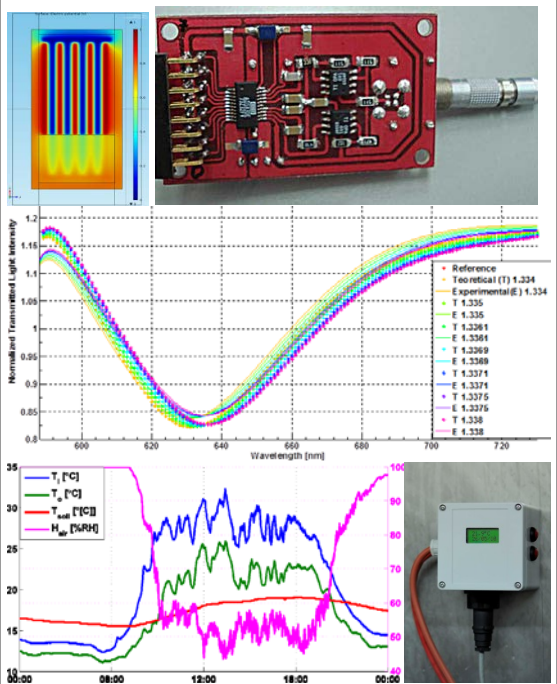



## ADVANCED SENSING TECHNOLOGIES GROUP

### Contact details

Name	Advanced Sensing Technologies Group	
Acronym	GAST	
Logo		
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### Areas of expertise

#### Smart sensors

-Simulation and design of optical sensors, MEMS based sensors, capacitive sensors, weather instruments

#### Wired and wireless sensor networks

-Ultra low power wireless sensors; Environmental monitoring with sensor networks; Multipoint wired networks

#### Hardware/software codesign for distributed control on embedded platforms

-Smart actuators; Fault tolerant control networks; Embedded servers and HMIs

#### Embedded hardware design for medical devices

- Innovative immunosensors; Monitoring in post-traumatic rehabilitation; Hyperthermic chemotherapy systems; Magnetic therapy equipment

#### Vision based monitoring and control

-Vision based automation systems for: quality control, automation in food industry, monitoring in agriculture

### Team

**Prof. Dr. Eng. Daniel Moga**, Prof. Dr. Eng. Dorin Petreus, Prof. Dr. Mat. Mircea Ivan, Prof. Dr. Mat. Ion Gavrea, Prof. Dr. Ion Aurel Mironiuc, Dr. Corneliu Lungoci, Dr. Traian Oniu, Assoc. Prof. Dr. Eng. Mihai Stelian Munteanu, Assoc. Prof. Dr. Eng. Ramona Galatus, Assoc. Prof. Dr. Eng. Vlad Muresan, Assoc. Prof. Dr. Mat. Bogdan Gavrea, Assoc. Prof. Dr. Eng. Eugen Vitan, Dr. Mat. Rozica Moga, Dr. Eng. Iulia Clitan, Dr. Eng. Nicoleta Stroia, Phd. Student Eng. Zsolt Barabas

### Representative projects

"Hyperthermic Intra-Peritoneal Chemotherapy Equipment based on Cyber-Physical System Paradigm"

Project no. PN-II-RU-TE-357/01.10.2015, funded by the Romanian Ministry of Education and Research, UEFISCDI, (2015-2017), <http://hiper-cps.hpm.ro/>

HydroSens – "Integrated Smart Sensor System for Monitoring of Strategic Hydrotechnical Structures", PN-II-PT-PCCA-2011-nr.71, <http://hydrosens.hpm.ro> (2012-2016)

Algorithms and methods for optical signal processing (2011-2014)

Medical equipment for magnetic therapy with low frequency pulsed magnetic field - ATM41, PN2, 2012

Complex architecture for monitoring and transfer of medical data. CNCSIS 1019, (2008-2010)

Research on Test Compression and LBIST, Research contract UTCN-Philips Semiconductors, (2005-2008)

Vision based systems for monitoring and intelligent control, X2C21/ 18.07.06, (2006-2008)

## Significant results

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

1. C. Lungoci, D. Moga, V. Muresan, D. Petreus, N. Stroia, R. Moga, M. Munteanu, I. Raus, V. Muntean, A. I. Mironiuc." Hyperthermic Intraperitoneal Chemotherapy Approach Based on Cyber-Physical System Paradigm", *Journal of Control Engineering and Applied Informatics*, vol 17, no 3, pp. 50-59, 2015.
2. R. Etz, D. Petreus, T. Frentiu, T. Patarau, C. Orian, "An Indirect Method and Equipment for Temperature Monitoring and Control," *Advances in Electrical and Computer Engineering*, vol.15, no.4, pp.87-94, 2015, doi:10.4316/AECE.2015.04012
3. Juan A. Vallés and R. Gálătuş, "Requirements for gain/oscillation in Yb3+/Er3+-codoped microring resonators", *Proc. SPIE 9359, Optical Components and Materials XII*, 93591R (March 16, 2015); doi:10.1117/12.2078657; <http://dx.doi.org/10.1117/12.2078657>
4. C. Cristea, A. Florea, R. Galatus, E. Bodoki, R. Sandulescu, D. Moga, and D. Petreus, "Innovative immunosensors for early stage cancer diagnosis and therapy monitoring", in *The International Conference on Health Informatics (Y.-T. Zhang, ed.)*, vol. 42 of IFMBE Proceedings, pp. 47-50, 2014, *Springer International Publishing*.
5. F. Neaga, D. Moga, D. Petreus, M. Munteanu and N. Stroia."A Wireless System for Monitoring the Progressive Loading of Lower Limb in Post-Traumatic Rehabilitation". In *IFMBE Proceedings of International Conference on Advancements of Medicine and Health Care through Technology*, 2011, Volume 36, Part 1, 54-59, DOI: 10.1007/978-3-642-22586-4\_13
6. N. Cennamo; M. Pesavento; G. D'Agostino; R. Galatus; Luigi Bibbò; Luigi Zeni, "Detection of trinitrotoluene based on SPR in molecularly imprinted polymer on plastic optical fiber", *Proc. SPIE 8794, Fifth European Workshop on Optical Fibre Sensors*, 879412 (20 May 2013); doi: 10.1117/12.2025695
7. R. Moga, F. Hrebenciuc, N. Stroia and D. Moga, "Optimal Approximations for Linearization of Sensor Transfer Curves", *Automation Computers Applied Mathematics*, Vol. 20, No. 1, pp. 3-8, 2011
8. N. Stroia, D. Moga, I. Kovacs, G. Mocanu, and M. Dobra. "Hydropower Structures Monitoring System with Hierarchically Distributed Smart Sensor Network", *2nd IFAC Workshop on Convergence of Information Technologies and Control Methods with Power Systems*, May 22-24, 2013, pp. 37-41, Cluj-Napoca, Romania, DOI: 10.3182/20130522-3-RO-4035.00047.

### Significant solutions:

Low cost hardware platforms for distributed sensing; Web based monitoring software for ARM platforms; Cross platform SCADA libraries; Ultra low power 8 bit embedded platform for wireless applications; Distributed control platform for building automation; Vision based mass and volume estimation for real time measurement of moving objects; CT medical image processing for computer assisted surgery

### Products and technologies:

1. Distributed sensing and control platform (embedded and PC) with applications deployed in: industrial systems health monitoring, greenhouse automation, building automation
2. Smart communications hub for sensor networks, allowing data logging, processing, bridging, storing and streaming and html browser-based visualization for multiple wired/wireless sensing devices
4. Soil humidity sensors with wired/wireless interfaces
5. Weather sensors with Modbus interface
6. Condition monitoring systems for industrial machines and equipment
7. Internet based embedded platform for condition-based maintenance support
8. Vision-based equipment for high speed sorting in food industry
9. Integrated equipment for remote control and monitoring of greenhouse fields
10. Wireless system for monitoring and control of the progressive loading of lower limb in post-traumatic rehabilitation

### Patents:

1. OSIM 123261 - **System for Monitoring the Progressive Loading of Lower Limb in Post-Traumatic Rehabilitation**, 2011
2. OSIM 122976 - **System And Process For Indirectly Measuring Mass Of Objects In Motion**, 2010
3. OSIM 122986 - **Contactless Coupling Circuit**, 2010
4. OSIM 122380- **Method And Device For Measuring Rotational Speed In Highly Disturbing Media**, 2009
5. OSIM 123490 - **Wireless System for Remote Tilt Measurement**, 2012

## The offer addressed to companies

Research & development	<ul style="list-style-type: none"> <li>Development of analytical and numerical models for sensor devices.</li> <li>Identification and calibration of measurement system models.</li> <li>Development of algorithms for sensor fault identification and isolation in control networks.</li> <li>Optimization of advanced digital signal processing algorithms for embedded platforms.</li> <li>Development of real-time measurement systems for vision based inspection and sorting.</li> <li>Development of real-time medical signal processing libraries.</li> </ul>
Consulting	<ul style="list-style-type: none"> <li>Consulting, design, research and prototyping in advanced sensing systems for remote monitoring</li> <li>Custom integrated hardware and software solutions for specific distributed control application</li> <li>Simulation and design of smart sensor for medical applications</li> </ul>