059-9, July 2010, pp. 151-160.
  14. Vida M., Stoicu-Tivadar L., *Measuring Medical Informatics Systems Interoperability Using the LISI Model*, Proc. 8th International Symposium on Intelligent Systems and Informatics (SISY 2010), Subotica, Serbia, ISBN 978-1-4244-7394-6, Sep. 2010, pp. 33-36.
  15. Stoicu-Tivadar L., *ICT Frame Supporting Continuity of Care towards Increased Quality of Healthcare Services*, Preprints 2nd IFAC Symposium on Telematics Applications (TA 2010), Timisoara, Romania, Oct. 2010, pp. 83-86.
  16. Puscoci S., Stoicu-Tivadar L., Serbanescu F., Băjan F., Bogdan I., Ionitã S., Ciortan C., *Integrated Tele-Assistance Platform – TELEASIS*, Preprints 2nd IFAC Symposium on Telematics Applications (TA 2010), Timisoara, Romania, Oct. 2010, pp. 97-102.
  17. Robu A., Stoicu-Tivadar L., Neagu A., *Considerations About a 3D Matrix Model for a Porous Scaffold and a Cell Suspension*, Annals of DAAAM for 2010 & Proc. 21st International DAAAM Symposium, Zadar, Croatia, ISBN 978-3-901509-73-5, ISSN 1726-9679, Oct. 2010, pp. 209-211.
  18. Vida M., Gomoi V., Stoicu-Tivadar L., Stoicu-Tivadar V., *Using HL7 CDA Standard to Connect Medical Databases as a Support for Automatic Generation of Computer Interpretable Guidelines*, Proc. National Conference on Medical Informatics (RO-MEDINF 2010), Arad, ISBN 978-606-8054-14-8, 978-973-664-436-8, Nov. 2010, pp. 69-74.
  19. Berian D., Gomoi V., Topac V., *A Hybrid Solution for a Telecare System Server*, Proc. National Conference on Medical Informatics (RO-MEDINF 2010), Arad, ISBN 978-606-8054-14-8, 978-973-664-436-8, Nov. 2010, pp. 166-172.
  20. Puscoci S., Berian D., Serbanescu F., *Homecare Teleassistance System*, Proc. National Conference on Medical Informatics (RO-MEDINF 2010), Arad, ISBN 978-606-8054-14-8, 978-973-664-436-8, Nov. 2010, pp. 173-180.
  21. Pinteã R., *Introducing Standardized Communication in Medical Practice Based on Mobile Solutions*, Proc. National Conference on Medical Informatics (RO-MEDINF 2010), Arad, ISBN 978-606-8054-14-8, 978-973-664-436-8, Nov. 2010, pp. 181-184.
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  24. Robu R., Stoicu-Tivadar V., *Evaluation and Improvement of User Interfaces for Medical Data Mining with Open Source Programs*, Proc. National Conference on Medical Informatics (RO-MEDINF 2010), Arad, ISBN 978-606-8054-14-8, 978-973-664-436-8, Nov. 2010, pp. 284-289.

#### RESEARCH GRANTS AND PROJECTS

1. *TELEASIS – NGN support-based, Complex System for home tele-attendance of elderly people*. 2nd Romanian National Research Program PN2

Participants: academic, research and medical organizations and SME's from București, Timișoara, Iași, Pitești. Local staff: Lăcrămioara Stoicu-Tivadar, Vasile Stoicu-Tivadar, Dorin Berian, Romina Pinteã, Raul Robu, Andreea Robu, Vasile Topac ("Politehnica" University of Timișoara).

The main objective of the project is the development of a tele-support system for elderly people, from medical and social perspective, as well. This system has as a goal the implementation and development of the social and medical support services of elderly people, at their homes, in accordance with the fulfillment of the requirement of this category, to live in their own homes not in asylum. In this way, the project contributes to

increase the active live duration of the people, and to optimize the customized management of the way of life of the assisted person.

The planned R&D activities:

- an experimental model for a specific local intelligent unit for the homes of the elderly people
- an experimental model for the Teleassistance Centre
- the telecare network
- the specific database and the required software solutions
- a model of tele-attendance services
- a complete guide of the developed know-how and technology.

The project has contributed to the development of knowledge related to NGN networks, and middleware technologies, to the development of the complex tele-attendance software systems.

## 2. *SIMIMED - Integrated medical information management system based on HL7 Standard.* 2nd Romanian National Research Program PN2

Participants: academic and medical organizations and SME's from Cluj, Timișoara, and Brașov. Local staff: Lăcrămioara Stoicu-Tivadar, Vasile Stoicu-Tivadar, Dorin Berian, Romina Pinte, Raul Robu, Andreea Robu, Vasile Topac ("Politehnica" University of Timișoara).

The main objective of the project is the research, design and implementation of a pilot integrated system development for the management of the patients, human and material resources in a hospital (Hospital Information System – HIS), based on the more advanced Standards from the medical informatics domain - HL7, DICOM, EN 13606, adapted to the needs of the Romanian Healthcare system.

The planned R&D activities:

- The analysis of the actual context and the general design
- The technical specifications definition for the HIS
- The development of the kernel of the HIS, including the compliance with HL7 Standard
- The design and the implementation of the software modules for each medical specialty
- The design and development of HL7-compliant communication interfaces with other Healthcare information systems
- The enlargement of the partnership with other medical organizations in order to implement the results of the project.

The project developed a modular and flexible solution that can be adapted to any Healthcare

organization, and integrated with other existing Healthcare Information systems.

### PERSPECTIVE DOMAINS

- a. Distributed architectures and appropriate technological solutions
- b. Mobile applications and related technologies
- c. Interoperability standards in distributed medical informatics
- d. Solutions for integrated healthcare networks and interoperability

### STRATEGIC PRIORITIES

The group intends to develop strategic researches on the directions specified in the domain by the European Community:

- The Education and Training of high level healthcare managers and policy makers on the strategic role of ICT in Healthcare and change management
- To implement programs on education and training, and other actions to promote awareness and to reduce resistance to change of healthcare professionals
- To set up specific awareness actions addressing sensitive groups, such as: academic circles, high reputation specialists at university hospitals and other local medical opinion leaders, clinical research groups, medicine and nursing students
- To improve mutual learning through information interchange, particularly to avoid cultural mismatches, to promote and encourage cross-border cooperation on e-Health topics and applications.

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### Researches in *REAL-TIME CONTROL SYSTEMS*

#### RESEARCH TEAM

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- Prof. dr. eng. Toma-Leonida Dragomir
- Prof. dr. eng. Ioan Silea
- Lecturer dr. eng. Sorin Nanu
- Assist. eng. Ana-Maria Dan
- Assist. eng. Tiberiu Ionică
- Eng. Mihai Iacob, PhD student

- Eng. Coman Cristina Elena, PhD student
- Eng. Gurban Eugen Horațiu, PhD student

### RESEARCH FIELDS

- Advanced Control of AC drives: Sensorless Control of IPMSM; Fault-tolerant Control
- Automotive Electric Actuation Technologies
- Applications to Electric and Hybrid Vehicles
- Boiler-Turbine Control System
- Solar Energy
- Informatics Systems, SCADA

### KEYWORDS

- Advanced control; Electric drives; Automotive electric actuation; Sensorless control; State and disturbance observers; Variable structure flux-observer, Signal injection; Active flux observer; Fault-tolerance; Boiler-turbine control; Hardware-in-the-Loop, Fuzzy-interpolating implementation, Wind energy; Solar energy, Informatics systems, SCADA, Real-time implementations.

### MAIN ACTIVITIES

- Control systems in Automotive electric actuation technologies
- SCADA system for a central heating and power plant
- Boiler-turbine control system with real-time capability for dispatcher training using LabView
- Enhancement sensorless control system for PMSM drives using square-wave signal injection including zero speed
- Active-flux based motion sensorless control of biaxial excitation generator for automobiles (BEGA)
- Novel position and speed estimator for PM single phase brushless dc motor drives
- Fast dynamics V/f sensorless control of PM-RSM drives
- Real-time implementation and testing using DSpace for Sensorless control of AC drives
- Informatics systems
- Solar energy

## RESULTS

### PUBLISHED PAPERS

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2. Ancuti R., Boldea I., Andreescu G.-D., *Sensorless V/f Control of High-Speed Surface Permanent Magnet Synchronous Motor Drives with Two Novel Stabilising Loops for Fast Dynamics and Robustness*, IET Electric Power Applications, ISSN 1751-8660, vol. 4, no. 3, March 2010, pp. 149-157. (IF = 1.212)
3. Iacob M., Bejan C.A., Andreescu G.-D., *Supervisory Control and Data Acquisition Laboratory*, TELFOR Journal, ISSN 1821-3251, Belgrade, Serbia, vol. 2, no. 1, Nov. 2010, pp. 49-54.
4. Andreescu G.-D., Schlezinger C., *Enhancement Sensorless Control System for PMSM Drives Using Square-Wave Signal Injection*, Proc. International Symposium on Power Electronics, Electrical Drives, Automation and Motion (SPEEDAM 2010), Pisa, Italy, ISBN 978-1-4244-4986-6, June 2010, pp. 1508-1511.
5. Iepure L., Andreescu G.-D., Iles D., Blaabjerg F., Boldea I., *Novel Position and Speed Estimator for PM Single Phase Brushless DC Motor Drives: Validation with Experiments*, Proc. IEEE International Symposium on Industrial Electronics (ISIE 2010), Bari, Italy, ISSN 978-1-4244-6390-9, July 2010, pp. 1389-1394.
6. Iepure L., Boldea I., Andreescu G.-D., Blaabjerg F., *Improved State Observers for Sensorless Single Phase BLDC-PM Motor Drives*, Proc. 36th Annual Conference of the IEEE Industrial Electronics Society (IECON 2010), Glendale, AZ, USA, ISSN 1553-572X, ISBN 978-1-4244-5225-5, Nov. 2010, pp. 870-875.
7. Stirban A.N., Boldea I., Andreescu G.-D., Iles D., Blaabjerg F., *FEM Assisted Position and Speed Observer for BLDC PM Motor Drive Sensorless Control, With Experiments*, Proc. 14th International Power Electronics and Motion Control Conference (EPE-PEMC 2010), Ohrid, Rep. Macedonia, ISBN 978-1-4244-7856-9, Sep. 2010, pp. T4: 34-40.
8. Iacob M., Andreescu G.-D., Muntean N., *Boiler-Turbine Simulator with Real-Time Capability for Dispatcher Training Using LabView*, Proc. 12th International Conference on Optimization of Electrical and Electronic Equipment (OPTIM 2010), Brasov, Romania, ISSN 1842-0133, ISBN 978-1-4244-7019-8, May 2010, pp. 864-869.
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10. Stirban A., Boldea I., Andreescu G.-D., Iles D., Blaabjerg F., *Motion Sensorless Control of BLDC PM Motor with Offline FEM Info Assisted State Observer*, Proc. 12th International Conference on Optimization of Electrical and Electronic Equipment (OPTIM 2010), Brasov, Romania, ISSN 1842-0133, ISBN 978-1-4244-7019-8, May 2010, pp. 321-328.
11. Paicu M.C., Tutelea L., Boldea I., Andreescu G.-D., Ancuti R., *PM-RSM Sensorless Vector Control: Zero Q-Axis Flux Versus Approximate Maximum Torque per Current, With Experiments*, Proc. 12th International Conference on Optimization of Electrical and Electronic Equipment (OPTIM 2010), Brasov, Romania, ISSN 1842-0133, ISBN 978-1-4244-7019-8, May 2010, pp. 460-468.
12. Boldea I., Moldovan A., Coroban Schramel V., Andreescu G.-D., Tutelea L., *A Class of Fast Dynamics V/F Sensorless AC General Drives with PM-RSM as a Case Study*, Proc. 12th International Conference on Optimization of Electrical and Electronic Equipment (OPTIM 2010), Brasov, Romania, ISSN 1842-0133, ISBN 978-1-4244-7019-8, May 2010, pp. 453-459.
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14. But A., Silea I., But E., *Computer Numerical Control Training Center - Results and Opportunities*, Proc. 6th International Seminar on the Quality Management in Higher Education (QMHE-2010), Tulcea, Romania, ISBN 978-973-662-566-4, July 2010, pp. 381-386.
15. Belgiu G., Nanu S., Silea I., *Artificial Intelligence in Machine Tools Design Based on Genetic Algorithms Application*, Proc. 4th International Workshop on Soft Computing Applications (SOFA 2010), Arad, Romania, ISBN 978-1-4244-7985-6, July 2010, pp. 57-60.
16. Nanu S., Belgiu G., Silea I., *Tolerance Design in the PLM Environment - An Expert System Approach*, Proc. 4th International Workshop on Soft Computing Applications (SOFA 2010), Arad, Romania, ISBN 978-1-4244-7985-6, July 2010, pp. 255-259.
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Symposium on Telematics Applications (TA 2010), Timisoara, Romania, Oct. 2010, pp. 69-74.

## RESEARCH GRANTS AND PROJECTS

### International grants and projects

1. Research EU Grant within 7th Framework Programme (FP7), Project title: *Energy Efficient Vehicles for Road Transport (EE-VERT)*; Grant no. 218598/ Nov. 2008, period 2009-2011; Director of UPT partner: Prof. Ion Boldea; member Prof. Gheorghe-Daniel Andreescu.
2. Research EU Grant 7th Framework Programme (FP7): Project title: *We steer - Actions to Sustain an Emerged Cluster for Automotive Field Based on the Research in West Region*; Project no. 205887/2007, period: 2008-2010, UPT Partner Subcontract no. 12935/ 21.08.2008; Director of UPT partner: Prof. Ioan Silea; member Prof. Toma Leonida Dragomir, (total financial value for UPT: 28.000 EUR; value for 2010: 9.740 EUR)

### National grants and projects

1. Research Grant in 2nd Romanian National Research Program PN2, Section: Partnerships in R&T Priority Domains; Project title: *Integrated Systems for Real-Time Control of Networked Processes – SICOTIR*; Project no. 15492/14.09.2007, period 2007-2010; Director of UPT partner: Prof. Ioan Silea (total financial value for UPT: 300.000 Lei; value for 2010: 2.5639 Lei)
2. Research Grant in 2nd Romanian National Research Program PN2, Section: Ideas Programme; Project title: *Research in Design and Implementation of Modern Solutions for Secured Information in Distributed Systems, SCADA, DCS and Remote Control with Applications in Gases Distribution*, Project no. 15492/14.09.2007, period 2007-2010; Director: Prof. Ioan Silea (total financial value 254.000 Lei)

### BOOKS

1. Nanu Sorin, *Structuri de Interfatare in Sisteme Automate*, Editura Politehnica, Timisoara, ISBN 978-606-554-192-4, 2010, 160 pp.

### PERSPECTIVE DOMAINS

- Automotive control
- Advanced control of electric drives, Robotics
- Boiler-turbine control system with Hardware-in-the-Loop
- Real-time control using LabView
- Applications with FPGA using VHDL, Xilinx
- SCADA systems

**STRATEGIC PRIORITIES**

- Advanced control of electric drives
- Automotive Electric Actuator Technologies
- DSpace platform, LabView real-time platform
- SCADA systems

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**Researches in ADVANCED COMPUTING ARCHITECTURES AND SYSTEMS****RESEARCH TEAM**

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- Assist. dr. eng. Oana Boncalo
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- Eng. Liviu Agnola, PhD Student
- Eng. Patrik Mezo, PhD Student
- Eng. Septimiu Fabian Mare, PhD Student

**MAIN ACTIVITIES**

- Computer Arithmetic
- Self testing development concepts
- Self checking development tools
- Digital system testing based on data compression (transitions counting syndrome, linear feedback shift register)
- Equipment structures with fault tolerant capability (error detecting and correcting codes, triple modular redundancy)
- Bio-Inspired Design of Applications on Reconfigurable Platforms
- Quantum Computing

- Networks-on-Chips
- Hardware-Software Co-Design
- Electronic Design Automation

**RESULTS****PUBLISHED PAPERS**

1. Amaricai A., Vladutiu M., Boncalo O., *Design Issues and Implementation of Floating Point Divide-Add Fused*, IEEE Trans on Circuits and Systems II: Express Briefs, ISSN 1549-7747, vol. 57, no. 4, Apr. 2010, pp. 295-299. (IF = 1.320)
2. Boncalo O., Amaricai A., Udrescu M., Vladutiu M., *Quantum Circuit's Reliability Assessment with VHDL-Based Simulated Fault Injection*, Microelectronics Reliability, Elsevier, ISSN 0026-2714, vol. 50, no. 2, Feb. 2010, pp. 304-311. (IF = 1.117)
3. Ruican C., Udrescu M., Prodan L., Vladutiu M., *Adaptive vs. Self-Adaptive Parameters for Evolving Quantum Circuits*, Proc. 9th International Conference on Evolvable Systems: From Biology to Hardware (ICES 2010), York, UK, Sep. 2010, Lecture Notes in Computer Science (Springer), ISBN 978-3-642-15323-5, LNCS vol. 6274, pp. 348-359.
4. Ruican C., Udrescu M., Prodan L., Vladutiu M., *Performance Analysis for Genetic Quantum Circuit Synthesis*, Proc. Artificial Intelligence and Soft Computing (ICAISC 2010), Zakopane, Poland, June 2010, Lecture Notes in Computer Science (Springer), ISBN 978-3-642-13232-2, LNCS vol. 6114, pp. 205-212.
5. Opritoiu F., Vladutiu M., Udrescu M., Prodan L., *Concurrent Error Detection for Multiplicative Inversion of Advanced Encryption Standard*, Proc. 10th IEEE International Conference on Computer and Information Technology (CIT 2010), Bradford, UK, ISBN 978-0-7695-4108-2, June/ July 2010, pp. 582-588.
6. Opritoiu F., Vladutiu M., Prodan L., Udrescu M., *A High-Speed AES Architecture Implementation*, Proc. 7th ACM International Conference on Computing Frontiers (CF'10), Bertinoro, Italy, ISBN 978-1-4503-0044-5, May 2010, pp. 95-96.

**BOOKS**

1. Opritoiu Flavius, *Reliable Implementations for Cryptographic Systems with Testability Facilities*, Editura Politehnica, Timisoara, ISBN 978-606-554-129-0, 2010.

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**Research in EMBEDDED, REAL-TIME  
SYSTEMS AND DIGITAL SIGNAL  
PROCESSING**

**RESEARCH TEAM**

- Prof. dr. eng. Vladimir Crețu, head of the team
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- Prof. dr. eng. Mircea Popa
- Prof. dr. eng. Horia Ciocârlie
- Assoc. Prof. dr. eng. Mihai Micea
- Assoc. Prof. dr. eng. Ioana Șora
- Assoc. Prof. dr. eng. Doru Todincă
- Assoc. Prof. dr. eng. Marius Marcu
- Lect. dr. eng. Sorin Babii
- Assist. eng. Dan Chiciudean
- Assist. eng. Răzvan Cioargă
- Assist. eng. Carmen Holotescu
- Assist. dr. eng. Daniela Stănescu

**MAIN ACTIVITIES**

- Methods of Temperature and Power Reduction in Embedded Systems and their Applications
- Modeling, Design and Development of Real-Time Systems for Critical Applications of Data Acquisition, Signal Processing and Embedded Control
- Development of unconventional computer architectures
- Study and development of intelligent sensor networks and robotic environments

**RESULTS**

**PUBLISHED PAPERS**

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2. Micea M. V., Stancovici A., Chiciudean D., Filote C., *Indoor Inter-Robot Distance Measurement in Collaborative Systems*, Advances Electr. Comput. Eng., vol. 10, no. 3, Suceava, ISSN 1582-7445, Aug. 2010, pp. 21-26. (IF = 0.509)
3. Kuczapski A. M., Micea M. V., Maniu L. A., Cretu V. I., *Efficient Generation of Near Optimal Initial Populations to Enhance Genetic Algorithms for Job-Shop Scheduling*, Inf. Tech. Control, Kaunas Univ. Technology, Kaunas, Lithuania, ISSN 1392-124X, vol. 39, no. 1, Jan. 2010, pp. 32-37. (IF = 0.495)
4. Stratulat B., Micea M. V., Filote C., *Data Fusion and Visualization Based on Voronoi Diagrams for Wireless Sensor Networks*, Proc. 2<sup>nd</sup> IEEE Intl. Conf. Test Meas., (ICTM 2010), Phuket, Thailand, ISBN 978-1-61284-030-7, ISSN 2157-5592, Dec. 2010, pp. 442-445.
5. Filote C., Ciufudean C., Micea M. V., Cozgară A., *Power Factor Improvement Using RNSIC Rectifier*, Proc. IASTED Intl. Conf. Intellig. Pow. Energ. Systs. (AsiaPES 2010), Phuket, Thailand, ISBN 978-0-88986-855-7, ISSN 1922-8074, Nov. 2010, pp. 96-102.
6. Stratulat B., Barzeianu S., Micea M. V., Groza V., *Wireless Synchronization Protocols for Collaborative Robotic and Sensor Environments*, Proc. 19<sup>th</sup> IEEE Intl. Wshop. Robotics in Alpe-Adria-Danube Region (RAAD 2010), Budapest, Hungary, ISBN 978-1-4244-6885-0, June 2010, pp. 25-30.
7. Fagadar-Cosma M., Micea M. V., Cretu V. I., *Obtaining Highly Localized Edges using Phase Congruency and Ridge Detection*, Proc. IEEE Intl. Joint Conf. Computational Cybernetics Technical Informatics (ICCC-CONTI 2010), Timisoara, Romania, ISBN 978-1-4244-7431-8, May 2010, pp. 339-342.
8. Cioarga R. D., Micea M. V., Cretu V. I., Groza V., *Evaluation of Fish Shoal Inspired Movement in Collaborative Robotic Environments*, Proc. 27<sup>th</sup> IEEE Instrum. Meas. Technol. Conf. (I2MTC 2010), Austin TX, USA, ISBN 978-1-4244-2832-8, ISSN 1091-5281, May 2010, pp. 1539-1544.
9. Popa M., Ciocârlie H., Popa A. S., Racz M. B., *Smart Metering for Monitoring Domestic Utilities*, Proc. 14th International Conference on Intelligent Engineering Systems (INES 2010), Las Palmas, Spain, ISBN 978-1-4244-7650-3, May 2010, pp. 55-60.
10. Popa M., Popa A. S., Ciocârlie H., *A Layered Architecture for Ad Hoc Networks of Mobile Embedded Systems*, Proc. 14th International Conference on Intelligent Engineering Systems (INES 2010), Las Palmas, Spain, ISBN 978-1-4244-7650-3, May 2010, pp. 243-248.
11. Istin C., Pescaru D., Ciocârlie H., *Performance Improvements of Video Video WSN Surveillance in Case of Traffic Congestion*, Proc. IEEE International Joint Conferences on Computational Cybernetics and Technical Informatics (ICCC-CONTI 2010), Timisoara, Romania, ISBN 978-1-4244-7432-5, May 2010, pp. 659-663.
12. Istin C., Pescaru D., Ciocârlie H., Doboli A., *Monte-Carlo Simulation of Dynamic Coverage Preservation Algorithm for Video Wireless Sensor Networks*, Proc. International Conference on Dependability and Computer Systems (DepCoS - RELCOMEX'10), Wroclaw, Poland, ISBN 978-83-7493-526-5 June 2010, pp. 51-55.

13. Fânaru O., Csertus A., Ciocârlie H., *Agile Methodologies. Test driven Development*, Proc. International Conference on Computer and Software Modeling (ICCSM 2010), Manila, Philippines, ISBN 978-1-4244-9095-0, Dec. 2010, pp. 234-238.
14. Novăcescu F., Velcea D., Ciocârlie H., *The Study of Vibrations of an Elastic System Using the LabView Graphic Programming Medium*, Proc. International Conference on Computer and Software Modeling (ICCSM 2010), Manila, Philippines, ISBN 978-1-4244-9095-0, Dec. 2010, pp. 244-248.
15. Velcea D., Novăcescu F., Ciocârlie H., *Current Trends in Grid Security*, Proc. International Conference on Computer and Software Modeling (ICCSM 2010), Manila, Philippines, ISBN 978-1-4244-9095-0, Dec. 2010, pp. 280-284.
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17. Mureșan R., Botoacă A., Ciocârlie H., *Automatic Configurator for Application Code*, Proc. Computational Intelligence, Man-Machine Systems and Cybernetics (CIMMACS'10), Merida, Venezuela, ISBN 978-960-474-257-8, Dec. 2010, pp. 165-170.
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2. *MELISSEVS: Dezvoltarea si analiza unui model integrat de reprezentare a sistemelor colaborative robotice si de senzori inteligenti in aplicatii de explorare-supraveghere de mediu* director Micea M.V., team: Cretu V.-I., Chiciudean D, Cioarga R., Stratulat B., Contract No ID\_22/2007-2010, Contract No. 58/01.10.2007; financed by: UEFISCSUCU, MEdCI; UPT value 100.926 RON.
3. *SICRAMAS: Sistem inteligent de conducere neliniara robust-adaptiva dupa fluxul rotorilor a actionarilor cu motoare asincrone* director Micea M.V., team: Cretu V.-I., Stratulat M., Micea C., Miclea F., Cioarga R., Ciubotaru B., Chidiucean D., Stanescu D., Contract No. PDP\_2306, Contract nr. 71-065/18.09.2007; financed by: UEFISCSUCU, MEdCI; UPT value 30.000 RON.
4. *FILOLET Innovative System for Electrical Energy Monitoring Based on Wavelet Transformation for Industrial Consumers*, director Micea M. V., team: Cretu V.-I., Stratulat M., Micea C., Miclea F., Cioarga R., Chidiucean D., Stanescu D., Stratulat B., Stratulat I., Contract No PDP\_4339, Contract No. 22-137/01.10.2008; financed by: UEFISCSUCU, MEdCI; UPT value 6.500 RON.
5. *MERLIN: Platforma IT de Modelare, Simulare, Planificare si Optimizare a Productiei Automatizate in Industria Semiconductorilor*, Cretu V., Micea M. V., Contract No. PDP\_1262, Contract No. 198/12.09.2008; financed by: UEFISCSUCU, MEdCI; UPT value 23.580 RON.
6. *FALX DACIAE: Unelte si Procese de Dezvoltare SW pentru Aplicatii Multimedia Avansate pe Arhitecturi Multi-Core pentru Telefoane Mobile*, proiect manager: M. V. Micea, team: V. I. Cretu, M. Vladutiu, H. Ciocârlie, D. Todinca, L. Prodan, M. Udrescu Milosav, R&D Grant POSCCE-499-11844/2010-2012, EU - Structural Instruments, ANCS Contract 133/04.06.2010. Total value: 2126766 RON (~ 506400 EUR). Value, PUT Partner: 1143416 RON (~ 272300 EUR).

#### BOOKS

1. Ciocârlie H., Ciocârlie R., *Tehnici de programare și structuri de date*, Editura EUROSTAMPA, ISBN 978-606-569-193-3, 2010, 312 pp.
2. Ciocârlie H., *Tehnici de compilare. Note de curs*, Editura Mirton & Orizonturi Universitare, ISBN 978-973-52-1000-7, 2010, 318 pp.

#### RESEARCH GRANTS AND PROJECTS

1. *ICT-eMuCo: Embedded Multi-Core Processing for Mobile Communication Systems* director Cretu V.-I., team: Ciocârlie H., Marcu M., Micea M., Tudor D., Jebelean C., Macariu G., Contract No: 216378/1 Feb. 2008; financed by: EU; UPT value 74.300 EUR.

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**Research in SOFTWARE ENGINEERING****RESEARCH TEAM**

- Prof. dr. eng. Ioan Jurca, head of the team
- Assoc. Prof. dr. eng. Marius Minea
- Assoc. Prof. dr. eng. Radu Marinescu
- Assist. dr. eng. Cristina Marinescu
- Assist. dr. eng. Petru Mihancea
- Assist. dr. eng. Dan Cosma
- Assist. eng. Adrian Petru Mierluțiu
- Assist. dr. eng. Ciprian-Bogdan Chirilă

**MAIN ACTIVITIES**

- Development of Integrated Evolving Environments for Software System Analysis
- Design of object-oriented software systems
- Engineering of complex software systems
- System modeling, verification and validation

**RESULTS****PUBLISHED PAPERS**

1. Groza B., Minea M., *A Formal Approach for Automated Reasoning About off-Line and Undetectable on-Line Guessing*, Proc. 14th International Conference on Financial Cryptography and Data Security (FC'10), Tenerife, Spain, ISBN 978-3-642-14576-6, LNCS vol. 6052, Jan. 2010, pp. 391-399.
2. Marinescu R., Ganea G., Verebi I., *inCode: Continuous Quality Assessment and Improvement*, Proceedings 14th European Conference on Software Maintenance and Reengineering (CSMR 2010), Madrid, Spain, ISBN 978-1-61284-369-8, March 2010, pp. 274-275.
3. Marinescu R., Ganea G., *inCode.Rules: An Agile Approach for Defining and Checking Architectural Constraints*, Proc. 6th IEEE International Conference on Intelligent Computer Communication and Processing (ICCP 2010), Cluj-Napoca, ISBN 978-1-4244-8228-3, Aug. 2010, pp. 305-312.
4. Marinescu C., *Detecting Missing Thrown Exceptions in Enterprise Systems: An Empirical Study*, Proc. International Symposium on Empirical Software Engineering and Measurement, (ESEM 2010), Bolzano, Italy, ISBN 978-1-4503-0039-1, Sept. 2010, Art. 59.
5. Mihancea P.-F., *Patrols: Visualizing the Polymorphic Usage of Class Hierarchies*, Proc. 18th IEEE International Conference on Program Comprehension (ICPC 2010), Braga, Portugal, ISBN 978-1-4244-7604-6, June 2010, pp. 36-37.
6. Balint M., *Automatic Inference of Abstract Type Behavior*, Proc. 25th IEEE/ACM International Conference on Automated Software Engineering (ASE 2010), doctoral symposium, Antwerp, Belgium, ISBN 978-1-4503-0116-9, Sep. 2010, pp. 499-504.
7. Cosma D.C., *Reverse Engineering Object-Oriented Distributed Systems*, Proc. 26th IEEE International Conference on Software Maintenance (ICSM 2010), Timisoara, Romania, ISBN 978-1-4244-8630-4, Sept. 2010, pp. 1-6.
8. Chirila C.-B., Jebelean C., Kniesel G., Lahire Ph., *Generic Rules for Logic Representation Transformations*, Proc. IEEE International Conference on Automation Quality and Testing Robotics (AQTR 2010), Cluj-Napoca, ISBN 978-1-4244-6724-2, May 2010, pp. 142-147.
9. Jebelean C., Chirila C.-B., Cretu V., *A Logic Based Approach to Locate Composite Refactoring Opportunities in Object-Oriented Code*, Proc. IEEE International Conference on Automation Quality and Testing Robotics (AQTR 2010), Cluj-Napoca, ISBN 978-1-4244-6724-2, May 2010, pp.130-135.
10. Chirila C.-B., Jebelean C., *Towards Programs Logic Based Representation Driven by Grammar and Conforming to a Metamodel*, Proc. International Joint Conference on Computational Cybernetics and Technical Informatics (ICCC-CONTI 2010), Timisoara, ISBN 978-1-4244-7432-5, May 2010, pp. 107-112.
11. Jebelean C., Chirila C.-B., Fasie M., Cretu V., *Towards Logic Based Representation of XML Models*, Proc. International Joint Conference on Computational Cybernetics and Technical Informatics (ICCC-CONTI 2010), Timisoara, ISBN 978-1-4244-7432-5, May 2010, pp. 101-105.
12. Chirila C.-B., Jebelean C., Slavici T., Cretu V., *Generating Logic Representations for Programs in a Language Independent Fashion*. Proc. WSEAS Transactions on Computers, ISSN 1109-2750, vol. 9, no. 10, Oct. 2010, pp. 1201-1211.
13. Jebelean C., Chirila C.-B., Slavici T., Cretu V., *Language Independent Generation of Logic Representation for Programs*, Proc. 14th WSEAS International Conference on Computers, Corfu, Greece, ISBN 978-960-474-201-1, ISSN 1792-4251, July 2010, pp. 385-390.
14. Chirila C.-B., Sakkinen M., Lahire Ph., Jurca I., *Reverse Inheritance in Statically Typed Object-Oriented Programming Languages*, Proc. 4th Workshop on Mechanisms for Specialization, Generalization and Inheritance



(MASPEGHI 2010), Maribor, Slovenia, ISBN 978-1-4503-0535-8, June 2010, Art.5, 5pp.

#### RESERCH GRANTS AND PROJECTS

1. *Metode si instrumente pentru asigurarea continua a calitatii in sisteme software complexe*, director: M. Minea, team: Marinescu R., Mihancea P., Marinescu C., Balint M., Grant PNCDI\_II ID-PCE, Contract No: 357/1.10.2007 (ID\_1215); financed by ANCS, UPT value 234.065 Lei

#### BOOKS

1. Chirila Ciprian-Bogdan, *Sisteme de operare - note de curs*, www.cs.upt.ro/~chirila/lectures/so1/index.html, Timisoara, 2010.
2. Chirila Ciprian-Bogdan, *Sisteme de operare - note de curs*, www.cs.upt.ro/~chirila/lectures/so2/index.html, Timisoara, 2010.
3. Chirila Ciprian-Bogdan, *Compiler Design - lecture slides*, www.cs.upt.ro/~chirila/lectures/cd/index.html, Timisoara, 2010.
4. Marinescu Cristina (ed.) - *Proceedings of the 10th IEEE International Working Conference on Source Code Analysis and Manipulation (SCAM 2010)*, IEEE Computer Society Press, 2010.

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#### Research in DISTRIBUTED DATA BASES AND ARTIFICIAL INTELLIGENCE

#### RESEARCH TEAM

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- Prof. dr. eng. Ionel Jian
- Prof. dr. eng. Marius Crișan
- Assoc. Prof. dr. eng. Dan Pescaru
- Lect. dr. eng. Sorin Babii
- Assist. dr. eng. Cosmin Cernazanu
- Assist. dr. eng. Dan Ciresan

#### MAIN ACTIVITIES

- Designing and implementing relational databases with complex network structures
- Pattern recognition in medicine and chemistry
- Development of hybrid expert systems for research in medical IT
- Developing complex distributed databases and Internet access to databases in companies, banks and local administration

- Interdisciplinary cooperation for expert and cognitive systems development
- E-Learning Application-Oriented Intelligent Agent with Pedagogic Functions

#### PUBLISHED PAPERS

1. Naghiu F.M., Pescaru D., Jian I., *Adaptive Filtering Algorithm Based on Drivers Behavior*, Proc. IEEE International Conference on Intelligent Network and Computing (ICINC 2010), Kuala Lumpur, Malaysia, ISBN 978-1-4244-8270-2, Nov. 2010, pp. 174-178.
2. Naghiu F.M., Pescaru D., Jian I., *Prediction Algorithms for Overtaking Actions*, DepCoS-RELCOMEX'10, Book Chapter in Monographs of System Dependability, OVP Pub., ISBN 978-83-7493-526-5, Wroclaw, Poland, June 2010, 12 pp.
3. Naghiu F., Pescaru D., Gavrilă V., Jian I., Curiac D., *Influence of Particle Filter Parameters on Error Correction Accuracy in Traffic Surveillance Using Sensor Networks*, Proc. 14th IEEE International Conference on Intelligent Engineering Systems, (INES 2010) Gran Canaria, Spain, ISBN 978-1-4244-7650-3, May 2010, pp. 183-188.
4. Gavrilă V., Naghiu F., Pescaru D., *Towards using Particle Filtering for Increasing Error Correction Accuracy in Traffic Surveillance Applications*, Proc. IEEE International Joint Conferences on Computational Cybernetics and Technical Informatics (ICCC-CONTI 2010), Timisoara, Romania, ISBN 978-1-4244-7432-5, May 2010, pp. 321-326.
5. Istin C., Pescaru D., Ciocarlie H., *Performance Improvements of Video WSN Surveillance in Case of Traffic Congestions*, Proc. IEEE International Joint Conferences on Computational Cybernetics and Technical Informatics (ICCC-CONTI 2010), Timisoara, Romania, ISBN 978-1-4244-7432-5, May 2010, pp. 659-663.
6. Istin C., Pescaru D., Ciocarlie H., Doli A., *Monte-Carlo Simulation of a Dynamic Coverage Preservation Algorithm for Video Wireless Sensor Networks*, DepCoS-RELCOMEX'10, Book Chapter in Monographs of System Dependability, OVP Pub., ISBN 978-83-7493-526-5, Wroclaw, Poland, June 2010, 12 pp.
7. Martin C., Pescaru D., *Predicting Indoor Temperature Variation through Sensor Data Pattern Analysis*, Proc. IEEE International Joint Conferences on Computational Cybernetics and Technical Informatics (ICCC-CONTI 2010), Timisoara, Romania, ISBN 978-1-4244-7432-5, May 2010, pp. 665-670.

8. Gavrilescu M., Magureanu G., Pescaru D., Doboli A., *A Simulation Framework for PSoC-based Cyber Physical Systems*, Proc. IEEE International Joint Conferences on Computational Cybernetics and Technical Informatics (ICCC-CONTI 2010), Timisoara, Romania, ISBN 978-1-4244-7432-5, May 2010, pp. 137-142.
9. Gavrilescu M., Magureanu G., Pescaru D., Doboli A., *Accurate Modeling of Physical Time in Asynchronous Embedded Sensing Networks*, Proc. 8th IEEE International Symposium on Intelligent Systems and Informatics (SISY 2010), Subotica, Serbia, ISBN 978-1-4244-7394-6, Sep. 2010, pp. 477-482.
10. Magureanu G., Gavrilescu M., Pescaru D., Doboli A., *Towards UML Modeling of Cyber-Physical Systems: A Case Study for Gas Distribution*, Proc. 8th IEEE International Symposium on Intelligent Systems and Informatics (SISY 2010), Subotica, Serbia, ISBN 978-1-4244-7394-6, Sep. 2010, pp. 471-476.
11. Magureanu G., Gavrilescu M., Pescaru D., Doboli A., *UML Support for Optimizing Goals of Distributed Control in Traffic Management Applications*, Proc. IEEE International Workshop on Robotic and Sensors Environments (ROSE 2010), Phoenix, AZ, USA, ISBN 978-1-4244-7147-8, Oct. 2010, pp. 1-6.
12. Curiac D., Plastoi M., Baniias O., Volosencu C., Tudoroiu R., Pescaru D., *Software Development for Malicious Nodes Discovery in Wireless Sensor Network Security*, Proc. 4th International Conf. on Sensor Technologies and Applications (SENSORCOMM 2010), Venice, Italy, ISBN 978-0-7695-4096-2, July 2010, pp. 402-407.
13. Curiac D., Baniias O., Volosencu C., Pescaru D., *Cellular Automata Based Simulation for Smoke and Fire Spreading in Large Buildings*, Proc. International Conf. on Development, Energy, Environment and Economics (DEEE 2010), Tenerife, ISBN 978-960-474-253-0, Dec. 2010, pp. 89-94.
14. Hurjui C., Holban S., A. Graur, *Quantifying Cryptographic Techniques in Radio Frequency Identification Protocols and Ways of Remedying -The Security Threats*, WSEAS Transactions on Communications, ISSN 1109-2742, vol. 9, no. 7, July 2010, pp. 406-417.
15. Hurjui C., Holban S., Graur A., *Comparison of RFID Protocols on Harmful Points that Threaten the Security and Privacy of RFID Structures*, Proc. 12th WSEAS Int. Conf. on Mathematical Methods, Computational Techniques and Intelligent Systems (MAMECTIS 2010), Sousse, Tunisia, ISBN 978-960-474-188-5, May 2010, pp. 223-228.
16. Penesel R., Stefan H., *Corelational Analysis of Phenomenon "Road Accident", Using Data Mining Techniques*, Proc. 31st National Conference on Medical Informatics (RO-MEDINF 2010), Arad, ISBN 978-606-8054-14-8, Nov. 2010, pp. 290-297.
17. Malea A.-G., Melita N., Holban S., *Analysis and Determination of Risk Factors Leading to Preterm Birth using Data Mining Techniques in R*, Proc. 31st National Conference on Medical Informatics (RO-MEDINF 2010), Arad, ISBN 978-606-8054-14-8, Nov. 2010, pp. 274-284.
18. Malea A.-G., Holban S., Melita N., *Analysis and Determination of Risk Factors Leading to Preterm Birth Using Data Mining Techniques in R*, Proc. 10th International Conference on Development and Application Systems (DAS 2010), Suceava, Romania, ISSN 1582-7445, May 2010, pp. 338-341.
19. Crisan M., *Upon Phoneme Synthesis Based on Dynamic Semantic Modeling*, Proc. 2nd IEEE International Conference on Software Engineering and Data Mining (SEDM 2010), Chengdu, China, ISBN 978-1-4244-7324-3, June 2010, pp. 467-472.
20. Pârvu O., Bălan A.G., Jian I., *Migrating 2D Barcode Technology to the Online in-browser Environment*, Proc. IEEE International Joint Conferences on Computational Cybernetics and Technical Informatics (ICCC-CONTI 2010), Timisoara, Romania, ISBN 978-1-4244-7432-5, May 2010, pp. 271-274.

#### BOOKS

1. Crisan M., *Convergence towards a Dynamic Theory of Linguistics and Semantics*, in *Convergence and Hybrid Information Technologies*, editor M. Crisan, Intech Publ. Vukovar, Croatia, ISBN 978-953-307-068-1, 2010.

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## AUTONOMOUS RESEARCH GROUPS

### DEPARTMENT OF AUTOMATION AND APPLIED INFORMATICS

#### MAIN RESEARCH FIELDS

- System theory applications in fault detection and diagnosis
- System analysis using sensitivities
- Development of control system devices
- Interpolative, fuzzy and neural systems
- Virtual instrumentation in control
- Control of electrical drives
- Time-delay systems
- Biomedical modeling
- Quality Management

### Research group in APPLIED SYSTEMS THEORY

#### RESEARCH TEAM

- Prof. dr. eng. Toma-Leonida Dragomir, head of the team
- Prof. dr. eng. Constantin Voloşencu
- Lecturer dr. eng. Dorina Popescu
- Lecturer dr. eng. Sorin Nanu
- Assist. eng. Ana Maria Dan
- Lecturer dr. eng. Adrian Korodi
- Eng. Flavius M. Petcuț, PhD Student
- Eng. Alexandru Codrean
- Eng. Vlad Ceregan
- Student Ioana Jiveț
- Student Angela Timofte

#### MAIN RESEARCH FIELDS

- System theory applications in fault detection and diagnosis
- System analysis using sensitivities
- Development of control system devices
- Interpolative, fuzzy and neural systems
- Virtual instrumentation in control
- Control of electrical drives
- Time-delay systems
- Management of the innovation and creativeness
- Sensor networks
- System identification
- Modeling the cardiovascular system with its nervous control
- Modeling of photovoltaic systems

#### KEYWORDS

Fault detection; identification and diagnosis; modeling; system safety and availability; controller design; process control; interpolating strategies; fuzzy logic; neural networks; control of electrical drives; virtual instruments; sensor networks; system

identification; time-delay systems; cardiovascular system; nervous control.

### RESULTS

#### PUBLISHED PAPERS

1. Korodi A., Dragomir T.L., *Correcting Odometry Errors for Mobile Robots Using Image Processing*, Proc. IAENG International Conference on Control and Automation, Hong Kong, ISBN 978-988-17012-4-1, ISSN 2078-0958, vol. 2, March 2010, pp. 1040-1045.
2. Codrean A., Ceregan V., Dragomir T. L., Korodi A., *Interpolative Frequency Characteristics Generators for the Vestibular Nucleus Activity*, Proc. IAENG International Conference on Bioinformatics, Hong Kong, ISBN 978-988-17012-8-2, ISSN 2078-0958, vol. 1, March 2010, pp. 195-199.
3. Korodi A., Ceregan V., Dragomir T. L., Codrean A., *A Continuous-Time Dynamical Model for the Vestibular Nucleus*, Proc. 12th Mediterranean Conference on Medical and Biological Engineering and Computing - IFMBE (MEDICON 2010), Chalkidiki, Greece, ISBN 978-3-642-13038-0, ISSN 1680-0737, May 2010, pp. 627-630.
4. Ceregan V., Korodi A., Dragomir T. L., Codrean A., *An Adaptive Interpolative Based Model for the Vestibular Nucleus*, Proc. IEEE International Joint Conferences on Computational Cybernetics and Technical Informatics (ICCC-CONTI 2010), Timisoara, Romania, ISBN 978-1-4244-7432-5, May 2010, pp. 31-36.
5. Korol T., Korodi A., *Predicting Bankruptcy with the Use of Macroeconomic Variables*, Journal of Economic Computation and Economic Cybernetics Studies and Research, ISSN 0424-267X, vol. 44, no. 1, Jan. 2010, pp. 201-220.
6. Petcuț F.M., Dragomir T.L., *Solar Cell Parameter Identification Using Genetic Algorithms*, Journal of Control Engineering and Applied Informatics (CEAI), ISSN 1454-8658, vol. 12, no. 1, Jan. 2010, pp. 30-37.
7. Dragomir T. L., Petreuş D. M., Petcuț F. M., Ciocan I. C., *Comparative Analysis of Identification Methods of the Photovoltaic Panel Characteristics*, Proc. IEEE International Conference on Automation Quality and Testing Robotics (AQTR 2010), Cluj-Napoca, ISBN 978-1-4244-6724-2, May 2010, vol. 3, pp. 64-69.

8. Dragomir T. L., Petcut F. M., Dragomir L. E., *Maximum Power Point Determination for a Photovoltaic Panel using a Simulink Model*, Proc. 4th International Workshop on Soft Computing Applications (SOFA 2010), Arad, Romania, ISSN 978-1-4244-7983-2, July 2010, pp. 221-224.
9. Dragomir T. L., Petcuț F. M., *Look Up Models for Maximum Power Point of Photovoltaic Panels*, Lucrările Conferinței Naționale "Zilele academice ale ASTR", Craiova, ISSN 2066-6586, Sep. 2010, pp. 289-296.

#### Research group in *PROCESS CONTROL*

##### RESEARCH TEAM

- Assoc. Prof. dr. eng. Florin Drăgan
- Assist. dr. eng. Daniel Iercan
- Assist. eng. Onuț Lungu
- Assist. eng. Emil Voişan
- Assist. eng. Lucian Fedorovici

##### RESEARCH FIELDS

- Programmable Logic Controllers
- Remote control
- Operating Systems
- Real-time Programming

##### KEYWORDS

Real-time programming, remote control, robots, image processing

##### ACTIVITIES

- hard real-time technologies
- robot motion and control

##### PUBLISHED PAPERS

1. Ghosal A., Iercan D., Kirsch C. M., Henzinger T. A., Sangiovanni-Vincentelli A. L., *Separate Compilation of Hierarchical Real-Time Programs into Linear-Bounded Embedded Machine Code*, Science of Computer Programming, Elsevier (in press), ISSN 0167-6423, pp. 180-197. (IF = 1.459)
2. Fedorovici L.-O., Voisan E., Dragan F., Iercan D., *Improved Neural Network OCR Based on Preprocessed Blob Classes*, Proc. IEEE International Joint Conferences on Computational Cybernetics and Technical Informatics (ICCC-CONTI 2010), Timisoara, Romania ISBN 978-1-4244-7432-5, May 2010, pp. 559-565.

##### STRATEGIC PRIORITIES

- Hard real-time control
- Remote control
- Image processing

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#### Research group in *CRYPTOLOGY AND INFORMATION SECURITY*

##### RESEARCH TEAM

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- Assist. eng. Lavinia Dragomir
- Assist. eng. Raul Robu
- Assist. eng. Căiman Dadiana
- Eng. Murvay Pal-Ștefan

##### RESEARCH FIELDS

- Authentication protocols
- Public-key cryptography
- Provable Security
- Foundations of cryptology
- Number theory
- Applied cryptography

##### KEYWORDS

Authentication protocols; digital signatures; public-key cryptography; entity authentication; message authentication; cryptography; cryptanalysis; one-way functions; trapdoor one-way functions; number theory; complexity theory.

##### PUBLISHED PAPERS

1. Groza B., Minea M., *A Formal Approach for Automatic Detection of off-Line and Undetectable on-Line Guessing*, Proc. 14th Financial Cryptography (FC 2010), Tenerife, Spain, ISBN 978-3-642-14576-6, Jan. 2010, pp. 391-400.

#### RESEARCH GRANTS AND PROJECTS

##### National grants and projects

1. Research Grant in 2nd Romanian National Research Program PN2, Section: Ideas Programme; Project title: *Research in Design and Implementation of Modern Solutions for Secured Information in Distributed Systems, SCADA, DCS and Remote Control with Applications in Gases Distribution*, Project no. 15492/14.09.2007, period 2007-2010; Director: Prof. Ioan Silea (total financial value 254.000 Lei)

##### BOOKS

1. Dragomir Lavinia, *Aplicatii de matematica asistate de calculator*, Editura Politehnica, Timisoara, ISBN 978-554-078-1, 2010.

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**Research group in BIOMEDICAL ENGINEERING****RESEARCH TEAM**

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- Lect. dr. eng. Adriana Albu
- Lect. dr. eng. Loredana M. Stanciu

**RESEARCH FIELDS**

- Friability of Medical Equipments
- Bionics
- Medical Diagnosis and Medical Informatics
- Artificial Intelligence (Expert Systems, Artificial Neural Networks)
- Medical Image Processing
- Human Hand Prosthesis
- Prehension

**KEYWORDS**

Cochlear implantation; medical diagnosis; expert systems; human hand prosthesis; prehension

**ACTIVITIES**

- Testing protocols for patients with cochlear implants
- Development of decisional systems
- Development of an artificial hand hydraulically actuated

**PUBLISHED PAPERS**

1. Albu A., Pamintas E., Banciu F., Carausu C., Ruset V., Belgiu G., *Turn-Milling Process Parameters Optimisation Using an Artificial Intelligence System*, Proc. 14-th International Conference Modern Technologies, Quality and Innovation-New face of TMCR (ModTech 2010), Slanic-Moldova, Romania, ISSN 2066-3919, May 2010, pp. 23-26.
2. Belgiu G., Mee R., Ruset V., Carausu C., Albu A., *Molded Plastic Part Analysis, Reasoning and Optimisation using CAD-CAE System*, Proc. 14-th International Conference Modern Technologies, Quality and Innovation -New face of TMCR (ModTech 2010), Slanic-Moldova, Romania, ISSN 2066-3919, May 2010, pp. 111-114.

**RESEARCH GRANTS**

1. *Professional Training of Regional Support Cells for Social and Professional Integration of Deaf Persons with Cochlear Implants*, Grant POSDRU/37/3.2/G/21608, 2009-2010.

**STRATEGIC PRIORITIES**

- Testing protocols for cochlear implantation
- The communication interface between a hand prosthesis and the human body
- Decision-making using Bayesian Networks and Markov Chains

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