The research activities and results represent the period 2002-2014, subsequent to the public presentation of the Ph.D. thesis in March 2002.

The research results are structured in three main research areas: *Industrial process control*, *Renewable energy systems* and *Software for process control*. These areas are also reflected in the related educational activities during the period mentioned by the nature and content of courses and laboratories in the curriculum of the programs: *System Control and Applied Informatics* and *Computer Engineering*.

The research activity from the field *Industrial process control* was oriented on the following areas: *Induction motor control algorithms*; *Belt conveyors control algorithms*; *Distributions theory in controller design* and *Industrial robots control algorithms*.

This field was developed as a continuation of the research from the Ph.D. thesis.

The main results were subject to the publication of 16 ISI papers, 32 papers indexed in international databases, participation in international conferences with section papers and with 2 plenary papers, registration of two OSIM patents: no. A 2011 01039 / 19.10.2011 on the subject of the use of distributions theory in designing a PWM controller for driving induction motors and no. A 2011 01118 / 11.07.2011 on the subject of an input device for processes with intrinsic safety.

The research and teaching activities were correlated within subjects related to *Microcontrollers and PLCs*, *Programming in 80X86 assembly language* and *Robot systems control*, these areas are related at the educational level to the research areas addressed.

This is reflected in co-editing four books and a textbook specialized in this field. I also coordinated a MENER grant, I participated in two national CNCSIS grants, a research contract with the National Society of Lignite Oltenia, all related to industrial processes control.

In the field of *Renewable energy systems* my research activity consisted of modeling, simulation and design of a control system for the three main types of renewable energy, namely wind, solar and hydropower. Each of these studies was the subject of ISI indexed papers.

Other research in this field is the analysis of the optimal distribution in terms of energy efficiency of the three types of renewable energy systems in a location in the Parâng Mountains, Jiu Valley to achieve an integrated renewable energy system.

The results of the research in this field has been published in 5 ISI indexed papers, 3 papers indexed in international databases and a specialty book and also evidenced by four research contracts signed with companies from the Jiu Valley.

Since 2010, my research has focused on *Software for process control*.

This field was an important part of both the research activity developed previously and the teaching activity. Thus, the MENER grant 482 / 21.09.2004 previously coordinated ended with
the development of an information system for preparation plants for control of the production
process by applying an algorithm to optimize the operations performed and for permanent
monitoring of the economic indicators. The use of this information system reduces
approximately 20 times the computation time of the technical parameters, leading to enhanced
economic efficiency of about 10%.

An important scientific contribution resulting from the research undertaken in this field is the
design of a 3D spiral lifecycle software development model based on the Boehm model and the
QFD (Quality Function Deployment) method from quality management. The life cycle model is
the subject of the patent application no. A 2012 00914 / 29.11.2012, published by OSIM. Also
this lifecycle model was presented as plenary lectures in the conferences: The 14th WSEAS
International Conference on Mathematical and Computational Methods in Science and
Engineering (MACMERE’12), 7-9 September, 2012, Sliema, Malta and The 4th International
Conference on Applied Informatics and Computing Theory (AICT ’13), August 6 to 8, 2013,
Valencia, Spain.

Another direction in this research field is related to the Development of educational software.
This direction has been addressed in two projects. Thus, the POSDRU / 87 / 1.3 / S / 62426
project has been oriented on the design and development of two categories of educational
software for school education using .NET technology: applications for the educational process
management and educational games. In the POSDRU / 87 / 1.3 / S / 64273 was designed and
implemented an eLearning system for the University of Petroșani and the Oil and Gas University
of Ploiesti. In order to evaluate the eLearning system quality from the perspective of meeting the
requirements of users, both students and teachers, I designed and implemented a software
application based on methods and tools of the quality management.

The research results from the two above projects have been subject to the plenary lecture
"Breaking the Boundaries of eLearning Systems through Creativity" at the conference: 1st
WSEAS International Conference on Computer Supported Education, 14-16 May 2013, Athens,
Greece.

Another direction is Software for medical applications. To this end, I developed an algorithm for
automatic segmentation of CT images to identify the organs and calculate their parameters such
as length, area, volume, etc. The algorithm has as element of originality in identifying organs the
fact that it takes into account the anatomical characteristics of the organs. This research results
were the subject of the paper "DICOM Automatic Segmentation for Organs’ Properties
Database Design" presented at the 3rd World Conference of the International Conference on
Innovation and Computer Sciences, Turkey.

I co-wrote a textbook in this field. I published 8 ISI indexed papers ISI, 20 papers indexed in
international databases, coordinated two POSDRU projects and an international project with the
company OmniSource Italy.

The second part of the thesis concludes with prospects for future development.

Finally I attached a list of references and a complete list of own publications during 2002-2014.