

# 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: Prof. dr. eng. Marius Crişan

## 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
- Dipl. eng. Claudia-Adina Dragoş, PhD student
- Dipl. eng. Mircea-Bogdan Rădac, PhD student
- Dipl. eng. Daniela Bărbulescu, PhD student.

### RESEARCH FIELDS

- Conventional control system structures
- Advanced control systems.

### KEYWORDS

Fuzzy logic control; iterative methods; sliding mode control; intelligent systems; optimization; 2-DOF control; stability analysis; sensitivity analysis; robustness; convergence; mobile robots; servo systems; embedded systems; signal processing.

### MAIN ACTIVITIES

- Development of conventional and advanced control systems
- Signal processing in control systems
- 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., Petriu E. M., Tar J. K., Tomescu M. L., Pozna C., *Generic Two-Degree-Of-Freedom Linear and Fuzzy Controllers for Integral Processes*, Journal of The Franklin Institute (Elsevier Science), ISSN 0016-0032, vol. 346, no. 10, 2009, pp. 980-1003.
2. Pozna C., Troester F., Precup R.-E., Tar J. K., Preitl S., *On the Design of an Obstacle Avoiding Trajectory: Method and Simulation*, Mathematics and Computers in Simulation (Elsevier Science), ISSN 0378-4754, vol. 79, no. 7, 2009, pp. 2211-2226.
3. Precup R.-E., Tomescu M.-L., Preitl S., Petriu E.M., *Fuzzy Logic-Based Stabilization of Nonlinear Time-Varying Systems*, International Journal of Artificial Intelligence (Indian Society for Development & Environment Research), ISSN 0974-0635, vol. 3, no. A09, 2009, pp. 24-36.
4. Preitl S., Precup R.-E., Tomescu M.-L., Rădac M.-B., Petriu E. M., Dragoş C.-A., *Model-Based Design Issues in Fuzzy Logic Control*, Towards Intelligent Engineering and Information Technology, editors: I.J. Rudas, J. Fodor, J. Kacprzyk, Studies in Computational Intelligence, vol. 243, Springer, ISBN 978-3-642-03736-8, ISSN 1860-949X (Print); 1860-9503 (Online), 2009, pp. 137-152.
5. Precup R.-E., Rădac M.-B., Preitl S., Petriu E.M., Dragoş C.-A., *Iterative Feedback Tuning in Linear and Fuzzy Control Systems*, Towards Intelligent Engineering and Information Technology, Editors: I.J. Rudas,

- J. Fodor, J. Kacprzyk, *Studies in Computational Intelligence*, vol. 243, Springer, ISBN 978-3-642-03736-8, ISSN 1860-949X (Print); 1860-9503 (Online), 2009, pp. 179-192.
6. Pozna C., Precup R.-E., Preitl S., Troester F., Tar, J.K., *Points of View on Building an Intelligent Robot*, Towards Intelligent Engineering and Information Technology, Editors: I.J. Rudas, J. Fodor, J. Kacprzyk, *Studies in Computational Intelligence*, vol. 243, Springer, ISBN 978-3-642-03736-8, ISSN 1860-949X (Print); 1860-9503 (Online), 2009, pp. 263-277.
  7. Rădac M.-B., Precup R.-E., Preitl S., Tar J.K., Burnham, K., *Tire Slip Fuzzy Control of a Laboratory Anti-lock Braking System*, Proc. European Control Conference 2009, ECC'09, Budapest, Hungary, ISBN 978-963-311-369-1, 2009, pp. 940-945.
  8. Rădac M.-B., Precup R.-E., Petriu E.M., Preitl S., Dragoş C.-A., *Iterative Feedback Tuning Approach to a Class of State Feedback-Controlled Servo Systems*, Proc. 6<sup>th</sup> International Conference on Informatics in Control, Automation and Robotics, ICINCO 2009, Milan, Italy, ISBN 978-989-8111-99-9, vol. 1, Intelligent Control Systems and Optimization, 2009, pp. 41-48.
  9. Precup R.-E., Rădac M.-B., Preitl S., Tomescu M.-L., Petriu, E.M., Paul, A.S., *IFT-based PI-fuzzy Controllers: Signal Processing and Implementation*, Proc. 6<sup>th</sup> International Conference on Informatics in Control, Automation and Robotics, ICINCO 2009, Milan, Italy, ISBN 978-989-8111-99-9, vol. 1 Intelligent Control Systems and Optimization, 2009, pp. 207-212.
  10. Precup R.-E., Preitl S., Petriu, E.M., Tar, J.K., Rădac M.-B., Dragoş C.-A., *Stable Design of Fuzzy Controllers for Robotic Telematipulation Applications*, Proceedings of 2009 IEEE Workshop on Computational Intelligence in Virtual Environments, CIVE 2009, Nashville, TN, USA, ISBN 978-1-4244-2772-7, 2009, pp. 1-6.
  11. Rădac M.-B., Precup R.-E., Preitl S., Petriu E.M., Dragoş C.-A., Paul A.S., Kilyeni S., *Signal Processing Aspects in State Feedback Control Based on Iterative Feedback Tuning*, Proc. 2nd International Conference on Human System Interaction, HIS'09, Catania, Italy, ISBN 978-1-4244-3960-7, 2009, pp. 40-45.
  12. Dragoş C.-A., Preitl S., Precup R.-E., *Electromagnetic Actuator in Mechatronic System*, Proc. 15th International Conference on Electrical Drives and Power Electronics, EDPE 2009, Dubrovnik, Croatia, ISBN 978-953-6037-55-1, 2009, CD-ROM paper index T03-003, 6p.
  13. Precup R.-E., Rădac M.-B., Preitl S., Petriu E.M., Fodor J., *On the Optimal Design of Low-Cost Fuzzy Controllers for Ship Course Control*, Proc. 51st International Symposium, ELMAR-2009, Zadar, Croatia, ISBN 978-953-7044-10-7, 2009, pp. 163-166.
  14. Precup R.-E., Gavriluță C., Rădac M.-B., Preitl S., Dragoş C.-A., Tar J.K., Petriu E.M., *Iterative Learning Control Experimental Results for Inverted Pendulum Crane Mode Control*, Proc. 7th International Symposium on Intelligent Systems and Informatics, SISY 2009, Subotica, Serbia, ISBN 978-1-4244-5349-8, 2009, pp. 323-328.
  15. Dragoş C.-A., Preitl S., Precup, R.-E., *Model Predictive Control Solutions for an Electromagnetic Actuator*, Proc. 7th International Symposium on Intelligent Systems and Informatics, SISY 2009, Subotica, Serbia, ISBN 978-1-4244-5349-8, 2009, pp. 59-64.
  16. Dragoş C.-A., Preitl S., Precup R.-E., Creţiu M., Fodor J., *Modern Control Solutions for Mechatronic Servosystems. Comparative Case Studies*, Proc. 10th International Symposium of Hungarian Researchers on Computational Intelligence and Informatics, CINTI 2009, Budapest, Hungary, ISBN 978-963-7154-96-6, 2009, pp. 69-82.

#### BOOKS

1. Preitl S., Precup R.-E., Preitl Zs., *Process Control Structures and Algorithms*, vol. 1 (in Romanian: Structuri si algoritmi pentru conducerea automata a proceselor), Editura Orizonturi Universitare Publishers, Timisoara, ISBN 978-973-638-362-5, 2009, 214 pages.
2. Preitl S., Precup R.-E., Preitl Zs., *Process Control Structures and Algorithms*, vol. 2 (in Romanian: Structuri si algoritmi pentru conducerea automata a proceselor), Editura Orizonturi Universitare Publishers, Timisoara, ISBN 978-973-638-429-5, 2009, 272 pages.

#### 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 – 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 for 2008: 44.499 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 Radac, 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. 4 papers were presented and/or published in journals and conference proceedings.

#### International grants and projects

1. Bilateral research contract, 2008-2009, partners: “Politehnica” University of Timisoara (PUT), Romania, and Budapest Tech Polytechnical Institution (BMF), Hungary, Type PN2 Capacities Module III Programme (2008-2009), Protocol of the 4<sup>th</sup> Meeting of the Romanian - Hungarian Intergovernmental Committee on Cooperation in Science and Technology / 18.02.2008; RO ID 39 in Annex, Title: *Integration of Iterative Learning Control (ILC) and Fuzzy Methods in Intelligent Control Systems*. Directors: Prof. dr. eng. Stefan Preitl (PUT, Romanian partner) and Prof. dr. Janos Fodor (BMF, Hungarian partner), (granted value for 2009: 13.157 LEI and 8.000 EUR)

Research team: Prof. Stefan Preitl – director of Romanian partner, Prof. Radu-Emil Precup – associate director of Romanian partner, Assoc. Prof. Florin Drăgan, Assist. Prof. Emil Voişan,

Assist Prof. Daniel Iercan, PhD student Claudia-Adina Dragoş.

The grant concerns the analysis, development and implementation of new intelligent fuzzy control structures, design techniques and applications on iterative feedback control. The mathematical support is very complex, and the approach needs a strong cooperation between specialist in mathematic/informatics and control engineers. Consequently, ILC techniques treated by the Romanian partner are completed by fuzzy logic techniques, which are one of the main research areas at the Hungarian partner.

Fuzzy controllers are developed usually in heuristic manner, and the obvious necessity for systematic development methods dedicated to these controllers has not been covered yet. Besides the sensitivity and stability analysis of fuzzy systems is in permanent actuality.

The two research teams co-organize biannually the International Symposiums on Applied Computational Intelligence and Informatics (SACI), in Timisoara, dedicated to the exchange of research results in the field. 6 joint papers were presented and/or published in journals and conference proceedings.

2. Bilateral research contract, 2008-2009, partners: “Politehnica” University of Timisoara (PUT), Romania, and University of Ljubljana (UL), Slovenia, Type PN2 Capacities Module III Programme (2008-2009), Protocol of the Third Meeting of the Joint Committee for Scientific and Technological Co-operation between Romania and the Republic of Slovenia/ 11.12.2007-24.12.2007; ID no 3 in Annex 1. Title: *New Results in Development and Applications of Fuzzy Control Systems*. Directors: Prof. dr. eng. Radu-Emil Precup (PUT, Romanian partner) and Assoc. Prof. dr. Škrjanc (UL, Slovenian partner), (granted value for 2009: 13.557 LEI and 8.000 EUR)

Research team: Radu-Emil Precup – director of Romanian partner, Prof. Stefan Preitl – associate director of Romanian partner, Assoc. Prof. Florin Drăgan, Lect. Dan Ungureanu-Anghel, Assist. Prof. Emil Voişan, Assist. Prof. Daniel Iercan, PhD student Claudia-Adina Dragoş, PhD student Mircea-Bogdan Radac.

The grant deals with the development and implementation of new fuzzy control structures and design techniques that employ the stability analysis, the sensitivity analysis with respect to parametric variations of the controlled plants, the predictive control techniques and the fuzzy modeling. Several classes of fuzzy control systems are investigated. It is justified to unify and complement the efforts of the two research

teams to contribute to better systematic application-oriented approaches resulting in low-cost fuzzy control systems.

The control solutions created by the two research teams are supported by their previous experience. The results are tested in several industrial and non-industrial applications. The laboratory equipment at both partners allows the implementation of fuzzy controllers aiming the illustration of the performance improvements. 1 joint ISI journal paper has been accepted for publication.

#### 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
- 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 Feedback Tuning and Iterative Learning 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. eng. Iosif Szeidert
- Assist. eng. Cristian Vașar
- Assist. eng. Andreea Robu, PhD student
- Assist. eng. Raul Robu, 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. Filip I., Vasar C., Robu R., *Considerations about an Oracle Database Multi-Master Replication*, Proc. 5th International Symposium on Applied Computational Intelligence, SACI 2009, Timisoara, Romania, ISBN 978-1-4244-4478-6, May 2009, pp. 147-151.
2. Szeidert I., Filip I., *Modeling and Simulation of a Doubly-Fed Induction Machine Operating in Generator Regime with a Angle Lagged Windings*, Proc. 5th International Symposium on Applied Computational Intelligence, SACI 2009, Timisoara, Romania, ISBN 978-1-4244-4478-6, May 2009, pp. 341-344.
3. Paunescu D., Babescu M., Prostean O., Szeidert I., *Stability of the Synchronous Generators within Wind Energy Power Systems*, Proc. 5th International Symposium on Applied Computational Intelligence, SACI 2009, Timisoara, Romania, ISBN 978-1-4244-4478-6, May 2009, pp. 251-254.
4. Szeidert I., Biriescu M., Mihet-Popa L., Toader D., *Analysis by Numerical Simulation regarding the Stability of the Synchronous Generator Operating in Autonomous or Grid Connected Regime*, Proc. 5th International Symposium on Applied Computational Intelligence SACI 2009, Timisoara, Romania, ISBN 978-1-4244-4478-6, May 2009, pp. 261-264.
5. Szeidert I., Prostean O., Budisan N., Filip I., Balas V. E., Prostean G., *Actual Situation and Perspectives on Wind Energy Usage in Banat Region*, WSEAS Transactions on Systems and Control, ISSN 1991-8763, Issue 8, Vol. 4, Aug. 2009, pp. 369-372.
6. Vasar C, Prostean O., Filip I., Robu R., Popescu D., *Markov Models for Wireless Sensor Network Reliability*, Proc. IEEE 5th International Conference on Intelligent Computer Communication and Processing, Cluj-Napoca, Romania, ISBN 978-1-4244-5007-7, Aug. 2009, pp. 323-328.
7. Vasar C, Prostean O., Filip I., Robu R., *A Reliability Analysis for Wireless Sensor Networks in a Wind Farm*, Proc. 22th International Conference in Information, Communication & Automation Technologies, ICAT 2009, Sarajevo, Bosnia Herzegovina, ISBN 978-1-4244-4221-8, Oct. 2009, CD-ROM, 5 pp.
8. Szeidert I., Prostean O., Budisan N., Filip I., Balas V. E., Prostean G., *Viewpoint on Wind Energy Usage in Romania- Banat Region*, Proc. 11th WSEAS International Conference on Sustainability in Science Engineering, SSE'09, Timisoara, Romania, ISSN 1790-2769, ISBN 978-960-474-080-2, May 2009, pp. 17-21.
9. Tirian G. O., Prostean O., Filip I., *Control System of the Continuous Casting Process for Cracks Removal*, Proc. 5th International Symposium on Applied Computational Intelligence, SACI 2009, Timisoara, Romania, ISBN 978-1-4244-4478-6, May 2009, pp. 265-269.
10. Szeidert I., Mihet-Popa L., Prostean O., Groza V., *Modeling, Control Design and Simulation of a Grid Connection Control Mode for a Small Variable-Speed Wind Turbine System*, Proc. IEEE 7th Annual Electrical Power and Energy Conference "Sustainable/ Renewable Energy Systems and Technologies", EPEC 2009, Montreal, Quebec, Canada, Oct. 2009, 6pp.
11. Cristea A. D., Prostean O., Muschalik T., Tirian G. O., *Using SAP Netweaver to Implement a New Authorization Concept based on Qualifications and Physical Connection through RFID*, Annals of DAAAM 2009 & Proc. 20th International DAAAM Symp. "Intelligent Manufacturing & Automation: Focus on Theory, Practice and Education", Vienna, Austria, ISSN 1726-9679, ISBN 978-3-901509-70-4, Vol. 20, No. 1, Nov. 2009, pp. 1617-1618.
12. Tirian G. O., Prostean O., Rusu-Anghel S., Pinca-Bretotean C., Cristea A. D., *Fuzzy System for Implementing the Cracks Control During the Continuous Casting*, Annals of DAAAM 2009 & Proc. 20th International DAAAM Symp. "Intelligent Manufacturing & Automation: Focus on Theory, Practice and Education", Vienna, Austria, ISSN 1726-9679, ISBN 978-3-901509-70-4, Vol. 20, No. 1, Nov. 2009, pp. 1661-1662.
13. Cristea A. D., Prostean O., Muschalik T., Tirian G. O., *An Access Control Pattern Based on Qualifications to Grand Access to Physic Resources*, Annals of DAAAM 2009 & Proc. 20th International DAAAM Symposium "Intelligent Manufacturing & Automation: Focus on Theory, Practice and Education", Vienna, Austria, ISSN 1726-9679, ISBN 978-3-901509-70-4, Vol. 20, No. 1, Nov. 2009, pp. 1765-1766.
14. Prostean G., Robu R., Prostean O., Taroata A., *Considerations Regarding the Integration of*

*the Cost Centers Based on Sap Management Accounting*, Proceedings of 6th International Conference on the Management of Technological Changes, MTC 2009, Alexandroupolis, Greece, ISBN 978-960-89832-7-4, Sept. 2009, pp. 699-702.

15. Prostean G., Robu R., Prostean O., Taroata A., *The Management Of Creative Techniques To Enhance The Process Of Improvement*, Proceedings of 6th International Conference on the Management of Technological Changes, MTC 2009, Alexandroupolis, Greece, ISBN 978-960-89832-7-4, Sept. 2009, pp. 721-724.

## 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 Prostean, PhD, 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) using the National Instruments Data Acquisition Systems and by using 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, head of the team
- Prof. dr. eng. Vasile Stoicu-Tivadar
- Lect. dr. eng. Dorin Berian
- Assist. eng. Romina Pinteaa, PhD student
- Assists. eng. Raul Robu, PhD Student
- Assist. eng. Andreea Robu, PhD Student
- Eng. Vasile Topac, PhD student
- Eng. Mihaela Vida, PhD student
- Eng. Valentin Gomi, 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., *Software Flexibility Improvement for Document Oriented Applications*, Proc. IEEE 13th International Conference on Intelligent Engineering Systems, INES 2009, Barbados, Book Series: ISBN 978-1-4244-4111-2, April 2009, pp. 21-26.
2. Topac V., Stoicu - Tivadar V., *Software Architecture for Better Text-Based Information Accessibility*, Proc. 5th Advanced International Conf. on Telecommunications, AICT 2009, Venice, Italy, ISBN 978-1-4244-3840-2, May 2009, pp. 198-202.
3. Stoicu - Tivadar V., Stoicu -Tivadar L., Topac V., Berian D., *A Webservice-Based Alarm Solution in a Telecare System*, Proc. 5th International Symposium on Applied Computational Intelligence and Informatics, SACI 2009, Timisoara, Romania, ISBN 978-1-4244-4477-9, May 2009, pp. 117-122.
4. Stoicu-Tivadar V., Berian D., *A Generic Approach for Interfacing Databases and*

*Devices*, Proc. 5th International Symposium on Applied Computational Intelligence and Informatics, SACI 2009, Timisoara, Romania, ISBN 978-1-4244-4477-9, May 2009, pp. 369-374.

5. Pinteaa R., Stoicu-Tivadar L., *Improvements in Cardiology Workflow in a Hospital Using Mobile Software Solutions*, Proc. 5th International Symposium on Applied Computational Intelligence and Informatics, SACI 2009, Timisoara, Romania, ISBN 978-1-4244-4477-9, May 2009, pp. 387-390.
6. Stoicu-Tivadar L., Blobel B., Kern J., Masic I., Mihalas G., Orel A., Surjan G., Urosevic V., *Is There a Common Background to Support Better Healthcare in Central and South East Europe?*, Proc. Medical Informatics in a United and Healthy Europe, MIE 2009, Sarajevo, Bosnia Herzegovina, vol. 150, Studies in Health Technology and Informatics, ISBN 978-1-60750-044-5, Aug. 2009, pp. 5.
7. Robu A., Stoicu-Tivadar L., *Tissue Engineering in Fractured Mandible Reconstruction*, Proc. Medical Informatics in a United and Healthy Europe, MIE 2009, Sarajevo, Bosnia Herzegovina, vol. 150, Studies in Health Technology and Informatics, ISBN 978-1-60750-044-5, Aug. 2009, pp. 788.
8. Pinteaa R., Stoicu-Tivadar L., *Improving Cardiology Workflow in a Hospital Using a Mobile Software Solution*, Proc. Medical Informatics in a United and Healthy Europe, MIE 2009, Sarajevo, Bosnia Herzegovina, vol. 150, Studies in Health Technology and Informatics, ISBN 978-1-60750-044-5, Aug. 2009, pp. 365.
9. Topac V., Stoicu - Tivadar V., *Software Architecture for Improving Accessibility to Medical Text-Based Information*, Proc. Medical Informatics in a United and Healthy Europe, MIE 2009, Sarajevo, Bosnia Herzegovina, vol. 150, Studies in Health Technology and Informatics, ISBN 978-1-60750-044-5, Aug. 2009, pp. 146.

### 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 Pinteaa, 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 will develop:

- an experimental model for a specific local intelligent unit for the homes of the elderly people
- an experimental model for the Teleassistace 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 will contribute 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 Pintea, 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 advances Standards form the medical informatics domain - HL7, DICOM, EN 13606, adapted to the needs of the Romanian Healthcare system.

The planned R&D activities are:

- 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.

In this way, the project will develop a modular and flexible solution that one can adapt to any Healthcare organization, and can integrate 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.

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## Researches in *REAL-TIME CONTROL SYSTEMS*

### RESEARCH TEAM

- Prof. dr. eng. Nicolae Robu, head of the team
- Prof. dr. eng. Gheorghe-Daniel Andreescu
- Prof. dr. eng. Toma-Leonida Dragomir
- Prof. dr. eng. Ioan Silea
- Lecturer dr. eng. Sorin Nanu
- Assist. eng. Tiberiu Ionică
- PhD. student eng. Mihai Iacob
- PhD. student eng. Cristian Schlezinger

### RESEARCH FIELDS

- Advanced Control of AC drives: Sensorless Control of IPMSM; Fault-tolerant Control
- Automotive Electric Actuation Technologies
- Applications to Electric and Hybrid Vehicles.

### KEYWORDS

- Advanced control of electrical drives; Automotive electric actuation; Sensorless control; State and disturbance observers; Variable structure flux-observer with signal injection; Active flux observer; Fault-tolerance; Fuzzy-interpolating implementation
- Wind energy; Solar energy, Informatics systems, SCADA, Real-time implementations.

### MAIN ACTIVITIES

- Control systems in Automotive electric actuation technologies
- Development of Sensorless control system with hybrid observer from zero speed for starter-generator with IPMSM for EHV
- Sensorless control of high-speed SPMSM
- Wind turbine PMSG sensorless control
- Real-time implementation and testing using DSpace for Sensorless control system of AC drives
- Informatics systems
- Solar energy.

### RESULTS

#### PUBLISHED PAPERS

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2. Boldea I., Paicu M.C., Andreescu G.-D., Blaabjerg F., *“Active flux” DTC-SVM Sensorless Control of IPMSM*, IEEE Transactions on Energy Conversion, ISSN 0885-8969, vol. 24, no. 2, June 2009, pp. 314-322.
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10. Silea I., Petrica D., *Some Considerations Regarding the Use of Simulations versus Practical Experiences in Engineering Education*, Proc. 6th International Conference on Management of Technological Changes, MTC 2009, Alexandroupolis, Greece, ISBN 978-960-89832-8-1, Sept. 2009, pp. 185-188.

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## 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 2009: 4.200 EUR)

### National grants and projects

1. Research Grant in 2nd Romanian National Research Program PN2, Section: Partners in 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 2009: 39.000 Lei)
2. Research Grant in 2nd Romanian National Research Program PN2, Section: Ideas Program; 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; value for 2009: 28.000 Lei)

## PERSPECTIVE DOMAINS

- Automotive control
- Advanced control of electric drives, Robotics
- Real-time control using LabView
- Applications with FPGA using VHDL, Xilinx
- SCADA systems

## STRATEGIC PRIORITIES

- Control of EHV and Automotive Electric Actuator Technologies
- DSpace platform, LabView real-time platform
- SCADA systems

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## RESEARCH DIVISION IN COMPUTER AND SOFTWARE ENGINEERING

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## Researches in ADVANCED COMPUTING ARCHITECTURES AND SYSTEMS

### RESEARCH TEAM

- Prof. dr. eng. Mircea Vladutiu
- Lect. dr. eng. Lucian Prodan
- Lect. dr. eng. Mihai Udrescu-Milosav
- Assist. dr. eng. Alexandru Amaricai-Boncalo
- Assist. dr. eng. Oana Boncalo
- Assist. eng. Versavia Ancusa
- Eng. Răzvan Bogdan
- Eng. Cristian Ruican
- Eng. Flavius Opritoiu (PhD Student)

### MAIN ACTIVITIES

- Watchdog processor for reliability increasing of computers
- 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

## RESULTS

### PUBLISHED PAPERS

1. Amaricai A., Udrescu M., Prodan L., Vladutiu M., Boncalo O., *Hardware Integer Multiplier Design Based on Booth's Algorithms*, Scientific Bulletin of "Politehnica" University of Timisoara, Transactions on Automatic Control and Computer Science, ISSN 1224-600X, vol. 54(68), no. 1, Mar. 2009, pp. 25-31.
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3. Ruican C., Udrescu M., Prodan L., Vladutiu M., *Quantum Circuit Synthesis with Adaptive Parameters Control*, Proc. European Conference on Genetic Programming, EuroGP09, Tubingen, Germany, LNCS 5481, Springer, ISBN 978-3-642-01180-1, April 2009, pp. 339-350.
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10. Amaricai A., Boncalo O., *Improving the Performance of the Divide-Add Fused Operation Using Variable Latency Quotient Generation*, Proc. 12<sup>th</sup> Euromicro Conference on Digital System Design, DSD'09, ISBN 978-0-7695-3782-5, Aug. 2009, pp. 45-49.
11. Boncalo O., Amaricai A., *Reliability Analysis of Qubit Data Movement for Distributed Quantum Computation*, Proc. 12<sup>th</sup> Euromicro Conference on Digital System Design, DSD'09, ISBN 978-0-7695-3782-5, Aug. 2009, pp. 481-487.

### BOOKS

1. Prodan L., *Self-Repairing Memory Arrays Inspired by Biological Processes*, Editura "Politehnica", Timisoara, ISBN 978-973-625-820-6, 2009.
2. Bogdan R., *A Data Security Perspective on Information Transmission over Distributed Systems*, Editura "Politehnica", Timisoara ISBN 978-973-625-909-8, 2009.
3. Udrescu M., *Quantum Circuits Engineering. Efficient Simulation and Reconfigurable Quantum Hardware*, Editura "Politehnica", Timisoara, ISBN 978-973-625-815-2, 2009.
4. Ancusa V., *Problema Consensului in Calculul Tolerant la Defecte*, Editura "Politehnica", Timisoara, ISBN 978-973-625-895-4, 2009.

### RESEARCH GRANTS AND PROJECTS

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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
- Prof. dr. eng. Mircea Stratulat
- 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. eng. Daniela Stanescu

**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**

1. Anton A., Crețu V-I., *Unsupervised Exploration of Scientific Articles*, Proc. 5th International Symposium on Applied Computational Intelligence and Informatics, SACI 2009, Timisoara, Romania, ISBN 978-1-4244-4477-9, May 2009, pp. 539-544.
2. Popa A. S., Popa M., Szilagy D., *Sensor-Based Motion Control For A Mobile Robot*, Proc. 5th International Symposium on Applied Computational Intelligence and Informatics, SACI 2009, Timisoara, Romania, ISBN 978-1-4244-4477-9, May 2009, pp. 335-340.
3. Gambutan A. T., Popa M., *Smart Home. A Solution for Smart Lighting System*, Proc. 5th International Symposium on Applied Computational Intelligence and Informatics, SACI 2009, Timisoara, Romania, ISBN 978-1-4244-4477-9, May 2009, pp. 205-210.
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5. Stratulat B., Fuicu S., Klein I. Marcu M., *A Survey of Power Saving Techniques for Wireless Communications*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Automatic Control and Computer Science, ISSN 1224-600X, vol. 54(68), no. 1, March 2009, pp. 45-52.
6. Popescu B.S., Stancovici A., Stangaciu V., Certejan C., Marcu M., *Intelligent Wireless Distributed Network for Power Consumption Monitoring and Analysis*, Proc. 2009 IEEE Toronto International Conference-Science and Technology for Humanity, TIC-STH 2009, Toronto, Canada, Sept. 2009, pp. 730-735.
7. Marcu M., Fuicu S., Moldovan H., Popa M., Tudor D., *Energy Characterization of Mobile Devices and Applications Using Power-Thermal Benchmarks*, Microelectronics Journal, ISSN 0026-2692, vol. 40, no. 7, 2009, pp. 1141-1153.
8. Filote C., Alexa D., Pletea I. V., Micea M.-V., Ciufudean C., Cozgarea A.-M., *Robust-Adaptive Flux Observers in Induction Motor Drive Systems*, Proc. 12th IASTED International Conference on Intelligent Systems and Control, ISC 2009, Massachusetts, USA, ActaPress, ISBN 978-0-88986-814-4, Nov. 2009, pp. 127-134.
9. Stanciu C., Tudor D., Crețu V-I., *Towards an Adaptable Large Scale Project Execution Monitoring*, Proc. 5th International Symposium on Applied Computational Intelligence and Informatics, SACI 2009, Timisoara, Romania, ISBN 978-1-4244-4477-9, May 2009, pp.503-508.
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11. Tudor D., Stancovici A., Popescu B., Reisinger G., Cretu V.-I., *Zombie: A Home Automation Prototype for Retrofitted Environments*, Proc. 2nd International Conference on Pervasive Technologies Related to Assistive Environments, PETRA 2009, Corfu, Greece, ISBN 978-1-60558-409-6, June 2009, pp. 1-8.
12. Tudor D., Macariu G., Jebelean C., Crețu V., *Towards a Load Balancer Architecture for Multi-Core Mobile Communication Systems*, Proc. 5th International Symposium on Applied

- Computational Intelligence and Informatics, SACI 2009, Timisoara, Romania, ISBN 978-1-4244-4477-9, May 2009, pp. 391-396.
13. Tudor D., Macariu G., Jebelean C., Cretu V.-I., *Load Balancing in Modern Multi-Core Mobile Communication Systems*, Proc. 17th International Conference on Control Systems and Computer Science, CSCS 17, Bucharest, Romania, ISSN 2066-4451, May 2009, vol. 1, pp. 255-260.
  14. Tudor D., Macariu G., Schreiner W., Crețu V., *Experiments on a Grid Layer Prototype for Shared Data Programming Model*, Proc. 5th International Symposium on Applied Computational Intelligence and Informatics, SACI 2009, Timisoara, Romania, ISBN 978-1-4244-4477-9, May 2009, pp. 441-446.
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  18. Marcu M., Tudor D., Moldovan H., Fuicu S., Popa M., *Energy Characterization of Mobile Devices and Applications Using Power-Thermal Benchmarks*, Microelectronics Journal, ISSN 0026-2692, vol. 40, no. 7, 2009, pp. 1141-1153.
  19. Popa M., Popa A.S., Gambutan A.T., *Remote Temperature Monitoring and Regulating System for Indoor Location*, Proc. 5th International Symposium on Applied Computational Intelligence and Informatics, SACI 2009, Timisoara, Romania, ISBN 978-1-4244-4477-9, May 2009, pp. 235-240.
  20. Popa M., Marcu M., Popa A.S., *Wireless Sensory Control for Mobile Robot Navigation*, Proc. 7th International Symposium on Intelligent Systems and Informatics, SISY 2009, Subotica, Serbia, ISBN 978-1-4244-5349-8, Sept. 2009, pp. 197-201.
  21. Popa M., Slavici T., *Embedded Server with Wake on LAN Function*, Proc. EUROCON 2009 International IEEE Conference, Saint Petersburg, Russia, ISBN 978-1-4244-3860-0, May 2009, pp. 365-370.
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  23. Marcu M., *High-Level Thermal Profiling of Mobile Applications*, Proc. 15th International Workshop on Thermal Investigations of ICs and Systems, THERMINIC 2009, Leuven, Belgium, ISBN 978-1-4244-5881-3, Oct. 2009, pp. 144-149.
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  25. Tudoroiu N., Neacsu G., Ilias N., Cretu V.-I., Tudoroiu R.-E., *The Neural Simulator of the Pollution Factors Impact on the Quality of the Water inside the Romanian Harbour of Black Sea*, Proc. International Multiconference on Computer Science and Information Technologies, IMCSIT'09, Mragowo, Poland, ISSN 1896-7094, ISBN 978-83-60810-22-4, Oct. 2009, pp. 445-452.
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  27. Teodorescu R., Racoceanu D., Leow W.-K., Cretu V.-I., *Prospective Study for Semantic Inter-Media Fusion in Content-Based medical Image Retrieval*, Medical Imaging Technology, [arXiv:0811.4717], ISSN 0288-450X, vol. 26, no. 1, Jan. 2009, pp. 1-11.
  28. Tudoroiu R.-E., Cretu V.-I., Paquet J., *Investigations using the Rational Unified Process (RUP) Diagrams for Software Process Modeling*, Proc. International Multiconference on Computer Science and Information Technologies, IMCSIT'09, Mragowo, Poland, ISSN 1896-7094, ISBN 978-83-60810-22-4, Oct. 2009, pp. 437-443.
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- Control Patterns in Robotic Collectives*, Proc. Intelligent Robotics and Applications, Singapore, ISBN 978-3-642-10816-7, LNCS Series vol. 5928, Dec. 2009, pp. 165-173.
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  38. Holotescu C., Grosseck G., *Microblogging in educatie. Studiu de caz: Cirip.ro*, Scoala de vara "Informatica la castel", Arad, Studia Universitatis Vasile Goldiş Arad, ISSN 1453-103X, Aug. 2009, 6 pp.
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  43. Todinca T., Dumitrel Al., Holotescu C., *Software Tools for the Modeling and Simualtion of Biomass Gasification Processes*, Zilele Academice Timisene, May 2009.

#### **BOOKS**

1. Micea M. V., *Prelucrarea numerica a semnalelor in domeniul timp*, Editura Politehnica, Timisoara, ISBN 978-973-625-927-2, 2009.
2. Ciocarlie H., Erzse G., *Programming Techniques. Textbook*, Editura Orizonturi Universitare, Timisoara, ISBN 978-973-638-409-7, 2009.

#### **RESEARCH GRANTS AND PROJECTS**

1. *ICT-eMuCo: Embedded Multi-Core Processing for Mobile Communication Systems* director Cretu V.-I., team: Ciocarlie 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.
2. *Framework de Executie pentru optimizarea consumului aplicatiilor mobile*, director Marcu M., team: Popa M., Fuicu S., Tudor D., Stratulat B., Stratulat I., Contract No: 680/19.01.2009; financed by: CNCSIS; UPT value 61.758 RON.



3. *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.
4. *SICRAMAS: Sistem inteligent de conducere neliniara robust-adaptiva dupa fluxul rotoric 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
5. *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
6. *UNIQUE Integration of Particulate Abatement, Removal of Trace Elements and Tar Reforming in one Biomass Steam Gasification Reactor Yielding High Purity Syngas for Efficient CHP and Power Plants*, director Todinca T., team: Dumitrel A., Holotescu C., Contract No. 211517/2009.
7. *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

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#### Research in SOFTWARE ENGINEERING

##### RESEARCH TEAM

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- Assoc. Prof. dr. eng. Radu Marinescu

- Assist. dr. eng. Cristina Marinescu
- Assist. eng. Petru Mihancea
- Assist. eng. Dan Cosma
- Assist. eng. Adrian Petru Mierluțiu
- Assist. 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. Chise C., Jurca I., *Towards Early Performance Assessment Based on UML MARTE Models for Distributed Systems*, Proc. 5th International Symposium on Applied Computational Intelligence and Informatics, SACI 2009, Timisoara, Romania, ISBN 978-1-4244-4477-9, May 2009, pp. 521-528.
2. Mihancea P.-F., Marinescu R., *Discovering Comprehension Pitfalls in Class Hierarchies*, Proc. 13th European Conference on Software Maintenance and Reengineering, CSMR 2009, Kaiserslautern, Germany; ISSN 1534-5351, ISBN 978-0-7695-3589-0, March 2009, pp. 7-16.
3. Groza B., Minea M., *A Calculus to Detect Guessing Attacks*, Proc. 12th Information Security Conference, ISC 2009, Pisa, Italy, ISSN 0302-9743, LNCS Book Series vol. 5735, Sept. 2009, pp. 59-67.
4. Dig D., Tarce M., Radoi C., Minea M., Johnson, R., *Relooper: Refactoring for Loop Parallelism in Java*, Proc. 24th ACM SIGPLAN Conference Companion on Object Oriented Programming Systems Languages and Applications, OOPSLA 2009, Orlando, Florida, USA, Oct. 2009, pp. 793-794.
5. Ratiu D., Marinescu R., Jürjens J., *The Logical Modularity of Programs*, Proc. 16th Working Conference on Reverse Engineering, WCRE 2009, Lille, France, ISBN 978-0-7695-3867-9, Oct. 2009, pp. 123-127.
6. Cosma D. C., Marinescu R., *Representing Object-Oriented Distributed Systems to Focus the Process of Reverse Engineering*, Proc. 5th IEEE International Conference on Intelligent Computer Communication and Processing, ICCP'09, Cluj-Napoca, Romania, ISBN 978-1-4244-5007-7, Aug. 2009, pp. 191-198.
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- Computer Communication and Processing, ICCP'09, Cluj-Napoca, Romania, ISBN 978-1-4244-5007-7, Aug. 2009, pp. 199-206.
8. Chirila C.-B., Jebeleanu C., Francz K., *Testing Techniques for a Logic Representation Generator*, Proc. 5th IEEE International Conference on Intelligent Computer Communication and Processing, ICCP'09, Cluj-Napoca, Romania, ISBN 978-1-4244-5007-7, Aug. 2009, pp. 207-210.
  9. Chirila C.-B., *Mecanisme pentru reutilizarea de clase in tehnologia orientata-obiect*, Buletinul Stiintific al Universitatii Ioan Slavici, Timisoara, Tomul I, 2009, pp. 18-24.
  10. Bulychev P., Minea M., *An Evaluation of Duplicate Code Detection Using Anti-Unification*, Proc. 3rd International Workshop on Software Clones, with CSMR 2009, IWSC'2009, Kaiserslautern, Germany, March 2009, CDROM, pp. 6.
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- Systems*, Editura Politehnica, Timisoara, ISBN 978-973-625-847-3, 2009, pp. 141.
4. Mihancea P.F., *A Novel Client-Driven Perspective on Class Hierarchy Understanding and Quality Assessment*, Editura Politehnica, Timisoara, ISBN 978-606-554-006-4, 2009, pp. 144.
  5. C.D. Cosma, *Reverse Engineering Object-Oriented Distributed Systems*, Editura Politehnica, Timisoara, ISBN 978-973-625-884-8, 2009, pp. 152.
  6. Cosma C.D., *Programarea aplicatiilor distribuite: Indrumator de laborator*, Editura de Vest, Timisoara, ISBN 978-973-36-0501-0, 2009, pp. 154.
  7. Chirila C.-B., *Structuri de date si algoritmi. Sisteme de operare - Indrumator de laborator*, Editura Fundatiei de cultura si invatamant Ioan Slavici, ISBN 978-973-88962-7-7, 2009, pp. 100.

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

#### RESEARCH TEAM

- Prof. dr. eng. Ștefan Holban
- Prof. dr. eng. Ionel Jian
- Prof. dr. eng. Marius Crișan
- Assoc. Prof. dr. eng. Dan Pescaru
- Lect. dr. eng. Sorin Babii
- Assist. eng. Cosmin Cernazanu
- Assist. 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. Lihu A., Holban S., *Top Five Most Promising Algorithms In Scheduling*, Proc. 5th International Symposium on Applied Computational Intelligence and Informatics,

#### RESEARCH 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 149.115 Lei
2. *Asigurarea Calitatii in Sistemele Software Distribuite*, director: Marinescu Cristina, Grant CNCISIS TD, Contract No: 94/17.09.2008, financed by: CNCISIS, UPT value: 11.243 Lei
3. *Curs "Programare Sistem sub Linux" si curs "Programare Real-Time sub Linux. Nucleul sistemului de operare Linux*, team: Mierluțiu A.P., Cosma D., Contract No: 33 / 2009, financed by: Alcatel-Lucent România S.R.L., UPT value: 13.388 Lei

#### BOOKS

1. Marinescu R., *Software Metrics for Quality Assessment*, Editura Politehnica, Timisoara, ISBN 978-973-625-885-5, 2009, pp. 184.
2. Cosma D. C., *Programarea aplicatiilor distribuite*, Editura de Vest Timisoara, ISBN 978-973-36-0501-0, 2009.
3. Marinescu Cristina, *Towards Understanding and Quality Assessment of Enterprise Software*

- SACI 2009, Timisoara, Romania, ISBN 978-1-4244-4477-9, May 2009, pp. 307-314.
2. Cernazanu-Glavan C., Holban S., *Determining the Optimal Percent of Negative Examples Used in Training the Multilayer Perceptron Neural Networks*, Proc. 10th WSEAS International Conference on Neural Networks, NN'09, Prague, Czech Republic, ISBN 978-960-474-065-9, March 2009, pp. 114-119.
  3. Curiac D., Volosencu C., Pescaru D., Jurca L., Doboli A., *A View Upon Redundancy in Wireless Sensor Networks*, Mathematics and Computers in Science and Engineering, Proc. 8th International Conference on Signal Processing, Robotics and Automation, ISPRA'09, WSEAS Press, Cambridge, UK, ISBN 978-960-474-054-3, Feb. 2009 pp. 341-345.
  4. Curiac D., Volosencu C., Pescaru D., Jurca L., Doboli A., *Redundancy and Its Applications in Wireless Sensor Networks: A Survey*, WSEAS Transactions on Computers, ISSN 1109-2750, 2009, pp. 705-714.
  5. Pescaru D., Istin C., Naghiu F., Gavrilescu M., Curiac D., *Scalable Metric for Coverage Evaluation in Video-based Wireless Sensor Networks*, Proc. 5th International Symposium on Applied Computational Intelligence and Informatics, SACI 2009, Timisoara, Romania, ISBN 978-1-4244-4477-9, May 2009, pp. 323-328.
  6. Fuiorea D., Gui V., Pescaru D., Toma C., *Kernel Based Image Registration Versus MLESAC: A Comparative Study*, Proc. 5th International Symposium on Applied Computational Intelligence and Informatics, SACI 2009, Timisoara, Romania, ISBN 978-1-4244-4477-9, May 2009, pp. 255-260.
  7. Naghiu F., Pescaru D., *Influence of Driver Behavior Patterns in Correcting Video Sensing Errors in Traffic Surveillance Applications*, Proc. 5th IEEE International Conference on Intelligent Computer Communication and Processing, ICCP'09, Cluj-Napoca, Romania, ISBN 978-1-4244-5007-7, Aug. 2009, pp. 173-176.
  8. C. Istin, D. Pescaru, H. Ciocarlie - *Energy Saving Algorithm Tuning for Obstacle Avoidance Using Coverage Metrics for Video-Based Wireless Sensor Networks*, Proc. 5th IEEE International Conference on Intelligent Computer Communication and Processing ICCP'09, Cluj-Napoca, Romania, ISBN 978-1-4244-5007-7, Aug. 2009, pp. 267-273.
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  11. Crisan M., *Upon the Dynamic Modeling in Semantics*, Proc. 5th International Symposium on Applied Computational Intelligence and Informatics, SACI 2009, Timisoara, Romania ISBN 978-1-4244-4477-9, May 2009, pp. 533-538.
  12. Crisan M., *Upon Dynamic Natural Language Processing*, Proc. International Conference on New Trends in Information and Service Science, NISS 2009, Beijing, China, ISBN 978-0-7695-3687-3, July 2009, pp. 487-492.
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  15. Plastoi M., Curiac D., Baniias O., Volosencu C., Pescaru D., Doboli A., *Self-Destruction Procedure for Cluster-Tree Wireless Sensor Networks*, Proc. International Conference on Wireless Information Networks and Systems, WinSys'09, Milan, Italy, ISBN 978-989-674-008-5, July 2009, pp. 63-67.
  16. Wang M., Subramanian V., Doboli A., Curiac D., Pescaru D., Istin C., *Towards a Model and Specification for Visual Programming of Massively Distributed Embedded Systems*, IFSA Sensors and Transducers Journal, ISSN 1726-5479, vol. 5, 2009, pp. 69-84.
  17. Teodor M.N., Popescu I., Holban S., *A Genetic Algorithm Approach to DNA Microarrays Analysis of Pancreatic Cancer*, Advances in Electrical and Computer Engineering, Suceava, ISSN 1582-7445, 2009, vol. 8, no. 2, pp.43-48.
  18. Cheveresan R., Holban S., *Workload Characterization an Essential Step in Computer Systems Performance Analysis - Methodology and Tools*, Advances in Electrical and Computer Engineering, Suceava, ISSN 1582-7445, vol. 9, no. 3, 2009, pp. 100-107.

19. Părvu O., Bălan A.G., *A Method for Fast Detection and Decoding of Specific 2d Barcodes*, Proc. 17<sup>th</sup> Telecommunications Forum, TELFOR 2009, Belgrade, Serbia, ISBN 978-86-7466-375-2, Nov. 2009, pp. 1137-1140.
20. Parvu O., Jian I., *A Spatial Database Approach to Virtual Worlds Systems*, Proc. International Multiconference on Computer Science and Information Technology, ISBN 978-83-60810-22-4, 2009, vol. 4, pp. 503-506.

#### BOOKS

1. Julean I., Holban S., *Incertitudini la prelucrarea datelor experimentale și în exprimarea rezultatelor*, Editura Politehnica, Timisoara, ISBN 978-973-625-831-2, 2009.

#### RESEARCH GRANTS AND PROJECTS

1. *Specializarea personalului didactic universitar pentru functia de "Cadru didactic supervizor"*

*de practică tehnologică și de cercetare*, director Holban S., team: Teodorescu L., Cernazanu C., Contract No: POSDRU/57/1.3/S/ 17884; financed by: FSE, MMFPS

2. *Model for PSoC Debugging*, Cypress University Alliance Technology Grant, 19HI7UN/2009, director: Pescaru D., team: Magureanu G., Gavrilesu M., Naghiu F., financed by Cypress Semiconductors, USA. UPT Value (2009): 456 USD.

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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 Voloșencu
- Lecturer dr. eng. Dorina Popescu
- Lecturer dr. eng. Sorin Nanu
- Assist. eng. Ana Maria Dan
- Lecturer dr. eng. Adrian Korodi
- Student Alexandru Codrean
- Student Vlad Ceregan

##### 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

##### 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.

##### RESULTS

##### PUBLISHED PAPERS

1. Dragomir T. L., Codrean A., Ceregan V., *On an Elementary Problem of Modelling Dead Time Systems*, Journal of Electrical Engineering, ISSN 1582-4594, vol. 9, no. 2, June 2009, pp. 79-86.

2. Dragomir T. L., Codrean A., Ceregan V., Dale S. *Dead Time Compensation for Interpolative-Type Control Systems*, Proc. 4th International Symposium on Computational Intelligence and Intelligent Informatics, ISCIII 2009, Luxor, Egypt, ISBN 978-1-4244-5380-1, Oct. 2009, pp. 119-124.
3. Bălaș V. E., Cergan V., Codrean A., Dragomir T.L., *Extension of a Control Structure with PSAIC*, Proc. 3rd International Workshop on Soft Computing Applications, SOFA 2009, Szeged, Arad, ISBN 978-1-4244-5054-1, Aug. 2009, pp. 81-84.
4. Dragomir T. L., Codrean A., Cergan V., *The Influence of Omitting the Prehistory on the Accuracy of Modelling Dead-Time Systems*, Proc. 5th International Symposium on Applied Computational Intelligence and Informatics, SACI 2009, Timisoara, Romania, ISSN 978-1-4244-4477-9, May 2009, pp. 417-422.
5. Robu N., Dragomir T. L., Silea I., Nanu S., *Management of Educational Changes in „Politehnica” University of Timisoara According to Bologna Process*, Proc. 16th International Conference on Management of Technological Changes, MTC 2009, Alexandroupolis, Greece, ISBN 978-960-89832-8-1, Sept. 2009, Book II, pp. 335-338.
6. Nanu A., Dragomir T. L., Nanu S., *Collaboration between Universities and Companies - A new Approach for Educational Changes*, Proc. 16th International Conference on Management of Technological Changes, MTC 2009, Alexandroupolis, Greece, ISBN 978-960-89832-8-1, Sept. 2009, Book I, pp. 124-127.
7. Nanu A., Dragomir T. L., Nanu S., *How Quality management and Project Management Knowledge Can Contribute to Defining some Engineering Qualifications*, Proc. 4th National Conference „The Academic Days of Academy of Technical Science in Romania”, Iasi, Romania, ISSN 2066-6586, Nov. 2009, vol. 1, pp. 23-28.
8. Volosencu C., *On Some Properties of Fuzzy Systems*, Proc. 8th WSEAS International Conference on Signal Processing, Robotics and Automation, ISPRA'09, Cambridge, UK, Book Series: Mathematics and Computers in Science and Engineering, ISBN 978-960-474-054-3, 2009, pp. 178-206.
9. Volosencu C., *Pseudo-Equivalence of Fuzzy PI Controller*, Proc. 8th WSEAS International Conference on Signal Processing, Robotics and Automation, ISPRA'09, Cambridge, UK, Book Series: Mathematics and Computers in Science and Engineering, ISBN 978-960-474-054-3, 2009, pp. 262-270.
10. Volosencu C., *Identification of Distributed Parameter Systems Based on Sensor Networks and Multivariable Estimation Techniques, Simulation*, Proc. 9th WSEAS International Conference on Simulation, Modeling and Optimization, SMO'09, Budapest, Hungary; Book Series: Mathematics and Computers in Science and Engineering, ISBN 978-960-474-113-7, 2009, pp. 187-196.
11. Volosencu C., *Identification of Non-Linear Systems, Based on Neural Networks, with Applications at Fuzzy Systems*, Proc. 10th WSEAS International Conference on Automation & Information, ICAI'09, Prague, Czech Rep., Book Series: Recent Advances in Electrical Engineering, ISBN 978-960-474-064-2, 2009, pp. 387-396.
12. Volosencu C., *Methods to Design Fuzzy Controllers*, Proc. 11th WSEAS International Conference on Automatic Control, Modeling and Simulation, ACMOS'09, Istanbul, Turkey, Book Series: Electrical and Computer Engineering Series, ISBN 978-960-474-082-6, 2009, pp. 378-385.
13. Volosencu C., *Pseudo-Equivalence of Fuzzy PI Controller*, WSEAS Transactions on Systems and Control, ISSN 1991-6763, vol. 4, no. 4, 2009, pp. 161-176.
14. Volosencu C., *Properties of Fuzzy Systems*, WSEAS Transactions on Systems and Control, ISSN 1109-2777, vol. 8, no. 2, 2009, pp. 210-238.
15. Volosencu C., *Quality Improvement in Production Systems with Modern Control Techniques for Electrical Drives*, Proc. 1st International Conference on Manufacturing Engineering, Quality and Production Systems, MEQAPS'09, Brasov, Romania ISBN 978-960-474-121-2, Sept. 2009, pp. 213-219.

#### **BOOKS**

1. Bălaș V. E., Fodor J., Várkonyi-Kóczy A. R. (Eds.), Dragomir Toma L., *Studies in Computational Intelligence, Ch. Interpolative-Type Control Solutions*, Springer Verlag, Studies in Computational Intelligence, ISBN 978-3-642-00447-6, vol. 196, 2009, 43 pp.
2. Dumitrache I., Dragomir T. L., Preitl S., and others, *Automatica*, vol. I, Ed. Academiei, ISBN 978-973-1883-4, 2009, 115 pp.

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#### Research group in *PROCESS CONTROL*

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- Assist. eng. Onuț Lungu
- Assist. eng. Emil Voișan
- Assist. eng. Lucian Fedorovici

##### RESEARCH FIELDS

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

##### KEYWORDS

Chaotic systems; programmable logic controllers; remote control.

##### ACTIVITIES

- hard real-time technologies
- robot motion and control
- analysis and synthesis of the electronic converters with chaotic behaviour

##### PUBLISHED PAPERS

1. Iercan D., Voisan E., Fedorovici L., Dragan F., *nRobotic: A Platform for Managing Robots With Different Capabilities*, Proc. 5th International Symposium on Applied Computational Intelligence and Informatics, SACI 2009, Timisoara, Romania, ISBN 978-1-4244-4478-6, May 2009, pp. 187-192.
2. Iercan D., Fedorovic L., *Porting Hierarchical Timing Language on a Microcontroller Based Platform*, Proc. 5th International Symposium on Applied Computational Intelligence and Informatics, SACI 2009, Timisoara, Romania, ISBN 978-1-4244-4478-6, May 2009, pp. 283-288.
3. Auerbach J., Bacon D.F., Iercan D., Kirsch C.M., Rajan V.T., Röck H., Trummer R., *Low-Latency Time-Portable Real-Time Programming with Exotasks*, ACM Transactions on Embedded Computing Systems (TECS), ISSN 1539-9087, Jan. 2009, vol. 8, no. 2, 48 pp.

##### STRATEGIC PRIORITIES

- Control of chaotic systems;
- Hard real-time control
- Remote control.

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

##### RESEARCH TEAM

- Lecturer dr. eng. Bogdan Groza
- Lecturer dr. eng. Dorina Petrică
- Assist. eng. Lavinia Dragomir
- Assist. eng. Raul Robu
- Assist. eng. Căiman Dadiana
- Eng. Murvay Pal-Ștefan
- Eng. Pop Dragoș-Liviu

##### 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 Calculus to Detect Guessing Attacks*, Proc. 12th Information Security Conference, ISC'09, Pisa, Italy, Springer-Verlag, LNCS, ISBN 978-3-642-04473-1, Sept. 2009, pp. 59-67.
2. Groza B., *Analysis of a Password Strengthening Technique and Its Practical Use*, Proc. 3rd International Conference on Emerging Security Information, Systems and Technologies, SECURWARE'09, Athens, Greece, ISBN 978-0-7695-3558-2, June 2009, pp. 292-297.
3. Groza B., Pop D., Silea I., Patriciu V., *Towards Developing Secure Video Surveillance Systems over IP*, Proc. 4th International Conference on Internet Monitoring and Protection, ICIMP'09,

- Venice, Italy, ISBN 978-1-4244-4477-11, May 2009, pp. 27-33.
4. Groza B., Dragomir L., *A Multidisciplinary Project: How to Turn a Webcam into a Secure-Cam*, Proc. 5th Int. Symposium on Applied Computational Intelligence and Informatics, SACI 2009, Timisoara, Romania, ISBN 978-1-4244-4478-6, May 2009, pp. 381-385.
  5. Silea I., Petrica D., *Some Considerations Regarding the Use of Simulations versus Practical Experiences in Engineering Education*, Proceedings of the 6<sup>th</sup> International Conference on Management of Technological Changes, MTC 2009, Alexandroupolis, Greece, ISBN 978-960-89832-8-1, Sept. 2009, pp. 185-188.

### CONTACT

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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 and 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
- Development of an artificial hand hydraulically actuated

### PUBLISHED PAPERS

1. Albu A., *Decisional Methods Applied in Medical Domain*, Proc. 5th International Symposium on Applied Computational Intelligence and Informatics, SACI 2009, Timisoara, Romania, ISBN 978-1-4244-4478-6, May 2009, pp. 123-128.
  2. Stanciu L., Albu A., *On Using Virtual Reality Tools to Study the Motion of a Human Hand Artificial Model*, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Automatic Control and Computer Science, ISSN 1224-600X, vol. 54(68), no. 3, Sept. 2009, pp. 143-146.
  3. Albu A., Rușeț V., Stanciu L., Belgiu G., Sirbu A.-N., *Analysis and Development of Technology's Value Model for Machine Tool Renewal Management*, Annals of DAAAM 2009 & Proc. 20th DAAAM World Symposium 2009 Intelligent Manufacturing & Automation: Theory, Practice & Education, Vienna, Austria, ISSN 1726-9679, ISBN 978-3-901509-70-4, Nov. 2009, pp. 1829-1830.
  4. Belgiu G., Albu A., Rușeț V., *Variation Management in Product Development and Manufacturing Processes*, Annals of DAAAM 2009 & Proc. 20th DAAAM World Symposium 2009 Intelligent Manufacturing & Automation: Theory, Practice & Education, Vienna, Austria, ISSN 1726-9679, ISBN 978-3-901509-70-4, Nov. 2009, pp. 1725-1726.
  5. Stanciu A., Stanciu L., *On-Site Preparation of a Facial Prosthesis Using a Rapid Prototyping Tool*, Proc. 5th International Symposium on Applied Computational Intelligence and Informatics SACI 2009, Timisoara, Romania, ISBN 978-1-4244-4478-6, May 2009, pp. 143-146.
  6. Stanciu Loredana, Stanciu A., *Designing and Implementing a Human Hand Prosthesis*, Proceedings of International Conference on Advancements of Medicine and Health Care through Technology, Cluj-Napoca, Romania, ISBN 978-3-642-04291-1, 2009, pp. 399-404.
  7. Stanciu Loredana, Stanciu A., *About an Antrophomorphic Robotic Hand*, Annals of DAAAM 2009 & Proc. 20th DAAAM World Symposium 2009 Intelligent Manufacturing & Automation: Theory, Practice & Education, Vienna, Austria, ISSN 1726-9679, ISBN 978-3-901509-70-4, Nov. 2009, pp. 1893-1894.
- #### 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; 2009-2011.

2. *Integrated Medical Information Management System Based on HL7 Standard - SIMIMED*, Grant D1-1-019/18.09.2007, 2007-2010, 2nd Romanian National Research Program PN2: Partners in Priority Domains.
3. *TELEASIS – NGN Support-Based, Complex System for Home Tele-Attendance of Elderly People*, Grant 11-066/18.09.2007, 2nd Romanian National Research Program PN2: Partners in Priority Domains.

#### **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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