

FCT Relatório Científico 2011 Print: 30-03-2012 15:50:34 [CENTRO ALGORITMI]

General Information

Name of Research Unit: (EEI-Norte-319)
CENTRO ALGORITMI

Coordinator: João Luis Marques Pereira Monteiro

Main Scientific Domain: Engenharia Electrotécnica e Informática

Other Subdomains: n/a

Host Institutions

Leading Host Institution: Universidade do Minho

Other Institutions Involved:

Objectives & Achievements

Unit Description

Centro ALGORITMI is a research unit of the School of Engineering – University of Minho, that develops R&D activity in Information and Communications Technology and Electronics (ICT&E), spreading into six major research groups: (1) Information Systems and Technologies; (2) Computer Communications and Pervasive Media; (3) Industrial Electronics; (4) Micro/Nanotechnologies and Biomedical Applications; (5) Systems Engineering, Optimization and Operations Research; (6) NonLinear Systems, Optimization and Statistics.

Centro Algoritmi focuses its activity on projects that explore a strong link with the community, namely the industry and the public administration. The University of Minho is located in an industrialized region with an important expression on textile and footwear industries, and an emerging field on ICT services enterprises, pushed by the e-phenomena age. The automotive industrial field also gained recently an important share of the market. Another external factor that influences our target field of application is the growth of the cities in the region, which introduces several demands for the co-operation of researchers, namely in the field of logistics, communication, e-government and resources management. The results of this policy are stated by the number of applied research projects in cooperation with companies (funded by AdI and QREN) and by specific national projects, namely POSI, POCTI, and POE. Additionally, the Centre participates in several European projects, typically funded by IST programmes.

Centro Algoritmi has 388 members, 114 are integrated with PhD.

University of Minho adopts a matrix model organization to enhance flexibility and improve resource utilization. The majority of PhD-level researchers of Centro Algoritmi are also Faculty members of four departments of the School of Engineering, namely: Industrial Electronics, Information Systems, Industrial Engineering & Management, and Informatics. Centro Algoritmi is organized around a Steering Committee (StC), formed by the Director and three Vice-Directors. Together with the six research group coordinators, these four SC members integrate the Coordinating Committee. The Director is elected among all senior researchers. Each research group coordinator is elected among the respective research group doctorate-level members. Elections take place in each three years (the last one was in December 2010). The SC is responsible for all the executive and planning tasks, including strategic planning and reporting activities. There is also a Scientific Committee (ScC) formed by all the doctorate-level members, which is essentially responsible for approving the StC work and the premature destitution of the Director. Finally, there is an Advisory Board, formed by external experts, to advice the strategic planning process. Currently, two staff permanent members and one hired member accomplish all the administrative daily work.

Centro Algoritmi interact with other UM administrative units related, like GAP (project support office) and the accounting office.

General Objectives

Centro Algoritmi, being a multidisciplinary research centre, has been able to guaranty sustainability over the years. Moreover, Centro Algoritmi has been able to improve, year after year, its research performance indicators. In fact Centro Algoritmi has been facing research challenges with efficacy and efficiency.

As a research centre aiming to be a national and international reference in all scientific fields represented by the six research groups, Centro Algoritmi devotes particular attention to:

- Conducting both fundamental and applied research, targeting to publish in the highest quality and flagship journals and world-class conferences
- Establishing research mobility, exchange and cooperation programs with internationally renowned research centers
- Establishing high quality research contracts with surrounding industries and services, aiming at contributing to their development and competitiveness
- Targeting the job placement of our PhD and MSc students in surrounding industries and services after they graduate
- Developing a research environment attractive to international graduate students, particularly from Portuguese speaking countries, and to postdoctoral researchers
- Encouraging the involvement of postgraduate students in ongoing research projects.

Despite the overall objectives referred above, Centro Algoritmi has been focusing on recommendations from last evaluation report, especially to multidisciplinary activities, defining strategies to explore synergies between research groups. This was achieved through awareness initiatives, promoting projects and collaborations mainly at the post-graduation level. The main idea behind this strategy keeps valid, since we believe that one of the Centro Algoritmi's strengths is its heterogeneous nature, which allows exploring different approaches and perspectives, which is an important factor towards innovation. Also the internationalization strategy has been evolving considerably. In fact, FP7, the 7th European Framework Programme has been decisively contributing to both multidisciplinary and internationalization – including cooperation with different international research centres and international companies.

Finally, one last Centro Algoritmi's aim is the intensification of regional activities concerning the science dissemination and technology transfer. This goal is very important nowadays since society and industries expect a lot from universities and its research infrastructures. Besides, this is also a strategic vector for University of Minho and the School of Engineering.

Main Achievements during the year of 2011

As stated above, Centro Algoritmi has been systematically improving its research performance indicators over the last years.

The number of international publications (books, book chapters, journals and conferences) has been significantly increasing – in fact, since our last evaluation process (2004-2007), the total number of international publications has evolved from 181 in 2008, to 191 in 2009, and to 301 in 2010 and 429 in 2011. This means a 137% increase in 3 years. Furthermore the ratio for international publications (per integrated research with PhD) was around

2 in 2008 and 2009, but it raised up to 3,2 in 2010 and to 3,68 in 2011. When just considering publications in peer review journals, the ratio for international papers (per integrated research with PhD) was near 0,7 in 2008 and 2009, but it was 0,91 in 2010 and in 2011 this ratio is 0,95 – which is a very high standard for both national and international research figures.

The number of funded projects is another important performance indicator. This indicator keeps high. During 2011, Centro Algoritmi's members were responsible or were involved in over 60 approved projects. Most of the projects are funded by FCT and other governmental agencies, but more and more projects are funded by European Programs (almost 10 FP7 programs in 2011) and also more and more research contracts with industry have been celebrated. Details are given in the individual research group reports.

Concerning the organization of scientific/technical events, in 2011 Centro Algoritmi's members were involved in several international events (excluding the participation in technical committees). In several areas some of these events are considered very specific, being supported by organizations that play an important role in those areas (i.e. ACM, IEEE and IFIP) - details are given in the individual research group reports.

Activities

Integrative/multidisciplinary activities during the year of 2011

Centro Algoritmi is a multidisciplinary research centre by nature. Looking to its main scientific areas it is not difficult to identify a wide research stream including researchers from Electronic field, addressing the construction of computing devices, Engineering Systems field, focusing on modeling complex systems and Information Systems, focusing on the issues related with the valuable utilization of Information and Communication Technology in organizations. This main stream is complemented by some specific research areas, like Energy, Instrumentation, Optimization, Micro/Nano technologies, Data Bases, etc., which address much more narrow issues and where multidisciplinary is more limited. Identifying projects in the main research stream is not an easy task since it would require a very long term research agenda and industry support behind our capacity. But there are interesting opportunities in sub-streams and, more important, from sharing knowledge acquired in each scientific area and that can influence research activities in other areas. So we can envisage two different types of collaboration: projects, where individuals' expertises are aggregated; and sharing knowledge activities, which conduces to a deeper understanding of surrounding requirements.

Integrative/multidisciplinary activities that require research across disciplines has been pursued in 2011.

The University of Minho has been celebrating several research protocols with important Portuguese companies. Centro Algoritmi has been acting as a key partner in most of the subsequent projects, involving different Algoritmi research teams, different Algoritmi research groups and even different research centres in each project. These type of partnerships include national companies like Efacec, Bosch, Tensai, CEIIA, Cabelauto, Metro do Porto, etc.

Also the same type of multidisciplinary activities have been experienced in international partnerships, including several outstanding international research centres.

FP7 has been proving to be another extremely important driver so as to constitute robust multidisciplinary teams, involving several national and international research teams in each successful international project – in 2011, ?? FP7 projects have been active with active roles from Algoritmi investigators.

Several Centro Algoritmi members are involved in the Portuguese governmental initiatives with CMU and MIT, addressing several engineer disciplines. Also, an intense research work has been carried out, involving researchers from Algoritmi, from other national research centres and MIT and CMU

researchers.

In the fulfillment of the applied research, the NSOS member have collaborated with several (national and international) research groups. Derivative-free optimization was applied to Structural Health Monitoring, in strict collaboration with Critical Materials, SA, where the publicly available solver (PSwarm - developed by a team member) was successfully applied in damage detection. Additional applied works were undertaken in Epidemiology (optimal control applied to diseases epidemiology models). There have been some collaboration with the robotics research group in optimal locomotion.

Outreach activities during the year of 2011

Following the tendency of last years, low level schools and social and economic agents keep showing a clear strategy to approach universities as a mean to explore knowledge advance. After all, this is the essence of the knowledge society. University as a whole responds to this requests positively opening its doors and organizing or adhering to several events. This is a global movement traversing all university's units. Concerning Centro Algoritmi, since it is integrated in the School of Engineering, most of the outreach activities are also integrated in wider School initiatives, allowing a better resource use and broader social impact. Besides these activities, individual researchers are frequently invited to take part of scientific, technical or dissemination events.

The School of Engineering organizes every year an open event associated to its birthday, aimed to show technical innovations and science advances resulting from research. PhD students are invited to take part on an exhibition where they have the opportunity to demonstrate their work and discuss with others their problems and achievements - most of the Centro Algoritmi members adhered enthusiastically to this initiative. Other activities are also relevant, like visits to laboratories where young students can contact with the research environment and with the learning environment.

One of the Centro Algoritmi's groups working in the robotics research field developed one robot football team and has been involved in the RoboCup competition, where they have achieved very interesting results. The group also organizes one local event, RoboParty, in Guimarães, which attracts a lot of people, including researchers, college students and teachers. This event had a tremendous impact, helping to disseminate the area and to bring society into the Centro Algoritmi internal walls.

Centro Algoritmi's members are also deeply involved in several national non-profit organizations/associations dedicated to the standardization and dissemination of technological and scientific knowledge: APDSI (Portuguese association for information society development), and two Technical Committees for standardization (CT 163 and CT 128).

Funding

	2008	2009	2010	2011
LA FCT	0,00	0,00		
Units FCT	334.631,25	228.250,00	391.000,00	370.301,00
Projects FCT	911.841,00	698.828,00	698.828,00	405.000,00
Other (National)	510.539,75	295.070,00	-238.000,00	207.000,00
Other (International)	1.226.766,00	1.416.614,00	1.416.614,00	1.850.000,00

National Industry	166.521,00	47.610,00	47.610,00	1.300.000,00
International Industry	0,00	0,00	0,00	155.000,00
	3.150.299,00	2.686.372,00	2.316.052,00	4.287.301,00

General Indicators

	2007	2008	2009	2010	2011	Total
No. of Researchers Hired (Ciência Programme)	0,00	0,00	0,00	0,00	1,00	1,00
No. of Researchers integrated with PhD	0,00	0,00	0,00	0,00	115,00	
Training PhDs (PhD thesis completed)	0,00	0,00	0,00	0,00	20,00	20,00

Researchers Hired

Name	Start Date	End Date	Other Institution
Abdur Rais	17-11-2011	16-11-2015	Universidade do Minho
André António Oliveira Gomes	02-12-2010	31-05-2011	Universidade do Minho
André Feliciano Quintas da Silva Coelho	02-12-2010	30-04-2011	Universidade do Minho
Luis António Araújo Ferreira	01-10-2011	31-12-2011	
Nuno Ricardo Palmeiro Otero	03-03-2008	02-03-2013	
Oscar Raul Vilela Bravo	02-12-2010	31-05-2011	Universidade do Minho
Ricardo Miguel Pinto Ferreira	01-10-2011	31-12-2011	

Technical Personnel Hired

Name	Start Date	End Date	Other Institution
Adriana Marilisa Machado da Silva Magalhães	02-12-2011	02-05-2012	Universidade do Minho
Marisa Gomes Jesus	21-11-2011	20-11-2012	Universidade do

Minho

Additional Comments**Research Groups**

Reference	Title / Principal Investigator
RG-Norte-319-2168	<u>Nonlinear Systems Optimization and Statistics</u> (António Ismael de Freitas Vaz)
RG-Norte-319-2169	<u>Systems Engineering, Optimization and Operations Research</u> (José Manuel Vasconcelos Valério de Carvalho)
RG-Norte-319-2171	<u>Knowledge and Information Systems and Services</u> (Henrique Manuel Dinis Santos)
RG-Norte-319-2184	<u>Ubiquitous and Pervasive Computing, Graphics, and Software Methodologies</u> (Adriano Jorge Cardoso Moreira)
RG-Norte-319-2959	<u>Industrial electronics</u> (João Carlos Aparício Paulo Fernandes)
RG-Norte-319-2976	<u>Micro/Nanotechnologies and Biomedical Applications</u> (José Higinio Gomes Correia)

Strategic Project Adjustments

Expenses during 2011 reached 96,2% of the budget. Two financial reports have been already concluded and the last one, regarding 2011, will be sent very soon. Due to the economical situation there will be short adjustments among some financial categories. This is being prepared by the administrative office of the University. The proposal of this short adjustment will be sent in the near future. Nevertheless, due to the 2011 budget loss, we are not quite sure if in 2012 we will be able to maintain the good financial performance.

FCT Relatório Científico 2011 Print: 30-03-2012 15:52:27 [CENTRO ALGORITMI]

Group Description

Title of Research Group:	(RG-Norte-319-2168) Nonlinear Systems Optimization and Statistics
Principal Investigator:	António Ismael de Freitas Vaz
Main Scientific Domain:	n/a
Group Host Institution:	Universidade do Minho

Funding, source, dates

Funding, source, dates

WALC - Web Assisted Laboratory for Control Engineering on-line Education, PTDC/ESC/68069/2006, PI: Leão, C.P., 01/10/2008-31/03/2011.

Flexible and adaptive Quadruped Locomotion Generation using the Dynamical Systems Approach, POCI-FCT 197067, PI: Santos, C., 01/06/2010-30/06/2013.

CSD-Chip – Development of an integrated biomedical microdevice for blood cell separation and deformation, PTDC/SAU-BEB/105650/2008, PI: Lima, R., 01/09/2010-31/08/2013.

GRACE - InteGration of pRocess and quALity Control using multi-agEnt technology, FP7-246203, PI: Leitão, P., 01/09/2010-31/08/2013.

Derivative-Free Optimization: Future Challenges and New Applications, PTDC/MAT/098214/2008, PI: Vicente, L.N., 01/01/2010-31/12/2012.

SEPP Sustainable Electricity Power Planning, PTDC/SEN/ENR/099578/2008, PI: Ferreira, P., 01/06/2010-01/06/2013.

Sparse and Smoothing Methods for Nonlinear Optimization of Complex Models, PTDC/MAT/116736/2010, PI: Vicente, L.N., to be started.

BIOMIMETIC - A biomimetic microdevice for the diagnosis of erythrocytes diseases based on their deformability, PTDC/SAU-ENB/116929/2010, PI: Lima, R., to be started.

Remote Physiological Systems (RePhyS) Laboratory: a didactic learning environment, PTDC/CPE-PEC/122329/2010, PI: Leão, C, to be started.

Objectives & Achievements

Objectives

The NSOS line fosters Excellency in fundamental and applied research, and teaching in its main research areas, which includes

- Continuous Nonlinear Optimization;
- Derivative-Free Optimization;
- Global Optimization;
- Mixed Integer Programming;

-Multi-objective Optimization;

-Semi-Infinite Programming;

-Statistics and Applications;

The objectives are:

1- to conduct fundamental and applied research, aiming to publish the results in leading journals;

2- to disseminate the obtained results in high level conferences, potentiating the impact of the research and possible collaborations;

3- to cooperate with local and international industries increasing its competitiveness;

4- to provide high quality public domain software;

5- to promote collaborations with international leading research groups actuating in the same research areas;

6- to offer high level educational courses either to MSc and PhD students in the programs supported by the research center;

Main Achievements

According to the objectives previously described, the team main achievements are described.

1- The team has published and submitted for publication 26 papers in leading journals (increasing the previous year number by 6).

2- The team had 50 participations in international conferences with extended abstract;

3- The team developed and maintained public domain software in the nonlinear optimization area: PSwarm (www.norg.uminho.pt/aivaz/pswarm) and DMS (www.mat.uc.pt/dms).

4- Team member have conducted some research visits to leading universities and research center, like the CERFACS (France), where collaborative works are expected in a near future. Some work is also under progress with the Metz University (France).

5- The research line is committed with the Doctoral Program in Industrial and Systems Engineering where several courses are offered to students in the main areas of the research line. The line is also involved in the Master Program in Systems Engineering, Master Program in Industrial Engineering and Master Program in Human Engineering, where several courses are also offered. This high level courses aim to provide students with tools in the research areas of the line, potentiating their employability.

6- Team members have served in the organization and scientific committees of several national and international conferences.

The impact of the research conducted by the team can be evaluated by the number of citations to previous works, where, for example, the papers about the PSwarm solver are cited 76 times in scholar.google.pt (on the 8th January).

The team visibility can also be evaluated by the journal where team members have acted as referees. In 2010 team members have reviewed paper on, for example, journal as "Journal of Global Optimization", "Optimization and Engineering", and "Mathematical Problems in Engineering".

Group Productivity

Publications in peer review Journals

- 1- Braga, AC; Costa, L; Oliveira, P; An alternative method for global and partial comparison of two diagnostic systems based on ROC curves. *Journal of Statistical Computation and Simulation*, 0, 1-19, 2011.
- 2- Castro, H; Teixeira, F; Romao, S; Santos, M; Cruz, T; Flórido, M; Appelberg, R; Oliveira, P; Ferreira-da-Silva, F; Tomás, A.M; Leishmania Mitochondrial Peroxiredoxin Plays a Crucial Peroxidase-Unrelated Role during Infection: Insight into Its Novel Chaperone Activity. *PLoS Pathogens*, 7, 1-11, 2011.
- 3- Correia, F; Nêveda, R; Oliveira, P; Chronic respiratory patient control by multivariate charts. *International Journal of Health Care Quality Assurance*, 24, 621-643, 2011.
- 4- Costa, BM; Viana-Pereira, M; Fernandes, R; Costa, S; Linhares, P; Vaz, R; Pinheiro, C; Lima, J; Soares, P; Silva, A; Pardal, F; Amorim, J; Nabiço, R; Almeida, R; Alegria, C; Melo Pires, M; Pinheiro, C; Carvalho, E; Oliveira, P; Lopes, JM; Reis, RM; Impact of EGFR Genetic Variants on Glioma Risk and Patient Outcome. *Cancer Epidemiology, Biomarkers and Prevention*, 0,0 , 2011.
- 5- Costa, L.; Espírito Santo, IACP; Oliveira, P.; An adaptive constraint handling technique for evolutionary algorithms. *Optimization*, 0, 1-13, 2011.
- 6- Costa, MFP; Fernandes, EMGP; Assessing the potential of interior point barrier filter line search methods: nonmonotone versus monotone approach. *Optimization*, 60, 1251-1268, 2011.
- 7- Custódio, AL; Madeira, JA; Vaz, AIF; Vicente, LN; Direct Multisearch for Multiobjective Optimization. *SIAM Journal on Optimization*, 21, 1109-1140, 2011.
- 8- Fernandes, JM; Vaz, AIF; Vicente, LN; Modeling nearby FGK Population I stars: A new form of estimating stellar parameters using an optimization approach. *Astronomy and Astrophysics*, 532, A20, 2011.
- 9- Ferraz, A; Carvalho, V; Soares, FO; Leão, CP; Characterization of blood samples using image processing techniques. *Sensors and Actuators A : Physical*, 172 (1), 308-314, 2011.
- 10- Hoi An, LT; Vaz, AIF; Vicente, LN; Optimizing radial basis functions by D.C. programming and its use in direct search for global derivative-free optimization, *TOP*, 0, 0, 2011.
- 11- Leão, CP; Soares, FO; Machado, J; Seabra, E; Rodrigues, H; Design and development of an industrial network laboratory. *International Journal of Emerging Technologies in Learning*, 6, 21-26, 2011.
- 12- Leão, CP; Soares, FO; Santos, S; Ribeiro, F; Lopes, G; An Early Start in Robotics - K-12 Case-Study. *International Journal of Engineering Pedagogy*, 1, 50-56, 2011.
- 13- Lemos, L; Alegria, C.; Oliveira, J; Machado, A; Oliveira, P; Almeida, A; Pharmacological versus microvascular decompression approaches for the treatment of trigeminal neuralgia: clinical outcomes and direct costs. *Journal of Pain Research*, 4, 233-244, 2011.
- 14- Machado, J; Seabra, E; Campos, J; Soares, FO; Leão, CP; Safe controllers design for industrial automation systems. *Computers and Industrial Engineering*, 60, 635-653, 2011.
- 15- Miranda, T.; Dias, D.; Eclaircy-Caudron, S.; Correia, AG; Costa, L.; Back analysis of geomechanical parameters by optimisation of a 3D model of an underground structure. *Tunnelling and Underground Space Technology*, 26, 659-673, 2011.
- 16- Monteiro, MTM; Meira, JFP; A Penalty method and a regularization strategy to solve MPCC. *International Journal of Computer Mathematics*, 88, 145-149, 2011.
- 17- Monteiro, MTM; Rodrigues, HSF; Combining the regularization strategy and the SQP to solve MPCC - A MATLAB implementation. *Journal of Computational and Applied Mathematics*, 235, 5348-5356, 2011.
- 18- Neves, M; Arezes, PM; Leão, CP; Teixeira, SFCF; A Lining for the Thermal comfort of Trekking Boots : experimental and numerical studies. *Research*

Journal of Textile and Apparel, 15, 50-61, 2011.

19- Oliveira, M.; Santos, CP; Costa, L; Rocha, A; Ferreira, M; Head Motion Stabilization During Quadruped Robot Locomotion: Combining CPGs and Stochastic Optimization Methods. International Journal of Natural Computing Research, 2, 39-62, 2011.

20- Pereira, A; Costa, MFP; Fernandes, EMGP; Interior point filter method for semi-infinite programming problems . Optimization, 60, 1309-1338, 2011.

21- Rocha, AMAC; Fernandes, EMGP; Numerical study of augmented Lagrangian algorithms for constrained global optimization. Optimization, 60, 1359-1378, 2011.

22- Rocha, AMAC; Martins, TFMC; Fernandes, EMGP; An augmented lagrangian fish swarm based method for global optimization. Journal of Computational and Applied Mathematics, 235, 4611-4620, 2011.

23- Rodrigues, HSF; Monteiro MTM; Torres, DFM; Dengue in Cape Verde - modelling, vector control and vaccination. Mathematical Population Studies, to be published 2012.

24- Rodrigues, HSF; Monteiro, MTM; Torres, DFM; Zinober, A; Dengue disease, basic reproduction number and control. International Journal of Computer Mathematics, to be published 2012.

25- Silva, A; Ribeiro, LM; Bressan, N; Oliveira, P; Ferreira, DA; Antunes, LM; Dogs mean arterial pressure and heart rate responses during high propofol plasma concentrations estimated by a pharmacokinetic model . Research in Veterinary Science, 91, 278-280, 2011.

26- Vaz, P; Gallas, MM; Braga, AC; Sampaio-Fernandes, JC; Tavares , AFP; IL1 gene polymorphisms and unsuccessful dental implant. Clin. Oral Impl. Res., 0, 1-10, 2011.

Other international publications

1- Alves, B; Soares, FO; Leão, CP; Incorporating an E-Book into Digital Control Studies. International Conference on Interactive Collaborative Learning, 1-6, 2011

2- Azad, MD; Fernandes, EMGP; Modified differential evolution based on global competitive ranking for engineering design optimization problems. LNCS, 6784, 245-260, 2011

3- Bento, D; Pereira, A; Monteiro, F; Monitoring feet temperature using thermography, Computational vision and medical image processing, Taylor & Francis Group, 189-191, 2011.

4- Bragança, S; Costa, E; Leão, CP; Carvalho, J; Project-based Learning in Industrial Environment from the Perspective of Students, Teachers and Company. International Symposium on Project Approaches in Engineering Education, 249-256, 2011

5- Carneiro, P; Braga, AC; Barroso, M; MUSCULOSKELETAL COMPLAINTS IN NURSES WHO PROVIDE HOME-BASED HEALTHCARE. 3rd International Conference on Healthcare Systems Ergonomics and Patient Safety, 2011

6- Carvalho, V; Leão, CP; Soares, FO; Cruz-Cunha, MM; Games development for pedagogical and educational purposes Computer games as educational and management tools: uses and approaches. Hershey: IGI Global, 1-9, 2011

7- Costa, A; Sampaio, P; Braga, AC; QWEB SPECIFICATION: NEW PERSPECTIVES FROM DIFFERENT STAKEHOLDERS. European Organization for Quality Congress, 2011

8- Costa, L; Espírito Santo, IACP; Fernandes, EMGP; Using a Genetic Algorithm to Solve a Bi-Objective WWTP Process Optimization, Operations Research Proceedings, 6p, 2010

- 9- Costa, L; Espírito Santo, IACP; Oliveira, P; Stochastic algorithms assessment using performance profiles. Genetic and Evolutionary Computation Conference Proceedings, 933–940, 2011
- 10- Costa, L; Espírito Santo, IACP; Oliveira, P; Uncertainty on multi-objective optimization problems, AIP CP, 1389/AIP, 775-778, 2011
- 11- Costa, MFP; Fernandes, EMGP; On minimizing objective and KKT error in a filter line search strategy for an interior point method. LNCS, 6784, 231-244, 2011
- 12- Costa, S; Soares, FO; Leão, CP; Students' perception on using WALS platform for Automation and Process Control engineering studies. International Conference on Interactive Collaborative Learning, 1-4, 2011
- 13- Espírito Santo, IACP; Costa, L; Rocha, A; Azad, MD; Fernandes, EMGP; On Challenging Techniques for Constrained Global Optimization. Handbook of Optimization, 30pp, 2011
- 14- Espírito Santo, IACP; Fernandes, EMGP; Heuristic pattern search for bound constrained minimax problems, LNCS, 6784, 174-184, 2011
- 15- Fernandes, FP; Costa, MFP; Fernandes, EMGP; Assessment of a hybrid approach for nonconvex constrained MINLP problems. 11th International Conference on Computational and Mathematical Methods in Science and Engineering, 484-495, 2011
- 16- Ferreira, A; Nunes, M; Teixeira, SFCF; Leão, CP; Teixeira, JCF; Martins, L; Marques, F; Silva, AME; Optimization of a small-scale cogeneration system as a function of the thermal demand, 4th International Congress on Energy and Environment Engineering and Management, 1-8, 2011
- 17- Fonseca, L; Ramos, A; Rosa, A; Braga, AC; Sampaio, P; IMPACT OF SOCIAL RESPONSIBILITY PROGRAMMES IN STAKEHOLDERS SATISFACTION: AN EMPIRICAL STUDY OF PORTUGUESE MANAGERS PERCEPTIONS. Symposium on Ethics & Social Responsibility Research, 1-7, 2011
- 18- Leão, CP; Soares, FO; Machado, J; Oliveira, PBM; Cunha, JB; A support tool for teaching Grafset: engineering students' perceptions. Proceedings of the ASME 2011 International Mechanical Engineering Congress & Exposition, 1-6, 2011
- 19- Leão, CP; Soares, FO; Santos, S; Ribeiro, F; Lopes, G; K-12, university students and Robots: An Early Start. EDUCON2011 Annual Global Engineering Education Conference, 1133-1138, 2011
- 20- Loureiro, IF; Leão, CP; Arezes, PM; Neto, E AL; What can a logistic regression model offer to a three-dimensional ergonomic study?. SHO, 339-343, 2011
- 21- Melo, TM; Monteiro, MT; Matias, JH; Solving MPCC problem with the hyperbolic penalty function. AIP CP, 1389/AIP, 763-766, 2011
- 22- Oliveira, M; Costa, L; Rocha, A; Santos, C; Ferreira, M; Multiobjective Optimization of a Quadruped Robot Locomotion using a Genetic Algorithm, The 15th Online World Conference on Soft Computing in Industrial Applications WWW, 10p, 2011
- 23- Oliveira, M; Santos, C; Costa, L; Matos, V; Ferreira, M; Multi-objective parameter CPG optimization for gait generation of a quadruped robot considering behavioral diversity. IEEE/RSJ International Conference on Intelligent Robots and Systems, 2286-2291, 2011
- 24- Oliveira, M; Santos, C; Costa, L; Rocha, A; Ferreira, M; Combining Optimization Techniques and CPGs for Head Motion Stabilization. Serial and Parallel Robot Manipulators: Kinematic Dynamics and Control, 2011
- 25- Oliveira, M; Santos, C; Rocha, A; Costa, L; Ferreira, M; Applying an Elitist Electromagnetism-Like Algorithm to Head Robot Stabilization, Computational Science and Its Applications, 6784, 343-357, 2011
- 26- Pereira, A; Barbosa, J ; Leitão, P, Combining adaptation and optimization in bio-inspired multi-agent manufacturing systems, 20th IEEE International Symposium on Industrial Electronics (ISIE), Gdansk, Polónia, 27 Jun - 30 Jun, 1773-1778, 2011
- 27- Pereira, A; Bento, D; Monteiro, F, Mathematical model of feet temperature, AIP CP, 1389/AIP, 787-790, 2011

- 28- Pereira, A; Ribeiro, T; Rufino, J; PSSA: Parallel Stretched Simulated Annealing, AIP CP, 1389/AIP, 783-786, 2011
- 29- Pereira, A; Fernandes, EMGP; Branch-and-bound reduction type method for semi-infinite programming, LNCS, 6784, 287-299, 2011
- 30- Pinho, A; Pereira, A; Gayubo, F; Lima, R; A comparison between a manual and automatic method to characterize red blood cell trajectories, AIP CP, 1389/AIP, 767-770, 2011
- 31- Ramadas, GCV; Fernandes, EMGP; Combining global tabu search with local search for solving systems of equalities and inequalities. AIP CP, 1389/AIP, 743-746, 2011
- 32- Rocha, A; Fernandes, EMGP; Electromagnetism-like Augmented Lagrangian Algorithm for Global Optimization. Soft Computing in Industrial Applications, 96, 415-425, 2011.
- 33- Rocha, A; Fernandes, EMGP; Martins, T; Novel fish swarm heuristics for bound constrained global optimization problems, LNCS, 6784, 185-199, 2011
- 34- Rodrigues, HSF; Monteiro, MT; Torres, DFM; Optimal control of a dengue epidemic model with vaccination. AIP CP, 1389/AIP, 1232-1235, 2011
- 35- Rodrigues, MA; Arezes, PM; Leão, CP; Risk acceptance criteria formulation in furniture industry: the Portuguese reality. ASME 2011 International Mechanical Engineering Congress & Exposition, 1-6, 2011
- 36- Rodrigues, MA; Leão, CP; Barroso, M; Arezes, PM; Supporting tool on the decision-making for the comfort conditions optimization. ENBIS-11 European Network for Business and Industrial Statistics, 1-7, 2011

Ph.D. thesis completed

1. Patrícia Dinis Mota da Costa, co-orientador, da tese de Doutoramento em Engenharia Industrial e de Sistemas, Modelos Multidimensionais de Resposta ao Item (orientadora Eugénia Ferrão da Universidade da Beira Interior), Universidade do Minho, 2008-2011, grau obtido.
2. Paulo Jorge Parreira da Cunha, co-orientador, da tese de Doutoramento em Engenharia Civil, Conformidade da Resistência à Compressão do Betão, (orientadores Barroso de Aguiar e Aires Camões), Universidade do Minho, 2006 - 2011, grau obtido.

Strategic Project Adjustments

Expenses during 2011 reached 96,2% of the budget. Two financial reports have been already concluded and the last one, regarding 2011, will be sent very soon. Due to the economical situation there will be short adjustments among some financial categories. This is being prepared by the administrative office of the University. The proposal of this short adjustment will be sent in the near future. Nevertheless, due to the 2011 budget loss, we are not quite sure if in 2012 we will be able to maintain the good financial performance.

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Group Description

Title of Research Group:	(RG-Norte-319-2169) Systems Engineering, Optimization and Operations Research
Principal Investigator:	José Manuel Vasconcelos Valério de Carvalho
Main Scientific Domain:	n/a
Group Host Institution:	Universidade do Minho

Funding, source, dates

Funding, source, dates

SearchCol: Metaheuristic search by column generation, FCT (PTDC/EIA-EIA/100645/2008), 04-2010, 03-2013, 94.719€

KEP - Novos modelos no processo de transplante renal, FCT (PTDC/EGE-GES/110940/2009), 4-2011, 04-2014, 126.000€

Logística Inversa de REEE, Amb3E, 12-2009, 12-2011, 34.800€

Optimização de modelo de logística para recolha e processamento de biomassa florestal e agrícola, QREN - Vale Inovação, 9-2009, 9-2011, 24.000€

Sistemas de Apoio à Decisão para o IMTT, Instituto da Mobilidade e dos Transportes Terrestres, IP, 09-2010, 02-2011, 50.000€.

Quadrilátero Urbano para a Competitividade, Inovação e Internacionalização, QREN, 2008, 2012

ASTRA – Sistema Alternativo de Transporte para Áreas Rurais, FCT, (PTDC/TRA/72871/2006), 11-2007, 11-2011, 116.263€

Business Intelligence, EFACEC, QREN, 01-2010. 6-2011, 70.000€

INSTEAD - Sistema Inteligente de Transporte para Indivíduos com Dificuldades de Locomoção, FCT (PTDC/SEN-TRA/116216/2009), 03-2011, 03-2014, 105.500€

Planeamento integrado de operações na indústria automóvel, COINDU, S.A, 5-2011, 4-2013, 42.120€

Objectives & Achievements

Objectives

The mission of SEOOR is to pursue research and research-led learning and teaching of the highest international level in all the teaching areas of the Optimization and Operations Research Group:

Optimization

Logistics and Transportation

Modeling and Simulation

Quality, Reliability and Maintenance

• Objectives:

Conduct both fundamental and applied research, targeting to publish in the highest quality and flagship journals;

Establish research mobility, exchange and cooperation programs with internationally renowned research centers;

Establish high quality research contracts with surrounding industries and services, aiming at contributing to their development;

Target the job placement of our PhD and MSc students in surrounding industries and services after they graduate;

Develop a research environment attractive to international graduate students, particularly from Portuguese speaking countries, and to postdoctoral researchers;

Encourage the involvement of postgraduate students in ongoing research projects

Main Achievements

1. Publications

The number of papers published in 2011 increased: there were 16 papers published or in press in international journals (10 in ISI journals), 1 book, 2 chapters in books, and 50 papers published in conference proceedings.

2. International visibility

The International visibility and recognition of the group increased. The number of citations to publications in international journals resulting from the PhD thesis recently completed by many researchers of the group is significant, and the total figures increased significantly.

There were more than 184 citations in the ISI Web of Knowledge, 300 citations in Scopus and 696 citations in <http://scholar.google.pt/> to the papers published by the group. The number of citations in the ISI Web of Knowledge more than tripled when compared with the figure of 2007.

3. Internationalization

Collaborations with MIT, in the MIT-Portugal Program, with the Universities of Lille and Valenciennes, France, and with Institute of Telecommunications, Warsaw, Poland resulted in publications in international journals. PhD students of SEOOR had stays at Valenciennes, France, and at the University of S.Paulo, Brazil. The exchange of PhD students of SEOOR is envisaged to increase in the future in a regular basis.

Some of these new cooperation programs are in areas within the line that gained a critical mass when researchers of SEOOR, who got their PhDs recently, were enabled to target larger scope projects and to establish new international links.

For further details, and an indication of publications resulting from international cooperation, see Section Internationalization, Subsection New Collaborative research.

4. Prizes and awards in 2011

- Paulo Sampaio, who joined the faculty in 2011, was Named to "40 New Voices of Quality" List by the American Society for Quality (ASQ).

- 2nd Best Communication Award in the European Organization for Quality Congress to Paulo Sampaio, Budapeste, Hungria.
- Honorable Mention to PhD Thesis of Rita Macedo by the School of Engineering of the University of Minho, October 2011.
- Best MSc Dissertation Award to Telmo Pinto by the School of Engineering of the University of Minho, October 2011.
- Honorable Mention to MSc Thesis of Sofia Teixeira by the Portuguese Association for Quality.

5. Post-doctoral researchers

Post-doctoral researchers find SEOOR attractive.

- Abdur Rais, PhD Purdue University, USA (FCT Grant Programa Compromisso Ciência), 2011 – to date
- Rita Macedo, PhD Universidade do Minho, Portugal (Grant SFRH / BPD / 78024 / 2011), 2011 – to date
- Jürgen Rietz, PhD Technische Universität Bergakademie Freiberg, Germany (Grant SFRH / BPD / 45157 / 2008), 2008 – to date
- Mansi Raed, PhD Université de Valenciennes, France (Grant SFRH / BPD / 64766 / 2009), 2010 - 2011

6. PhD Program in Industrial and Systems Engineering (PDEIS)

PDEIS is now running for the third year, in collaboration with NSOS (another research line of Algoritmi) and with CITEPE, another research center, and is directed by V.Carvalho. The number of PhD students has been increasing, and is now about 80.

There are currently 20 PhD students (2 of them are 1st year students) under the supervision of SEOOR members, after 5 PhD were completed in 2011. We anticipate that the numbers will continue to grow, and we aim at having a larger number, but below 40, which would correspond to a ratio of 3 PhD students / member of the faculty.

The courses in

- Decomposition Methods in Integer Programming
- Approximate methods in Integer Programming and Combinatorial Optimization
- Exact and hybrid methods for Integer Programming
- Heuristics Methods
- Total Quality Management

are offered by faculty members of SEOOR. Other are now preparing new PhD courses in the frontier of the knowledge of their research areas to offer in this PhD Program.

Group Productivity

Publications in peer review Journals

Macedo, Rita; Alves, C.; Valério de Carvalho, J.; Clautiaux, F.; Hanafi, S., Solving the vehicle routing problem with time windows and multiple routes exactly using a pseudo-polynomial model. European Journal of Operational Research 214(3) 536-545, 2011. [ISI + Scopus]

Clautiaux, F.; Alves, C.; Valério de Carvalho, J.; Juergen Rietz. New stabilization procedures for the cutting stock problem. *INFORMS Journal on Computing* 23(4) 530-545, 2011. [ISI + Scopus]

Dorabella Santos; Amaro de Sousa; Filipe Alvelos; Mateusz Dzida; Michal Pióro. Optimization of link load balancing in multiple spanning tree routing networks. *Telecommunication Systems* 48(1-2) 109-124, 2011. [ISI + Scopus]

Chan, Tak Ming; Filipe Pereira Pinto Cunha Alvelos; Silva, Elsa; Valério de Carvalho, J. Heuristics with stochastic neighborhood structures for two-dimensional bin packing and cutting stock problems. *Asia-Pacific Journal of Operational Research* 28(2) 255-278, 2011. [ISI + Scopus]

Alves, C.; Brás, Pedro; Valério de Carvalho, J.; Pinto, Telmo. A variable neighborhood search algorithm for the leather nesting problem. *Mathematical Problems in Engineering*, 2011. [ISI + Scopus]

Mansi, R.; Alves, C.; Valério de Carvalho, J.; Hanafi, S. An exact algorithm for bilevel 0-1 knapsack problems. *Mathematical Problems in Engineering*, 2011. [ISI + Scopus]

Pimentel, Carina; Filipe Alvelos; Valério de Carvalho, J.; António Duarte, Exact and heuristic approaches for lot splitting and scheduling in identical parallel machines. *International Journal of Manufacturing Technology and Management* 22(1) 39-57, 2011. [Scopus]

Jürgen Rietz, Cláudio Alves, José Valério de Carvalho. General properties of staircase and convex dual feasible functions. *WSEAS Transactions on Information Science and Applications*, vol. 8, 6, pp. 233–242, 2011. [Scopus]

Jürgen Rietz, Rita Macedo, Cláudio Alves, José Valério de Carvalho. Efficient lower bounding procedures with application in the allocation of virtual machines to data centers. *WSEAS Transactions on Information Science and Applications*, vol. 8, n.04, pp. 157–170, 2011. [Scopus]

Sampaio, P.; Pedro Manuel Saraiva; António Guimarães Rodrigues, ISO 9001 Certification Forecasting Models. *International Journal of Quality and Reliability Management* 28(1) 5-26, 2011. [Scopus]

Sampaio, P.; Pedro Manuel Saraiva; António Guimarães Rodrigues. The Economic Impact of Quality Management Systems in Portuguese Certified Firms: Empirical Evidence. *International Journal of Quality and Reliability Management* 28(9) 929-950, 2011. [Scopus]

Sofia Teixeira; Sampaio, P. An analysis of food safety management systems certification: the Portuguese case. *Sinergie Journal* 85, 53-68, 2011.

Rietz, Jürgen; Alves, Cláudio; Valério de Carvalho, J. On the extremality of maximal dual feasible functions. *Operations Research Letters*, in press, 2011. [ISI + Scopus]

Dorabella Santos; Amaro de Sousa; Filipe Alvelos; Michal Pióro. Optimizing network load balancing: an hybridization approach of metaheuristics with column generation, *Telecommunication Systems*, in press 2011. [ISI + Scopus]

Isabel Martins, Filipe Alvelos, Miguel Constantino, A Branch-and-Price Approach for Harvest Scheduling subject to Maximum Area Restrictions *Computational Optimization and Applications*, in press 2011. [ISI + Scopus]

Alves, C.; Valério de Carvalho, J.; Rietz, Jürgen. Worst-case analysis of maximal dual feasible functions. *Optimization Letters*, in press, 2011. [ISI + Scopus]

Book chapters

Chan;Alvelos;Silva;Valério Carvalho. Heuristics for two-dimensional bin-packing problems. The Industrial Electronics Handbook, Intelligent Systems, Chapter I54

International Conference Proceedings (full text)

Afonso;Telhada;Oliveira. An Activity-Based Costing Model for Strategic Decisions in Transportation on Demand Projects. International Conference on Project Economic Evaluation

Neves;Sampaio. O uso de indicadores de desempenho nos sistemas de gestão integrados: estado-da-arte. Colóquio Internacional de Segurança e Higiene Ocupacionais

Bastos;Lopes;Pires. SPAMUF: a behaviour-based maintenance prediction system Advances in Safety, Reliability and Risk Management, Taylor&Francis Group

Brás;Alves;Valério Carvalho;Pinto. Irregular shape packing on leather hides using GRASP: a real case study. International Conference on Engineering

Geraldes;Carvalho;Pereira. Simulation in the Warehouse Design and Management Context: A Survey. European Simulation and Modelling Conference

Geraldes;Carvalho;Pereira. An integrated approach for warehouse design and planning. European Simulation and Modelling Conference

Costa;Sampaio;Braga. QWEB Specification: new perspectives from different stakeholders. European Organization for Quality Congress

Matias;Sampaio;Braga. ISO 9001 certification: customer's perspective. TV Conference

Dias;Telhada;Carvalho. A simulation approach to support the design of flexible transport systems. European Simulation and Modelling Conference

Sousa;Marques;Matos;Alves. A location problem in the field of wind energy. International Conference on Business Sustainability

Hussain;Figueiredo;Tereso;Ferreira. Competitiveness in the textile and clothing supply chain. International Conference on Engineering

Idrogoa;Paladini;Arezes;Sousa. Sistema Integrado de Gestão: Um modelo para as PMEs. Colóquio Internacional de Segurança e Higiene Ocupacionais

Barradas;Sampaio. ISO 9001/ISO 17025 standards in a metrology laboratory. TV Conference

Barradas;Sampaio. ISO 9001 or ISO 17025: What is more important for the metrology laboratory. International Symposium on Quality

Lopes;Nunes;Sousa;Esteves. Quality improvement practices adopted by industrial companies in Portugal. World Congress on Engineering

Fonseca;Ramos;Rosa;Braga;Sampaio. Stakeholder Satisfaction and Sustained Success. International Conference on Business Sustainability

Macedo;Alves;Valério Carvalho. An exact approach for the location routing problem with multiple routes. International Conference on Engineering

Macedo;Alves;Valério Carvalho;Hanafi. Relaxation induced methods based on column generation for vehicle routing problems. International Conference on Business Sustainability

Mansi;Alves;Valério Carvalho;Brotcorne;Hanafi. A heuristic approach to bilevel multidimensional knapsack problems based on a surrogate relaxation. International Conference on Engineering

Oliveira;Telhada;Ferreira. A cost-benefit analysis of an intelligence and demand-responsive public transport system for elderly and disabled. International Conference on Project Economic Evaluation

Oliveira;Telhada;Dias;Figueiredo. Improving the efficiency of the portuguese WEEE collection system by using a WEB-based GIS application. Congreso

Galego de Estatística e Investigación de Operacións

Oliveira;Dias;Pereira. An evolutionary algorithm with active plans for the RCPS. European Concurrent Engineering Conference

Oliveira;Oliveira;Dias;Pereira. Modeling and simulating a textile production system. European Simulation and Modelling Conference

Domingues;Sampaio;Arezes. Management systems integration: should quality be redefined? European Organization for Quality Congress

Domingues;Sampaio;Arezes. Benchmarking on behalf of management systems integration. International Conference on Business Sustainability

Domingues;Sampaio;Arezes. Management Systems Integration: a 3-dimensional organizational perspective. International Symposium on Quality

Domingues;Sampaio;Arezes. Integrated Management Systems: the vision from the perspective of the occupational health and safety system. Colóquio Internacional de Segurança e Higiene Ocupacionais

Domingues;Sampaio;Arezes. Beyond audit definition: a framework proposal for integrated management systems. Institute of Industrial Engineers Annual Conference

Peito;Pereira;Leitão;Dias. Simulation as a decision support tool in maintenance float systems: the automatic generation of simulation programs. European Simulation and Modelling Conference

Pereira;Dias;Vik;Oliveira. Discrete simulation tools ranking: a commercial software packages comparison based on popularity. Industrial Simulation Conference

Pereira;Peito;Leitão;Dias. Simulation as a decision support tool in maintenance float systems. European Concurrent Engineering Conference

Pereira;Peito;Leitão;Dias. Simulation as a decision support tool in maintenance float systems: system availability versus total maintenance cost. Modeling and Applied Simulation

Pinto;Alves;Valério Carvalho;Brás. Heuristic methods for process optimization in the automotive industry. International Conference on Business Sustainability

Carvalho;Alves;Lopes. Principles and practices of Lean Production applied in a metal structures production system The World Congress on Engineering

Mansi;Alves;Valério Carvalho;Hanafi. An exact solution approach for a multi-follower bilevel optimization problem. International Conference on Business Sustainability

Ribeiro;Telhada;Carvalho. A decision support system for a flexible transport system. The European Concurrent Engineering

Ribeiro;Telhada;Carvalho. Economic evaluation of a demand-responsive transport in rural area. International Conference on Project Economic Evaluation

Sampaio;Saraiva. Management Systems: a path to organizational sustainability. European Organization for Quality Congress

Sampaio. Management Systems: A Global Perspective. Croatian Conference on Quality

Sampaio;Saraiva. A Worldwide Analysis of Management Systems Certification. Institute of Industrial Engineers Annual Conference

Sampaio;Pereira;Carvalho;Telhada;Paisana;Paixão;Fonseca. A business intelligence solution for public transportation sector. European Concurrent Engineering Conference

Silva;Oliveira;Tereso. A genetic algorithm for project scheduling in activity networks under resource complementarity. European Concurrent Engineering Conference

Teixeira;Sampaio. Food safety management systems implementation and certification: survey results. Institute of Industrial Engineers Annual

Conference

Sousa;Nunes;Lopes. On the characterisation of uncertainty in Performance Measurement systems. Business Sustainability

Other national publications

Rui M. Lima; Sampaio, P.; Marques, Ana; Nunes, Manuel; Alvelos, Filipe; Mesquita, D.; Silva, Daniela; Fernandes, Fábio; Antunes, João; Morais, Marta. Livro de actas do encontro nacional de engenharia gestão industrial 2011 (enegi 2011), Universidade do Minho. Escola de Engenharia. Departamento de Produção e Sistemas, (ISBN: 978-989-97050-2-9), Guimarães, 373 p., 2011.

Sampaio, P.; Pedro Manuel Saraiva. Qualidade e as Normas ISO 9000: Mitos, Verdades e Consequências. Verlag Dashofer, Lisboa, 2011.

Pedro Domingues; Sampaio, P.; Arezes, P. M. Management systems integration: a Renaissance organizational Era. Semana da Escola de Engenharia 2011, 2011

Pedro Domingues; Sampaio, P.; Arezes, P. M. Integração de sistemas de gestão. dados preliminares do projecto para desenvolvimento de uma metodologia para avaliação do nível de maturidade e eficiência. II Encontro de Investigadores da Qualidade, 2011

Pedro Domingues; Sampaio, P.; Arezes, P. M. Integração de sistemas de gestão: dados preliminares no desenvolvimento de uma metodologia para avaliação do nível de maturidade. Encontro Nacional de Engenharia e Gestão Industrial, Guimarães, 2011, (ISBN: 978-989-97050-2-9)

Silva, Elsa; Filipe Alvelos; Valério de Carvalho, J. Problema integrado de corte bidimensional e dimensionamento de lotes. 15º Congresso da Associação Portuguesa de Investigação Operacional IO 2011, Coimbra, p. 91-102, 2011, (ISBN: 978-989-95055-4-4)

Gomes, Tiago; Alvelos, Filipe; Maria Sameiro Carvalho. Modelação e optimização de cadeias de abastecimento de biomassa florestal. 15º Congresso da Associação Portuguesa de Investigação Operacional IO 2011, Coimbra, p. 275-286, 2011, (ISBN: 978-989-95055-4-4)

Antunes, Diana; Carvalho, Maria Sameiro; Martins, Paulo Jorge de Figueiredo; Costa, Paulo Especificação de uma aplicação informática para a melhoria da função compras e procurement das unidades de negócio da EFACEC, Encontro Nacional de Engenharia e Gestão Industrial, Guimarães, 2011, (ISBN:978-989-97050-2-9)

Marta Martins; Sampaio, P. O impacto da implementação da norma ISO 9001 no processo de gestão de reclamações: caso de estudo na indústria de mobiliário. ENEGI 2011 - Encontro Nacional de Engenharia e Gestão Industrial, Guimarães, 2011

Marta Pacheco; Sampaio, P.; Rodrigues, Cristina. Ferramentas da qualidade: estudo da sua aplicação e uso nas organizações Portuguesas. ENEGI 2011 - Encontro Nacional de Engenharia e Gestão Industrial, Guimarães, 2011

Andreia Neves; Virgínia Linhares; Sampaio, P.; Pedro Saraiva. Metodologias e boas práticas de integração e avaliação de sistemas de gestão. II Encontro de Investigadores da Qualidade, 2011

Alves, C.; Pedro Brás; Valério de Carvalho, J.; Pinto, Telmo. Optimização de processos no fabrico de estofos para automóveis: o caso da COINDU S.A. Boletim da APDIO, 2011.

Anabela Silva; Carneiro, P.; Braga, Ana; Sampaio, P.; Barroso, Mónica. A logistic regression model for the risk of musculoskeletal complaints in the

lumbar region. Poster presentation at European Network for Business and Industrial Statistics (ENBIS 2011), Coimbra, Portugal, 4-8 September 2011, 2011.

Elsa Sousa; Miguel Marques; José Matos; Alves, C. GIS enabled decision support system for IEC 61400-12-1'S reference meteorological mast siting European Wind Energy Association Annual Event 2011 - EWEA 2011, Bruxelas, Bélgica, 14-17 de Março de 2011, 2011.

Luís Fonseca; Sampaio, P. Certificação de Sistemas em Portugal: percepção das entidades certificadas Ingenium: Revista da Ordem dos Engenheiros, 22-23, 2011.

Sampaio, P.; Ana Cristina Braga. Responsabilidade Social e Sucesso Sustentado: análises estatísticas. Relatório técnico, 2011

Sampaio, P.; Pedro Manuel Saraiva. Barómetro da Certificação 2010. Guia das Empresas Certificadas, 2011.

Sampaio, P.; Pedro Manuel Saraiva. Sistemas de gestão: uma análise global. Revista Qualidade 1, 36-42, 2011.

Sampaio, P.; Pedro Manuel Saraiva. Retrato da Certificação de Sistemas de Gestão em Portugal. Revista Qualidade 2, 32-39, 2011.

Sofia Teixeira; Sampaio, P. Implementação e Certificação de Sistemas de Gestão de Segurança Alimentar em Portugal. Revista Qualidade 4, 18-23, 2011.

Ph.D. thesis completed

Pedro Brás, Posicionamento automático de figuras irregulares (Grant SFRH / BDE / 15650 / 2007), 2011.

Rita Macedo, Modelos e algoritmos para problemas difíceis de otimização (Grant SFRH / BD / 39607 / 2007), 2011.

Isabel Cristina Lopes, Pattern sequencing models in cutting stock problems (Grant SFRH / BD / 32151 / 2006), 2011.

Carina Pimentel, Métodos híbridos para dimensionamento de lotes e escalonamento integrados (Grant SFRH / BD / 38582 / 2007), 2011.

Elsa Silva, Modelos e métodos de otimização para problemas de corte e empacotamento a duas dimensões (Grant SFRH / BD / 42259 / 2007), submitted December 2011.

Organization of conferences

Organizing Committee

XVIII International Conference on Industrial Engineering and Operations Management (ICIEOM 2012), Guimarães, 09-11 July 2012 (Local OC: S.Carvalho, G.Pereira)

Program Committee

C. Alves, 6th International Conference on P2P, Parallel, Grid, Cloud and Internet Computing-3PGCIC 2011 (Global Optimization in Large-Scale Distributed Systems), Barcelona, Spain, 26-28 October 2011

C.Alves, 2nd International Conference on Business Sustainability-BS11, Póvoa de Varzim, 22-24 June 2011

- I.Lopes, International Conference on Engineering UBI2011-Innovation and Development, Covilhã
- S.Carvalho, ESM'2011, Guimarães, November 2011
- S.Sousa, Business Sustainability 2011-Management, Technology and Learning for Individuals, Organisations and Society in Turbulent Environments, Póvoa de Varzim
- V.Carvalho, VII ALIO EURO Workshop on Applied Combinatorial Optimisation, Porto, May 2011
- V.Carvalho, Optimization 2011, Lisbon, July 2011
- V.Carvalho, ICIEOM 2012, Guimarães, 09-11 July 2012
- V.Carvalho, Euro Summer Institute on Cutting and Packing (ESI-C&P), Porto, 16-27 July 2012
- V.Carvalho, ICORES 2012, 1st International Conference on Operations Research and Enterprise Systems, Vilamoura, February 2012
- S.Carvalho, International Conference on Information Systems, Logistics and Supply Chain (ILS), Quebec City, Canada, 26-29 August 2012
- J.Telhada, Artificial Intelligence In Transportation Systems (AITS) in 15th Portuguese Conference on Artificial Intelligence, EPIA2011, Lisbon, 10-13 October 2011
- J.Oliveira, Simulation and Optimization in The 25th annual European Simulation and Modelling Conference (ESM'2011) Guimarães, October 2011
- V.Carvalho, IO 2011, 15o Congresso da Associação Portuguesa de Investigação Operacional, 2011, Coimbra, 18-20 Abril 2011.
- P.Sampaio, II Encontro de Investigadores da Qualidade, Tróia, junho 2011.
- P.Sampaio, V Workshop de Engenharia Industrial da UMinho – Os Emigrantes da Engenharia e Gestão Industrial da UMinho, Guimarães, janeiro 2011.

Industry contract research

Names of companies, titles of project, responsible and budget:

EFACEC, Business Intelligence, Guilherme Augusto Borges Pereira 70.000€

VIMASOL, BIOLOG - Optimização de modelo de logística para recolha e processamento e biomassa florestal e agrícola, Maria Sameiro Faria Brandão Soares Carvalho, 24.000€

COINDU, Planeamento integrado de operações na indústria automóvel, Cláudio Alves, 42.120€

IMTT - Instituto da Mobilidade e dos Transportes Terrestres, Sistemas de Apoio à Decisão para o IMTT, Maria Sameiro Faria Brandão Soares Carvalho, 90.000,00 €

AMB3E, Logística Inversa de REEE, José António Vasconcelos Oliveira, 34.800,00 €

Internationalization

Collaborative publication, Research

Clautiaux, F.; Alves, C.; Valério de Carvalho, J.; Juergen Rietz. New stabilization procedures for the cutting stock problem. INFORMS Journal on

Computing 23(4) 530-545, 2011. [ISI]

Dorabella Santos; Amaro de Sousa; Filipe Alvelos; Mateusz Dzida; Michal Pioro. Optimization of link load balancing in multiple spanning tree routing networks. *Telecommunication Systems* 48(1-2) 109-124, 2011. [ISI + Scopus]

Dorabella Santos; Amaro de Sousa; Filipe Alvelos; Michal Pióro. Optimizing network load balancing: an hybridization approach of metaheuristics with column generation

Telecommunication Systems [num] - 2011. [ISI + Scopus]

Macedo, Rita; Alves, C.; Valério de Carvalho, J.; Clautiaux, F.; Hanafi, S.

Solving the vehicle routing problem with time windows and multiple routes exactly using a pseudo-polynomial model. *European Journal of Operational Research* 214(3) 536-545, 2011. [ISI]

Mansi, R.; Alves, C.; Valério de Carvalho, J.; Hanafi, S. An exact algorithm for bilevel 0-1 knapsack problems. *Mathematical Problems in Engineering*, 2011. [ISI]

Graduate Training Networks and Staff Mobility

Several members of the staff are involved in the Graduate Training Network with Massachusetts Institute of Technology (MIT), Instituto Superior Técnico (IST) and Faculdade de Engenharia da Universidade do Porto (FEUP) in the MIT-Portugal Program.

Valério de Carvalho taught at the Università degli studi di Padova, Dipartimento di Matematica Pura ed Applicata, Padova, Italia, Module on Column Generation, course "Metodi e Modelli per l'Ottimizzazione Combinatoria", Corso di Laurea Magistrale in Informatica, 19th – 27th October 2011.

Cláudio Alves was Visiting Professor at the Université de Technologie de Compiègne, Département de Génie Informatique, Compiègne, France, May 9-11, 2011.

Examination boards

PhD Thesis of Emanuel Tresoldi, Location and Routing Problems: an Unified Approach, Dottorato di Ricerca in Informatica, University of Milan, Italy, December 2011 (external referee: Valério de Carvalho).

Government/Organization contract research

Sistemas de Apoio à Decisão para o IMTT – Instituto da Mobilidade e dos Transportes Terrestres, IP., funded by IMTT (2009-2010).

Strategic Project Adjustments

Expenses during 2011 reached 96,2% of the budget. Two financial reports have been already concluded and the last one, regarding 2011, will be sent very soon. Due to the economical situation there will be short adjustments among some financial categories. This is being prepared by the administrative office of the University. The proposal of this short adjustment will be sent in the near future. Nevertheless, due to the 2011 budget loss,

we are not quite sure if in 2012 we will be able to maintain the good financial performance.

FCT Relatório Científico 2011 Print: 30-03-2012 15:54:11 [CENTRO ALGORITMI]

Group Description

Title of Research Group:	(RG-Norte-319-2171) Knowledge and Information Systems and Services
Principal Investigator:	Henrique Manuel Dinis Santos
Main Scientific Domain:	n/a
Group Host Institution:	Universidade do Minho

Funding, source, dates

Funding, source, dates

- "SIDIC - Sistema Integrado de Detecção e Identificação de Comportamentos e Dados Biométricos por Análise de Video", Program QREN – SI I&DT, co-promotion (contract nº 2011/021584); 10/2011 to 09/2013; total founding 328.930,56€; UM founding 127.149,06€.
- "csSecure II", Program QREN – SI I&DT, co-promotion (contract nº 2010/013619); 04/2010 to 03/2013; total founding 1.065.759,45€; UM founding 80.495,39€.
- "OFELIA - Open Federated Environments Leveraging Identity and Authorization" cofunding by Compete (PTDC/EIA-EIA/104328/2008); 06/2010 to 5/2012; total founding 120.000€; UM founding 17.094,00€.
- BATinLoko – Environmental performance indicators and their relation with economic factors in textile BAT implementation, funded by LIFE+ Environment Policy and Governance 2007, 01/2009-03/2011
- DeGóis - Plataforma Nacional de Ciência e Tecnologia, funded by FCT, 03/2010-02/2011
- INTCARE - Sistema de Suporte à Decisão Inteligente para Medicina Intensiva, funded by FCT, 04/2008-04/2011
- ACTOR: Apostar na Certificação das Empresas TICE Organizadas em Rede, funded by ADI, 11/2010-05/2013
- ISOFIN: Interoperabilidade em Software Financeiro, funded by ADI, 10/2010-09/2013

Objectives & Achievements

Objectives

During 2011 and within the larger context of the Algoritmi Centre reorganization initiative, there was an internal exercise to rethink the internal organization, resulting in a change of the group name and a realignment of the strategic areas. The former KISS research group has been replaced by the current IST (Information Systems and Technologies) research group. The group embraces three strategic vectors: (1) intelligent data systems, (2) information systems & technologies in organizations and (3) software engineering & management. Within these strategic vectors, we stimulate the cooperation between the internal research sub-communities that address more specific research topics: business process management, information services, information systems security & audit, knowledge management, data mining, data warehousing & OLAP, intelligent decision support systems, modeling approaches for analysis and design, business and location-enhanced database systems, metadata and ontologies for the semantic Web,

process and project management life-cycles. Supported by several research projects and post-graduation activities, these specific topics establish both the research agenda for the group and its strategic development.

The group maintains most of the main objectives for 2012, which are:

- Perform fundamental and applied research, aiming to disseminate the scientific results in leading journals and world-class conferences;
- Reinforce research cooperation with international leading research groups;
- Cooperate with industrial partners to increase their competitiveness;
- Offer high-quality courses at MSc and PhD levels to maximize the employability of the students, both nationally and internationally;
- Attract international graduate students to get involved into the on-going research projects; and
- Stimulate young researchers to conduct high quality research, creating opportunities to develop their own research plan.

Main Achievements

In terms of main achievements, it is worth to mention the reinforcement of involvement in international activities with other universities like CMU or MIT, and associations like AIS and IFIP. Within the CMU|Portugal Program, one team member is coordinating the Innovation Network on Software Engineering (NET-SEI): <http://net-sei.cmuportugal.org/>.

R&D Projects: 3 coordinates the Doctoral Program in Information Systems and Technology, where several advanced courses are offered to students in the main areas of the research line. Some involvement also occurs with the Doctoral Programs in Computer Science and in Telecommunications, joint ventures of Universidade do Minho, Universidade de Aveiro and Universidade do Porto (MAP-I and MAP-Tele). MAP-I is a dual degree doctoral program with the Carnegie Mellon University, within the CMU|Portugal Program.

The research group also coordinates the following Master Programmes, where several courses are also offered: MSc in Information Systems, MSc in Information Services, MSc in Engineering and Management of Information Systems. Students from these Master programs have a high employability rate due mainly from the research-driven approach adopted within the post-graduate courses, within IST group.

The team visibility can also be evaluated by the journals and conferences where team members have acted as referees. In 2011 team members have reviewed papers on, for example, journal as "Elsevier Information Processing Letters", "Wiley Journal on Software: Practice and Experience ", "International Journal of Data Mining, Modelling and Management", "International Journal of Technology and Human Interaction", "Enterprise Information Systems", "Journal of Information System Security", "Journal of Information System Security" and "IEEE Transactions on Industrial Informatics".

Group Productivity

Publications in peer review Journals

- Ramos, I. and J. Fernandes (2011). Web-Based Intellectual Property Marketplace: A Survey Of Current Practices, In Special Issue on Open Innovation Strategies for SMEs Development: Utilization of ICT methods, International Journal of Information Communication Technologies and Human Development (IJICTHD), Volume 3(4), October-December 2011
- Rahman, H. and Ramos, I. (2011). Empowerment of SMEs through Open Innovation Strategies: Life Cycle of Technology Management. In Special Issue

on Open Innovation Strategies for SMEs Development: Utilization of ICT methods, International Journal of Information Communication Technologies and Human Development (IJICTHD), Volume 3(3), July-September 2011

- Santos, M. F., Mathew, W., Santos, H., Grid Learning Classifiers - A Web Based Interface, International Journal of Computers, Vol 5, nº 2, pp 243-251, ISSN: 1998-4308, 2011. (NAUN – North Atlantic University Union)

Pereira, Óscar M., Rui L. Aguiar, and Maribel Yasmina Santos, "CRUD-DOM: A Model for Bridging the Gap Between the Object-Oriented and the Relational Paradigms - an Enhanced Performance Assessment Based on a Case Study", International Journal on Advances in Software, Vol. 4, nº 1 & 2, 158-180, ISSN 1942-2628, pp. 158-180, 2011 (URI: <http://hdl.handle.net/1822/13937>).

Gomes L, Khomenko V, Fernandes JM; Selected papers from the 10th International Conference on Application of Concurrency to System Design (ACSD 2010)), IET Computers & Digital Techniques 5(6):425-6, ISSN 1751-8601, dez/2011. DOI 10.1049/iet-cdt.2011.0150.

Other international publications

Books and Book Chapters:

- P.Peres, P.Pimenta. Teorias e Práticas de B-Learning, Edições Sílabo, 2011

- H.Rahman, I.Ramos. Open Innovation in SMEs of developing and transitional economies. In Strategic and Pragmatic E-Business: Implications for Future Business Practices, IGI Global, 2011

- F.Oliveira, I.Ramos. The Case of a Portuguese Intermediary of Open Innovation: Inova+. In SMEs and Open Innovation: Global Cases and Initiatives, IGI Global, 2011

- C.Silva, I.Ramos. Cardmobili: Innovation Technology in Everyday Life. In Cases on SMEs and Open Innovation: Applications and Investigations, IGI Global, 2011

- M.Cardoso, I.Ramos. Rvolta, a case for open innovation. How can a SME be innovative in a competitive industrial environment. In SMEs and Open Innovation: Global Cases and Initiatives, IGI Global, 2011

- H.Rahman, I.Ramos. Research and Practices on Open Innovation: Perspectives SMEs. In Cases on SMEs and Open Innovation: Applications and Investigations, IGI Global, 2011

- H.Rahman, I.Ramos. Open Innovation Strategies in SMEs: Development of a Business Model. In Cases on SMEs and Open Innovation: Applications and Investigations, IGI Global, 2011

- H.Rahman, I.Ramos. A Research Model for Open Innovation: Synthesizing Opportunities and Challenges Surrounding SMEs. In Cases on SMEs and Open Innovation: Applications and Investigations, IGI Global, 2011

- H.Santos, M.F.Santos, W.Mathew. Supervised Learning Classifier Systems for Grid Data Mining. In New Fundamental Technologies in Data Mining, InTech, 2011

- A.Ferreira, R.Correia, D.Chadwick, H.Santos, R.Gomes, D.Reis, L.Antunes. Password Sharing and How to Reduce It. In Certification and Security in Health-Related Web Applications: Concepts and Solutions, IGI Global, 2011

- J.M.Fernandes, R.Lämmel, J.Visser, J.Saraiva. Generative and Transformational Techniques in Software Engineering III, GTTSE 2009, Revised Papers, Springer, 2011

- M.P.Monteiro, J.M.Fernandes. Aspect-oriented refactoring of Java programs. In Java in Academia and Research, iConcept Press, 2011

- O.M.Pereira, R.L.Aguiar, M.Y.Santos. ABC Architecture: a New Approach to Build Reusable and Adaptable Business Tier Components Based on Static Business Interfaces. In Evaluation of Novel Approaches to Software Engineering, Springer, 2011
- S.Azevedo, R.J.Machado, A.Bragança, H.Ribeiro. Systematic Use of Software Development Patterns through a Multilevel and Multistage Classification. In Model-Driven Domain Analysis and Software Development: Architectures and Functions, IGI Global, 2011

Edited Volumes:

- H.Rahman, I. Ramos (eds.). SMEs and Open Innovation: Global Cases and Initiatives, IGI Global, 2011
- H.Rahman, I. Ramos (eds.). Cases on SMEs and Open Innovation: Applications and Investigations, IGI Global, 2011
- Y.Tonta, U.AI, P.L.Erdogan, A.A.Baptista (eds.). ELPUB2011. Digital Publishing and Mobile Technologies, 2011.

International Conferences:

- I.Ferreira, S.Ferreira, I.Ramos. The relevance of results in interpretive research in information systems and technology. In VinOrg'2011, Ofir, Portugal
- C.Silva, I.Ramos. Knowledge repository framework for crowdsourcing innovation intermediar: a proposal. In CENTERIS 2011, Algarve, Portugal
- H.Rahman, I.Ramos. Is Open Innovation imperative to Small and Medium Enterprises?: A Comparative Study. AMCIS 2011, Detroit, Michigan, USA
- I.Ramos. Organizational memory: a neuroscience-based comprehensive model. OSWC-XVII, Steamboat Springs, Colorado, USA
- A.Cardoso, J.A.Carvalho. Information Systems in Community Initiatives with Sustainability Goals. OASIS 2011, Shanghai, China, 2011
- A.Cardoso, I.Ferreira, J.A.Carvalho, L.Santos. What Service? CENTERIS 2011, Vilamoura, Portugal, Springer, 2011
- A.Cardoso, J.A.Carvalho. Using Green IS to encourage recycling behavior. MCIS 2011, Limassol, Cyprus, 2011
- I.Noce, J.A.Carvalho. Business and Technology Integrated Model. AMCIS 2011
- I.Mendes, H.Santos. Sistemas Auto-regulados de Conteúdos Orientados para Contextos de Aprendizagem em Ambiente Profissional. CLME'2011/IIIICEM, Maputo, Moçambique
- D.Borges, V.Sá, J.S.T.Magalhães, H.Santos. Study of the Perception on the Biometric Technology by the Portuguese Citizens. ICGS3'2011, Thessaloniki, Greece
- M.F.Santos, W.Mathew, H.D.Santos. Grid data mining by means of learning classifier systems and distributed model induction. GECCO'11, Dublin, Ireland
- T.Pereira, H.Santos. Description of a Practical Application of an Information Security Audit Framework. ECIW 2011, Tallinn, Estonia
- J.Ferreira, H.Santos, B.Patrão. Intrusion Detection Through Keystroke Dynamics. ECIW 2011, Tallinn, Estonia
- L.Mendonça, H.Santos. Botnet Detection: A Numerical and Heuristic Analysis. ECIW 2011, Tallinn, Estonia
- R.Dinis, A.Ribeiro, M.Y.Santos, J.Cruz, A.T.Araújo. A Business Intelligence Infrastructure Supporting Respiratory Health Analysis. BusTECH'2011, Rome, Italy
- O.M.Pereira, R.L.Aguiar, M.Y.Santos. A Reusable Business Tier Component with a Single Wide Range Static Interface. ECSA'2011, Essen, Germany, LNCS, Springer
- J.Peña, M.Y.Santos. Representing, Storing and Mining Moving Objects Data. ICDMKE/WCE 2011

- M.Y.Santos, M.Wachowicz. Computing Performance Indicators in Detecting Shipping Collision. MobiSys 2011, Washington DC, USA, ACM
- J.Silva, M.Y.Santos, J.M.Pires. A Brief Survey on Online Analysis of Movement Data. CISTI'2011, Chaves, Portugal
- O.M.Pereira, R.L.Aguiar, M.Y.Santos. An Adaptable Business Component based on pre-defined Business Interfaces. ENASE'2011, Beijing, China
- R.Silva, J.Moura-Pires, M.Y.Santos. Spatial Clustering to Uncluttering Map Visualization in SOLAP. ICCSA 2011, Santander, Spain, LNCS, Springer
- M.Y.Santos, J.Mendes, A.Moreira, M.Wachowicz. Towards a Spatio-Temporal Information System for Moving Objects. ICCSA 2011, Santander, Spain, LNCS, Springer
- A.L.Ferreira, R.J.Machado, M.C.Paulk. An Approach to Software Process Design and Implementation Using Transition Rules. SEAA 2011, Oulu, Finland, IEEE CS
- P.Borges, P.Monteiro, R.J.Machado. Tailoring RUP to Small Software Development Teams. SEAA 2011, Oulu, Finland, IEEE CS
- J.E.Fernandes, R.J.Machado, J.A. Carvalho. Profiling and Framing Structures for Pervasive Information Systems Development. ViNOrg'11, Ofir, Portugal.
- A.L.Ferreira, R.J.Machado, M.C.Paulk. Supporting Audits and Assessments in Multi-Model Environments. PROFES 2011, Torre Canne, Italy, LNCS, Springer
- N.Hattum-Janssen, J.M.Fernandes. Peer-assessment in projects: an analysis of qualitative feedback. PAEE 2011, Lisboa, Portugal
- I.C.Viana, R.J.Machado, M.A.Brito. Between the Virtual and the Real: Technology and the City as an Opportunity and Challenge to the Education of the Future. CISC 2011, Madrid, Spain

Other national publications

PAPERS IN NATIONAL JOURNALS:

Ricardo J. Machado, Luís Amaral. Sobre os Actos da Profissão no Âmbito do Colégio de Engenharia Informática. Revista Informativa da Ordem dos Engenheiros Região Norte (INFO), no. 23, pp. 14-19, Março, 2011, [ICS: 113324. DL: 29 299/89].

PAPERS IN NATIONAL PROCEEDINGS:

- Pimenta, P., Almeida, P., Sanches, S., "A presença das Instituições de Ensino Superior na web social", COIED, 7 a 14 de Fevereiro de 2011 (indexado em <http://www.mendeley.com/research/presena-das-instituies-ensino-superior-nas-social-web/>).
- Gonçalves, M. J. A., Pérez-Cota, M., Pimenta, P. "Que Learning Objects (los) Utilizam As Instituições De Ensino Superior?", 6ª Conferência Ibérica de Sistemas e Tecnologias de Informação, 15 a 18 de Junho de 2011, Chaves, Portugal
- Peres, P., Pimenta, P., Gouveia, L. B., "Planeamento Pedagógico Documentos, Mobilidade, E Reutilização", 6ª Conferência Ibérica de Sistemas e Tecnologias de Informação, 15 a 18 de Junho de 2011, Chaves, Portugal
- Rodrigues, P., Santos, H., Estudo da percepção dos utilizadores em relação à utilização de tecnologias de autenticação biométrica no acesso aos serviços de saúde, 11ª Conferência da Associação Portuguesa de Sistemas de Informação (CAPSI 2011), pp. (!!!), ISEG, Lisboa, Portugal, 19-21 de Outubro, 2011.

Patents/propotypes

de pontos”, pedido de patente submetido em 08 de Março de 2007.

Organization of conferences

- Isabel Ramos, Co-chair of the track “Utilization of open innovation strategies for the development of small and medium scale enterprises in Euro-Med Region”, 4th Annual Conference of the EuroMed Academy of Business, em Elounda, Crete, Greece, October 20-21, 2011
- Isabel Ramos, Co-Chair of the track “Online Communities and Group Collaboration” da Mediterranean Conference on Information Systems (MCIS 2011), in Limassol, Cyprus, September 3-5, 2011
- Isabel Ramos, Associate Editor of the track “Human Behavior and IT”, da International Conference on Information Systems (ICIS 2011), Shanghai, China, December 4-7, 2011.
- Rui Dinis Sousa, Conference Chair, Business Process Management Conference, (BPM Lisbon 2011) in Lisboa (Portugal), June 2011.
- J.M.Fernandes: QUORS 2011, UCAMI 2011, BM-FA 2011
- R.J.Machado: chair steering MOMPES’2011, PC member INDIN’2011, REC’2011, UML&AADL’2011, WER’2011, CISTI’2011, MDA&MDS’2011, FSKD’2011, ICSoft’2011, INFORUM’2011, CAPSI’2011, CloudViews’2011, ICSEA’2011, UCAMI’2011.
- Maribel Santos: PC member ICSEA’2011, CAPSI 2011, BUSTECH 2011, INFORUM 2011, BUSTECH 2011, CISTI’2011, IAWDQ’2011, AGILE’2011, DBKDA’2011
- Filipe de Sá-Soares, Conference Committee Member for ECIW 2011 – 10th European Conference on Information Warfare and Security, Tallinn (Estonia), September 2010-June 2011.
- Filipe de Sá-Soares, Conference Committee Member for ECIW 2012 – 11th European Conference on Information Warfare and Security, Laval (France), August 2011-June 2012.
- Filipe de Sá-Soares, International Program Committee Member for The 10th Annual Security Conference, Las Vegas (USA), September 2010/May 2011.
- Filipe de Sá-Soares, International Program Committee Member for The 11th Annual Security Conference, Las Vegas (USA), August 2011/Abril 2012.
- Filipe de Sá-Soares, International Program Committee Member for The 2nd European Security Conference, Örebro ((Sweden), September 2010-June 2011.
- Filipe de Sá-Soares, International Program Committee Member for The 3rd European Security Conference, Örebro (Sweden), September 2011-Agosto 2012.
- Rui Dinis Sousa, Program Committee Member, 11th Conference of Portuguese Association of Information Systems, (CAPSI 2011), in Lisboa (Portugal), October 2011.
- Rui Dinis Sousa, Program Committee Member, Conference on Enterprise Information Systems (CENTERIS 2011), in Vilamoura, (Portugal), October 2011.

Internationalization

The group is involved in the CMU|Portugal Program. Two ERASMUS MUNDUS students have been working with the group.

Recognizing that internationalization relies on the strength of individual networking, some initiatives have been set up aiming at stimulating

networking, e.g.: invite foreign researchers for visits to UMinho for teaching in the graduate programs and to collaborate with researchers; encourage IST members to participate in committees either related to the organization of events or related to international bodies encourage researchers to use their sabbatical leaves to visit other institutions.

In terms of internationalization, IST also includes:

-I.Ramos:

.visit at the University of Oulu, Finlandia from 9 to 13 of May 2011, teaching Crowdsourcing, ERASMUS scholarship

.national representative and secretary of IFIP TC8 Technical Committee on Information Systems

.associate editor of Idea Group International Journal of Technology and Human Interaction

.associate editor of Taylor & Francis Enterprise Information Systems

-F.Sá-Soares:

.managing editor of Journal of Information System Security

.editorial board member of International Journal of Knowledge Society Research

-A.A.Baptista: representative in the Dublin Core Metadata Initiative Advisory Board

-M.Santos: editorial board of International Journal of Data Mining, Modelling and Management

-J.M.Fernandes:

.national representative of IFIP TC10 Technical Committee on Computer Technology

.editorial review board of Journal of Information Technology Research

R.J.Machado:

.chair of the Steering Committee of the international workshop series MOMPES (International Workshops on Model-Driven Methodologies for Pervasive and Embedded Software); IFIP WG10.2; LNCS Springer

.founding member of IFIP WG10.2 Working Group on Embedded Systems

.founding member of IEEE-IES Technical Committee on Education in Engineering and Industrial Technologies

.membership of IEEE-Computer Society Educational Activities Board

.guest editor Springer Journal on Innovations in Systems and Software Engineering

.membership of IEEE-Computer Society Educational Activities Board

Government/Organization contract research

- OMSIS – Opportunities for Improvement in Health Information Systems – A project involving managers, IT and health professionals at the national public hospitals to identify main concerns on health information systems and ways of addressing them. A project in collaboration with the Faculty of Medicine of the University of Porto and ISCTE/Lisbon (the leading partner). Funded by ACSS (33k€), a governmental agency for the public administration of the national health system. UMinho budget: 10k€

- Elaboration of the information systems strategic plan and the information systems management model for the Municipality of Lisbon; total budget/University of Minho budget: 89.400 EUR, Municipality of Lisbon, Lisbon (Portugal), March 2010–December 2011
- Monitoring of the Information System Project of the Citizen Card, funded by Agency for Administrative Modernization, 01/2008-07/2011. Members of the IST research group are responsible for the certification of the project concerning information security and development process.
- ACTOR: Apostar na Certificação das Empresas TICE Organizadas em Rede, funded by ADI, 11/2010-05/2013. Members of the KISS research line are responsible coordinating the adoption by the Portuguese industry of international standards for software process improvement, IT service management, and innovation & industrial research methods.

Strategic Project Adjustments

Expenses during 2011 reached 96,2% of the budget. Two financial reports have been already concluded and the last one, regarding 2011, will be sent very soon. Due to the economical situation there will be short adjustments among some financial categories. This is being prepared by the administrative office of the University. The proposal of this short adjustment will be sent in the near future. Nevertheless, due to the 2011 budget loss, we are not quite sure if in 2012 we will be able to maintain the good financial performance.

FCT Relatório Científico 2011 Print: 30-03-2012 15:54:56 [CENTRO ALGORITMI]

Group Description

Title of Research Group:	(RG-Norte-319-2184) Ubiquitous and Pervasive Computing, Graphics, and Software Methodologies
Principal Investigator:	Adriano Jorge Cardoso Moreira
Main Scientific Domain:	n/a
Group Host Institution:	Universidade do Minho

Funding, source, dates

Funding, source, dates

The group Ubiquitous and Pervasive Computing, Graphics, and Software Methodologies was re-organized during 2011, as a consequence of the re-organization of the Centro Algoritmi itself. The new group, now named Computer Communications and Pervasive Media (CCPM), integrates two major sub-groups: the Mobile and Ubiquitous Systems Group (Ubicomp) that was the core of the previous group, and the Computer Communications and Networks (CCN) that moved from another FCT Unit into the Centro Algoritmi. This group has also strong interaction with engageLab, a sub-group that was part of the previous group and is now recognized by Centro Algoritmi as an ad-hoc sub-group.

The main sources of funding for this research group, in 2011, were from the participation in European funded projects (around 133€), in AdI funded projects (around 239k€), in FCT funded projects (around 132€), and the direct funding from FCT, with a total budget of around 550k€. The list of projects include Tice.MobiPag (QREN), Tice.Mobilidade (QREN), SUM (FCT), WESP (Carnegie Mellon Portugal), PD-NET (FET-OPEN), GUIDE (FP7), Processing Social Signals in Human-Computer Interaction (FCT).

Objectives & Achievements

Objectives

The group Ubiquitous and Pervasive Computing, Graphics, and Software Methodologies was re-organized during 2011, as a consequence of the re-organization of the Centro Algoritmi itself. The new group, now named Computer Communications and Pervasive Media (CCPM), integrates two major sub-groups: the Mobile and Ubiquitous Systems Group (Ubicomp) that was the core of the previous group, and the Computer Communications and Networks (CCN) that moved from another FCT Unit into the Centro Algoritmi. This group has also strong interaction with engageLab, a sub-group that was part of the previous group and is now recognized by Centro Algoritmi as an ad-hoc sub-group.

The research objectives of the mobile and ubiquitous systems group have been structured around three main topics: urban sensing, open display networks, and ubiquitous services.

Work on urban sensing focuses on the use of data generated by information technologies to increase our understanding of the urban space and how it is lived by people. Some of the research challenges include the acquisition of real time data about city dynamics, data fusion, cooperative maps construction, visualization of dynamic data, and modeling of the human mobility. Main projects include SUM, TICE.Mobilidade.

Work on open display networks aims to develop and evaluate new concepts of situated display. The potential applications of public displays may go far

beyond today's traditional uses, i.e., advertising and dissemination of information to passive users. Our objective is to study the tools and practices that may enable public displays to become a new communication medium for society. This involves work at the supporting technologies as well as on the new publication and interaction concepts needed to turn that vision into reality. Main projects include the FET-Open PD-Net project and the CMU-Portugal project WESP.

Work on ubiquitous information services is focused on the development of new services for ubiquitous computing. This work combines empirical development of specific services with the study of the technological frameworks that may support such development as well as the methodologies that may guide their design. The objective is to understand the development practices that may be more effective in leading to successful services. Main projects include the MobiPag project.

Current CCN research interests include the engineering, test and deployment of QoS-aware network solutions to support Future Internet applications both in fixed and mobile environments. Recent R&D results have been closely related to international projects or linked to other international cooperation, such as the Cyted funded "Thematic Network on Wireless Network Technologies in Communication and Distance Learning".

Another research and development objective is on network virtualization and on the development of an open platform whose goal is to support large scale experimentation and validation of new Internet concepts and services allowing its use in a controlled, but continuously evolving, set of living laboratories (we have proposed a project to FP7 ICT EU-Brazil Coordinated Call, entitled "Virtual Networking Laboratory-EU", in order to establish a large scale distributed computing environment on Future Internet (FI) technologies, where several universities from Brazil and EU implement new structures for federated virtual lab. In spite the project has not been funded, several project tasks have been pursued.

Mobile multimedia, a strong revenue-generating opportunity, is leading us into several research projects on mobile multimedia delivery over diverse network technologies; we had having two PhD research works in this field, addressing both device and network mobility, with a special focus at Personal Area Network (PAN) level and Vehicular Ad-Hoc Network (VANET) level. We will also proceed with research on ad-hoc and wireless sensor networks, with a special focus on e-health and e-emergency systems context, looking for more robust solutions also able to fulfil the required quality of service, without compromising significantly the energy consumption.

engageLab is a laboratory at the intersection of arts and technology established as an ad-hoc group promoting the intersection of researchers from different scientific areas, namely the Centre for Communication and Society Studies, Centre in Education and the Centro Algoritmi at University of Minho. engageLab aims to be a space of convergence of different fields and audiences, conducive of the intersection of different languages, integrating researchers from a variety of fields that contribute to imagine, research, design and implement the next generation of human-computer interaction systems combining the functional with the aesthetics of the experience, applied to a wide set of human activities and ideally inspiring new ones.

Main Achievements

CCN research main achievements during 2011 have been reported in 24 international scientific publications, all peer-reviewed, being: 12 Journal articles (including four selected papers in LNCS publications) and 12 other scientific publications in international peer-reviewed Conferences and Workshops. CCN R&D activities led to the successful conclusion of 2 PhD Thesis and 20 MsC Dissertations completed during 2011.

Furthermore, CCN research group continued to increase its international recognition and hosted several visiting researchers. External and international recognition may also be showed by the collaborations both in editorial and reviewers boards of International Journal publications - such as "International Journal of Computer Networks & Communications", "International Computer Communications" or "International Journal of Information Technology & Decision Making" - and in several TPC committees of well-known ACM and IEEE technically co-sponsored conferences in the area.

During 2011, CCN members proceeded in supervising 6 PhD students (two of them finished, Q4 2011) on their research work.

The Ubicomp group organized the IPIN'2011 – International Conference on Indoor Positioning and Indoor Navigation (21-23 September 2011), with 210 participants. The organization of this international conference promoted the group in this research specific area. Program Chairs: Adriano Moreira (UM) & Rainer Mautz (ETHZ) (<http://ipin2011.dsi.uminho.pt/>)

The Ubicomp group is organizing The International Symposium on Pervasive Displays (<http://www.pervasivedisplays.org/2012>), scheduled to June 2012.

A patent has been awarded to the Ubicomp group.

The Ubicomp group started a significant number of funded research projects.

Organization of the workshop “Beyond the binding: exploring the future book” @ Creativity and Cognition, Atlanta, Georgia, USA, 3-6 November, 2011, in collaboration with Natalie Freed and Jie Qi, MIT, Media Lab.

TOK, Finalist, creative industries prize 2011.

Prototype development of TOK - a tangible interface for storytelling (<https://sites.google.com/site/hybridlearningmaterials/home/projects>)

AMONG, prize VIDA 13.0 Fundación Telefónica | Arte y tecnología, 2011

Group Productivity

Publications in peer review Journals

Otero, Nuno; Milrad; Rogers, Y; Santos, AJ; Verissimo, N. Torres Challenges in designing seamless-learning scenarios: affective and emotional effects on external representations. *International Journal of Mobile Learning and Organisation* 5 (1), 15-27

Nuno Vasco Lopes, Maria João Nicolau, Alexandre Santos. A QoS/Mobility-Aware Model for Mobile Internet, *JCOMSS - Journal of Communications Software and Systems* (ISSN 1845-6421), Volume: 7 Number: 2, 2011. SCImago SJR: 0,034

Nuno Vasco Lopes, Maria João Nicolau, Alexandre Santos. A QoS-Enabled Resource Management Scheme for F-HMIPv6 Micro Mobility Approach, *Journal of Telecommunication Systems*, ISSN: 1572-9451, Springer, DOI 10.1007/s11235-011-9653-7, Oct 2011. ISI Web of Knowledge JCR: 0,670 SCImago SJR: 0,037

Leão, Celina; Soares, F.O.; Machado, José; Seabra, Eurico and Rodrigues, Helena. Design and development of an industrial network laboratory, *International Journal of Emerging Technologies in Learning*, Vol. 6, No. S1, pp: 21-26, 2011

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Ricardo Silva; Carvalho, Paulo; Sousa, Pedro; Pedro Neves, Enabling Heterogeneous Mobility in Android Devices, *Mobile Networks and Applications*, 16 (4), 518-528, 2011. ISI Web of Knowledge JCR: 0,683 SCImago SJR: 0,046

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Ph.D. thesis completed

Nuno Vasco Moreira Lopes, with an FCT Grant, "A QoS-aware Architecture for Mobile Internet", PhD in Informatics, 18/Oct/2011.

Óscar Sílvio Marques de Almeida Gama, with an FCT Grant, "A MAC Protocol for Quality of Service Provisioning in Adaptive Biomedical Wireless Sensor Networks", PhD in Electronics and Computers, 15/Dec/2011.

Patents/propotypes

Patents:

Rui José and Carlos Lopes. Interaction Method for Remote Content in Digital Photo Frames. Instituto Nacional da Propriedade Industrial. N° Pedido: 105541. Date: 24-02-2011

Adriano Moreira, Maribel Santos, PAT103677: "Processo de cálculo automático do contorno convexo ou côncavo de um conjunto arbitrário de pontos", requested 8 March 2007, assigned 11 November 2011

Prototypes:

InstantPlaces. Software prototype for open display networks. <http://www.instantplaces.org>

Tool for Experience Sampling Studies (TESS). Web platform and Android app for user studies. <http://applications.instantplaces.org/esmsite>

Organization of conferences

The group organized the IPIN'2011 – International Conference on Indoor Positioning and Indoor Navigation (21-23 September 2011), with 210 participants. The organization of this international conference promoted the group in this research specific area. Program Chairs: Adriano Moreira (UM) & Rainer Mautz (ETHZ) (<http://ipin2011.dsi.uminho.pt>)

Rui José. Membro da Comissão de Programa do 5th International Symposium on Ubiquitous Computing and Ambient Intelligence (UCAmI'11). 6th-8th December, 2011, Riviera Maya, Mexico. <http://mami.uclm.es/ucami2011/>

Rui José. Membro da Comissão de Programa do 4th Workshop on Pervasive Advertising, June 12, 2011, San Francisco, USA http://pervasiveadvertising.org/?page_id=5

Rui José. Membro da Comissão de Programa da 13th International Conference on Human-Computer Interaction with Mobile Devices and Services – MobileHCI. 30 Agosto-2 Setembro. Estocolmo, Suécia. <http://www.mobilehci2011.org/>

Rui José. Membro da Comissão de Programa da 7th International Conference on Intelligent Environments (IE'11), Nottingham, United Kingdom.

<http://intelligentenvironments.org/conferences/ie11>

Filipe Meneses. Membro da Comissão de Programa da AGILE 2011 - The 14th AGILE International Conference on Geographic Information Science. Utrecht, The Netherlands, Maio de 2011. <http://www.uu.nl/faculty/geosciences/EN/agile2011/Pages/default.aspx>

Filipe Meneses. Membro da Comissão de Científica da EvAAL 2011 - Evaluating AAL Systems through Competitive Benchmarking - Special theme on Indoor Localization and Tracking. CIAMI Living Lab, Valencia, Spain. Jul 2011. <http://eval.aaloa.org/2011-competition/2011>

Industry contract research

TeleportWall-Globaltronic Lda. no âmbito de VALE I&DT do IAPMEI. Global budget:75.000€

Internationalization

International collaborations, both with several activities within an InterUniversity Network in ITC area, derived from TriComFor.

Establish a consortium with two other European Universities and three Brazilian Federal Universities in order to lead and present a STREP Project to the FP7 ICT EU-Brazil Coordinated Call, with a proposal entitled "Virtual Networking Laboratory-EU" (although not EU funded).

Cooperation with the Universidad Nacional de La Plata (UNLP), Argentina, with Interchange and Post-graduate formation actions for UNLP teaching staff

Cooperation with the Universidade Federal do Rio Grande do Sul, Brasil, with Researchers Interchange actions

Cooperation with the Universidade de Vigo, Espanha, with Researchers Interchange actions

TPC of 3rd International ICST Conference on Mobile Networks and Management (MONAMI 2011), Aveiro, Portugal, 2011; TPC of 26th ACM Symposium on Applied Computing, Computer Networks Track (SAC 2011), Tunghai University, Taichung, Taiwan, March 21 - 25, 2011; TPC of International Indoor Positioning and Navigation (IPIN 2011), Guimaraes, Portugal, 2011

Government/Organization contract research

The expertise of the CCN team on Quality of Service (QoS) and on Public Administration e-Government services, led to several contract research and auditing on ITC services for the Portuguese Presidential and General Elections – contract with the Ministry of Internal Affairs - held in 2011 and also with CML – (Câmara Municipal de Lisboa) Lisbon City Municipality Council – for Information Systems and ITC auditing and long term planning.

Strategic Project Adjustments

Expenses during 2011 reached 96,2% of the budget. Two financial reports have been already concluded and the last one, regarding 2011, will be sent very soon. Due to the economical situation there will be short adjustments among some financial categories. This is being prepared by the administrative office of the University. The proposal of this short adjustment will be sent in the near future. Nevertheless, due to the 2011 budget loss, we are not quite sure if in 2012 we will be able to maintain the good financial performance.

FCT Relatório Científico 2011 Print: 30-03-2012 15:58:15 [CENTRO ALGORITMI]

Group Description

Title of Research Group:	(RG-Norte-319-2959) Industrial electronics
Principal Investigator:	João Carlos Aparício Paulo Fernandes
Main Scientific Domain:	n/a
Group Host Institution:	Universidade do Minho

Funding, source, dates

Funding, source, dates

The Industrial Electronics group congregates a large number of researchers organized in 3 areas: Control, Automation and Robotics, Energy and Power Electronics and Embedded Systems.

1. MobiCar – Conception, Development, Tests and Demonstration of Sustainable Mobility Solutions: € 232.580,66 , QREN, (Nov 2011 - Dec 2013)
2. “MICABCAD: Sistema computadorizado de auxílio ao diagnóstico médico com base na classificação de microcalcificações presentes na mamografia”: 344.725,82 €, QREN; (Oct 2011 – Oct 2014)
3. “Flexible and Adaptive Quadruped Locomotion Generation Using the Dynamical Systems Approach”, 197.067,00 €, FCT PTDC/EEA-CRO/100655/2008, (Jun 2010 – May 2013).
4. UPQC-IM-REI – Unified Conditioner for Energy Quality with Integrated Monitoring for Renewable Energy Sources (FCT PTDC/EEA-EEL/104569/2008): €161.470,00, (Apr 2011 -Mar 2013)
5. Analysis and Development of Integrated Systems for Electric Vehicles (FCT MIT-Pt/EDAM-SMS/0030/2008): €122.579,00, (2009 – 2011)
6. Project “GOLFMINHO” : QREN - I&D (in Co-promotion) - 442,300€.
7. WALC - Web Assisted Laboratory for Control Engineering on-line, 70000€: FCT PTDC/ESC/68069/2006
8. Robotic Tools for Special Education, FCT RIPD/ADA/109407/2009: € 79.792,00 €, (Jun 2010 - Dec 2012)

Objectives & Achievements

Objectives

1. Development of socially intelligent robots:
 - a. to build dynamic control architectures to endow autonomous robots with the capacity of reading motor intention for human-robot interaction tasks;
 - b. development of learning schemes for social robotics;
 - c. Robots that provide assistance to disabled people;

- d. Robotics, Automation and Virtual Games for Special Education Needs;
 - e. Control architectures for legged robots with many DOFs and for movement coordination/cooperation between different platforms;
 - f. Research on algorithms and technologies suitable for the localization of mobile platforms, ex. for factory automation and mobile robotics.
2. Development and construction of new laboratorial (also with remote access) and industrial prototypes in the following areas:
- a. Mechatronics systems
 - b. Computer vision and image processing
 - c. Instrumentation, acquisition, automations and control
 - d. Multisensory fusion and integration using soft computing techniques
3. Research in Collective Intelligence in Organizations (Modeling and software)
4. R&D development on:
- a. Shunt Active Power Filters and UPQCs (Unified Power Quality Conditioners);
 - b. Low-Cost Power Quality Monitoring Systems;
 - c. Optimized Interfaces for Renewable Energy Systems with the Power Grid;
 - d. Power Electronics applied to Electric and Hybrid Vehicles.
 - e. Start a new R&D line in the area of "Energy Harvesting/Scavenging".
5. R&D development on methodologies and tools to support the creation of embedded systems, in particular languages and specification tools, real-time operating systems, simulation techniques and support for fault-tolerance. Internationalization is being pursued through: international cooperation with interchange of staff and students, using own resources and Erasmus Mundus support; preparing an international top-level Doctorate Program (PhD) including high-level and recognized Universities from Europe, Asia and Brazil; extending the participation in FP7 with SMEs (that will be a permanent target), the group aims to have a broader project, with long-term R&D activities focused on virtualization, design space exploration and Hypervisors development

Main Achievements

The main achievements of the Industrial Electronics Group:

- 1. R&D on autonomous and cognitive robotics, autonomous mobile robots, jointly-acting autonomous systems (robot-robot and human-robot) that communicate and work intelligently on mutual tasks (e.g. joint transportation of objects, robotic football, joint construction):
 - i. control architectures for multi-robot motion coordination,
 - ii. neuron-cognitive inspired architectures that endow the robots with socially intelligent behaviour,
 - iii. methods to synthesize such systems, using non-linear dynamical systems theory.
- 2. R&D solutions on Mechatronics Systems, Computer Vision and Image Processing including the development of a virtual and remote laboratory for improving the under and post-graduate teaching/learning process and also the industrial cooperation (R&D FCT project).
- 3. R&D development on: Shunt Active Power Filters and UPQCs (Unified Power Quality Conditioners); Low-Cost Power Quality Monitoring Systems;

Optimized Interfaces for Renewable Energy Systems with the Power Grid; Power Electronics applied to Electric and Hybrid Vehicles.

4. Conclusion of a FP7 Research for SME project and the participation in two new FP7 projects, in the area of embedded systems (power harvesting, embedded software and wireless communications). Celebration of two industry full-supported contracts with regional SME. Development of industrial prototypes. Exchange of investigators and collaborative research in European Networks with University of Zielona Gora (Poland), University of Ilmenau and Wurzburg University (Germany). Establishing a network for a future Erasmus Mundus PhD application with the universities from Europe, South America and Asia. Research partnership with Asian Institute of Technology (Thailand) and University of Wurzburg for aerospace applications (virtualization and binary translation). The Embedded System Research sub-group defined as its Vision, to be internationally recognized as a top-level R&D group in a time frame of 4 years since it was formed in middle 2009.

Group Productivity

Publications in peer review Journals

- E.Bicho, W. Erlhagen, L.Louro, E. Costa e Silva, "Neuro-cognitive mechanisms of decision making in joint action: a Human-Robot interaction study", *Human Movement Science*, 30 (2011) 846–868. <http://dx.doi.org/10.1016/j.humov.2010.08.012> <http://hdl.handle.net/1822/11987>
- C. P. Santos and V. Matos, "Gait transition and modulation in a quadruped Robot: A brainstem-like modulation approach", *Robotics and Autonomous Systems* (2011), vol. 59, Issue 9, September 2011, pp. 620-634, doi: 10.1016/j.robot.2011.05.003 (available on line 15 May 2011), <http://hdl.handle.net/1822/14843>, [0],[1.3610], [ISI]
- Miguel Oliveira, Cristina P. Santos, Lino Costa, Ana Rocha and Manuel Ferreira. "Head Motion Stabilization During Quadruped Robot Locomotion: Combining CPGs and Stochastic Optimization Methods." *International Journal of Natural Computing Research (IJNCR)* 2.1 (2011): 39-62. Jul. 2011. doi:10.4018/jncr.2011010103, <http://hdl.handle.net/1822/14826>, [0],[,]
- Martins, M., Santos, C., Frizzera, A., Ceres, R. (2011), "Assistive Mobility Devices focusing on Smart Walkers: Classification and Review.", *Robotics and Autonomous System*, accepted (2011), <http://hdl.handle.net/1822/14841>, [, [1.3610],[ISI]
- . Marcelo C. Cavalcanti, Alexandre M. Farias, Kleber C. Oliveira, Francisco A. S. Neves, João L. Afonso, "Eliminating Leakage Currents in Neutral Point Clamped Inverters for Photovoltaic Systems", *IEEE Transactions on Industrial Electronics*, Volume: PP, Issue:99, Digital Object Identifier: 10.1109/TIE.2011.2138671, April 2011, ISSN: 0278-0046.

Other international publications

- E. Costa e Silva, M. F. Costa, E. Bicho, and W. Erlhagen, "Human-Like Movement of an Anthropomorphic Robot: Problem Revisited", in *AIP Conference Proceedings Volume 1389, NUMERICAL ANALYSIS AND APPLIED MATHEMATICS ICNAAM 2011: International Conference on Numerical Analysis and Applied Mathematics*, pp. 779-782, Halkidiki, (Greece), 19–25 September 2011, ISBN: 978-0-7354-0956-9
- F. Ferreira, W. Erlhagen, E. Bicho, "A Dynamic Field Model of Ordinal and Timing Properties of Sequential events", in *Artificial Neural Networks and Machine Learning - ICANN 2011, Part II*, T. Honkela et al. (Eds.) LNCS 6792, pp. 325-332, Springer, 2011.
- E. Costa e Silva, F. Costa, E. Bicho and W. Erlhagen, "Nonlinear Optimization for Human-like Movements of a High Degree of Freedom Robotics Arm-hand system", in *11th International Conference on Computational Sciences and Applications (ICCSA 2011), Lecture Notes in Computer Science*, B. Murgante et al., Ed., vol. 6784, Part III. Springer-Verlag, June 2011, pp. 327-342.

M. Martins, A. Frizera, Cristina P. Santos and R. Ceres (2011), "Revisão e Classificação de Dispositivos de Treino e Reabilitação da Marcha Humana", VI Congresso deTecnologías de Apoyo a la Discapacidad IBERDISCAP 2010, 16-17 June 2011, Palma de Maiorca, Espanha, Actas del VI Congreso deTecnologías de Apoyo a la Discapacidad IBERDISCAP 2011, pp. 149-160.

F. Barroso, A. Frizera, Cristina P. Santos and R. Ceres (2011), "Revisão crítica das ortóteses activas para membros inferiores", VI Congresso deTecnologías de Apoyo a la Discapacidad IBERDISCAP 2010, 16-17 June 2011, Palma de Maiorca, Espanha, Livro de Actas, Volume II, pp. 369-377

Sandra Costa, Filomena Soares, Cristina Santos, Manuel J. Ferreira, Fátima Moreira, Ana Paula Pereira, and Fernanda Cunha, "An approach to promote social and communication behaviors in children with Autism Spectrum Disorders: Robot based intervention", 20th IEEE International Symposium on Robot and Human Interactive Communication, July 31 - August 3, 2011, Atlanta, GA, USA

M. Martins, A. Frizera, Cristina P. Santos and R. Ceres (2011), "Review and Classification of Devices for Human Gait", 11th European Association for the Advancement of Assistive Technology in Europe (AAATE'11), August 21- September 2, 2011, Maastricht, the Netherlands

A.Tavares, M. Ekpanyapong, J. Cabral, P. Cardoso, J. A. Mendes, J. Monteiro, "Experiments with Embedded System Design at UMinho and AIT", International Conference on Computers and Advanced Technology in Education, Beijing, November 2011.

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Garrido, P. "Firms as Teams", BS01, Business Sustainability Conference, 2011, Póvoa de Varzim, Portugal.

Joel F.M. Crespo, J. C. Aparício Fernandes , "Calibração de uma Câmara Digital ", Proceedings of the 6º Congresso Luso-Moçambicano de Engenharia - CLME'08,pp , 29 Agosto -2 September, 2011, Maputo, Moçambique, Edições INEGI, ISBN: 978-972-8826-24-6

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Other national publications

Paulo Rogério de Almeida Ribeiro, Fernando Ribeiro, Gil Lopes, "Vision and distance integrated sensor (Kinect) for an autonomous robot", Revista Robótica, n.º. 85, 4º trimestre 2011, ISSN: 0874-9019, pag. 8-14.

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Pedro Reis Gomes , "Instrumentação Médica Para Aquisição, Monitorização e Análise da Actividade Cardíaca", 18 De Abril de 2011

Organization of conferences

- Summer school on Cognitive Robotics entitled "Hands-on summer school on Neural Dynamic Approaches to Cognitive Robotics 2011", Guimarães, Portugal, September 4-10, 2011

which was financed by the EC through the "2nd European Network for the Advancement of Artificial Cognitive Systems, Interaction and Robotics".

For this summer school 30 PhD and Postdoc students, in the area of neurosciences and Robotics, have been selected. The students came from different labs in Europe (França, Alemanha, Suécia, Itália, Dinamarca, Espanha, Holanda, Inglaterra, Polónia, Eslováquia e Portugal) and USA.

The summer school has provided tutorials and practical sessions on neural dynamics and its application for the design and modeling of embodied and situated cognitive systems. In addition , the students have developed projects based on knowledge acquired and implemented in the robotic platforms built by the Laboratory of Mobile Robotics and Anthropomorphic, Group Control, Automation and Robotics, in the context of several projects funded by the European Commission and FCT .

- European Robotics Week 2011, com experiências interactivas e demonstrações no âmbito da Robótica, entre 28 de Novembro e 2 de Dezembro de 2011.

Industry contract research

Projecto "Non Conformity Analysis in Tyres using Computer Vision" – Funding: Continental/Mabor, 140k€, duration: 3 yrs.

3D PECTUS System: Personalized Automatic Modelling and Bending for Cirurgical Prothesis with Fixings, Radiation free and with Virtual Simulation of Post-Operative Cosmetic Results, Funding: 194.000,00€, FCT, Project Duration: 3 years (1 Sept 2009 - 30 Aug 2012)

MESA AUTOMATIZADA , Funding : 33.000,00€ , QREN (Sistema de Incentivos Vale I&DT), Partners: Nelsomoveis, Lda, Project Duration: 2 years (2011-2012)

3D-Object Measurement Prototype for Reverse Engineering , Funding: 33.000,00€ , (Sistema de Incentivos Vale I&DT), Partners: Conde Trigo, Lda, Project Duration: 2 years (2011-2012)

Road Pavement Stress Testing Equipment, Funding: 33.000,00€, QREN (Sistema de Incentivos Vale I&DT), Partners: Cert&Mec, Lda, Duration: 2 years (2011-2012)

"Máquina robotizada de estampagem assistida por visão artificial", Funding: QREN– Projectos de I&DT Empresas Individuais, Starting date: 2010-10-01, Duration: 24 months, Partners: IMAVES, S.A. ,

Internationalization

Internationalization is being pursued through: international cooperation with interchange of staff and students, using own resources and Erasmus Mundus support; preparing an international top-level Doctorate Program (PhD) including high-level and recognized Universities from Europe, Asia and Brazil; extending the participation in FP7 with SMEs (that will be a permanent target), the group aims to have a broader project, with long-term R&D activities focused on virtualization, design space exploration and Hypervisors development.

•Cristina Manuela Peixoto dos Santos, Parceria na área da Robótica de reabilitação, Institut des Systèmes Intelligents et de Robotique (ISIR), Université Marie-Curie, MR 7222 – CNRS/UPMC, França. Janeiro 2011.

•Cristina Manuela Peixoto dos Santos, Parceria na área da Robótica e reabilitação, CSIC- Consejo Superior de Investigaciones Cientificas, Madrid, Espanha. Inicio Dezembro 2010.

Government/Organization contract research

- FP7 Marie Curie Initial Training Networks (ITN): "NETT- Neural Engineering Transformative Technologies" (submitted and approved)
- FP7 Marie Curie IIF : "Turn-Taking in Human-Robot Interactions: a Developmental Robotics Approach" (submitted and approved)

Strategic Project Adjustments

Expenses during 2011 reached 96,2% of the budget. Two financial reports have been already concluded and the last one, regarding 2011, will be sent very soon. Due to the economical situation there will be short adjustments among some financial categories. This is being prepared by the administrative office of the University. The proposal of this short adjustment will be sent in the near future. Nevertheless, due to the 2011 budget loss,

we are not quite sure if in 2012 we will be able to maintain the good financial performance.

FCT Relatório Científico 2011 Print: 30-03-2012 16:01:16 [CENTRO ALGORITMI]

Group Description

Title of Research Group:	(RG-Norte-319-2976) Micro/Nanotechnologies and Biomedical Applications
Principal Investigator:	José Higino Gomes Correia
Main Scientific Domain:	n/a
Group Host Institution:	Universidade do Minho

Funding, source, dates

Funding, source, dates

The MNBA group is composed by investigators related with the development, design, and fabrication of microsystems for biomedical applications and a strong component of biomedical Instrumentation and signal processing. Five examples of funding sources are:

- 1 - FCT/PTDC/EEA-ELC/109936/2009. High-resolution miniaturised stereoscopic image sensor in CMOS technology for endoscopy and minimally invasive surgery. Partners: UMinho. 140.000,00 €. Start: 1st March 2011. End: 28th February 2014..
- 2 - TICE.Healthy - Sistemas de Saúde e Qualidade de Vida, ADI/QREN:13842, 177.449,12 €, consórcio com mais de 20 instituições, 2010-2013.
- 3 - FCT/PTDC/EEA-TEL/65286/2006, MEMS: Micro-Antenna for Wireless Biomedical Devices, 2009 2011, 130.000,00 €.
- 4 - ADI/FCOMP-01-0202-FEDER-005358, NFCE, 400.000,00 €. Start: 1st January 2010. End: 31th December 2012.
- 5 - FCT/PTDC/SAU-BEB/100392/2008, Wireless biomedical microsystem for neural implants. UMinho budget: 180.000,00 €.Start: 1st May 2010. End: 30th April 2013.

Objectives & Achievements

Objectives

Development, design, and fabrication of:

- 1) Wearable systems for monitoring human posture, heart-rate and respiratory frequency.
- 2) Neural microsystems for brain-computer interface and neural microelectrodes.
- 3) Lab-on-a-chip for biological fluids.
- 4) X-rays microdetectors for medical imaging (digital radiography, CT).
- 5) Wireless sensor networks.
- 6) Chip-size antenna.
- 7) Energy scavenging thermoelectric microsystems.

8) RF transceivers in CMOS technology.

9) Novel microsensors architectures using traditional MEMS fabrication processes and polymer based microtechnologies

10) Magnetic control platform for wireless endoscopic capsules and new vision system

Therefore, the goals were to consolidate the biomedical devices developed in the past (lab-on-a-chip, neural electrodes, chip-size antenna for implantable devices) and to start the development of nanodevices, especially related with CarbonNanoTubes (CNT) for neural applications and food safety with the support of the International Nanotechnology Laboratory that will be located in Braga and it is sponsored by Portuguese and Spanish Governments, and European Commission as an European Laboratory. The final prototype of an implantable biomedical microsystem for neural prostheses, will have a tremendous impact in the development of the next generation of neuron recording/stimulation devices. A major interest in the areas of x-ray imaging sensors and piezoelectric polymer sensors and actuators.

Also, the setup of the Microtecnology Lab. and Biomedical Lab. with imaging systems was a priority (ultrasound, CT, endoscopic capsule).

Main Achievements

The setup of the Microtecnology Lab. with evaporator, silicon wet-bench, sputtering system, wafer-probe station, wire-bonding system, dicing and sawing system, mask aligner equipment, spin-coating system, SU-8 photoresist development system, clean cabin class 100, silicon bulk-micromachining system for fabricating 3D structures. profilometer (Dektak150™ Surface Profiler from Veeco Instruments) Simulations,

Development and validation of the β -PVDF piezoelectric polymer placed underneath the microfluidic structures of lab-on-a-chip devices for mixing and promoting fluids reaction; influence of the polymer thickness and area on the reaction rate of biological fluids; the better transparent conductive electrodes for using in the β -PVDF piezoelectric polymer.

Participation in projects included in the MIT-Portugal Portugal in 2 different Engineering systems fields: EDAM-Engineering Design and Manufacturing (Automotive smart flooring based in photonics) and Bio-Engineering Systems (wearable systems for biomedical applications).

Design of CMOS optical sensors optimized for measuring the fluorescence emission spectra of gastrointestinal tissues (at specific spectral bands), and readout electronics for data processing.

The setup of the Biomedical Lab. with ultrasound system – Doppler effect, EEG system for monitoring neural signals, computer tomography system, capsule endoscope system for diagnostic of the small bowel.

Group Productivity

Publications in peer review Journals

1. J.P.Carmo, and J.H. Correia, "RF CMOS transceiver at 2.4 GHz in wearables for measuring the cardio-respiratory function", Measurement: Elsevier ScienceDirect, Vol. 44, pp.65-73, 2011. IF=0.846.
2. N. S. Dias, J. P. Carmo, P. M. Mendes, and J. H. Correia, "A low power/low voltage CMOS wireless interface at 5.7 GHz with dry electrodes for cognitive networks", IEEE Sensors Journal, Vol. 11, No. 3, pp. 755-762, March 2011. IF =1.581.
3. L.M. Goncalves, P. Alpuim, A.G. Rolo, J.H. Correia, Thermal co-evaporation of Sb₂Te₃ thin-films optimized for thermoelectric applications, Thin Solid Films, pp. 4152-4157, April 2011. IF =1.909.

4. J. P. Carmo, J. C. Ribeiro, P. M. Mendes, and J. H. Correia, "Super-regenerative receiver at 433 MHz ", *Microelectronics Journal: Elsevier Science Direct*, Vol. 42, No. 5, pp. 681–687, May 2011, 2011. IF =0.787.
5. A. F. Silva, J. P. Carmo, P. M. Mendes, and J. H. Correia, "Simultaneous cardiac and respiratory frequency measurement based on a single fiber Bragg grating sensor", *Measurement Science and Technology: Institute of Physics (IOP)*, Vol. 22, pp. 1-5, June 2011. IF=1.353.
6. M. F. Silva, J. F. Ribeiro, L. M. Goncalves, J. P. Carmo, and J. H. Correia, "Infra-estrutura magnética activa para a locomoção de cápsulas endoscópicas", *Jornal Português de Gastroenterologia*, Vol. 18, No. 4, pp. 100-101, Maio/Junho 2011.
7. A.F. Silva, F. Goncalves, L.A. Ferreira, F.M. Araujo, P.M. Mendes, and J.H. Correia, "A Smart Skin PVC Foil Based on FBG Sensors for Monitoring Strain and Temperature," *IEEE Transactions on Industrial Electronics*, Vol. 58, No. 7, pp. 2728-2735, July 2011. IF=3.429.
8. J. P. Carmo, M. F. Silva, J. F. Ribeiro, R. F. Wolffenbuttel, P. Alpuim, J. G. Rocha, L. M. Gonçalves and J. H. Correia, "Digitally-controlled array of solid-state microcoolers for use in surgery", *Microsystems Technologies: Springer*, Vol. 17, No. 8, pp. 1283-1291, 2011, ISSN 0946-7076, July 2011. IF=1.069.
9. A. F. da Silva, A. F. Goncalves, P. M. Mendes, and J. H. Correia, "FBG Sensing Glove for Monitoring Hand Posture", *IEEE Sensors Journal*, Vol. 11, No. 10, pp. 2442-2448, October 2011, October 2011. IF=1.471.
10. D. S. Ferreira, V. C. Pinto, J. H. Correia, G. Minas, Spectroscopic Detection of Gastrointestinal Dysplasia Using Optical Microsensors, *IEEE Transactions Biomedical Engineering*, VOL. 58, NO. 9, pp. 2633-2639, September 2011. IF=1.790.
11. J.P. Carmo, Joaquim Antunes, M.F. Silva, J.F. Ribeiro, L.M. Goncalves, J.H. Correia, "Characterization of thermoelectric generators by measuring the load-dependence behavior", *Measurement: Sciencedirect*, Vol. 44, No. 10, pp. 2194-2199, December 2011. IF=0.846.
12. P. Alpuim, V. Correia, E.S. Marins, J.G. Rocha, I.G. Trindade, S. Lanceros-Mendez, "Piezoresistive silicon thin film sensor array for biomedical applications ", *Thin Solid Films*, Volume 519, Issue 14, 2 May 2011, Pages 4574-4577. IF=1.909.
13. R. A: Dias, R. F: Wolffenbuttel, E. Cretu, L. A. Rocha, "Design of a Time-Based Micro-g Accelerometer", *IEEE Sensors Journal*, Vol. 11 , No. 8, pp. 1677-1683, 2011. IF=1.471.
14. J.A. Afonso, H.D. Silva, P. Macedo and L.A. Rocha, "An Enhanced Reservation-based MAC Protocol for IEEE 802.15.4 Networks", *Sensors* 11 (2011), 3852-3873. (<http://dx.doi.org/10.3390/s110403852>).
15. L.A. Rocha, R. A. Dias, E. Cretu, L. Mol and R.F. Wolffenbuttel, "Auto-calibration of Capacitive MEMS Accelerometers based on Pull-In Voltage" *Microsystem Technologies* 17 (2011), 429-436. (<http://dx.doi.org/10.1007/s00542-011-1252-8>).
16. Isa C.T. Santos, João Manuel R. S. Tavares and L.A. Rocha "Concept Selection in the Development of Medical Devices: The Case of the Smart Stent-Graft" *J. Med. Devices* 5, 027510 (2011). (<http://dx.doi.org/10.1115/1.3589826>).
17. R.A. Dias, E. Cretu, R.F. Wolffenbuttel and L.A. Rocha, "Pull-in-based μ g-resolution accelerometer: characterization and noise analysis" *Sensors and Actuators. A. Physical* 172 (2011), pp. 47-53. (<http://dx.doi.org/10.1016/j.sna.2011.01.027>).
18. A.T. Sepúlveda. F. Fachin, R. Guzmán de Villoria, B.L. Wardle, J.C. Viana, A.J. Pontes and L.A. Rocha, "Nanocomposite flexible pressure sensor for biomedical applications" *Procedia Engineering* (2011). (em publicação)
19. L.A. Rocha, C.S. Silva, M.F. Cerqueira, J.F. Ribeiro, L.M. Gonçalves, A.J. Pontes and J.C. Viana, "A microinjected 3-axis thermal accelerometer" *Procedia Engineering* (2011). (em publicação)
20. R. A. Dias, E. Cretu, R.F. Wolffenbuttel and L.A. Rocha, "Squeeze-film damper design with air channels: Experimental verification" *Procedia Engineering* (2011). (em publicação)

Chapters of Books:

1. J.P. Carmo, L.M. Gonçalves, and J.H. Correia, "Micro and Nanodevices for Thermoelectric Converters", pp. 789-810. Chapter 25 of the book Scanning Probe Microscopy in Nanoscience and Nanotechnology 2, Springer, Edited by Bharat Bhushan, January 2011, ISBN 978-3-642-10496-1.
2. J. P. Carmo, and J. H. Correia, A low cost wireless sensors network with low-complexity and fast prototyping, Handbook of Research on Mobility and Computing: Evolving Technologies and Ubiquitous Impacts, IGI Global Editors. 2011
3. Daniel Barbosa, Dalila Roupar and Carlos Lima (2011). Multiscale Texture Descriptors for Automatic Small Bowel Tumors Detection in Capsule Endoscopy, Discrete Wavelet Transforms Biomedical Applications, Hannu Olkkonen (Ed.), ISBN: 978-953-307-654-6, InTech.
4. P. M. Mendes, C. P. Figueiredo, M. S. Fernandes, O. S. Gama, "Electronics in Medicine," Book chapter in Handbook of Medical Technology, 1st edition, Springer, ISBN 978-3-540-74657-7, 2011.

Full papers in proceeding conferences:

1. J. F. Ribeiro, M. F. Silva, L. M. Gonçalves, J.P. Carmo, J. H. Correia, "Thin-film improved materials for solid-state lithium batteries", Proc. of Materials 2011, pp.1, Guimaraes, Portugal, 18-20 April 2011.
2. N. S. Dias, M. F. Silva, J. F. Ribeiro, V. Cardoso, L. Jacinto, J. Cerqueira G. Minas, N. Sousa, J. H. Correia, Gold Coated SU-8-Based Microelectrodes for in Vivo Electrophysiological Studies, Proceedings of NER 2011, Cancun, Mexico, pp., April 27- May 1, 2011.
3. J. F. Ribeiro, M. F. Silva, V. F. Cardoso, N. S. Dias, L. R. Jacinto, J. P. Carmo, G. Minas, J. H. Correia, "SU-8 spike electrodes for neural signals", Proc. of MMB 2011, pp. 114-115, Lucern, Switzerland, 4-6 May, 2011.
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5. J. F. Ribeiro, M. F. Silva, L. M. Gonçalves, J. P. Carmo, J. H. Correia, M. M. Silva, F. Cerqueira, P. Alpuim, and J.-E. Bourée, "Thin film solid state rechargeable lithium battery", Proc. of MME 2011, pp. 1-4, Paper C44, Toensberg, Norway, 19 21 June 2011.
6. Pedro R. Gomes, C. S. Lima, Filomena O. Soares, J. H. Correia, "Automatic Continuous ECG Monitoring System for Over-drug Detection in Brugada Syndrome", in Proceedings of the 33rd Annual International Conference of the IEEE EMBS Boston, Massachusetts USA, August 30 - September 3, 2011, pp. 7928-7931.
7. R. P. Rocha, A. F. Silva, J. P. Carmo, J. H. Correia, "FBG in PVC Foils for Monitoring the Knee Joint Movement During the Rehabilitation Process", in Proceedings of 33rd Annual International Conference of the IEEE EMBS, Boston, Massachusetts USA, August 30-September 3, 2011, pp. 458-461.
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10. M. F. Silva, J. F. Ribeiro, L. M. Gonçalves, J. P. Carmo, C. A. Silva, and J. H. Correia, "Magnetic control platform for wireless endoscopic capsules", in Proceedings of Eurosensors 2011, 4-7 September 2011, pp. 1-2. Atenas, Grécia.
11. P. Carmo, M. F. Silva, R. P. Rocha, J. F. Ribeiro, L. M. Gonçalves, and J. H. Correia, "Stereoscopic image sensor in CMOS technology", in Proceedings of Eurosensors 2011, 4-7 September 2011, pp. 1-2. Atenas, Grécia.
12. Ricardo Lameiro, Vitor Sencadas, Senen Mendez, José Higinio Correia, Paulo Mendes, "Large Area Microfabrication of Electroactive Polymeric Structures Based on Near-Field Electrospinning", in Proceedings of Eurosensors 2011, 4-7 September 2011, pp. 1-2. Atenas, Grécia.

13. J. P. Carmo, J. H. Correia, "PLL at 2.4 GHz with reduced reference spurs", in Proceedings of the 2011 SBMO/IEEE MTT-S International Microwave and Optoelectronics Conference (IMOC 2011), Natal, Rio Grande do Norte, Brazil, 30th October 2011 - 2nd November 2011, pp. 171-175.
14. J. P. Carmo, et al., "Stereoscopic Image Sensor with Low-Cost RGB Filters Tuned for the Visible Range", IEEE International Conference on Electronics, Circuits, and Systems (ICECS), Beirut, Libano, 11-14 de Dezembro de 2011, pp. 285-288.
15. A.T. Sepúlveda, Isa C.T. Santos, F. Fachin, R. Guzmán de Villoria, B.L. Wardle, A.J. Pontes, J.C. Viana and L.A. Rocha "Design of a Pressure Sensor for Post-Evar Surveillance", in Proc. Biodevices 2011, Rome, Italy, 26-29 January 2011, pp. 14-22.
16. Isa C.T. Santos, João Manuel R. S. Tavares and L.A. Rocha "Concept Selection in the Development of Medical Devices: The Case of the Smart Stent-Graft", in Proc. of the 2011 Design of Medical Devices Conference, Minneapolis, MN, USA, 12-14 April 2011.
17. A.T. Sepúlveda, A.J. Pontes, J.C. Viana and L.A. Rocha, "Aligned Carbon Nanotubes composites for flexible Pressure Sensors" in VI International Materials Symposium MATERIAIS 2011 Guimarães, Portugal, 18-20 April 2011.
18. S. Hede, M. Nunes, P. Ferreira and L.A. Rocha, "Addressing Sustainability: Comprehensive Frameworks for Evaluating New Product Development", in Proc. International Conference on Project Economic Evaluation, Guimarães, Portugal, 28-29 April 2011.
19. R.A. Dias, E. Cretu, R.F. Wolffenbuttel and L.A. Rocha, "Sensitivity Linearization Technique for a Time Based MEMS Accelerometer" in Proc. Transducers'11, Beijing, China, June 5 - 9, 2011, 711-714.
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21. C.S. Silva, M.F. Cerqueira, J.F. Ribeiro, L.M. Gonçalves, A.J. Pontes, J.C. Viana and L.A. Rocha, "Design of a Polymer 3D-Thermal Accelerometer", in Proc. MME'2011 (22h MicroMechanics Europe), Toensberg, Norway, June 19-21, 2011.
22. R.A. Dias, E. Cretu, R.F. Wolffenbuttel and L.A. Rocha, "Noise Analysis of a Micro-G Pull-in Time Accelerometer", in Proc. MME'2011 (22h MicroMechanics Europe), Toensberg, Norway, June 19-21, 2011.
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25. C. Oliveira, J.M. da Silva and L.A. Rocha, "A Methodology to Test a Stent-Graft Endoleakage Monitor" in Proc. DCIS'11, Albufeira, Portugal, November 16-18, 2011.
26. M. S. Fernandes, J. H. Correia, P. M. Mendes "Bioelectric Activity Recording based on Single Electrode for use on Wearable Devices," Proc. BIODEVICES 2011, International Conference on Biomedical Electronics and Devices, Rome, Italy, 26-29 January, 2011.

Other national publications

1. T. Sousa, P. M. Mendes, J. M. Ribeiro, "The impact of rhythms analysis technique on electrographic seizure detection (EEG)," 1st Portuguese Meeting in Bioengineering, IST, Lisbon, Portugal, 1-4 March, 2011.
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1 - Alexandre Ferreira da Silva, "PVC Smart-Foil based on Fiber Bragg Grating Sensors", Started in October 2007. Program EDAM-MIT-Portugal. Finished on 25 July 2011.

2 - Pedro Gomes (Universidade Lusíada), "Sistema para aquisição, monitorização e análise da actividade cardíaca", Started in October 2004. Finished on 18 April 2011

3 - Helena Fernandez, "Remote vital signs monitoring based on wireless sensors networks", Started in October 2007. Program EDAM-MIT-Portugal. Finished on 9 December 2011.

4 - Óscar Sílvio Gama, "A MAC Protocol for Quality of Service Provisioning in Adaptive Biomedical Wireless Sensor Networks" Started in September 2007. Doctoral Program on Industrial Electronics and Computers Engineering. Finished on 15 December 2011

Patents/propotypes

J. L. Ramos, P. M. Mendes, F. M. Fernandes, L. Marques, Tube-jacks Testing for Irregular Masonry Walls, PP nº 105321

Organization of conferences

1st Portuguese Meeting in Bioengineering, IST, Lisbon, Portugal, 1-4 March, 2011.

Industry contract research

A. F. Silva won the PVC Forum Iberian, March 2011, Barcelona, Spain. This award is sponsored by the PVC Iberian Industry and contemplates a contract research with the investigator.

Internationalization

Collaborative publications, exchange of investigators and research in European Networks with Delft University of Technology, The Netherlands in Lab-on-a-chip devices and chip-size antenna. RWTH-Aachen, Germany, in technology for fabrication of bioelectrodes. CNM-Barcelona and Universidade Miguel Hernandez, Alicante, Spain in CarbonNanoTubes (CNT) for neural implants and neural diagnostic. Pennsylvania State University, State College, USA, in brain-computer interfaces and EEG systems. University of Cardiff, UK, in design and fabrication of thermoelectric microsystems.

Therefore, the goals for the next years is the development of nanodevices, especially related with CarbonNanoTubes (CNT) for neural applications and food safety with the support of the International Nanotechnology Laboratory that will be located in Braga and it is sponsored by Portuguese and Spanish Governments, and European Commission as an European Laboratory. Collaboration with the group of CNM-Barcelona and University of Barcelona will be appointed.

Débora Ferreira started her collaboration with the Spectroscopy Laboratory in the Laser Biomedical Research Center, at the Massachusetts Institute of Technology, to perform the work related to her PhD degree.

Technische Universität Dresden, Germany, in Biosensors for wastewater. Institut für Biomedizinische Technik IBMT, St. Ingbert, Germany, in Lab-on-a-chip devices.

Carlos Lima maintains his collaboration with the Athinoula A. Martinos Center for Biomedical Imaging at Harvard Medical School and Massachusetts General Hospital. The Ph. D. student João Valente is spending one year there continuing the work on cortical lesion segmentation in Multiple Sclerosis.

Pedro Anacleto started a collaboration at Johns Hopkins University, Baltimore, USA, to perform work related to his PhD degree.

Fábio Rodrigues started a collaboration at TUDelft University, Delft, The Netherlands, to perform work related to his PhD degree.

Government/Organization contract research

J. H. Correia collaborated in the elaboration of the program EU-Brazil R&D, that resulted in the FP7-ICT-2011-EU-Brazil call.

Strategic Project Adjustments

Expenses during 2011 reached 96,2% of the budget. Two financial reports have been already concluded and the last one, regarding 2011, will be sent very soon. Due to the economical situation there will be short adjustments among some financial categories. This is being prepared by the administrative office of the University. The proposal of this short adjustment will be sent in the near future. Nevertheless, due to the 2011 budget loss, we are not quite sure if in 2012 we will be able to maintain the good financial performance.