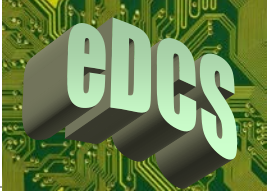
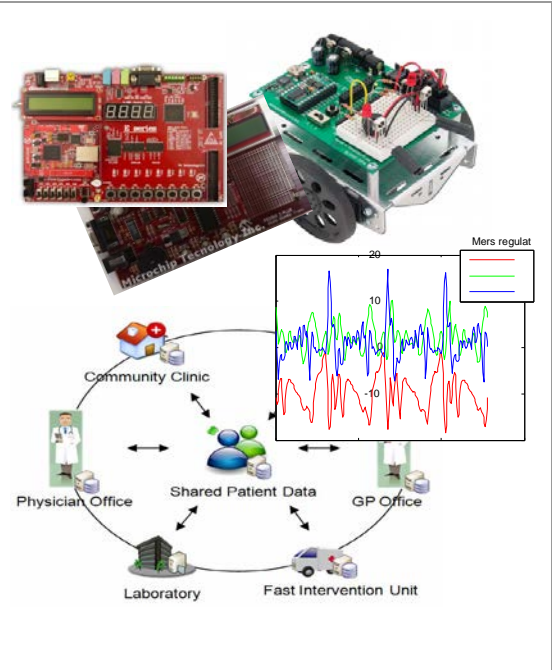


## EMBEDDED AND DEDICATED COMPUTER SYSTEMS LABORATORY

### Contact details

Name	<b>Embedded and Dedicated Computer Systems</b>
Acronym	<b>eDCS</b>
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### Areas of expertise

#### **Embedded systems, Dedicated digital systems and FPGA-bases systems**

Modeling, design and implementation of hardware & software systems adapted for various applications in industrial, medical and security domains.

#### **Real-time systems:**

Real-time systems modeling and design, scheduling strategies and simulation

#### **eHealth systems:**

Design and implementation of distributed medical information systems and remote patient monitoring applications

#### **Real random number generators and Cryptography:**

Design and implementation of Real random generators based on the exploitation of physical phenomena known for their intrinsic random nature (eg quantum phenomena).

#### **Digital Libraries:**

Design and implementation of dedicated digital content management systems.

### Team

**Prof. Dr. Eng. Gheorghe Sebestyen**, Prof. Dr. Eng. Octavian Creț, Prof. Dr. Eng. Alin Suci, Dr. Eng. Lucia Vacariu, Assist. Dr. Eng. Kinga Marton  
PhD students: Eng. Ciprian Oprisa, Eng. Sandor Lukacs, Eng. George Cabau, István Kiss

### Representative projects

**Jeopard**, “Java Environment For Parallel Realtime Development”, European FP7 project,

[http://www.jeopard.org/index.php?option=com\\_content&view=article&id=53&Itemid=58](http://www.jeopard.org/index.php?option=com_content&view=article&id=53&Itemid=58) (2007-2010)

**PRO-INOVA**, “Educational Program in Innovation Management”, POSDRU/21/1.5/G/24239,

<http://platinova.utcluj.ro/DetaliiProiect/index.php> (2010-2012)

**CryptoRand**, “A High Performance System for Generation and Testing of Random Number Sequences for Cryptographic Applications”, <http://cryptorand.utcluj.ro/> (2007-2010)

“Dynamic Partial Reconfiguration for FPGA Devices”, international project with third parties (company National Instruments USA), [http://users.utcluj.ro/~sebestyen/eDCS.html#\\_Recent\\_research\\_results](http://users.utcluj.ro/~sebestyen/eDCS.html#_Recent_research_results): (2012-2013)

**CyberWater**, “Prototype Cyberinfrastructure-based System for Decision-Making Support in Water Resources Management”, PNL PCCA (Joint Applied Research Project), <http://cyberwater.cs.pub.ro/drupal-7.17/> (2012-2015)

## Significant results

### The most representative publications of the past 5 years:

1. István Kiss, Béla Genge, Piroska Haller, Gheorghe Sebestyén, "Data Clustering-based Anomaly Detection in Industrial Control Systems", *ICCP 2014 Intelligent Computer Communication and Processing (ICCP)*, Cluj-Napoca, 2014
2. Mădălin Neagu, Gheorghe Sebestyén, "Increasing Memory Security through Data Scrambling and Information Entropy Models", *15th IEEE International Symposium on Computational Intelligence and Informatics* Budapest, Hungary, 2014
3. Gheorghe Sebestyén, „Real-time communications, from industrial networks toward IoT (Internet of Things)”, plenary presentation at *ICCC 2015*, Hungary, 2015
4. Gheorghe Sebestyén, Dan Muresan, Anca Hangan, "Road Quality Evaluation with Mobile Devices", proceedings of *ICCC 2015*, Hungary 2015
5. Ciprian Oprisa, George Cabau, and Gheorghe Sebestyén Pal. Semi-automated verdicts assignment for potentially malicious programs. In *IEEE International Conference on Intelligent Computer Communication and Processing (ICCP)*, Cluj-Napoca, Romania, 2015
6. G. Sebestyén, A. Hangan, K. Sebestyén, R. Vachter, "Self-tuning multimedia streaming system on cloud infrastructure", *International Conference on Computational Science, ICCS 2013*, Barcelona, 2013
7. G. Sebestyén, A. Hangan, "Genetic Approach for Real-Time Scheduling on Multiprocessor Systems", *ICCP 2012*, Cluj-Napoca, Romania, 2012
8. A. Hangan, G. Sebestyén, "RTMultiSim: A versatile simulator for multiprocessor real-time systems", in *Proceedings of 3rd International Workshop on Analysis Tools and Methodologies for Embedded and Real-time Systems*, WATERS 2012, pp. 15-20
9. G. Sebestyén, A. Tirea, R. Albert, "Monitoring Human Activity through Portable Devices", *ESWSNDA 2012*, Debrecen, Hungary, 2012
10. O. Cret, G. Tamas, A. Suci, "Implementing True Random Number Generators Based on High Fanout Nets", in *Romanian Journal of Information, Science and Technology*, vol. 15, no.3, 2012, pp. 277-298
11. K. Márton, A. Suci, C. Săcărea, O. Creț, "Generation and Testing of Random Numbers for Cryptographic Applications", *Proceedings of the Romanian Academy, Series A*, vol. 13, no. 4, 2012, pp. 368-377
12. A. Ceclan, V. Țopa, D. Micu, L. Czumbil, A. Șimon, O. Creț, "Improved framework for Monte Carlo numerical evaluations in field interference problems", in *International Journal of Applied Electromagnetics and Mechanics*, vol. 38, no.4, 2012, pp. 1-6
13. K. Marton, M. Homan, A. Suci, I. Rasa, "The histogram test for randomness assessment", in *Proceedings of the IEEE International Conference on Networking in Education and Research - RoEduNet 2013*, Constanța, 2013, pp. 1-5

### Tools and platforms developed:

**CARDIONET** - Computerized healthcare system designed to provide tracking and management of patients with cardiovascular disease

**Platnova** - Platform type digital library for the acquisition, storage, processing and retrieval of information contained in patents

**RTMultiSim** - Integrated simulation and optimization of real-time systems on parallel and distributed structures

**CryptoRand** - Integrated high performance system for generating and testing sequences of random numbers for cryptographic applications

## The offer addressed to the economic environment

Research & development	Efficient strategies for scheduling communication and tasks on real-time parallel and distributed architectures; integrated modeling, simulation and optimization of real-time systems. Advanced techniques for generating random numbers with applications in cryptography. Reconfigurable computer system Portable medical devices - for continuous monitoring of patients for prophylactic treatment of chronic diseases. Digital content management systems. Real high quality random number generators, high flow (Mbps) or very high (Gbps). Advanced software systems for testing random sequences. Systems for mobile robots Sensor networks for monitoring rivers
Consulting	Design of dedicated systems based on specialized processors and FPGA circuits. Development of real-time applications. Cryptography and random number generators Evaluating the quality of a random number generators. Evaluation of algorithms using random number generators Industrial Informatics, industrial networks, dedicated devices based FPGA circuits According to TRNG design and implementation of user specifications, wireless Sensor Networks
Training	<b>Computer Architecture, Industrial Informatics, Digital circuit design, using FPGA circuits, quality systems, Cryptography.</b> Training on proper use of random number generators in various types of applications, focusing on cryptographic applications. Training on methods of generating random sequences, with emphasis on real random generators